Riverside Energy Park

Environmental Statement

Chapter 5: Alternatives Considered

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5 Alternatives Considered

5.1 Introduction

5.1.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (Infrastructure EIA Regulations 2017) require that an Environmental Statement (ES) should include a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) that have been studied by the developer which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of environmental effects.

5.1.2 PINS Advice Note 7 (Version 6, December 2017) (AN 7) identifies that PINS considers a good ES to be one that (inter alia):

"…explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment".

5.1.3 The consideration of alternatives and design evolution for the Proposed Development have been undertaken with the aim of preventing or reducing adverse environmental effects (following the hierarchy of avoid, reduce and if possible remedy).

5.1.4 A staged process was adopted in considering alternatives for the Proposed Development, firstly considering the suitability of the Riverside Energy Park (REP) site, followed by an options appraisal for alternative layouts for the Main REP Building and other key components within the REP site. Following this, construction phase options for the marine environment were considered, along with options for the Electrical Connection route and potential Main Temporary Construction Compounds.

5.1.5 The reasonable alternatives considered by the Applicant for the Proposed Development are described below.

5.2 Suitability of the REP site

5.2.1 National Policy Statement (NPS) EN-1 (Ref 4-1) paras 4.4.1 and 4.4.2 states that:

"This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option. However, applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant's choice, taking into account the environmental, social, and economic effects and including, where relevant, technical and commercial feasibility".

5.2.2 In deciding upon the location for the Proposed Development, the Applicant has had regard to factors such as those described in NPS EN-3, section 2.5 of which includes factors influencing site selection in relation to 'Biomass and Waste Combustion' facilities.

5.2.3 Relating to grid connections, para 2.5.23 states:

"Applicants will usually have assured themselves that a viable grid connection exists", and *"any application to the [decision maker] must include information on how the generating station is to be connected and whether there are any particular environmental issues likely to arise from that connection".*

5.2.4 Para 2.5.25 of NPS EN-3 also identifies that transport infrastructure is another determining factor, in that:

"Government policy encourages multi-modal transport and the IPC should expect materials (fuel and residues) to be transported by water or rail routes where possible". It also states that *"Applicants should locate new biomass or waste combustion generating stations in the vicinity of existing transport routes wherever possible",* and that *"…any application should incorporate suitable access leading off from the main highway network".*

5.2.5 This Chapter provides information on how these factors have been considered when selecting the REP site for development, however in line with paragraph 2.1.3 of NPS EN-3, '*It is for energy companies to decide what applications to bring forward and the Government does not seek to direct applicants to particular sites for renewable energy infrastructure…'.*

5.2.6 Given that the Applicant owns the majority of the REP site, along with the proximity of associated road and jetty links with the River Thames (and associated network of riparian Waste Transfer Stations in London), the location was considered ideally suited for the Proposed Development. Whilst it was noted that the REP site would potentially interact with some non-statutory ecological designations (see **Chapter 11**), for the numerous reasons identified below the REP site was considered highly advantageous and consideration of alternative sites was not deemed necessary.

- Located adjacent to the existing Riverside Resource Recovery Facility (RRRF), REP would have access to the existing purpose-built jetty and the River Thames network beyond. The jetty is already utilised by RRRF and has sufficient capacity to accommodate REP deliveries and removals with no modification or improvement works required. Utilising the jetty would result in fewer road deliveries required with a subsequent reduction in the potential for effects to the environment. The ability to use the Applicant's established and unique river network is a significant benefit;

- It has existing road access to the road network via Norman Road. This access point is already utilised by vehicles accessing RRRF, thus it is known that standard waste delivery and export vehicles could access REP without the need for new or upgrading works;

- It has existing mains water and foul sewage connections with sufficient capacity to service REP, preventing the requirement for provision of additional infrastructure and thus further reducing potential effects to the environment;
- There is adequate footprint to accommodate the required REP plant and equipment;
- It was considered technically feasible to connect to the electricity distribution network with a high likelihood of avoiding substantial intrusive works within greenfield land or other private ownership, due to the utilisation of previously developed or disturbed land (public highway and verges or existing cable routes);
- It was considered to be at a sufficient distance from sensitive residential receptors to limit impacts (i.e. in terms of noise), as RRRF is a similar development which operates highly successfully;
- It does not directly conflict with any statutory environmental designations (apart from being located within a flood zone, however the REP site benefits from flood defences);
- It is located within an existing urban/industrialised environment, with an existing precedent set for similar and other tall structures within the local environment on both banks of the River Thames; and
- The site benefits from proximity to proposed developments that local authorities already intend to be served by a potential local district heating network, to which REP could further contribute alongside RRRF.

5.3 Alternative Layouts and Design

Alternative Layout

5.3.1 The Applicant's intention is to use similar technology to RRRF for the Energy Recovery Facility (ERF) element of the Proposed Development. This allows proven and deliverable technology to be employed along with the integrated benefits of Anaerobic Digestion, Battery Storage and Solar Photovoltaics. The scale of development required to support the proposal fits within existing established site boundaries, e.g. Crossness Local Nature Reserve (LNR) to the west and south, the River Thames flood bank to the north and RRRF to the east.

5.3.2 The characteristics of the REP site allows for a limited number of options in relation to the specific orientation of the Main REP Building and other key components. Other specific site constraints to layout include ensuring existing RRRF operations are not inhibited, the established location of entry to the REP site via the existing jetty and from Norman Road and ground level drainage and dyke systems.

5.3.3 As part of the process to assess orientations within the REP site, four orthogonal layout options were initially considered. Key considerations within this process included:

- Continued operation of RRRF; and
- The ability to utilise existing infrastructure (road network access and jetty), whilst being able to operate as a standalone facility.

5.3.4 The ERF and Anaerobic Digestion components of REP are particularly reliant on a process flow through each facility. For example, the discharge emissions stack for the ERF lies at the opposite end of the Main REP Building to the tipping hall, as these components are at each end of the linear waste thermal treatment process and result in a predominantly rectangular main building form, albeit wider at the tipping hall end. Therefore, the four layout options considered were:

1. North to south orientation with the stack at the south and the tipping hall at the north;
2. North to south orientation with the stack at the north and the tipping hall at the south;
3. East to west orientation with the stack at the west and the tipping hall to the east; and
4. East to west orientation with the stack at the east and the tipping hall to the west.

5.3.5 Arrangements on two main orthogonal axes were considered more appropriate, both due to the challenges of achieving an efficient skewed arrangement (between RRRF infrastructure to the east and the Crossness LNR boundary to the west) and the relationship to other buildings adopting similar orientations in the local context.

5.3.6 The options appraisal resulted in options three and four being discounted. As waste deliveries would enter the REP site either from the jetty to the north or from Norman Road to the south, an east to west orientation of REP would result in increased vehicle congestion, a more complex route and conflict of movements to the tipping hall. An east to west orientation would also potentially create a ‘wall’ of building and infrastructure parallel to the Thames River Path, and block more views to and from the River Thames.

5.3.7 A north to south orientation was therefore considered to be more in keeping with the orientation of existing surrounding infrastructure (RRRF and the Thames Water Sewage Treatment Works), as well as providing a more efficient routing system within the REP site for vehicular deliveries from the jetty and Norman Road. In addition, a north to south orientation reduces the blocking of views to and from the River Thames when compared with an east to west orientation.

5.3.8 Following the appraisal of orientations for REP, a strengths, weaknesses, opportunities and threats (SWOT) analysis was conducted on options one and two. The layouts were considered in the context of a range of environmental strengths and weaknesses; the outcomes allowed a preferred option to be taken forward within the detailed design and EIA process.

5.3.9 The SWOT analysis identified that there was no discernible difference between options one and two in terms of potential effects on the environment in relation to:

- noise and vibration - due to the distance from the nearest noise-sensitive receptor (NSR);
- air quality – due to the minor change in stack location between options; and
- historic environment, ground conditions, and hydrology and flood risk – as the footprint of the two options is approximately the same.

5.3.10 The layout of REP was not considered to affect off site transport, potential impacts to human health or socio-economic impacts.

5.3.11 In relation to the TVIA it was identified that option two would introduce a narrower built form along the Thames River Path and could be considered to be less dominant in views from the path, as well as likely having a reduced shadowing effect to the Thames River Path.

5.3.12 In addition, it was considered beneficial for the stack to be located at the northern end of the facility, as it would prevent shadowing over the roof of the Main REP Building, allowing maximum potential for unobscured generation from the roof-mounted Solar Photovoltaic installation.

5.3.13 For these reasons, option two was considered more favourable than option one as it resulted in less potential for giving rise to effects on the environment, as well as maximising the opportunity for Solar Photovoltaic renewable energy generation.

Alternative Design

5.3.14 As part of the ongoing iterative design to the Proposed Development, alternative designs of the Main REP Building form have been considered. Following initial architectural and technical analysis, including sun path analysis to identify solar output opportunities of alternative designs, three options for the main form of the building were presented during the consultation. The Applicant provided a review of these options against social, environmental and economic factors and invited consultees to provide comments relating to the options.

5.3.15 The specific nature of the plant required to be housed within the Proposed Development has restricted opportunity to consider alternative scales or sizes of buildings and infrastructure.

5.3.16 Despite the restrictions on scale and size, the Applicant has expressed a preference for a building form of a stepped roof design based on its performance against the social, environmental and economic factors considered. Further consideration of the design of the Proposed Development is presented in the Design and Access Statement (**Document Reference 7.3**) submitted with this application.

5.3.17 The DCO application and the EIA for the Proposed Development has been undertaken on the basis of maximum parameters using the Rochdale Envelope approach, as described in **Chapter 3** of the ES (the Main REP Building has been assessed as having a height of 65 m AOD, and a stack height of 113 m AOD). The final detailed design of the Proposed Development will be submitted to and approved by the local authority under a Requirement of the DCO.

5.4 Proposed Works in the Marine Environment

5.4.1 Within the Scoping Report submitted to the Secretary of State in November 2017, temporary marine works within the River Thames were included to facilitate the construction of REP. **Figure 5.1** shows the Indicative Application Boundary presented in the Scoping Report and the extent of the marine environment identified at that time as being potentially affected.

5.4.2 Two potential construction options were considered:

- the installation of a temporary causeway across the intertidal zone where self-propelled multi-axle trailers would have rolled the construction modules off a barge; and
- the use of a lift crane, either located on a jetty head constructed in the river or constructed near the river bank, which would have directly lifted construction modules from a barge into the REP site.

5.4.3 Both options would have required the need to lift construction modules over the flood defence wall and the Thames River Path. It was considered that some localised dredging would be required to ensure adequate and safe vessel access and stability during the tidal cycle.

5.4.4 Further refinement of the Proposed Development and likely construction methodologies concluded that it was not favourable to undertake works within the River Thames. An approach also reducing impact to users of the Thames footpath. Instead, the Applicant is proposing to utilise the existing jetty and road network where possible, to bring plant and equipment to site and during operation for the delivery of fuel. This approach is reflected in the relevant assessments presented in this ES.

5.4.5 This refinement removed the need for intrusive works in the river (foundations and capital dredging), greatly reducing the potential to give rise to significant adverse effects on the marine environment. The River Thames is still proposed to be used during the construction and operational phases of the Proposed Development, however this would not require any new works in the river and all

activities would make use of the existing jetty and mooring points. The Application Boundary shown in **Figure 1.2** identifies the area of marine environment now proposed for non-intrusive working.

5.5 Electrical Connection

Electrical Connection Point

5.5.1 Two options for the new electricity connection point were initially considered as described in the EIA Scoping Report (see **Figure 5.1**, which shows the Indicative Application Boundary considered at the Scoping stage):

- Electrical Connection route to Renwick Road, Barking – the cable route headed north west from the REP site and followed the existing RRRF Electrical Connection route, to an Electrical Connection Point north of the River Thames at the existing National Grid substation on Renwick Road, Barking. This option would utilise the existing electricity cable tunnel under the River Thames; and

- Electrical Connection route to Littlebrook substation – the cable would be routed within the existing road network to the existing National Grid Littlebrook substation in Dartford.

5.5.2 The Electrical Connection route to Barking would have required crossing the River Thames via a UKPN owned c. 1.7 m diameter utilities tunnel, which accommodated power and telecommunication cables. During the early feasibility work for the grid connection for REP, UKPN investigated the use of other existing cables routed through the tunnel and found that all the cables were in use and could not be removed to accommodate cables for RRRF. The use of the utilities tunnel was therefore discounted by UKPN due to the lack of space.

5.5.3 Additionally, during technical feasibility studies, the upgrade of the existing cables to accommodate ratings for both RRRF and REP was investigated by UKPN who confirmed that this was not feasible due to lack of capacity and existing potential overheating problems inside the utilities tunnel.

5.5.4 Construction of a separate new utility tunnel was therefore ruled out on the basis that this would not be viable relative to a route to Littlebrook substation. This decision took account of UKPN's licence obligations under the Electricity Act 1989.

5.5.5 Accordingly, the Electrical Connection route to Littlebrook substation has been progressed as the Electrical Connection solution for the Proposed Development.

Development of the Electrical Connection route to Littlebrook substation

5.5.6 Subsequent to the publication of the Scoping Opinion, UKPN undertook more detailed studies of potential route options which resulted in alternative routes for

the Electrical Connection to the Littlebrook substation (Routes 1, 1A, 2A and 2B) being developed, as identified in **Figure 5.2** and outlined below:

- Route 1 followed a route along the public highways A2016 and A206;
- Route 1A left the REP site and followed Norman Road south, re-joining Route 1 at its junction with the A2016;
- Route 2A diverted away from Route 1 and followed Anderson Way, Church Manorway, Lower Road, West Street, Erith High Street, Manor Road, Slade Green Road, Hazel Road, Moat Lane and Howbury Lane where it re-joined Route 1 at its junction with the A206; and
- Route 2B diverted away from Route 1 at A206/Joyce Green Lane roundabout, and followed Joyce Green Lane, a gravel path routed off the public highway and a busway routed east where it re-joined Route 1 at its junction with Rennie Drive.

5.5.7 The Electrical Connection route options were assessed and the preliminary findings were presented in the Preliminary Environmental Information Report (PEIR).

5.5.8 Soon after the publication of the PEIR, six additional areas were identified where the Electrical Connection was proposed to be routed outside of the identified Indicative Application Boundary along Route 1 and 1A. This resulted in new areas of land, described below, which would potentially be impacted by the Proposed Development and that had not previously been assessed:

- An area of verge extending towards the existing fenced boundary as demarked by green railings adjacent to the western extent of Norman Road (north) to allow an option for trenched cable installation here rather than within the public highway (location A1 on **Figure 5.3**);
- Areas either side of the existing Norman Road bridge to facilitate either the installation of a cable bridge/trough spanning the existing watercourse between banks, or to allow alternative civil engineering techniques / solutions (for example localised Horizontal Directional Drilling (HDD)) which could commence either within the additional areas, or within the existing boundary (location A2 on **Figure 5.3**);
- An area to the front of Erith station and along an existing pedestrian route to allow an option to install cables avoiding a potential engineering constraint in the adjacent dual carriageway (location A3 on **Figure 5.3**);
- Existing footway and bridge crossing immediately west of the A206 and east of the Erith Leisure Centre, included to allow alternative means of crossing the existing railway, should this be preferable to using one of the existing road bridges. Cables would be trenched either side of the bridge and attached to the existing footbridge structure for support (location A4 on **Figure 5.3**);

- An area included to the south of the existing A206 highway, between its junction with Crayford Way, and its junction with the A2026, to allow for alternative civil engineering techniques/solutions, for example localised HDD under the River Cray, other watercourses and the existing railway line. The area also includes for trenched installation in those areas outside the current metalled highway (location A5 on **Figure 5.3**); and

- The areas north and south of the existing bridge crossing of the River Darent allow optional implementation of alternative civil engineering techniques/solutions (for example localised HDD) under the river in the event that a highway based crossing is not practicable. These areas also allow for access and installation in the event that cables are attached to the existing bridge. Further east the additional areas allow for trenching outside the highway, crossing of other watercourses and the exploration of using the existing opening that protects the existing strategic sewer under the A206 as a crossing point (location A6 on **Figure 5.3**).

5.5.9 Accordingly, a Supplementary Information Report to the PEIR was published and consulted on (see the Consultation Report (**Document Reference 5.1**) for further details), identifying no changes to the PEIR conclusions for Transport, Air Quality, Noise and Vibration, Townscape and Visual Impact, Hydrology and Socio-economics. The potential for new, not significant, adverse effects were identified in relation to the Historic Environment. The report also identified that the changes were not anticipated to result in new significant effects for Terrestrial Biodiversity or Ground Conditions, however that this was subject to further investigation and assessment work which is presented within this ES. Overall, the changes were not considered to be material.

5.5.10 The Electrical Connection options for which development consent is sought through this DCO Application are reflected in the Works Plans (**Document Reference 2.3**).

5.6 Alternative Main Temporary Construction Compounds

5.6.1 The REP site incorporates areas for temporary use during the construction phase. However, given the characteristics of the REP site, there is insufficient space to accommodate all construction laydown, fabrication, welfare and parking provision within the site boundaries. This is particularly the case as the footprint of the permanent works increases through construction.

5.6.2 An initial desktop exercise was therefore undertaken to identify off site areas considered suitable for use as Temporary Construction Compounds, after which a further assessment of the identified sites was undertaken to determine which were considered to be more suitable from an environmental and technical perspective.

5.6.3 The criteria considered in identifying potential compounds were as follows:

- A minimum site area (26,000 sqm) was required. Sites smaller than this were not considered adequate for use in the construction phase;

- To maintain a reasonable degree of construction efficiency in the movement of staff, materials and plant, a maximum distance of 2.5 km from the REP site was applied;
- To avoid difficulties in the transport of off-site fabricated components from a compound to the REP site, a maximum distance of 0.5 km from the A2016 was applied; and
- Proximity to residential areas were considered, with the aim of reducing potential disturbance to sensitive receptors.

5.6.4 An initial list of nine sites was identified which met the above criteria and were taken to the next stage for detailed consideration.

5.6.5 Of the nine sites, two would have needed to be combined to provide the required area and were thus considered less favourable than those which individually met the area requirements. In addition, one of these areas was located within 500 m of residential properties, further reducing its suitability.

5.6.6 The seven remaining sites were considered, however four were discounted for the following reasons:

- One was located within 100 m of a sport and recreation facility, a school, and a public open space;
- One was within an area designated as public open space;
- One was located within 500 m of residential properties and was not considered suitable for laydown purposes; and
- One was located within 2.5 km of the REP site but on the northern bank of the River Thames. This was not considered suitable for car parking, fabrication or storage, nor was it considered logistically feasible or safe to present the construction workforce on a regular schedule to access the REP site via a crossing of the River Thames.

5.6.7 Of the three sites which remained, all were determined to be technically feasible and were considered to be subject to fewer environmental constraints. Two sites were located to the west of Crabtree Manorway North (both adjacent to each other, and both meeting the area requirements). The site on land west of Norman Road (immediately south of the REP site) was also considered technically feasible.

5.6.8 The Indicative Application Boundary shown in **Figure 5.1,** (Scoping stage) includes both of the previously considered Main Temporary Construction Compounds at Norman Road and Crabtree Manorway North.

5.6.9 The Applicant established that the Crabtree Manorway North sites were subject to extant planning permissions that were due to be implemented prior to REP's intended 2021 construction commencement. In some cases, the Applicant was

advised that construction works were commencing or imminent. In other cases, elements of an overall outline permission had already been implemented and further phases were understood to be imminent.

5.6.10 In light of the above, and particularly the suitability of the site on land west of Norman Road, the Crabtree Manorway North sites were not progressed and do not form part of the REP DCO application.

5.7 Alternative Vehicular Access Arrangements

5.7.1 Due to the existing access points at the REP site, from the existing jetty to the north and from Norman Road to the south, no additional access arrangements were considered necessary for the REP site. In addition, there are existing constraints to land-based access in respect of the adjacent Crossness LNR and surrounding development.

5.8 Do Nothing Alternative

5.8.1 The ‘Do Nothing’ scenario is not considered appropriate given the established need for new energy generation and waste treatment in London, including a need for low carbon and renewable energy generation, and policy support for increased use of the river. Additionally, the ‘Do Nothing’ scenario would prevent this additional investment in the local economy, as well as present a lack of opportunity for potential future provision of local district heating for the local area.