The Millbrook Power (Gas Fired Power Station) Order

6.1 Environmental Statement

Planning Act 2008
The Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009

PINS Reference Number:	EN010068
Document Reference:	6.1
Regulation Number:	5(2)(a), 5(2)(i), 5(2)(m) & Infrastructure Planning (Environmental Impact Assessment) Regulations 2009
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Revision	Date	Description
0	October 2017	Submission Version

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1 Introduction

1.1 Overview

1.1.1 This document is the Environmental Statement (ES) for the Millbrook Power Project which comprises an up to 299 Megawatts (MW) gas fired peaking power generation plant designed to produce electricity, along with associated development, such as a gas connection and electrical connection (hereafter referred to as the 'Project)'. It has been prepared by Peter Brett Associates LLP (PBA) on behalf of Millbrook Power Limited (MPL), (the 'Applicant').

1.1.2 The Project would be located in an area known as 'the Marston Vale' between Milton Keynes and Bedford with the approximate centre of the Project Site at grid reference 501373, 240734, the location of which is shown in Figure 1.1. The Project Site falls within areas administered by both Central Bedfordshire Council (CBC) and Bedford Borough Council (BBC).

1.1.3 The up to 299 MW gas fired peaking power generation plant element of the Project constitutes a Nationally Significant Infrastructure Project (NSIP) pursuant to the Planning Act 2008 (PA 2008) and therefore requires development consent under that Act. The Applicant is therefore applying for a development consent order (DCO); this ES is provided as part of that application. The DCO process is described further in Section 1.3 below.

1.1.4 The Project would comprise:

- a new Power Generation Plant in the form of an Open Cycle Gas Turbine (OCGT) peaking power generating station, fuelled by natural gas with a rated electrical output of up to 299 MW. This is the output of the generating station as a whole, measured at the terminals of the generating equipment. The Power Generation Plant comprises:
  - generating equipment including one Gas Turbine Generator with one exhaust gas flue stack and Balance of Plant (together referred to as the 'Generating Equipment'), which are located within the 'Generating Equipment Site';
  - a new purpose built access road from Green Lane to the Generating Equipment Site (the 'Access Road' or the 'Short Access Road');
  - a temporary construction compound required during construction only (the 'Laydown Area');
- a new underground gas pipeline connection, approximately 1.8 km in length (the 'Pipeline') to bring natural gas to the Generating Equipment from the National Transmission System (the 'Gas Connection'). The Gas Connection also incorporates an Above Ground Installation (AGI) at the point of connection to the National Transmission System; and

- a new electrical connection to export power from the Generating Equipment to the National Grid Electricity Transmission System (NETS) (the 'Electrical Connection'), comprising an underground double circuit Tee-in. This would require one new tower (which will replace an existing tower and be located in the existing Grendon – Sundon transmission route corridor, thereby resulting in no net additional towers). This option would require two Sealing End Compounds (SEC)s, one located on each side of the existing transmission line, and both circuits would then be connected via underground cables approximately 500 m in length to a new substation (the 'Substation'*).*

1.1.5 The Generating Equipment, Access Road and Laydown Area are together known as the 'Power Generation Plant' and are located within the 'Power Generation Plant Site'. The Power Generation Plant Site is approximately 12.5 ha in area.

1.1.6 The Power Generation Plant, Gas Connection, and Electrical Connection, together with all access requirements are referred to as the 'Project'. The land upon which the Project would be developed, or which would be required in order to facilitate the development of the Project, is referred to as the 'Project Site'. The Project Site is approximately 48 ha in area. The Project is described in more detail in Chapter 3.

1.1.7 A full glossary of defined terms is presented in Appendix 1.1.

1.1.8 The Project Site and all elements of the Project listed above are shown on Figure 1.2.

1.1.9 The Power Generation Plant Site is located primarily on land within former clay pits known as 'The Rookery', with the associated Gas Connection and Electrical Connection extending from The Rookery into adjacent agricultural land to the south.

Peaking Plant

1.1.10 As a peaking plant, the Generating Equipment could run up to a maximum of 2,250 hours in any given year, provided that the 5 year rolling average does not exceed 1,500 hours. For the purposes of the EIA, a worst case yearly maximum of 2,250 running hours has been assessed where appropriate. Peaking plants are required to operate when there is a 'stress event' on the grid. This occurs when there is a surge in demand for electricity associated with a particular event (e.g. where many people across the country might boil a kettle following the end of a popular television programme) or where there is a sudden drop in power being generated from plants which are constantly operational (e.g. a sudden outage). Peaking plants also help to 'balance out' the grid at other times of peak electricity demand and help to support the grid at times when other technologies (e.g. renewable energy sources, such as wind and solar farms) cannot generate electricity due to their intermittent operation and reliance on weather conditions.

1.2 Purpose of this Document

1.2.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the 'EIA Regulations') require an Environmental Impact Assessment (EIA) to be carried out in respect of any development listed in Schedule 1 to the EIA Regulations ('Schedule 1 development'). An EIA is also required for development listed in Schedule 2 to the EIA Regulations ('Schedule 2 development') if it is likely to have significant effects on the environment[1].

1.2.2 The Project is a Schedule 1 development as it is a thermal generating station with a heat output of 300 MW or more as listed in Schedule 1, paragraph 2(a) of the EIA Regulations. Therefore, an EIA for the Project is required under the EIA Regulations.

1.3 Application for Development Consent

1.3.1 In England and Wales, an onshore electricity generating station is considered to be a NSIP under the PA 2008 if it has a capacity of more than 50 MW. As the Generating Equipment would have a rated electrical output of at least 50 MW it would be classified as a NSIP under section 14(1)(a) and section 15 of the PA 2008. Under section 31 of the PA 2008, consent is required for development that is or forms part of a NSIP and therefore a DCO Application must be made to the Secretary of State (SoS) for the Power Generation Plant.

1.3.2 Development consent for a NSIP may only be granted further to an application made under section 37 of the PA 2008 to the SoS. Development consent can also be granted for associated development. The Gas Connection and Electrical Connection are associated development and consent for them is being applied for as part of the DCO Application for the Project. The Gas Connection and Electrical Connection are included within this ES and are being assessed through the EIA process and their likely significant environmental effects have been reported on in this ES which forms part of the DCO Application.

1.3.3 Section 37 of the PA 2008 (and associated legislation) also governs the content of a DCO Application, including requirements for certain accompanying documents.

1.3.4 These requirements are specified, in particular, in the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (the 'APFP Regulations'). The APFP Regulations require that a

[1] The Project falls under the EIA Regulations 2009 regime and not the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations 2017) regime. This is because a scoping opinion was requested from the Secretary of State under the EIA Regulations 2009 before the commencement of the EIA Regulations 2017. This means that, in accordance with the transitional arrangements at Regulation 37 of the EIA Regulations 2017, the EIA Regulations 2009 will continue to apply to the Project.

DCO Application, where applicable, must be accompanied by an ES and scoping (or screening) opinions. There is a Scoping Opinion dated July 2014 for the Project, included as Appendix 1.2. A screening opinion was not sought.

1.4 The Applicant

1.4.1 The Applicant for the Project is MPL, an energy development company established for the Project and recently acquired by Drax Group plc (Drax).

1.4.2 Drax is responsible for generating 7% of the UKs electricity, predominantly via Drax power station in Selby. Drax is one of the UK's largest energy producers and is committed to helping to reduce carbon emissions, displacing more coal off the system and providing additional system support to plug the gaps created by intermittent renewables and boost security of supply.

1.4.3 Drax acquired MPL from Watt Power Limited (Watt Power) in 2016. Stag Energy Development Co. Ltd (Stag Energy) previously provided management services to Watt Power in relation to MPL. Stag Energy continues to provide resources to MPL through a management services agreement. Stag Energy was founded in 2002 and the company draws on a depth of experience within a team that has created and delivered over 10,000 MW of power generation and related infrastructure projects across the globe, of which 2,500 MW has been delivered in the UK.

1.4.4 Drax currently has three other power generation projects which have either already been granted consent under or are being brought forward through the PA 2008 process. They are: Progress Power Ltd at Eye Airfield in Suffolk (www.progresspower.co.uk): Hirwaun Power Ltd at Hirwaun in South Wales (www.hirwaunpower.co.uk): and Abergelli Power Ltd at Abergelli in South Wales (www.abergellipower.co.uk). The first two listed projects were granted Development Consent in July 2015[2].

1.4.5 MPL is committed to the development of assets to support the UK Government's drive to a low carbon economy. MPL recognises the need to balance commercial issues with the environmental benefits and concerns relating to energy projects and believes this balance can be responsibly delivered. The Project would be designed and developed to high quality, safety and environmental standards.

[2] Please see https://infrastructure.planninginspectorate.gov.uk/projects/eastern/progress-power-station/ for a copy of the relevant legislation for the Progress Power Project and https://infrastructure.planninginspectorate.gov.uk/projects/wales/hirwaun-power-station/ for the Hirwaun Power Project

1.4.6 Further information on the companies referred to above is provided at www.millbrookpower.co.uk or www.drax.com.

1.5 Structure of this Document

1.5.1 This ES has been prepared in discrete chapters to allow the reader to understand the Project, the purpose of this document, the regulatory framework in which it has been prepared and the methodologies and results of the EIA.

1.5.2 The ES is set out as follows:

- **Chapter 1** (this chapter) comprises an overview of the Project, an introduction to the consenting regime, a description of the Applicant and the need for and benefits of the Project;
- **Chapter 2** provides a description of the environmental planning policy background and regulatory framework in which the document has been prepared (although a more detailed description is provided in the Planning Statement which accompanies the DCO Application – Document Reference 10.1);
- **Chapter 3** provides a description of the Project Site and surrounding area, and includes a more detailed description of the Power Generation Plant, Gas Connection and Electrical Connection;
- **Chapter 4** provides a description of the methodologies employed in undertaking the EIA for the Project;
- **Chapter 5** provides a description of alternatives which have been considered; and
- **Chapters 6 to 15** provide a description of the results of the EIA process for each specific environmental topic. The topics which are covered are:
  - Air Quality – Chapter 6;
  - Noise and Vibration – Chapter 7;
  - Ecology – Chapter 8;
  - Water Quality and Resources – Chapter 9;
  - Geology, Ground Conditions and Hydrogeology – Chapter 10;
  - Landscape and Visual Impacts Assessment (LVIA) – Chapter 11;
  - Traffic, Transport and Access – Chapter 12;
  - Historic Environment – Chapter 13;
  - Socio-Economics – Chapter 14; and
  - Other effects considered (Waste, Health and Electromagnetic Fields (EMFs)) – Chapter 15.

1.5.3 Each topic chapter includes: a brief introduction, an explanation of the relevant legislation and policy for that topic; a summary of consultation responses received to date and how these have been responded to, a description of the topic specific realistic worst case scenario for assessment, a brief explanation of the assessment methodology and significance criteria used; a description of the baseline conditions, an assessment of the likely significant environmental effects of the Project after the implementation of embedded mitigation; an assessment of the interactions and cumulative effects of the Project; an explanation of what additional mitigation may be appropriate in order to minimise any significant adverse effects; an assessment of the residual significant environmental effects of the Project; and a conclusion/summary.

2 Regulatory and Policy Background

2.1 Introduction

2.1.1 This chapter summarises the main regulatory and policy framework that is relevant to the Project at the international, national and local level.

2.1.2 A summary of the EU Directives, National Policy Statements (NPS) as well as national and local policy considered relevant to the Project is set out below.

2.2 European Union

2.2.1 The UK voted to leave the European Union (EU) on the 23rd June 2016. The formal process of triggering Article 50 of the Lisbon Treaty, to commence negotiations for exiting the EU was undertaken on 29th March 2017. However, the exit process is anticipated to involve lengthy and complex negotiations, taking up to two years. Therefore, until the UK formally leaves the EU and/or discards or alters EU legislation, it is considered that the following policies are still relevant to the Project:

Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the EIA Directive);

2.2.2 The EIA Directive ensures that plans, programmes and projects likely to have significant effects on the environment are made subject to an environmental assessment, prior to their approval or authorisation. The Directive sets the thresholds for projects that require an EIA (as stated in section 1.2) and also outlines the impacts on the environment to be assessed in the EIA process. This Directive is implemented in the respect of NSIPs in the UK by the EIA Regulations.

2.2.3 It is noted here that the EIA Directive has been amended as of May 2014 (Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment) and the amendments have now been implemented in Member States as of 16th May 2017.

2.2.4 For NSIPs, such as the Project, this will be through the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (which came into force on 16th May 2017).

2.2.5 Regulation 37(2)(a) of the 2017 Regulations states that, where a scoping opinion has already been requested, or an application or an ES submitted, before the commencement of the new EIA regulations, the previous EIA regulations and regime will continue to apply.

2.2.6 Therefore, as a Scoping Report was submitted for the Project in June 2014 (Appendix 1.2), the ES has been undertaken in line with the previous (2011) EIA Directive.

Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (the Industrial Emissions Directive (IED));

2.2.7 In December 2010 the EU adopted a proposal for a Directive on industrial emissions (IED). The IED recasts seven existing directives related to industrial emissions, in particular Directive 2008/1/EC of 15th January 2008 concerning integrated pollution prevention and control (the IPPC Directive) and Directive 2001/80/EC of 23rd October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants (the Large Combustion Plant Directive (LCPD)), into a single legislative instrument to improve the permitting, compliance and enforcement regimes adopted by Member States. However, the general principles of the IPPC Directive and the LCPD Directive are retained and will remain relevant to the Project. The IED has been implemented in England and Wales by the Environmental Permitting (England and Wales) Regulations 2016.

Directive 1992/43/EEC of 21 May 1992 on the Conservation of natural habitats and of wild fauna and flora (the Habitats Directive);

2.2.8 The aim of the Habitats Directive is to contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora. Measures taken pursuant to this Directive by the Member States are designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest whilst also taking into account economic, social and cultural requirements, and regional and local characteristics. The Conservation of Habitats and Species Regulations 2010 implement the Habitats Directive in England and Wales.

Industrial Emissions Directive 2010/75/EU – Final draft Best Available Techniques (BAT) reference document (BREF) for large combustion plants (June 2016)

2.2.9 The draft BREF for the Large Combustion Plants sector covers combustion of fuels in installations with a total rated thermal input of 50 MW or more. It sets out a series of best available techniques which should be applied to large combustion plants in order to drive greater efficiency, cost savings and lower emissions. Given the nature of the Project (to operate intermittently as a peaking plant) many of the techniques highlighted in the BREF do not apply to the Project. Nevertheless, it is has been referenced where appropriate.

Conservation of Habitats and Species Regulations 2010 (as amended)

2.2.10 In the UK, Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (‘the Habitats Directive’), was originally transposed into law by means of the Conservation (Natural Habitats, & c.) Regulations 1994 (as amended). The Regulations came into force on 30th October 1994, and have been amended several times. Subsequently the Conservation of Habitats and Species Regulations 2010 was created which consolidates all the various amendments made to the 1994 Regulations in respect of England and Wales and is commonly known as the 'The Habitats Regulations'. The Habitats Regulations contain five Parts and four Schedules, and provide for the designation and protection of 'European Sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.

2.3 Nationally Significant Infrastructure Projects and Planning Act 2008

2.3.1 The Power Generation Plant is categorised as a NSIP and, if the DCO Application for the Project is accepted by the Planning Inspectorate (PINS), it will be examined for a period up to six-months, starting the day after the date of the Preliminary Meeting for the Project. PINS will then, within three months of the end of the Examination, provide the SoS with a report setting out its conclusions and recommendations. The SoS will then have three months from the receipt of the PINS' report to make his or her decision on the DCO Application. All of these steps are pursuant to the regime established by the PA 2008, as described in Chapter 1.

2.3.2 Section 104 of the PA 2008 requires the SoS to make a decision on an application in accordance with relevant NPSs, unless particular considerations apply (including where the adverse impacts of a development would outweigh its benefits). NPS EN-1 (Overarching National Policy Statement for Energy) sets out that 'this NPS, when combined with the relevant technology-specific energy NPS, provides the primary basis for decisions' (paragraph 1.1.1 of NPS EN-1). The decision-maker 'should start with a presumption in favour of granting consent to applications for energy NSIPs' (paragraph 4.1.2 of NPS EN-1) and on the basis that the urgent national need for such projects is settled.

2.3.3 The decision on an application must also be taken by the SoS having regard to a number of factors, including the local impact reports that will be provided by relevant local authorities, as well as any other matters which the SoS 'thinks are both important and relevant to its decision' (section 104 of the PA 2008). Important and relevant matters may include the National Planning Policy Framework (NPPF), Development Plan Documents (DPD) or other documents in the Local Development Framework (LDF).

2.4 The Planning Act 2008 and the Localism Act 2011

The process for considering proposed NSIPs was established by the Planning Act 2008, as amended by the Localism Act 2011.

2.4.1 Under the Localism Act 2011 PINS became the agency responsible for operating the planning process for NSIPs (previously, it had this role whilst also being the decision maker). As the Examining Authority (ExA), PINS conducts certain pre-application and application procedures (such as EIA Scoping consultation and conducting acceptance checks when the DCO Application is submitted) and the examination.

2.4.2 The examination is a predominantly written process led either by a single appointed person or a panel, who submit a report with their recommendation on an application to the relevant SoS who will take the final decision as to whether to make a DCO for a proposed project and in what terms. The relevant SoS for the Project is the Secretary of State for Business, Energy & Industrial Strategy.

2.4.3 Section 104 of the PA 2008 provides that in making decisions on applications, the SoS must have regard (amongst certain other documents and matters) to any relevant NPS and must decide applications in accordance with such relevant NPS(s) unless the adverse impacts of the proposal would outweigh its benefits (or in certain other limited circumstances). The NPSs relevant to this Application are NPS EN-1, NPS EN-2, NPS EN-4 and NPS EN-5, as set out below in section 2.5.

2.4.4 Section 104 of the PA 2008 also requires the SoS to have regard to any Local Impact Report and other matters which the SoS "thinks are both important and relevant to [the SoS's] decision". Other national and local planning policy which may be relevant to this Application is set out in sections 2.6 and 2.7 below.

2.5 National Policy Statements

2.5.1 The Department for Energy and Climate Change (DECC) published 6 National Policy Statements (NPS) for Energy in 2011:

- Overarching National Policy Statement for Energy (EN-1);
- National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2);
- National Policy Statement for Renewable Energy Infrastructure (EN-3);
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4);
- National Policy Statement for Electricity Networks Infrastructure (EN-5); and
- National Policy Statement for Nuclear Power Generation (EN-6).

2.5.2 NPS EN-1 is a relevant NPS for any energy NSIP, along with the relevant technology specific NPS. NPS EN-1 is a relevant NPS for any energy NSIP, along with the relevant technology specific NPS. For the DCO Application this includes NPS EN-2 National Policy Statement for Fossil Fuel Electricity Generating Infrastructure and NPS EN-4 - National Policy Statement for Gas Supply Infrastructure. The majority of NPS EN-5 does not directly relate to the Project, since its electrical infrastructure is to be predominantly underground. However, NPS EN-5 is of relevance in respect of the substation and SECs and so is referred to where relevant in this document.

Overarching National Policy Statement for Energy (EN-1)

2.5.3 NPS EN-1 sets out the Government's overall policy towards the delivery of major energy infrastructure.

2.5.4 Paragraph 1.1.1 of NPS EN-1 states that 'this NPS, when combined with the relevant technology-specific energy NPS, provides the primary basis for decisions'. The relevant technology-specific energy NPS for this Application are NPS EN-2, EN-4 and EN-5 as set out below. In addition, Paragraph 4.1.5 of NPS EN-1 states that Development Plan Documents or other documents in the Local Development Framework may be both important and relevant considerations to SoS decision-making. Local planning policy for Central Bedfordshire and Bedford Borough relevant to this Application is set out in section 2.7 below.

2.5.5 Paragraph 3.1.3 of NPS EN-1 states that all development consent applications for energy infrastructure should be assessed 'on the basis that the Government has demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described for each of them in this Part.' Accordingly, the SoS 'should give substantial weight to the contribution which projects would make towards satisfying this need when considering applications for development consent under the Planning Act 2008' (paragraph 3.1.4).

2.5.6 Section 3.3 of NPS EN-1 sets out the key reasons why the Government believes there is an 'urgent need' for new electricity NSIPs (paragraph 3.3.1), including:

- Meeting energy security and carbon reduction objectives;
- The need to replace closing electricity generating capacity;
- The need for more electricity capacity to support an increased supply from renewables; and
- Future increases in electricity demand.

2.5.7 Furthermore, paragraph 3.7.3 of NPS EN-1 stresses that new electricity network infrastructure projects add to the reliability of the national energy supply and provide crucial national benefits which are shared by all users of the system.

2.5.8 Whilst alternatives to the need for new large scale electricity infrastructure have been considered – including: reducing demand; more intelligent use of electricity; and interconnection of electricity systems – the Government believes that these measures will not be sufficient to meet energy and climate change objectives on their own (paragraph 3.3.25 of NPS EN-1).

2.5.9 Paragraph 3.6.1 of NPS EN-1 recognises the 'vital role' that fossil fuel power stations play in providing electricity supplies, and states that 'they will continue to play an important role in our energy mix as the UK makes the transition to a low carbon economy.'

2.5.10 Section 4 of NPS EN-1 sets out the general assessment principles by which applications relating to energy infrastructure are to be decided.

2.5.11 Paragraph 4.1.2 of NPS EN-1 states that, given the level and urgency of need for energy infrastructure, the SoS 'should start with a presumption in favour of granting consent to applications for energy NSIPs.'

2.5.12 Paragraph 4.1.3 of NPS EN-1 explains that the Secretary of State will weigh up a proposal's contribution to meeting the need for energy infrastructure, job creation and other long term and wider benefits, against the potential adverse impacts of the proposal in question including 'any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.'

2.5.13 Paragraph 4.1.4 of NPS EN-1 continues and explains that the SoS should take into account 'environmental, social and economic benefits and adverse impacts, at national, regional and local levels' whether identified in the NPSs or elsewhere, including in local impact reports.

2.5.14 Paragraph 4.1.5 of NPS EN-1 states that other matters that the SoS may consider both important and relevant to its decision-making could include Development Plan Documents or other documents in the Local Development Framework and explains that, 'in the event of a conflict between these or any other documents and an NPS, the NPS prevails.' The documents included within the Local Development Frameworks for both Central Bedfordshire Council and Bedford Borough Council are referenced in section 2.7.

2.5.15 Paragraph 4.1.7 of NPS EN-1 confirms that the SoS will have regard to the guidance in Circular 11/95, as revised, on "The Use of Conditions in Planning Permissions" in agreeing or suggesting requirements in a DCO. Although that circular has in part been superseded by advice contained within NPPG (published in March 2014), the Applicant notes that the general advice remains essentially similar.

2.5.16 Paragraph 4.1.8 states that, "The [SoS] may take into account any development consent obligations that an applicant agrees with local authorities."

2.5.17 Paragraph 4.1.9 of NPS EN-1 states that viability issues are unlikely to be of relevance to decision making providing that the technical feasibility of the proposal has been properly assessed, but limited exceptions exist and are set out in NPS EN-1 and others.

2.5.18 Paragraph 4.2.1 of NPS EN-1 advises that, 'All proposals for projects that are subject to the European Environmental Impact Assessment Directive must be accompanied by an ES describing the aspects of the environment likely to be significantly affected by the project.' The Environmental Statement should include an assessment of the likely significant effects of the proposed project on the environment, including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects at all stages of the project. Paragraph 4.2.3 of NPS EN-1 adds that 'the ES should cover the environmental, social and economic effects arising from pre-construction, construction, operation and decommissioning of the project.' When considering cumulative effects, Paragraph 4.2.5 of NPS EN-1 advises that the ES should provide information on how the effects of the proposal combine and interact with the effects of other development, including projects for which consent is sought or granted, as well as those already in existence.

2.5.19 In respect of Habitats and Species Regulations, paragraph 4.3.1 of NPS EN-1 advises applicants to consult with Natural England and to subsequently undertake an Appropriate Assessment if required.

2.5.20 Paragraph 4.4.1 of NPS EN-1 notes that, "the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to the proposed development is in the first instance a matter of law, detailed guidance on which falls outside the scope of this NPS. From a policy perspective NPS EN-1 does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option." However, paragraph 4.4.2 of NPS EN-1 states that applicants are obliged to include, as a matter of fact, information about the main alternatives that have been considered within the ES, including the main reasons for the applicant's choice, taking into account the environmental, social and economic effects.

2.5.21 Paragraph 4.5.1 of NPS EN-1 states that good design for energy infrastructure 'should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible'. However, paragraph 4.5.1 also acknowledges that 'the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area'.

2.5.22 Paragraph 4.5.3 of NPS EN-1 seeks that proposals are "sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable (including taking account of natural hazards such as flooding) as they can be". Further, Paragraph 4.5.3 states that "Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation."

2.5.23 Paragraph 4.5.4 of NPS EN-1 seeks that applicants "demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected". Further, paragraph 4.5.4 of NPS EN-1 notes that "in considering applications the [SoS] should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy."

2.5.24 Paragraph 4.5.5 of NPS EN-1 states that "applicants are encouraged" to use design review services.

2.5.25 Paragraph 4.6.6 of NPS EN-1 states that, 'Under guidelines issued by DECC (then DTI) in 2006, any application to develop a thermal generating station under Section 36 of the Electricity Act 1989 must either include CHP or contain evidence that the possibilities for CHP have been fully explored to inform the IPC's consideration of the application.' Further, paragraph 4.6.7 of NPS EN-1 advises that the opportunities for CHP should be considered from the outset of the site selection process.

2.5.26 Section 4.7 of NPS EN-1 explains the considerations to be given to Carbon Capture and Storage (CCS) and Carbon Capture and explains that all applications for new combustion plant which are of a generating capacity at or over 300MW and of a type covered by the EU's Large Combustion Plant Directive (LCPD) should demonstrate that the plant is "Carbon Capture Ready" (CCR).

2.5.27 Section 4.8 of EN-1 sets out considerations that applicants and the Examining Authority/Secretary of State should take into account to help ensure that new energy infrastructure is resilient to climate change. Paragraph 4.8.5 of NPS EN-1 advises that applicants 'must consider the impacts of climate change when planning the location, design, build, operation and, where appropriate, decommissioning of new energy infrastructure.'

2.5.28 Paragraph 4.9.1 of NPS EN-1 advises applicants to consult the National Grid and to ensure that there is the necessary infrastructure and capacity within an existing or planned transmission or distribution network to accommodate the electricity generated.

2.5.29 Paragraph 4.10.1 of NPS EN-1 advises that 'Issues relating to discharges or emissions from a proposed project which affect air quality, water quality, land quality and the marine environment, or which include noise and vibration may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes.'

2.5.30 Paragraph 4.11.1 of NPS EN-1 advises applicants to consult with the HSE on matters relating to safety which are relevant to the construction, operation and decommissioning of energy infrastructure.

2.5.31 Paragraph 4.12.1 of NPS EN-1 explains that all establishments wishing to hold stock of hazardous substances above a threshold will require Hazardous Substances consent, and thus should consult the HSE at the pre-application stage.

2.5.32 Section 4.13 of NPS EN-1 advises that energy production has the potential to impact on health and wellbeing (paragraph 4.13.1), through increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation and increases in pests (paragraph 4.13.3). Accordingly, the ES should assess these effects and identify any measures to avoid, reduce or compensate for these impacts as appropriate (paragraph 4.13.2).

2.5.33 Paragraph 4.14.2 of NPS EN-1 stresses the importance of considering possible sources of nuisance and how they may be mitigated or limited at the pre-application stage under section 79(1) of the Environmental Protection Act 1990.

2.5.34 Paragraph 4.15.2 of NPS EN-1 outlines that 'Government policy is to ensure that, where possible, proportionate protective security measures are designed into new infrastructure projects at an early stage in the project development.'

2.5.35 Part 5 of NPS EN-1 explains the potential impacts of energy infrastructure, in terms of: air quality and emissions; biodiversity and ecological conservation; civil and military aviation and defence interests; coastal change; dust, odour, artificial light, smoke, steam and insect infestation; flood risk; historic environment; landscape and visual; land use including open space, green infrastructure and Green Belt; noise and vibration; socio-economic; traffic and transport; waste management; and water quality and resources.

2.5.36 Paragraph 5.2.1 of NPS EN-1 advises that the construction, operation and decommissioning of infrastructure development 'can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats, or on the wider countryside.' Paragraph 5.2.7 of NPS EN-1 provides that the applicant should undertake an assessment as part of the ES, describing:

- "any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;
- the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;
- existing air quality levels and the relative change in air quality from existing levels; and
- any potential eutrophication impacts."

2.5.37 With regard to biodiversity and geological conservation for EIA development, paragraph 5.3.3 of NPS EN-1 advises that the ES 'clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.' Appropriate mitigation measures should be an integral part of the proposed development and should demonstrate that: activities are confined to the minimum areas required during construction; best practice is followed during construction and operation; habitats are restored after construction works where practicable; and opportunities are taken to enhance or create new habitats (paragraph 5.3.18).

2.5.38 Paragraph 5.4.1 of NPS EN-1 advises that civil and military aviation and defence interests can be affected by new energy development, and as such an assessment of potential effects should be set out within the ES (paragraph 5.4.10). In addition, the MoD, CAA, NATS and any aerodrome likely to be affected by the proposed development should be consulted (paragraph 5.4.11).

2.5.39 Paragraph 5.6.1 of NPS EN-1 states that, ‘during the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects.’ Accordingly, applicants are required to assess the potential for emissions and the impact on amenity in the ES, in particular: the type, quantity and timing of emissions; aspects giving rise to emissions; locations affected by the emissions; effects of the emissions on identified locations; and measures to be employed in preventing or mitigating emissions (paragraph 5.6.5). Paragraph 5.6.11 advises that mitigation measures may be provided in respect of engineering, lay-out or administration.

2.5.40 Paragraph 5.7.4 of NPS EN-1 states that application for energy projects of 1 ha or greater in Flood Zone 1 and all energy projects in Flood Zones 2 and 3 should be accompanied by a flood risk assessment (FRA). Where necessary, paragraph 5.7.18 of NPS EN-1 advises that flood risk should be mitigated by making arrangements to manage surface water and the impact of the natural water cycle on people and property.

2.5.41 Paragraph 5.8.1 of NPS EN-1 advises that the construction, operation and decommissioning of energy infrastructure has the potential to result in adverse impacts on the historic environment. Accordingly, the applicant is required to ‘provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance’ (paragraph 5.8.8).

2.5.42 Paragraph 5.9.1 of NPS EN-1 acknowledges that the landscape and visual effects of energy projects will vary according to the type of development, its location and the landscape setting. Paragraphs 5.9.5 – 5.9.7 advise that the applicant should carry out a landscape and visual impact assessment of the effects during construction and operation, including light pollution effects on local amenity and nature conservation. Paragraph 5.9.21 notes that reducing the scale of the project can help to mitigate the landscape and visual impacts, however it is acknowledged that amending the design of proposed energy infrastructure may result in a significant operational constraint and reduction in function.

2.5.43 Paragraph 5.10.1 of NPS EN-1 acknowledges that an energy infrastructure project ‘will have direct effects on the existing use of the proposed site and may have indirect effects on the use, or planned use, of land in the vicinity for other types of development.' Accordingly, the applicants should consult the local community (paragraph 5.10.6) and the ES should include an assessment of the impact of the proposed development on existing and proposed land uses near the project. Paragraph 5.10.19 notes that there may be little that can be done to mitigate the direct effects of the energy project on the existing use of the proposed site; however, the effects may be minimised through the application of good design principles, including the layout of the project.

2.5.44 Paragraph 5.11.1 of NPS EN-1 states that excessive noise can have wide-ranging impacts on the quality of human life, health, and use and enjoyment of areas, as well as on wildlife and biodiversity (paragraph 5.11.2). Where noise impacts arise, paragraph 5.11.4 states that a noise assessment should be provided, to include: a description of the noise generating aspects of the proposal, identification of noise sensitive areas, the characteristics of the existing noise environment, and a prediction of how the noise environment will change. Mitigation measures may include engineering, layout design, or administrative measures (paragraph 5.11.12).

2.5.45 Paragraph 5.12.1 of NPS EN-1 states that 'The construction, operation and decommissioning of energy infrastructure may have socio-economic impacts at local and regional levels.' Accordingly, an assessment should be undertaken of all relevant socio-economic impacts, which may include: the creation of jobs and training opportunities, the provision of additional local services and improvements to local infrastructure, effects on tourism, the impact of a changing influx of workers during different phases of the project, and cumulative effects. Mitigation measures could include improvements to the visual and environmental experience for visitors and the local community through high quality design (paragraph 5.12.9).

2.5.46 Paragraph 5.13.1 of NPS EN-1 notes that 'The transport of materials, goods and personnel to and from a development during all project phases can have a variety of impacts on the surrounding transport infrastructure and potentially on connecting transport networks.' The applicant should therefore undertake a transport assessment and consult with the Highways Agency and Highways Authority regarding appropriate mitigation (paragraph 5.13.3).

2.5.47 Paragraph 5.14.1 of NPS EN-1 outlines that government policy on hazardous and non-hazardous waste is intended to 'protect human health and the environment by producing less waste and by using it as a resource wherever possible.' Paragraph 5.14.6 states that the applicant should set out the arrangements proposed for managing waste and include information on the proposed waste recovery and disposal system.

2.5.48 Paragraph 5.15.1 of NPS EN-1 advises that infrastructure development can have adverse effects during the construction, operation and decommissioning phases on the water environment, including groundwater, inland surface water, transitional waters and coastal waters. Accordingly, the applicant should undertake an assessment of 'the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES' (paragraph 5.15.2). Paragraphs 5.15.9 and 5.15.10 advise that the impacts on the water environment and local water resources can be mitigated through careful design.

National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2)

2.5.49 Paragraph 1.1.1 of NPS EN-2 states “Fossil fuel generating stations play a vital role in providing reliable electricity supplies and a secure and diverse energy mix as the UK makes the transition to a low carbon economy…”

2.5.50 Paragraph 1.2.1 of NPS EN-2 states that, NPS EN-2, together with NPS EN-1, provides the primary basis for decisions by the SoS on applications for nationally significant fossil fuel electricity generating stations.

2.5.51 Part 2 of NPS EN-2 provides additional guidance to Part 4 and Part 5 of EN-1 regarding the assessment of impacts specifically associated with fossil fuel generating stations.

2.5.52 Paragraph 2.2.1 of NPS EN-2, "it is for energy companies to decide which applications to bring forward and the government does not seek to direct applicants to particular sites for fossil fuel generating stations."

2.5.53 NPS EN-2 notes that “Fossil fuel generating stations have large land footprints and will therefore only be possible where the applicant is able to acquire a suitably-sized site” (NPS EN-2, paragraph 2.2.2). It also notes that “Applicants should locate new fossil fuel generating stations in the vicinity of existing transport routes wherever possible.”

2.5.54 Section 2.3 of NPS EN-2 states that government policy criteria for fossil fuel generation stations relating to – CHP, CCR, CCS, climate change adaptation, and ‘good design’ – must be met before consent is given.

2.5.55 Section 2.3.13 of NPS EN-2 sets out considerations specifically for fossil fuel generating stations in respect of climate change. NPS EN-2 suggests that as fossil fuel generating stations are likely to be proposed for coastal or estuarine sites, applicants should set out how the proposal would be resilient to: coastal changes and increased risk from storm surge; effects of higher temperatures, including higher temperatures of cooling water; and increased risk of drought leading to a lack of available cooling water.

2.5.56 Paragraph 2.3.16 of NPS EN-2 states that, “Applicants should demonstrate good design particularly in respect of landscape and visual amenity ...and in the design of the project to mitigate impacts such as noise and vibration, transport impacts and air emissions.”

2.5.57 Section 2.4 of NPS EN-2 contains additional policy for assessing the potential impacts of energy infrastructure projects for fossil fuel generating stations, relating to: air emissions; landscape and visual; release of dust by coal-fired generating stations; residue management for coal-fired generating stations; and water quality and resources.

2.5.58 Paragraph 2.5.2 of NPS EN-2 acknowledges that CO2 emissions are a significant adverse impact of fossil fuel generating stations. As such, paragraph 2.5.5 of EN-2 states that an assessment should be carried out at the initial stages of developing proposals, and Paragraph 2.5.8 of EN-2 states that the SoS and Environment Agency (EA) should be satisfied that the potential adverse impacts of mitigation measures are assessed.

2.5.59 Paragraph 2.6.2 of NPS EN-2 advises that the main structures of a fossil fuel generating station – including the turbine and boiler halls, exhaust gas stacks, storage facilities, cooling towers, and water processing plant – are large and likely to have an impact on the surrounding landscape and visual amenity. A landscape and visual impact assessment should therefore be included as part of the ES, and consideration should be given to the design of the plant, the materials to be used, and the visual impact of the stack (paragraphs 2.6.3 and 2.6.4). Paragraph 2.6.5 of EN-2 states that mitigation is to minimise impact on visual amenity as far as reasonably practicable; however, the visibility of a fossil fuel generating station should be given limited weight if the SoS is satisfied that the location is appropriate for the project and that it has been designed sensitively (paragraph 2.6.10).

2.5.60 Paragraph 2.7.1 of NPS EN-2 advises that the sources of noise and vibration from fossil fuel generating stations may include the gas and steam turbines and external noise sources such as externally-sited air-cooled condensers. Paragraph 2.7.2 of EN-2 states that the ES should include a noise assessment, and paragraph 2.7.5 of NPS EN-2 states that mitigation should be achieved through ‘good design’, including enclosure of plant and machinery in noise-reducing buildings where possible.

2.5.61 Paragraph 2.10.1 of NPS EN-2 advises that water cooling systems for fossil fuel generating stations may have additional impacts on water quality, abstraction and discharge. Where the project is likely to have an effect on water quality and resources, Paragraph 2.10.2 of EN-2 states that an assessment should be undertaken to ‘demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water.’

National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

2.5.62 NPS EN-4, together with NPS EN-1, provides the primary basis for decisions by the SoS on applications for gas supply infrastructure and gas and oil pipelines (Paragraph 1.2.1).

2.5.63 Part 2 of NPS EN-4 provides additional guidance to Part 4 and Part 5 of EN-1 regarding the assessment of impacts specific to gas supply infrastructure and oil and gas pipelines.

2.5.64 Sections 2.20 – 2.23 of NPS EN-4 set out addition policy for assessing the potential impacts of gas and oil pipelines, relating to: noise and vibration; biodiversity, landscape and visual; water quality and resources; and soil and geology.

2.5.65 Paragraph 2.20.2 of NPS EN-4 states that there are specific noise and vibration impacts which apply to gas pipelines, including – 'During the pre-construction phase there could be vibration effects from seismic surveys. During construction, tasks may include site clearance, soil movement, ground excavation, tunnelling, trenching, pipe laying and welding, and ground reinstatement. In addition, increased HGV traffic will be generated on local roads for the movement of materials.' The ES should include an assessment of all of the above noise and vibration effects during the pre-construction and construction phases (paragraph 2.20.5).

2.5.66 Paragraph 2.21.1 of NPS EN-4 states that the construction of a pipeline can impact upon 'specific landscape elements within and adjacent to the pipeline route, such as grasslands, field boundaries (hedgerows, hedgebanks, drystone walls, fences), trees, woodlands, and watercourses.' Accordingly, the ES should include an assessment of the biodiversity and landscape and visual effects of the proposed route and of the main alternative routes considered' (paragraph 2.21.3 of EN4). Where it is not possible to restore the landscape to its original state, Paragraph 2.21.3 of EN-4 also states that 'the applicant should set out measures to avoid, mitigate, or employ other landscape measures to compensate for, any adverse effect on the landscape.'

2.5.67 Paragraph 2.22.2 of NPS EN-4 advises that 'constructing pipelines creates corridors of surface clearance and excavation that can potentially affect watercourses, aquifers, water abstraction and discharge points, areas prone to flooding and ecological receptors. As such, an assessment should be provided in the ES where the project is likely to have effects on water resources or water quality, for example through impacts on: 'groundwater recharge or on existing surface water or ground abstraction points; associated ecological receptors', or through: 'siltation or spillages, discharges from maintenance activities or the discharge of disposals such as wastewater or solvents' (paragraphs 2.22.3 and 2.22.4).

2.5.68 Paragraph 2.23.1 of NPS EN-4 states that 'it will be important for applicants to understand the soil types and the nature of the underlying strata.' Accordingly, applicants should consult with the relevant statutory consultees at an early stage regarding the potential impact of gas pipelines on soil and geology (paragraph 2.23.4). Paragraph 2.23.2 states that applicants should assess the stability of the ground conditions associated with the pipeline route, including considering the options for installing the pipeline.

National Policy Statement for Electricity Networks Infrastructure (EN-5)

2.5.69 NPS EN-5, together with NPS EN-1, provides the primary basis for decisions by the SoS on applications for electricity networks infrastructure NSIPs

(Paragraph 1.2.1) such as overhead lines, and associated development of electrical networks infrastructure (such as substations) for other NSIPs. The Project considered an overhead line as an alternative for the Electrical Connection and includes a substation. Accordingly, the Project has had regard to the provisions of NPS EN-5 as they relate to substations and the consideration of alternative Electrical Connections, as set out below.

2.5.70 Part 2 of NPS EN-5 provides additional guidance to Part 4 and Part 5 of EN-1 regarding the assessment of impacts specific to electricity networks infrastructure.

2.5.71 In respect of climate change adaptation, paragraph 2.4.1 of NPS EN-5 states that applicants should set out the extent to which the proposed development would be vulnerable and how it would be resilient to: flooding; the effects of wind and storms; higher average temperatures; and earth movement or subsidence.

2.5.72 Paragraph 2.5.2 of NPS EN-5 states that, 'proposals for electricity networks infrastructure should demonstrate good design in their approach to mitigating the potential adverse impacts which can be associated with overhead lines', particularly in respect of: biodiversity and geological conservation; landscape and visual; noise and vibration; and EMFs.

2.5.73 Paragraph 2.7.1 of NPS EN-5 advises that there is the potential for large birds to collide with overhead power lines, particularly in poor visibility. Accordingly, the EIA should consider whether the proposed line will cause problems at any point along its length, in particular regarding feeding and hunting grounds, migration corridors and breeding grounds (paragraph 2.7.2). Suitable mitigation measures may include: careful siting of the line; making lines more visible; or reducing electrocution risks through the design of crossarms and insulators (paragraphs 2.7.4 – 2.7.6).

2.5.74 Paragraphs 2.8.4 – 2.8.6 of NPS EN-5 state that applicants should follow guidance set out in the Holford Rules when considering the approach to the routeing of new overhead lines. Paragraph 2.8.4 also states that applicants should offer 'constructive proposals for additional mitigation of the proposed overhead lines', and consider the 'potential costs and benefits of other feasible means of connection or reinforcement' where the proposed overhead line is likely to have a significant visual impact.

2.5.75 Paragraph 2.8.8 of NPS EN-5 acknowledges that, whilst the development of overhead lines will often be appropriate for meeting the need for new electricity lines of 132kV and above, there are cases where overhead lines are not appropriate. This paragraph adds, "Where there are serious concerns about the potential adverse landscape and visual effects of a proposed overhead line, the IPC will have to balance these against other relevant factors, including the need for the proposed infrastructure, the availability and cost of alternative sites and routes and methods of installation (including undergrounding)."

2.5.76 Paragraph 2.8.9 of NPS EN-5 notes, “The impacts and costs of both overhead and underground options vary considerably between individual projects (both in absolute and relative terms). Therefore, each project should be assessed individually on the basis of its specific circumstances and taking account of the fact that Government has not laid down any general rule about when an overhead line should be considered unacceptable.”

2.5.77 Paragraph 2.10.1 of NPS EN-5 advises that ‘power frequency Electric and Magnetic Fields (EMFs) arise from generation, transmission, distribution and use of electricity and will occur around power lines and electric cables. Paragraph 2.10.15 of EN-5 states that in order to mitigate for EMFs, the applicant should consider: height, position, insulation and protection measures; optimal phasing of high voltage overhead power lines where possible and practicable; and any new Government advice.

2.6 Other National Planning Policy

2.6.1 Section 104(2)(d) of the PA 2008 states that in determining Applications, the SoS should have regard to any other matters which are considered to be ‘both important and relevant to the [SoS’s] decision.’

2.6.2 Other national planning policy (in addition to the various high level energy policy documents referred to above) which is considered to be important and relevant to the Application is contained within the National Planning Policy Framework (NPPF) (adopted in 2012) and National Planning Practice Guidance (NPPG) are summarised below.

National Planning Policy Framework (NPPF)

2.6.3 The NPPF was adopted in March 2012 to replace previous planning policy statements and guidance, with one consolidated national planning statement. It sets out the Government’s planning policies for England and how these are expected to be applied.

2.6.4 The NPPF does not contain specific policies for NSIPs. Instead, Paragraph 3 of the NPPF states that NSIPs “are determined in accordance with the decision-making framework set out in the Planning Act 2008 and relevant national policy statements for major infrastructure, as well as any other matters that are considered both important and relevant (which may include the National Planning Policy Framework).”

2.6.5 The Application is therefore to be determined primarily in accordance with NPS EN-1, NPS EN-2, NPS EN-4 and NPS EN-5. However, the NPPF does contain some general planning guidance which may be considered to be ‘both important and relevant’ to the determination of the Application.

2.6.6 Paragraph 14 of the NPPF sets out a ‘presumption in favour of sustainable development’, such that development that is sustainable is approved without delay. Sustainable development incorporates: an economic role, which includes identifying and coordinating the provision of infrastructure; a social role, which includes meeting the community's needs; and an environmental role, which includes protecting and enhancing the environment and adapting to a low carbon economy (paragraph 7). Further, Paragraph 56 of the NPPF states that 'good design is a key aspect of sustainable development' and is 'indivisible from good planning.'

2.6.7 Paragraph 17 of the NPPF sets out 12 core planning principles, which include:

- Proactively driving and supporting economic development to deliver amongst other things the infrastructure that the country needs;
- Always seeking to secure high quality design;
- Taking account of the different roles and character of different areas;
- Supporting the transition to a low carbon future;
- Contributing to conserving and enhancing the natural environment; and
- Encouraging the effective use of land by reusing land that has been previously developed.

2.6.8 Paragraph 18 of the NPPF explains that the Government is committed to securing economic growth and to meeting the challenge of a low carbon future.

2.6.9 Paragraph 66 of the NPPF states that proposals in which an applicant has worked closely with those directly affected by their views should be considered favourably.

2.6.10 Paragraph 93 of the NPPF acknowledges that planning plays a key role in supporting the delivery of low carbon energy and therefore achieving the economic, social and environmental dimensions of sustainable development. Paragraph 97 of the NPPF advises that, in order to increase the use and supply of low carbon energy, there should be a positive strategy to promoting energy from renewable and low carbon sources, whilst ensuring that adverse impacts are addressed satisfactorily.

2.6.11 Paragraph 109 of the NPPF states that 'the planning system should contribute to and enhance the natural and local environment' by:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- minimising impacts on biodiversity and providing net gains in biodiversity where possible;
- preventing new development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

2.6.12 Paragraph 121 of the NPPF advises that a site should be suitable, taking into account ground conditions and land instability, pollution and proposed mitigation.

2.6.13 Paragraph 123 of the NPPF advises that planning decisions should seek to avoid noise from giving rise to significant adverse impacts on health and quality of life, and to mitigate any adverse impacts where necessary.

National Planning Practice Guidance (NPPG)

2.6.14 On 6th March 2014, the Government published new online planning practice guidance to replace previous guidance documents and support the application of the NPPF. Sections of the NPPG are updated on a rolling basis. The NPPG resource provides planning guidance in respect of a number of topics, including: air quality, design, flood risk and coastal change, natural environment, noise, renewable and low carbon energy, and water supply, wastewater and water quality. Relevant NPPG guidance, correct as at the end of September 2017, is set out below.

2.6.15 Paragraph 001 of guidance relating to air quality advises that air quality, odour and dust can be a planning concern because of the effect on biodiversity and local amenity. Accordingly, assessments could include a description of baseline conditions, the assessment methods to be adopted and acceptable mitigation measures (paragraph 007). The impacts of air quality could be mitigated through the design and layout of development, the use of green infrastructure, and controlling dust and emissions from construction, operation and demolition (paragraph 008).

2.6.16 Paragraph 001 of guidance relating to design highlights that good quality design is an integral part of sustainable development – "Good design responds in a practical and creative way to both the function and identity of a place. It puts land, water, drainage, energy, community, economic, infrastructure and other such resources to the best possible use – over the long as well as the short term."

2.6.17 Paragraph 029 of guidance relating to flood risk and coastal change advises developers and applicants to consider flood risk to and from the development site as early as possible, and to follow the broad approach of assessing, avoiding, managing and mitigating flood risk. Paragraph 030 states that a site-specific flood risk assessment should be carried out to demonstrate "how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users."

2.6.18 Paragraph 016 of guidance relating to the natural environment states that the potential impacts on biodiversity should inform all stages of development. Biodiversity enhancement should seek to include habitat restoration, re-creation and expansion (paragraph 017).

2.6.19 Paragraph 001 of guidance relating to noise states that "noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment." Paragraph 008 advises that there are four broad types of mitigation: engineering, layout, using planning conditions/obligations and mitigating.

2.6.20 Paragraph 001 of guidance relating to renewable and low carbon energy acknowledges that increasing the amount of energy from low carbon technologies will help to make sure the UK has a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses.

2.6.21 Paragraph 016 of guidance relating to water supply, wastewater and water quality states that a detailed assessment will be required where it is likely that a proposal will have a significant adverse impact on water quality. The assessment should form part of an Environmental Statement.

2.7 Local Planning Policy

2.7.1 Prior to April 2009, the Project Site fell within Mid-Bedfordshire District Council, South Bedfordshire District Council and Bedford Borough Council. However, as part of the structural changes to local government in England, effected on 1 April 2009, new unitary authorities were created on existing borough boundaries, and in parts of the country which previously operated a 'two-tier' system of counties and districts.

2.7.2 As a result of these changes, Mid Bedfordshire District Council and South Bedfordshire Council were combined to form Central Bedfordshire (a unitary authority). BBC also became a unitary authority on its existing boundaries.

2.7.3 Thus, the Project Site now falls within the jurisdiction of the unitary authorities of CBC and BBC. However, several of the planning documents from the previous districts were saved and therefore remain relevant to the Project Site and proposals. As such, local planning policy is contained within the following documents:

The Development Plan

Central Bedfordshire Council

- Central Bedfordshire Core Strategy and Development Management Policies (adopted 2009); and
- Central Bedfordshire Site Allocations DPD (adopted 2011).

Bedford Borough Council

- Bedford Borough Local Plan 2002 (adopted 2002) (Saved Policies);
- Bedford Core Strategy and Rural Issues Plan (adopted 2008); and
- Bedford Allocations and Designations Local Plan (adopted 2013).

Mid-Bedfordshire Council (now dissolved)

- Mid-Bedfordshire Local Plan (adopted 2005) (Saved Policies).

Joint Waste Authority (Bedford Borough, Central Bedfordshire and Luton Borough Councils)

- Bedfordshire and Luton Minerals and Waste Local Plan (2005); and,
- Bedford Borough, Central Bedfordshire and Luton Borough Council – Minerals and Waste Local Plan: Strategic Sites and Policies (adopted 2014).

Other Material Considerations

2.7.4 CBC and BBC are in the process of preparing new development plan documents for their respective local authorities. The draft versions of the development plans are material considerations to the determination of the proposed development.

2.7.5 Further, a number of Supplementary Planning Documents (SPDs) and guidance notes have been adopted in order to supplement and add further details to support the implementation of adopted planning policies. Additional planning guidance of potential relevance to the Project is contained within the following documents.

2.7.6 The material considerations to each respective local authority are listed below.

Central Bedfordshire Council

- Central Bedfordshire Local Plan 2015-2035 (Draft Plan – July 2017);
- Central Bedfordshire Planning Obligations SPD (North) (2009);
- Central Bedfordshire Design Guide (2014);
- Central Bedfordshire Sustainable Drainage Guide (2015); and
- Landscape Character Assessment (2015).

Bedford Borough Council

- Bedford Borough Local Plan 2032 (Draft Strategy 2017);
- Pollution SPD (2008); and
- Bedford Borough Planning Obligations SPD (2013).

Combined

- Forest of Marston Vale Plan (2000).

2.7.7 Local planning policies and guidance contained within the above documents and of relevance to the Project is set out in more detail below.

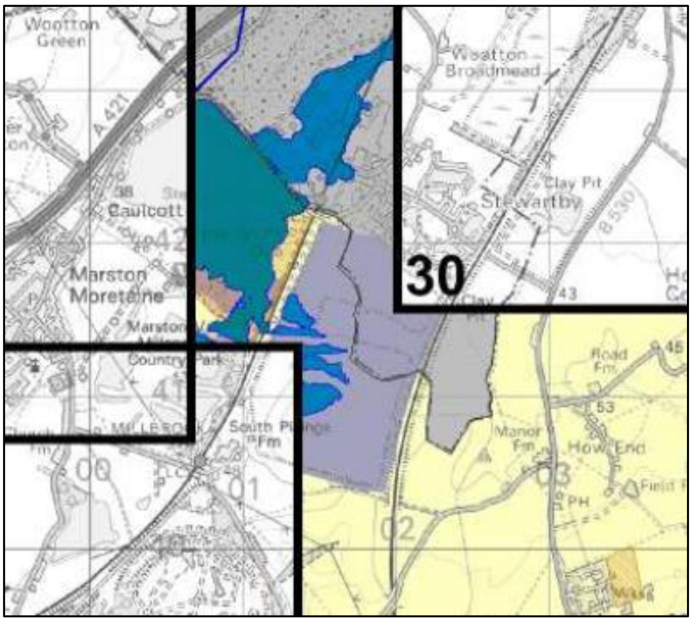
Central Bedfordshire Council

Central Bedfordshire Local Development Framework (North) – Proposals Maps (2011)

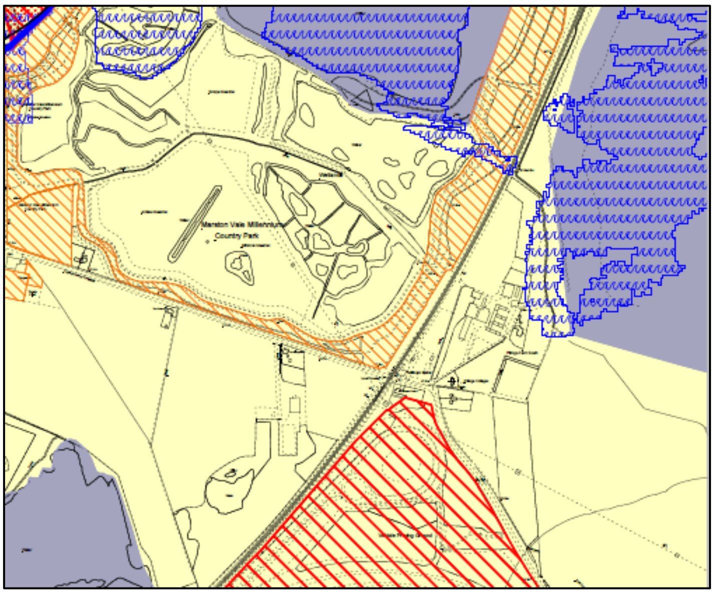
2.7.8 The adopted Proposals Maps form part of the Local Development Framework (LDF) for Central Bedfordshire (North), which also comprises Central Bedfordshire Core Strategy and Development Management Policies (2009) and Central Bedfordshire Site Allocations DPD (2011).

2.7.9 The Project Site is included on 'Side A' and in part on 'Inset 39: Millbrook Proving Ground' of the adopted Proposal Maps, as shown in Inserts 2-1 and 2-2 below, alongside the Key (Insert 2-3).

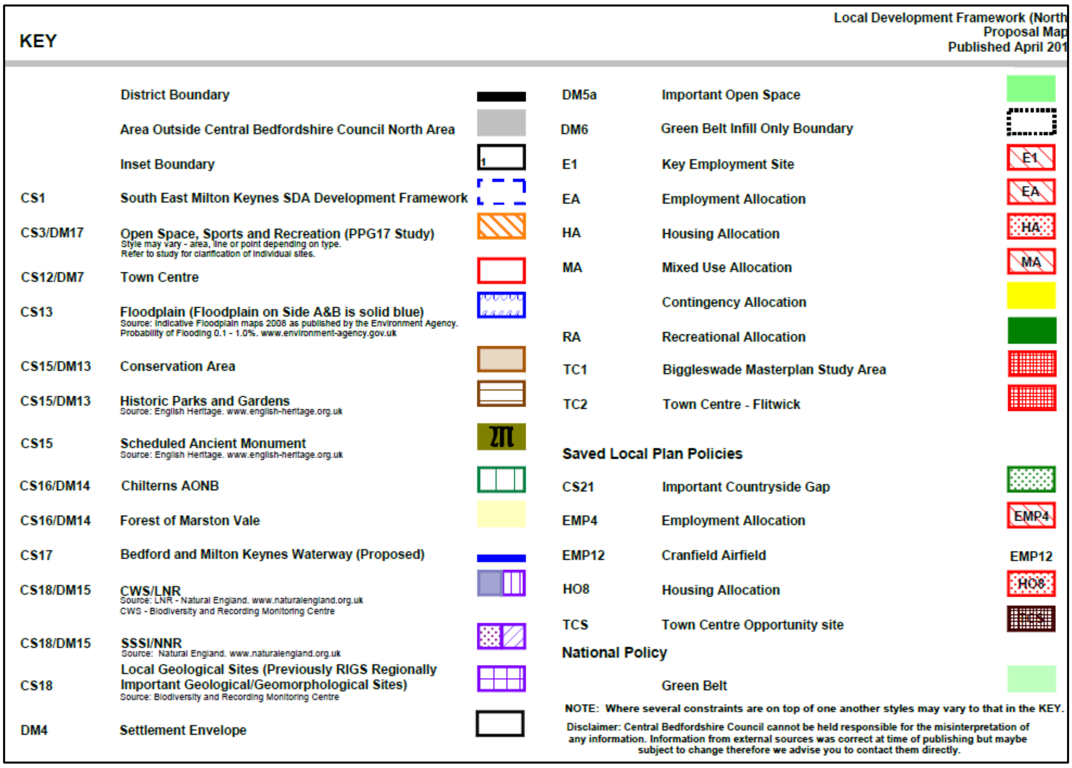
Insert 2-1: Extract of 'Side A' of Central Bedfordshire LDF (North) Proposals Maps



Insert 2-2: Extract of ‘Inset 39: Millbrook proving Ground’ of Central Bedfordshire LDF (North) Proposals Maps



Insert 2-3: Key to Central Bedfordshire LDF (North) Proposals Maps



2.7.10 As illustrated on the adopted Proposals Maps, the Project Site is subject to the following designations and planning policy considerations:

- Forest of Marston Vale – Policies CS16 and DM14 of Central Bedfordshire Core Strategy and Development Management Policies;
- CWS – Policy CS18 of Central Bedfordshire Core Strategy and Development Management Policies;
- Floodplain – Policy CS13.

2.7.11 Reference to relevant planning policy considerations, relating to the designations of the Project Site on the Proposals Maps, is contained below.

Central Bedfordshire Core Strategy and Development Management Policies (2009)

2.7.12 The Central Bedfordshire Core Strategy and Development Management Policies document was adopted in November 2009 as part of the LDF for Central Bedfordshire (North). This document is the key Development Plan Document (DPD) for the northern part of the district and provides the long-term vision and direction for future development in this area over the period 2001-2026.

2.7.13 The Project Site is located on the edge of the Northern Marston Vale Strategic Area, as identified on the Core Strategy Key Diagram. The Spatial Vision for the Core Strategy states that the Northern Marston Vale will 'continue to be a growth location where development will help to bring about environmental regeneration, support the urban renaissance of Bedford and make the Vale a more attractive place to live, do business and enjoy leisure time' (page 16).

2.7.14 Further, Policy CS1 states that sites within Northern Marston Vale will be identified and developed for new homes, jobs and key infrastructure, with a particular focus on delivery at Wixams (north-east of the Project Site) and Marston Moretaine (west of the Project Site). Wixams and Marston Moretaine are identified for housing provision of c.1000 dwellings and c.0-100 dwellings respectively in Policy CS5.

2.7.15 Policy CS9 states that the Council will plan for a minimum target of 17,000 net additional jobs in the district over the period 2001-2026. This target will be supported through the provision of 10-20ha of new employment land within Northern Marston Vale, in accordance with Policy CS10.

2.7.16 The Project Site is located within the floodplain as illustrated on the Central Bedfordshire LDF (North) Proposals Map, where Core Strategy Policy CS13 applies. Policy CS13 states that the Council will seek to minimise the risk of flooding and manage residual risks, as well as securing new development which incorporates measures to take account of climate change. Policy CS13 also states that energy generating proposals with low carbon impact will be considered positively.

2.7.17 Policy CS14 states that the Council will require development to be of the highest quality by, inter alia, respecting local context and the varied character and local distinctiveness of Mid Bedfordshire.

2.7.18 The Project Site is located within the Forest of Marston Vale as illustrated on the LDF North Proposals Map, where Core Strategy Policy CS16 applies. Policy CS16 states that the Council will:

- Conserve and enhance the varied countryside character and local distinctiveness;
- Resist development where it will have an adverse effect on important landscape features or highly sensitive landscapes;
- Require development to enhance landscapes of lesser quality;
- Continue to support the creation of the Forest of Marston Vale;
- Conserve woodlands including ancient and semi natural woodland, hedgerows and veteran trees; and
- Promote an increase in tree cover outside of the Forest of Marston Vale, where it would not threaten other valuable habitats.

2.7.19 Policy CS17 states that the Council will:

- Seek a net gain in green infrastructure through the protection and enhancement of assets and the provision of new green spaces;

- Take forward priority areas for the provision of new green infrastructure in the Forest of Marston Vale; and
- Require new development to contribute towards the delivery of new green infrastructure and the management of a linked network of new and enhanced open spaces and corridors.

2.7.20 The Project Site is part-located within a County Wildlife Site (CWS) as illustrated on the Central Bedfordshire LDF (North) Proposals Map, where Core Strategy Policy CS18 applies. Policy CS18 states that the Council will support the designation, management and protection of biodiversity and geology, including locally important CWS's. Development that would fragment or prejudice the biodiversity network will not be permitted.

2.7.21 Policy DM3 requires that all proposals for new development will, inter alia:

- Be appropriate in scale and design to their setting;
- Respect local distinctiveness through design and use of materials;
- Use energy efficiently;
- Comply with the current guidance on noise, waste management, vibration, odour, water, light and airborne pollution; and
- Incorporate appropriate access and linkages.

2.7.22 The Project Site is located within the Forest of Marston Vale as illustrated on the LDF North Proposals Map, where Core Strategy Policy DM14 applies. Policy DM14 states that the Council will ensure that the impact of proposed development on the landscape will be assessed. Proposals for development within the Northern Marston Vale and the Forest of Marston Vale will be required to provide landscape enhancement on or adjacent to the development site or contribute towards landscape enhancement in these areas. Trees, woodland and hedgerows in the district will be protected by requiring developers to retain and protect such features in close proximity to building works. Further, tree planting or contributions towards planting for the purposes of enhancing the landscape will be sought from new developments.

2.7.23 Policy DM15 states that the Council will ensure that advice is sought from relevant national and local organisations where proposed development is considered to have an impact on wildlife. For developments where there is a need to protect or enhance biodiversity, developers will be required to carry out such work and/or make contributions to secure longer term benefits for wildlife.

Central Bedfordshire Site Allocations DPD (2011)

2.7.24 The Central Bedfordshire Site Allocations DPD was adopted in April 2011. The document identifies sites and policies to help deliver the spatial vision, objectives and policies of the Core Strategy and Development Management Policies DPD.

2.7.25 Policy E1 states that the Council will safeguard a number of Key Employment Sites within the district, including Millbrook Proving Ground (approximately 400 m to the south of the Project Site).

2.7.26 Policy MA4 allocates land at Moreteyne Farm in Marston Moretaine (approximately 1.5 km to the west of the Project Site) for a mixed-use phased development, comprising residential development of 125 dwellings, 7 ha of employment land for B1, B2 and B8 uses, and land reserved for contingency housing provision of 320 dwellings.

2.7.27 Policy HA5 allocates land north of Church Street, Ampthill (approximately 2 km to the south-east of the Project Site) for residential development of 38 dwellings and a public car park.

2.7.28 Policy HA4 allocates land west of Abbey Lane, Ampthill (approximately 2.5 km to the south-east of the Project Site) for residential development of a minimum of 410 dwellings.

<u>Bedford Borough Council</u>

Bedford Borough Local Plan (2002) (Saved Policies)

2.7.29 The Bedford Borough Local Plan was adopted in October 2002. The Local Plan set out a wide range of policies and proposals to guide development in the Borough in the period up to 2006.

2.7.30 Following its expiry, a number of Local Plan policies were 'saved' for continued use in development control. Some 'saved' Local Plan policies have subsequently been deleted following the adoption of the Core Strategy and Rural Issues Plan in 2008, the Town Centre Area Action Plan in 2008 and the Allocations and Designations Local Plan in 2013; however, a number of 'saved' Local Plan policies remain in force and are applicable to the Application.

2.7.31 As illustrated on the adopted Policies Map, the site is part-located within a designated County Wildlife Site and to the south-east of a designated Local Geological Site. Saved Local Plan Policy NE3 states that development will not be permitted that may directly or indirectly destroy or adversely affect a County Wildlife Site or Regionally Important Geological Site.

2.7.32 Saved Policy NE4 states that the Borough Council will seek to protect and retain trees and hedges which are considered to be of amenity, landscape or wildlife significance.

2.7.33 Saved Policy NE8 states that where development would result in the loss of habitats or features, a replacement asset of a comparable or enhanced nature conservation value will be required. Similarly, saved Policy NE9 seeks to control development which may have an impact on the nature conservation of a site, and saved Policy NE10 states that development will be expected to contribute to nature conservation.

2.7.34 Saved Policy NE12 seeks to ensure that development proposals make early provision for adequate and appropriate landscaping. In addition, saved Policy NE13 advises that adequate provision should be made for the retention, protection, management and maintenance of landscape features.

2.7.35 Saved Policy NE24 seeks to ensure that development proposals do not adversely affect the quality or quantity of water resources or their amenity or nature conservation value.

2.7.36 Saved Policy H11 allocates land north of Fields Road, Wootton (approximately 4 km to the north of the Site) for mixed development including approximately 450 dwellings.

2.7.37 Saved Policy H12 allocates land south of Fields Road, Wootton (approximately 3.5 km to the north of the Site) for approximately 340 dwellings.

2.7.38 Saved Policy H13 allocates land at Rousbury Road, Stewartby (approximately 1.5 km to the north of the Site) for residential development of approximately 330 dwellings.

2.7.39 Saved Policy H14 allocates the Elstow Storage Depot (approximately 4 km to the north-east of the Site) for mixed-use development, including approximately 375 dwellings.

2.7.40 Saved Policy T4 seeks to ensure the provision of landscape screening appropriate to the scale of proposed roads and the preservation of existing trees.

2.7.41 Saved Policy LR10 states that the Borough Council will, inter alia: safeguard existing footpath/bridleway links; and seek opportunities to enhance existing footpath, bridleway and cycle networks in conjunction with new development from the urban area into the countryside and the Forest of Marston Vale.

2.7.42 Saved Policy BE9 states that the Borough Council will seek to protect the character and appearance of designed conservation areas through the careful control of development. The policy states that proposals which fail to preserve or enhance their character will not be permitted.

2.7.43 Saved Policy BE11 states that the Borough Council will ensure that all new development likely to affect the setting of conservation areas, preserves or enhances its character or appearance. Applications will be assessed according to the following criteria: design (scale, form, density & materials), traffic generation, visual impact (streetscape, roofscape, skyline & open space) and potential economic regeneration benefits.

2.7.44 Chapter 13 identifies there are no designated heritage assets located within the Power Generation Plant Site however there are two Grade I and four Grade II* listed buildings within the wider study area. Saved Policy BE21 states that the Borough Council will seek to preserve and enhance the setting of listed buildings through controlling the design of new development, use of adjacent land and preservation of trees and landscape features in the vicinity of listed buildings.

2.7.45 Chapter 13 identifies there are no scheduled monuments located within the Power Generation Plant Site however there is one scheduled monument (Ampthill Castle) located in the vicinity of the site. Saved Policy BE23 states that proposals which would have an adverse effect on scheduled ancient monuments and other important archaeological assets and their settings will not be permitted except where adverse impacts can be mitigated while keeping the asset physically preserved in situ.

2.7.46 Saved Policy BE24 states that the Borough Council will have regard to the need to protect, enhance and preserve sites of archaeological interest and their settings when considering planning applications. The policy goes on to state that planning permission will be refused where an adequate assessment has not been undertaken to evaluate the archaeological aspects of proposals.

2.7.47 Saved Policy BE29 Design states that the Borough Council expects all new development to be designed to the highest standards and the Council will promote good design by means of design guides, good design principles and other appropriate measures that it will publicise.

2.7.48 Saved Policy BE30 states that the Borough Council will have full regard to all material considerations when determining applications for new development and particular; visual impact; design quality of building and public spaces; traffic generation and potential for sustainable non-car modes; health and safety issues; generation of waste; adequacy of existing infrastructure; and any adverse impacts on neighbours, the surrounding community, the natural environment and built heritage.

2.7.49 Saved Policy BE38 states that the Borough Council will not grant planning permission unless sufficient provision has been made for landscaping (on-site or off-site) which results in an environmental / landscape benefit. The Borough Council may also negotiate commuted sums to secure the management and maintenance of landscaped areas where appropriate.

Bedford Core Strategy and Rural Issues Plan (2008)

2.7.50 The Bedford Borough Core Strategy and Rural Issues Plan was adopted in 2008. The Plan sets out the long term vision and spatial strategy for Bedford Borough to 2021. The following key policies are relevant to the Project.

2.7.51 Policy CP2 sets out a number of sustainable development principles which seek to ensure that, inter alia: resources and infrastructure are used efficiently; biodiversity is protected and resources are conserved; and climate change is properly addressed.

2.7.52 Policy CP10 states that 'a minimum of 16,000 net additional jobs will be provided in the borough by 2021', and Policy CP11 states that up to 75ha of additional employment land will be provided in the period 2001-2021.

2.7.53 Policy CP21 advises that all new development should, inter alia, be of the highest design quality, fully consider the wider context and address sustainable design principles.

2.7.54 Policy CP24 states that 'The Marston Vale will be the focus for landscape enhancement and restoration and the council will continue to support the Forest of Marston Vale.' New development should protect and where appropriate enhance the quality and character of the landscape.

2.7.55 Policy CP25 states that the biodiversity and geodiversity of the borough will be protected and where appropriate enhanced. Appropriate mitigation and/or compensation will be required where harm to biodiversity and/or geodiversity is likely to be a result of development.

2.7.56 In regards to climate change and pollution, Policy CP26 advises that the Council will require development to, inter alia:

- Minimise the emission of pollutants into the wider environment;
- Have regard to the cumulative impacts of development proposals on air quality;
- Minimise the consumption and use of energy;
- Utilise sustainable construction techniques;
- Incorporate facilities to minimise the use of water and waste; and
- Limit any adverse effects on water quality, reduce water consumption and minimise the risk of flooding.

Bedford Allocations and Designations Local Plan (2013)

2.7.57 The Bedford Borough Allocations and Designations Local Plan was adopted in 2013. The Plan allocates sites to meet the Borough's future development needs and designates areas of land where specific policies will apply.

2.7.58 The Local Plan does not allocate any land within close proximity of the Site for new development; however Policy AD13 allocates the Marston Vale Innovation Park Phase 2 at Wootton (approximately 3 km to the north of the Site) for a mix of classes B1(a)(b)(c) and B2 uses.

Draft Bedford Borough Local Plan 2035

2.7.59 Bedford Borough Council is currently preparing a new Local Plan that will guide new development within the Borough up to 2035. The new Local Plan will allocate the amount and location of new development across the Borough and contain planning policies to manage the delivery of new development.

2.7.60 An initial 'Call for Sites' and Issues and Options consultation was undertaken in early 2014, and a further 'Call for Sites' was undertaken in late 2015. A Consultation Paper was published in April 2017 and consultation ran from 24th

April to 9th June 2017. Further consultation is anticipated in early 2018, followed by submission of the Draft Local Plan in late 2018 and adoption in 2019. Upon adoption, the Local Plan 2035 will replace the adopted Core Strategy and Rural Issues Plan as the key DPD for the Borough.

Mid-Bedfordshire Council

Mid-Bedfordshire Local Plan (2005) (Saved Policies)

2.7.61 The Mid-Bedfordshire Local Plan: First Review was adopted in December 2005. The Local Plan set out a wide range of policies and proposals to guide development within the former Mid-Bedfordshire district. The majority of the Local Plan policies have now been superseded by the Central Bedfordshire Core Strategy and Development Management Policies document (adopted in 2009), however some policies have not been superseded and continue to be part of the development plan.

2.7.62 Saved Local Plan Policy HO8 (1) allocates land east of Lidlington (approximately 2 km to the west of the Project Site) for residential development of approximately 60 dwellings.

2.7.63 Saved Local Plan Policy HO8 (2) allocates land at Stewartby (to the north of the Project Site) for residential development of approximately 50 dwellings.

2.7.64 Saved Local Plan Policy HO8 (2A) allocates land at High Street, Houghton Conquest (approximately 2.5 km to the east of the Project Site) for residential development of approximately 24 dwellings.

2.7.65 Saved Local Plan Policy HO8 (3A) allocated land at Woburn Road, Marston Moretaine (approximately 1.5 km to the east of the Project Site) for residential development of approximately 100 dwellings.

2.7.66 Saved Local Plan Policy HO8 (5) allocates land adjacent to Swaffield Close, Ampthill (approximately 3 km to the south-east of the Project Site) for residential development of approximately 50 dwellings.

Joint Waste Authority (Bedford Borough Council, Central Bedfordshire and Luton Borough Councils)

Bedfordshire and Luton Minerals and Waste Local Plan (2005)

2.7.67 The Bedfordshire and Luton Minerals and Waste Local Plan was adopted in 2005 and covers Bedford Borough, Central Bedfordshire and Luton Borough Councils. The majority of the minerals and waste policies contained in the Local Plan have now been superseded by the Bedford Borough, Central Bedfordshire and Luton Borough Council Minerals and Waste Local Plan: Strategic Sites and Policies (2014). However, some policies have not been superseded and continue to be part of the development plan.

2.7.68 Policy W4 states that an overall reduction in the amount of waste generation in the region will be actively encouraged.

2.7.69 Policy W5 requires that, where developments are likely to generate significant volumes of waste, a waste audit is undertaken which demonstrates that waste is minimised as far as possible and managed appropriately.

2.7.70 Policy W22 states that proposed waste management sites will be protected as far as practicable from development that may conflict or prejudice their waste management use.

Bedford Borough, Central Bedfordshire and Luton Borough Council – Minerals and Waste Local Plan: Strategic Sites and Policies (2014)

2.7.71 The Minerals and Waste Local Plan: Strategic Sites and Policies (MWLP:SSP) was adopted by Bedford Borough, Central Bedfordshire and Luton Borough Councils on 30th January 2014. The MWLP:SSP forms part of the Minerals and Waste Local Development Framework for the three Councils which also includes the Managing Waste in New Developments SPD (adopted in 2006), Minerals and Waste Development Scheme, Monitoring Report, Statement of Community Involvement (adopted in 2006) and Policies Map.

2.7.72 The General and Environmental Policies Local Development Document (LDD), which was anticipated for adoption in 2015/16, was also expected to form part of the MWLP:SSP. However instead of adopting this document, the saved minerals and waste policies will be replaced by new policy in the main Development Plan Documents being produced by the three authorities.

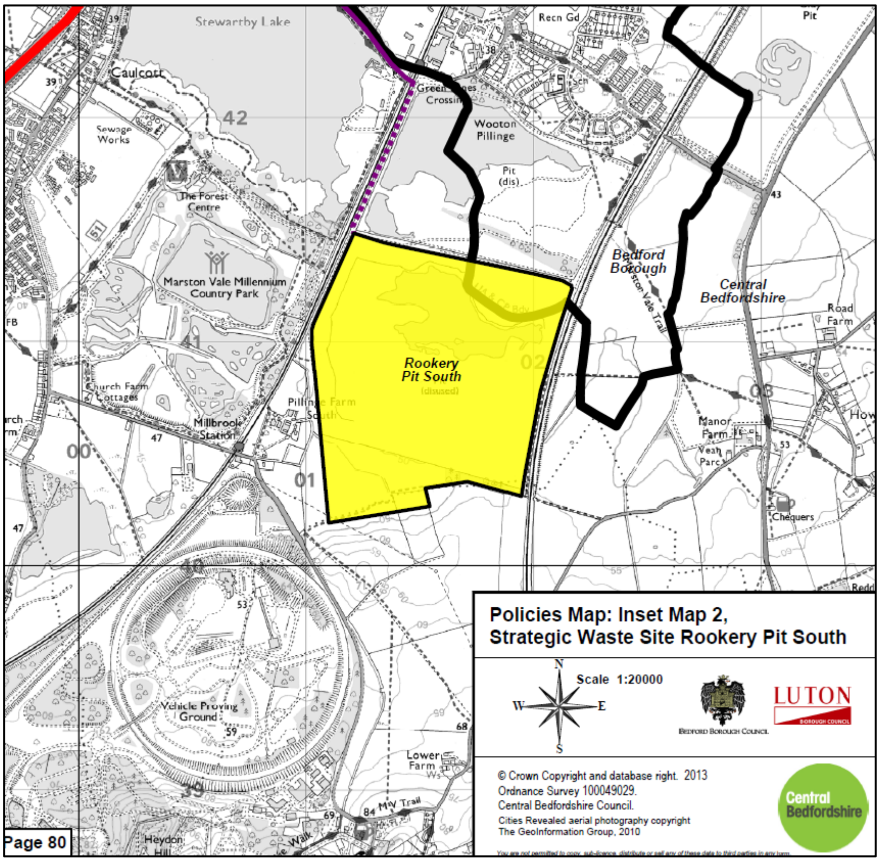
2.7.73 The MWLP:SSP sets out a series of strategic objectives for waste and minerals over the period 2013-2028, together with strategic allocations for mineral extraction and waste management development and strategic policies to guide the ongoing supply of minerals and development of waste management facilities.

2.7.74 The MWLP:SSP sets out a presumption in favour of sustainable development when considering development proposals, at Policy MWSP1, reflective of that contained in the NPPF. Accordingly, Bedford Borough, Central Bedfordshire and Luton Borough Council will work proactively to find solutions which mean that proposals can be approved wherever possible, to secure development that improves the economic, social and environmental conditions in the Plan area. Policy MWSP1 further states that planning applications that accord with the MWLP:SSP and subsequent Local Development Documents will be approved without delay.

2.7.75 The MWLP:SSP addresses the provision of additional waste management capacity in a number of ways, including through various forms of recovery operations, in order to support the move towards a materials reusing economy. As part of the Spatial Strategy for Waste, Policy WSP2 allocates four sites for waste recovery uses, at Elstow North, Land at Former Brogborough landfill, Rookery Pit South, and Land at Thorn Turn. The site at Rookery Pit South (107 ha), located predominantly within Central Bedfordshire Council and partly within Bedford Borough Council, is allocated for non-landfill waste management recovery operations and non-hazardous landfill, with opportunities for pre-treatment recovery operations prior to landfill.

2.7.76 Insert 2-4 shows an extract of the MWLP:SSP Policies Map, Inset 2, illustrating the extent of Rookery Pit South (shaded in yellow) allocated by Policy WSP2 for waste recovery uses.

Insert 2-4: Extract of MWLP:SSP Policies Map Inset 2



2.7.77 Policy MWSP2 requires that waste management and restoration proposals take account of climate change through measures to reduce greenhouse gas emissions and to adapt to future climate changes. The supporting text to Policy MWSP2 acknowledges that all waste management developments have the scope to contribute to mitigating climate change (paragraph 4.15). Paragraph 4.16 of the MWLP:SSP states that applications should set out how waste management developments will make use of renewable, decentralised, and low carbon energy.

2.7.78 Paragraph 5.16 of the MWLP:SSP notes that a DCO was issued in March 2013 for "the development [by Covanta Energy Ltd] of a Resource Recovery Facility on land at Rookery Pit South."

2.8 Other Material Considerations

Central Bedfordshire Council

Central Bedfordshire Local Plan 2015-2035 (Draft Plan – 2017)

2.8.1 The above Draft Local Plan was issued for consultation in July 2017 and will become, once adopted, the main planning policy document for Central Bedfordshire. It will set out the vision, strategic objectives and spatial strategy for the area up to 2035, together with detailed policies to help determine planning applications.

2.8.2 The Draft Local Plan includes detailed and strategic policies for Central Bedfordshire and the Forest of Marston Vale. Policies of relevance to the Project include:

- Policy SP1: Growth Strategy
- Policy SP2: National Planning Policy Framework – Presumption in Favour of Sustainable Development
- Policy T1: Identifying Connectivity, Accessibility and Impacts on the Transport Network
- Policy T2: Mitigation of Transport Impacts on the Network
- Policy T3: Highway Safety and Design
- Policy EE2: Enhancing Biodiversity
- Policy EE4: Trees, Woodlands and Hedgerows
- Policy EE9: Forest of Marston Vale
- Policy CC1; Climate Change and Sustainability
- Policy CC3: Flood Risk Management
- Policy CC5: Sustainable Drainage
- Policy CC6: Water Quality
- Policy CC7: Pollution
- Policy HQ6: High Quality Development
- Policy DC1: Development in the Countryside

2.8.3 The Central Bedfordshire Local Plan will be the key strategic planning document for Central Bedfordshire and will guide the delivery of new infrastructure. Once adopted the plan will replace the North Core Strategy and Development Management Policies Document (2009) and the majority of the remaining policies within the South Bedfordshire Local Plan (2004), the Mid Bedfordshire Local Plan (2005) and the remaining saved policies of the Bedfordshire and Luton Minerals and Waste Local Plan (2005) so far as they affect Central Bedfordshire.

2.8.4 The Draft Local Plan (July 2017) includes broad policies for steering and shaping development, and other more detailed policies for determining planning applications, it does not at this stage include allocation policies for specific sites. These will feature in the next draft of the plan in spring 2018 known as the pre-submission plan.

2.8.5 Once adopted, the Local Plan will be accompanied by the Policies Maps which provide a spatial representation of the Local Plan policies. The Policies Map has not yet been published with the Draft Local Plan.

2.8.6 The Draft Policies relevant to the Project are detailed below:

2.8.7 Draft Policy SP1 sets out the Growth Strategy for Central Bedfordshire in the period 2011-2031, which includes the delivery of 31,000 new homes and 27,000 new jobs.

2.8.8 Draft Policy SP2 states that development proposals will be considered in accordance with the presumption in favour of sustainable development set out within the NPPF.

2.8.9 Draft Policy T1 states that development will be required to evidence that there is sufficient capacity in the transport network to accommodate the increase in demand to travel as a result of the development.

2.8.10 Draft Policy T2 states that development will be required to evidence that sufficient mitigation measures are in place to alleviate any pressures that are demonstrated to occur.

2.8.11 Draft Policy T3 states that proposals for new development must not have a detrimental effect on highway safety, patterns of movement and the access needs of all people. It states that development will be permitted where, inter alia, the proposal does not impede the free flow of traffic on the existing network or create hazards to that traffic and other road users.

2.8.12 Draft Policy EE4 seeks to protect existing trees, woodland and hedgerows. It states that existing hedgerows and trees should be integrated within developments, unless demonstrably inappropriate. Further, it states that any removal of trees or hedgerows to accommodate development must be justified, and should be replaced within the development site.

2.8.13 Draft Policy EE9 states that the Council will continue to support the creation of the Forest of Marston Vale. It required developments for new buildings within the Forest of Marston Vale to demonstrate how they will deliver 30% tree cover across their development site, through a combination of retaining and protecting existing trees and planting of new trees.

2.8.14 Draft Policy CC1 states that the Council will require that any new development minimises the vulnerability of the development and its surroundings to climate change. It lists the means through which new development will be required to incorporate measures that minimise and mitigate their impact on the environment.

2.8.15 Draft Policy CC3 states that development will be supported where inter alia, it located is in areas at lowest risk of flooding. A sequential approach to site layout is applied; a site-specific Flood Risk Assessment has been undertaken following the criteria within this policy and the NPPF and mitigation measures maximise water efficiency and contribute to a net gain in water quality, biodiversity, landscape character and green infrastructure.

2.8.16 Draft Policy CC5 states that all new development must, inter alia, demonstrate that the discharge of surface water obeys the priority order, demonstrate that surface water runoff is managed as close to its source as possible, and demonstrate that demonstrate that the run-off from all hard surfaces shall receive an appropriate level of treatment to minimise the risk of pollution.

2.8.17 Draft Policy CC6 requires all new developments to demonstrate that, inter alia, it has no adverse impact on the quality of waterbodies and groundwater, or will prevent future attainment of good status, and that development contributes positively to the water environment and its ecology and does not adversely affect surface and ground water quality.

2.8.18 Draft Policy CC7 states that development proposals which are likely to cause pollution or are likely to be exposed to potential unacceptable levels of pollution or land instability will only be permitted where it can be demonstrated that measures can be implemented to minimise impacts to a satisfactory level which protects health, environmental quality and amenity.

2.8.19 Draft Policy HQ6 states that the Council will ensure that all developments are of the highest possible quality and respond positively to their context. It states that all development proposals should ensure that, inter alia, a clear distinction between public and private space using clear boundaries. proposals are complimentary to the existing natural environment, there is not an unacceptable adverse impact upon nearby existing or permitted uses, including impacts on amenity, privacy, noise or air quality; resources are used efficiently and energy and water efficiency is maximised; and any lighting associated with the development does not have a detrimental impact on the surrounding areas.

2.8.20 Draft Policy DC1 states that outside Settlement Envelopes the Council will work to maintain and enhance the intrinsic character and beauty of the countryside and only particular types of new development will be permitted.

Central Bedfordshire Planning Obligations SPD (North) (2009)

2.8.21 The Central Bedfordshire Planning Obligations SPD (North) (2009) sets out proposals for negotiating and securing planning obligations associated with new development in Central Bedfordshire; however the approach contained within the Planning Obligations SPD (North) towards securing planning obligations is now no longer in use.

2.8.22 CBC is currently preparing a revised Planning Obligations Strategy for the whole of Central Bedfordshire which will sit alongside the CIL Charging Schedule. However, Central Bedfordshire Council are currently reviewing the charging schedule following the withdrawal of the Development Strategy in November 2015, and there is no agreed timescale for future work at this stage. due for adoption later in 2015. Prior to adoption of the revised Planning Obligations Strategy, planning obligations will be determined on a case-by-case basis.

Central Bedfordshire Design Guide (2014)

2.8.23 The Central Bedfordshire Design Guide (2014) was adopted on 18th March 2014 as technical guidance for development management purposes. The Design Guide sets out the key principles and standards to ensure the delivery of high quality design in Central Bedfordshire. The document comprises one core chapter, entitled 'Placemaking in Central Bedfordshire', and nine accompanying themed supplements, including a chapter entitled 'Green Infrastructure, Climate Change Adaptation and Sustainable Buildings'.

Central Bedfordshire Sustainable Drainage Guide (2015)

2.8.24 The Central Bedfordshire Sustainable Drainage Guide provides technical guidance on the application of SuDS within Central Bedfordshire. It has been created to be a comprehensive resource for SuDS reference and policy development for decision makers and designers, developers and partner organisations to support the application of SUDS in a range of contexts across Central Bedfordshire.

Central Bedfordshire Landscape Character Assessment (2015)

2.8.25 The Central Bedfordshire Landscape Character Assessment is a revision of the previous LCAs for the county of Bedfordshire covering the former Mid Beds and South Beds districts following unitary reorganisation. The LCA of Central Bedfordshire provides a comprehensive landscape evidence base to help underpin planning and management decisions in the Unitary Authority. The assessment presents a characterisation of the whole Unitary Authority through 10 landscape types, and each landscape type is subdivided into component landscape character areas.

Bedford Borough Council

Bedford Borough Climate Change and Pollution SPD (2008)

2.8.26 The Bedford Borough Climate Change and Pollution SPD (2008) was adopted in December 2008 in order to give detailed guidance on the implementation of Policy CP26 of the Council's Core Strategy and Rural Issues Plan, which concerns climate change and pollution. The document seeks to promote a more sustainable approach to energy use, and provide practical advice on, inter alia, how to reduce carbon emissions, conserve water, minimise waste and minimise pollution.

Bedford Borough Planning Obligations SPD (2013)

2.8.27 The Bedford Borough Planning Obligations SPD (2013) was adopted in July 2013. The SPD explains the Council's policies and procedures for securing developer contributions through planning conditions and obligations in S106 Agreements, as well as providing evidence and guidance to developers about the types of contributions that will be sought.

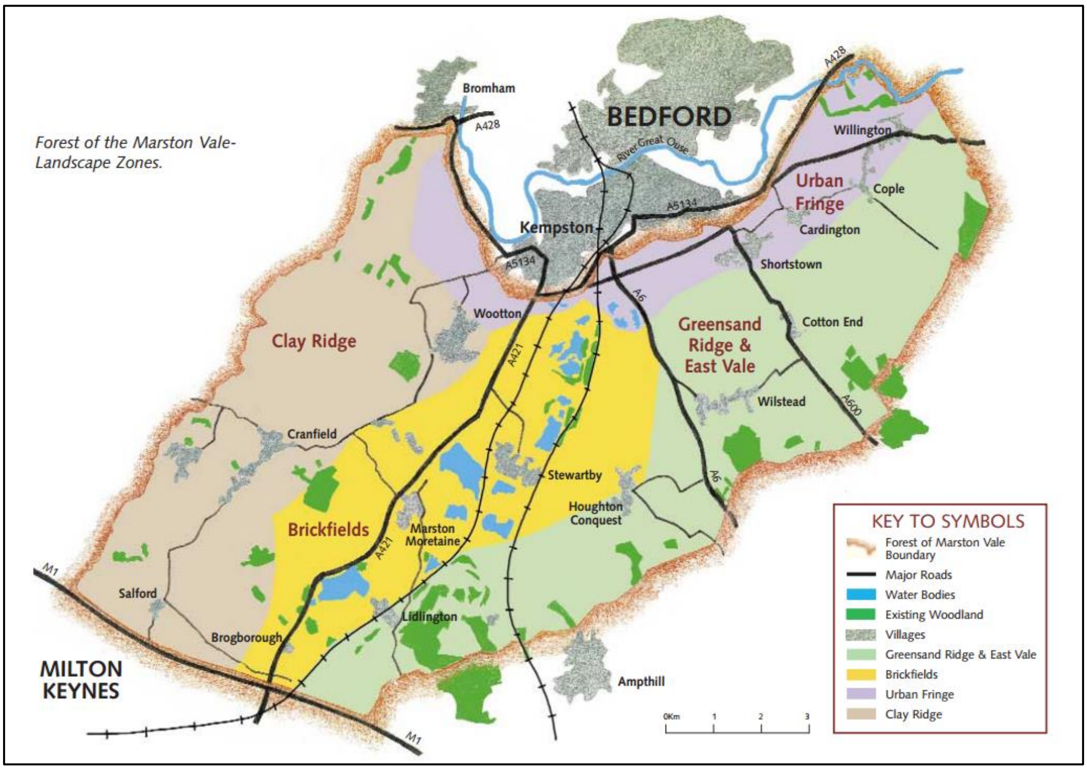
Forest of Marston Vale Plan

2.8.28 The Project Site is located within the Forest of Marston Vale and therefore the Forest of Marston Vale Plan provides planning guidance of relevance to the Project. The Forest of Marston Vale Plan was published as non-statutory planning guidance by Marston Vale Trust in 2000, in order to guide the creation of the Forest of Marston Vale as a Community Forest. The Forest of Marston Vale Plan is a tool to achieve Forest objectives and support countryside enhancement policies, and the plan provides that it shall be a material consideration in the local authority's determination of planning applications for development within the Forest boundary. The publication of the Plan followed the designation of the Forest of Marston Vale as a Community Forest through the Forests for the Community programme, which aimed to achieve major environmental improvements around towns and cities.

2.8.29 The Project Site is located within the Brickfields Landscape Zone of the Forest of Marston Vale (Forest of Marston Vale Plan, Page15), as illustrated in Insert 2-5.

2.8.30 The Forest of Marston Vale Plan identifies the site as located within the Brickfields Landscape Zone (Page 15). According to the Plan, the area is dominated by clay pits and their varying after-uses, transport infrastructure and expanding village settlements. This area is identified as a core area of the Vale where there is a need to secure a higher level of new planting than elsewhere in the community forest (Page 16).

Insert 2-5: Forest of Marston Vale Landscape Zones (Extract from Forest of Marston Vale Plan)



2.8.31 The Forest of Marston Vale Plan notes that the Brickfields Landscape Zone "is the core area of the Vale where there is a need to secure a higher level of new planting than elsewhere in the Community Forest", in order to offer landscape, wildlife, recreation and amenity benefits (page 16). Proposals for the Brickfields Landscape Zone include: "The Team will work with landowners to secure a higher proportion of woodland planting in this area than the more agriculturally productive land to either side of the Vale. All land types will need to be targeted to deliver the level of planting needed and landscape impacts of project work will need to be assessed from both the Vale floor and elevated positions on the ridges" (page 17).

2.8.32 The Forest of Marston Vale Plan also provides further guidance in respect of woodland creation and tree planting. Page 21 of the Forest of Marston Vale Plan notes that, "Tree planting is the core objective of the Community Forest with the new woodland providing a setting for a wide range of other activities. Significant areas of tree planting will be secured towards the 30% target, with the core Brickfields and urban fringe zones being targeted for the highest proportion of tree planting. Reduced tree cover will be sought on the land to the east and west." Furthermore, in this regard, the Forest of Marston Vale Plan continues, that, "Opportunities offered through the restoration of landfill and derelict sites and planning agreements offer the greatest future prospects for large scale woodland creation" (page 21).

2.8.33 The Forest of Marston Vale Plan states that woodland creation and tree planting will be achieved through a number of means, including:

- “implementing an annual programme of tree planting towards realising the long-term aim of 30% woodland cover in the Vale over a 40 year period. Joint working with landowners and organisations such as the Woodland Trust, local authorities and Forestry Commission will be promoted;”
- “promoting well designed new woodlands, as a resource, to deliver a wide range of landscape, economic, social and environmental benefits. Particular emphasis will be placed on securing larger woodlands (>20 ha) and those that meet defragmentation, urban fringe and access objectives in accordance with the England Forestry Strategy and DETR targets;”
- “encouraging and supporting landowners to ensure that all new woodlands are successfully established and well maintained, and developing new services to assist with this, where appropriate;”
- “working with planning authorities to ensure that developments provide opportunities to secure large scale new woodland creation in appropriate areas;”
- “working with site owners and planning authorities to ensure that restoration schemes for derelict land and landfill sites meet Forest landscape, wildlife and recreation objectives;”
- “seeking opportunities to secure land for woodland creation. This could be through acquisition, leasing, management partnerships or other suitable mechanisms.”

2.8.34 The Forest of Marston Vale Plan also notes that, “As part of creating the varied and well-wooded countryside of the Community Forest, the creation and management of a range of habitats other than woodland, such as farmland, grassland, and wetland, is important” (page 24). Accordingly, page 26 of the Forest of Marston Vale Plan states that non-woodland habitats will be managed and created through a number of means, including:

- securing opportunities to maximise the ecological potential of the Marston Vale. This work will be done in conjunction with organisations such as the Wildlife Trust and English Nature and is to be guided by Biodiversity Action Plans where possible;
- using the Countryside Stewardship Scheme or other means to secure new hedgerow planting and enhanced management. Networks of well-managed farmland and roadside hedges that link other habitats will be developed or strengthened;
- increasing and conserving areas of ecologically valuable grassland within the Community Forest, in partnership with the appropriate site owners and managers;
- promoting the appropriate management and increasing the amount of wetland habitats throughout the Marston Vale, including watercourses, ponds, lakes and any marsh areas; and
- working with the Wildlife Trust, Bedfordshire County Council, English Nature and other partners to ensure that any rare habitats and species are

conserved and their status enhanced. Sites of Special Scientific Interest and County Wildlife Sites will be particularly important in this area of work.

3 Project and Site Description

3.1 Project Site and Surroundings

The Rookery

3.1.1 The Project Site is partially located within 'The Rookery'. The Rookery comprises two former clay pits (Rookery North and Rookery South (both shown on Figure 1.2)) covering an area of some 210 ha, separated by an east-west spine of unexcavated clay. The Rookery is situated in the Marston Vale between Milton Keynes and Bedford. It lies predominantly within the administrative area of CBC although it also falls, in part, within the administrative area of the adjacent BBC.

3.1.2 The Generating Equipment Site, Laydown Area and parts of the Access Road, Gas Connection and Electrical Connection would be located within Rookery South Pit which is approximately 95 ha in area and is bound by steep clay banks that are varied in nature and substrate. The level of the pit base currently varies between approximately 10 m and 15 m below ground level and includes open water, reed beds, pools and bare clay. The land that remains at the original ground level, approximately 42 m above ordnance datum (AOD) immediately around the periphery of Rookery South Pit is predominantly bare ground that has been previously cleared of vegetation and subsequently maintained in this state over the last 30 or so years.

3.1.3 The Gas Connection and Electrical Connection would extend from Rookery South Pit into farmland to the south as shown on Figure 1.2. Part of the Access Road would lie within Rookery North Pit.

Low Level Restoration Scheme (LLRS)

3.1.4 The Rookery is the subject of an ongoing LLRS being undertaken by the landowner pursuant to a separate planning consent (application number - BC/CM/2000/8) in order to restore the former clay workings (i.e. below pre-excavation ground levels) to low-intensity agricultural land, with measures included in the restoration to enhance biodiversity and landscape. This restoration work is taking place independently of the Project, although a five-year option agreement, which is extendable to seven under certain conditions, has been put in place between the Applicant and the landowner of Rookery Pit. Included in the agreement is a clause which ensures that the elements of the LLRS as set out below at paragraph 3.1.5 will be completed prior to the commencement of the development of the Project (anticipated to be in 2020 at the earliest). The EIA baseline assessments, as presented in this ES, assume that these LLRS works have been completed.

3.1.5 The LLRS works for Rookery South Pit which form part of the baseline for this ES comprise:

- the re-profiling of the base of the pit involving the extraction of soils and clays from the permitted extraction area on the southern side with re-grading of the base of the pit to an approximate level of 15 mbgl;
- implementation of surface water drainage measures and construction of an attenuation pond and pumping station in order to facilitate a managed surface water drainage strategy;
- a landscape strategy to include planting on the boundary of the Rookery South Pit and the margins of the attenuation pond;
- provision of buttresses to the southern, eastern and northern slopes to ensure the long-term stability of those slopes, and re-grading through excavation;
- provision of a series of permissive footpaths around the perimeter of Rookery North Pit and around the attenuation pond within Rookery South Pit;
- provision of an access ramp into Rookery South Pit from Rookery North Pit which connects to Green Lane, Stewartby via an existing track along the western side of Rookery North Pit. Note that the ramp and existing track are both of an agricultural standard; and
- provision of a further, smaller access track into and out of Rookery South Pit from the south side of the pit connecting with Station Lane, near Millbrook Station.

3.1.6 To facilitate the proposed LLRS works, extraction of clay from a currently un-worked area situated directly to the south of the existing extent of Rookery South Pit will be undertaken. This area covers approximately 25 ha and forms part of the existing minerals extraction consent boundary, but has not historically been subject to excavation works. Deposits won from this area will provide material for use in the restoration, re-profiling and buttressing work to Rookery South Pit together with the implementation of a landscape and ecology strategy, which will integrate with ecological mitigation works and strategic landscape planting in Rookery North Pit.

3.1.7 It is anticipated that all LLRS works will be completed prior to the commencement of the construction works for the Project. Although it is possible that the buttressing and re-profiling to the eastern side of Rookery South Pit may not be completed, these works are outside of the Project Site and any environmental effects associated with the continued LLRS works have been included in the baseline assessments.

3.1.8 Once the LLRS works are completed, Rookery South Pit will be approximately 15 m below the surrounding ground level in the vicinity of the Generating Equipment Site, Laydown Area and the Substation.

Wider Setting

3.1.9 To the north of The Rookery, beyond Green Lane, lie the remaining former brickworks buildings and chimneys of the Stewartby Brickworks as well as the settlement of Stewartby, part of which is a conservation area. Other nearby residential areas include: Houghton Conquest approximately 1.5 km to the east of the Project Site boundary; Marston Moretaine approximately 1.2 km to the west; and Millbrook approximately 400 m to the south. These residential areas are shown on Figure 1.1.

3.1.10 The Project Site is within The Forest of Marston Vale - an evolving community forest which runs south west from the towns of Bedford and Kempston towards the M1 motorway. It is operated by a registered charity- The Marston Vale Trust.

3.1.11 The Forest of Marston Vale is one of twelve of community forest projects in the United Kingdom. It was initiated by the Countryside Agency and the Forestry Commission, in partnership with Bedfordshire County Council, Mid Bedfordshire District Council, and BBC. The total area covered is 61 square miles (158 km^2). There are incentives for landowners to plant trees, and the target for community forests in general is to reach 30% tree cover.

3.1.12 The principal public open space in the Forest is Marston Vale Millennium Country Park, as shown on Figure 1.2, which provides habitat conservation and indoor and outdoor community amenities and is also the site of a wind turbine. There is also a Forest Centre within the Country Park which provides the focal point for the indoor and outdoor community amenities. Millbrook Proving Ground, a vehicle testing ground covering 285 ha, is located to the south-west of the Electrical Connection.

3.1.13 Road access to the Power Generation Plant Site is currently from the north near Stewartby via the A421, Bedford Road (this is the old-A421 formerly known as the C94) and Green Lane, as shown on Figure 1.2. There is a junction on Green Lane leading to an access track which extends southwards into Rookery South Pit and the Generating Equipment Site. The Gas and Electrical Connections would be accessed, in part, by the route described above then through the Power Generation Plant Site. They would also be accessed from the A421, northwards along the A5141, westwards then southwards for approximately 7 km along the B530 (referred to variously along its route as Ampthill Road / Hardwick Road / Bedford Road / Hazelwood Lane) to Millbrook Road (for the Gas Connection) continuing along Houghton Lane and Station Lane to access the Electrical Connection.

3.1.14 A level crossing of the Marston Vale Rail line is located 70 m to the west of the junction between Green Lane and the Access Road. The Kimberley College (a STEM - Science, Technology Engineering and Mathematics – Sixth Form College) is located to the north of Green Lane, 400 m to the west of the proposed site access.

3.1.15 There are overhead power lines that run west to east, to the south of Rookery South Pit. Furthermore, a number of existing public footpaths are located in and around the Project Site, linking it to the wider Marston Vale. As part of the

LLRS there are also a series of permissive footpaths proposed within the Rookery (See Appendix 12.1).

3.1.16 The Mill Brook watercourse flows in a northerly direction along the western flank of Rookery South Pit whilst a tributary watercourse, passing to the south of Rookery South Pit within the Project Site, joins Mill Brook in the vicinity of South Pillinge Farm. Further detail is provided in Chapter 9 and shown on Figure 9.1.

3.1.17 Substantial areas of land around Stewartby, including The Rookery, have been previously worked for clay that was used in Stewartby Brickworks until it closed in 2008. Following clay extraction, these former clay working sites have been restored (to varying levels of completion) by different means and to different uses, including water based recreation and commercial sites.

3.1.18 Furthermore, significant regeneration and development is allocated for the Northern Marston Vale Growth Area, in which the Project Site is located. This will result in further change within the landscape, not least represented by the provision of substantial residential and employment development such as in the nearby settlements of Marston Moretaine and Stewartby.

3.1.19 The Gas Connection and Electrical Connection would be located largely outside of Rookery South Pit, in a less dynamic, mostly undeveloped agricultural landscape which comprises large arable fields, small areas of woodland, hedgerows and a number of drainage ditches.

3.1.20 The closest residential dwelling to the Power Generation Plant Site is South Pillinge Farm, located approximately 130 m to the west of the Project Site boundary. South Pillinge Farm is separated from the Project Site by a small deciduous woodland.

Relevant Planning History

3.1.21 The area around the Marston Vale has a long history of clay extraction, which was used primarily for the brick industry resulting in former clay extraction pits dominating the Marston Vale. Some have been restored for amenity use (e.g. on the nearby Millennium Country Park), while others have been used for landfill (e.g. Stewartby and Brogborough), whereas the Rookery South Pit has remained as an open, undeveloped pit.

3.1.22 Partial backfilling of Rookery South Pit has been recorded, including deposition of non-hazardous liquid organic wastes from a variety of industrial sources. The waste was reportedly mixed with un-weathered Oxford Clay deposits commonly known as the “callow” and pumped, as sludge, into the south eastern quarter of the Rookery North Pit and the north eastern quarter of Rookery South Pit but outside of the Project Site boundary.

3.1.23 Additional fill to the base of Rookery South Pit has also been historically undertaken by placement of variable thicknesses (generally from 1 m to 4 m) of Callow Clay Fill across the base of the pit. These naturally occurring deposits were unsuitable for the brick making process and were cast back into the pit along with brick fragments and other overburden deposits.

3.1.24 The land directly north of the Generating Equipment Site has been allocated to a Resource Recovery Facility (RRF) which Covanta Rookery South Limited obtained DCO consent for pursuant to the PA 2008 in autumn 2011 (the 'Covanta RRF Project'). Construction has not commenced on the Covanta RRF Project and therefore it has been considered as part of the cumulative effects assessment in each topic chapter rather than as part of the baseline conditions as discussed in section 4.10 below. Nevertheless, as the proposed start of construction for the Covanta RRF Project is Q1 2018 there is the possibility that construction of the Covanta RRF Project could occur during Examination of the DCO Application for the Project. If this is the case, the cumulative assessments presented still represent a sufficient assessment of the potential cumulative effects of both projects during construction and operation.

Development Parameters and the 'Rochdale Envelope'

3.1.25 As a series of parameters have been built into the design of the Project, this ES has been prepared with reference to PINS Advice Note 9 (AN9) – 'Using the Rochdale Envelope'. AN9 states that PINS understands that '…the 'Rochdale Envelope' is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been resolved at the time when the application is submitted'.

3.1.26 In the case of this Project, it is considered that the DCO Application would be flexible enough using the Rochdale Envelope approach to allow the Applicant to construct and operate an electricity generating plant of up to 299 MW by building one Gas Turbine Generator with its own dedicated flue stack, which could be procured from a range of suppliers.

3.1.27 It is made clear in AN9 that an EIA must '...ensure that all the realistic and likely worst case variations of the project have been properly considered and clearly set out in the ES and as such that the likely significant impacts have been adequately assessed'.

3.1.28 To this end, where flexibility in parameters for the Project (such as the height of the stack) has been provided, the Applicant has assessed the realistic worst case and it is made clear in each 'topic' assessment what this constitutes.

3.2 Description of Power Generation Plant

3.2.1 The elements which make up the Power Generation Plant are set out in paragraph 1.1.4 and are described in turn below.

Generating Equipment

Overview

3.2.2 The maximum area for the Generating Equipment Site would be approximately 4 ha. Figure 3.1 shows an indicative illustration of the position and layout of the Generating Equipment with the Electrical Connection. The design would be finalised in the event that a DCO is made by the SoS and the Gas Turbine Generator has been procured. The Requirements of the DCO (similar to planning conditions) would control the detail of the final design and would require approval by the relevant planning authorities at that time (in this case CBC and BBC). In addition, embedded and additional mitigation would be inherent to the design. The Applicant is therefore proposing to submit its application on the basis of a series of parameters for the Project which allows an assessment of the realistic worst case in accordance with the 'Rochdale Envelope' approach as explained in paragraphs 3.1.25 – 3.1.28 above.

3.2.3 The nature and purpose of peaking plants such as that which is proposed for the Project is set out in paragraph 1.1.10 and the reason for selecting OCGT plant as the most appropriate technology choice is further described in Chapter 5. The paragraphs below therefore describe the operation of OCGT plants in more detail.

Open Cycle Gas Turbine (OCGT)

3.2.4 An 'industrial' type gas turbine would be used for the Project. This type of turbine has been selected as it is suited to generating up to 299 MW using only one unit, thereby reducing potential effects of noise, air quality and visual impacts. Additionally, they are suitable for frequent and fast start-ups, flexibility, and high-availability maintenance techniques.

3.2.5 The main equipment in an OCGT is a Gas Turbine Generator, including the following components:

- Gas turbine generator;
- air inlet filter house;
- air inlet duct;
- exhaust diffuser;
- Auxiliaries including:
  - Lube oil system;
  - Air dryers;
  - Fuel gas filter package;
  - Instrument air system;
  - Compressor washing; and
  - A stack with an exhaust silencer would also be part of the OCGT.

3.2.6 On entering the gas turbine, air would be compressed and natural gas injected into the air. The air and natural gas mixture would then burn in the combustion chamber producing hot, high pressure gases. The gas would then expand across the blades of the gas turbine driving the compressor and the electrical generator to produce electricity.

3.2.7 The waste gases and heat produced from this process would be released into the atmosphere via the stack. The stack would contain equipment which would reduce emissions released to the atmosphere, including a silencer.

3.2.8 Further information on why the exhaust gases are emitted to the atmosphere and cannot be recovered is given in Chapter 5 of this ES and in a separate Combined Heat and Power (CHP) statement (Appendix 5.1).

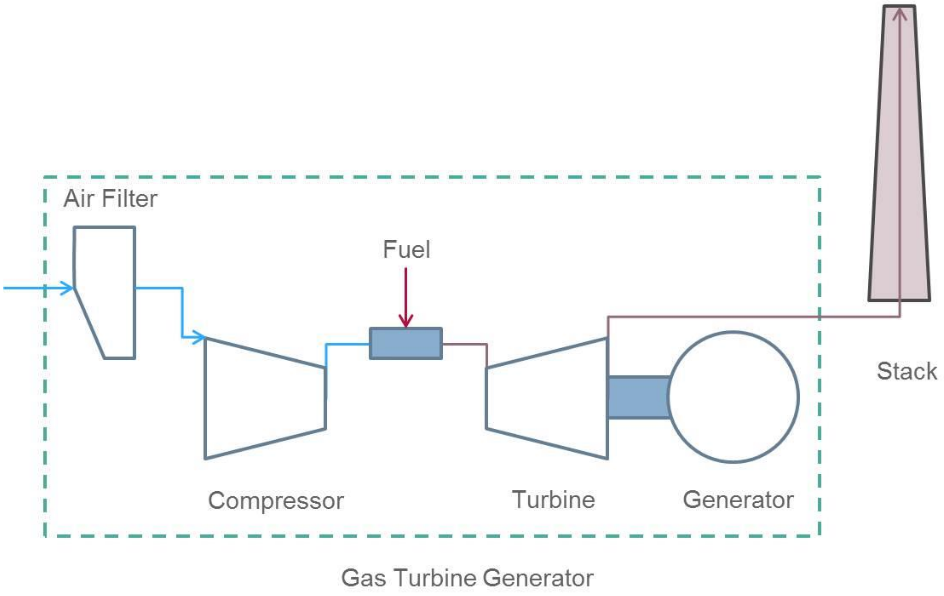
3.2.9 A stack height sensitivity study has been undertaken for the Project to determine the minimum stack height for the Gas Turbine Generator required for adequate dispersion of emissions to meet legislative air quality targets. The findings of this initial study setting out the height parameters are in Table 3.1.

3.2.10 Stack emissions would be continuously recorded to ensure correct and efficient operation of the Generating Equipment. Any significant deviations to emission limit values specified in the Environmental Permit required for the Project would be alarmed and corrections carried out on occurrence. Records of performance and deviation would be maintained. Full facilities for interfacing information, control and alarm systems would be installed so that the Generating Equipment can be operated from a central control room via a distributed control system (DCS). In the event of a fault in the Gas Turbine Generator or other major plant items, the Generating Equipment would shut down automatically in a controlled manner.

3.2.11 Processed natural gas sourced from the National Transmission System is a clean burning fuel and does not produce the particulate or sulphur emissions associated with burning coal. Further discussion of emissions characteristics from the Generating Equipment is provided in Chapter 6 of this ES which sets out the findings of the air quality assessment.

3.2.12 Insert 3.1 shows a simple schematic of OCGT operation.

Insert 3.1 - Schematic of OCGT operation



Other Generating Equipment Plant Items

3.2.13 In addition to the Gas Turbine Generator at the Generating Equipment Site, the following plant and buildings would also be present:

- Raw / Fire Water Tank: The fire water storage tank would be designed to comply with the relevant fire regulations and would be installed together with fire pumps, hose reels, fire hydrants and portable extinguishers;
- Demineralised Water Tank: Required to store demineralised water for the Generating Equipment (used for e.g. blade washing);
- Control Room / office / workshop Building: Required in order to monitor the plant operation and house plant controls;
- Gatehouse: Needed to provide security and maintain a log of site attendance, deliveries etc.;
- Electrical Transformer Compound: Required to connect the electrical infrastructure from the Generating Equipment to transformers before export to the Substation which is part of the NETS, via overhead cables. This would also include a generator step-up transformer, unit and other transformers, an overhead line gantry and associated equipment;
- Natural Gas Receiving Station: Required to ensure that gas coming from the National Transmission System feeds into the Generating Equipment Site at the right flow and pressure conditions. This would include a Pipeline Inspection Gauge (PIG) receiving facility, isolation valves, metering, heating, filtering, compression, pressure regulation equipment, electricity supply kiosks, emergency generator including fuel storage tank, Joule-Thompson boilers and auxiliary control and instrumentation kiosks;
- Fin-Fan Cooler(s) to provide cooling to the Generating Equipment;

- Telemetry apparatus including electrical cabinets;
- Emergency Generator: A small diesel fired generator to provide power for the safe shutdown of the Gas Turbine Generator and running of essential security systems in emergency situations; and
- Maintenance Compound: an area of hard standing for use during maintenance procedures.

3.2.14 Table 3.1 provides minimum and maximum dimensions for the main plant items located within the Project Site. Figure 3.1 shows an indicative illustration of the position and layout of the Generating Equipment and Electrical Connection.

Table 3.1 Minimum and Maximum Dimensions of Main Plant Items, Substation and Electrical Connection

Building or structure	***Maximum height (metres above existing site level of approximately 31.5 metres AOD unless otherwise stated)***	***Minimum height (metres above existing site level of approximately 31.5 metres AOD unless otherwise stated)***	***Maximum length (metres)***	***Minimum length (metres)***	***Maximum width (metres)***	***Minimum width (metres)***
Gas turbine generator (including gas turbine, generator, air inlet filter house, air inlet duct, exhaust diffuser, and auxiliaries such as lube oil system, air dryers, fuel gas filter package, instrument air system, compressor washing)	27	–	50	–	40	–
Exhaust gas emission flue stack	35	32.5	12	–	12	–
Control room/office/ workshop	7	–	45	–	25	–
Emergency Generator	6	–	13	–	5	–

Building or structure	*Maximum height (metres above existing site level of approximately 31.5 metres AOD unless otherwise stated)*	*Minimum height (metres above existing site level of approximately 31.5 metres AOD unless otherwise stated)*	*Maximum length (metres)*	*Minimum length (metres)*	*Maximum width (metres)*	*Minimum width (metres)*
Raw/fire water tank	15	–	15	–	15	–
Demineralised water tank	5	–	5	–	5	–
Gas receiving station (including compression station, emergency generator, Joule-Thompson boilers and other auxiliary control cabinets)	10	–	70	–	50	–
Fin Fan Cooler(s)	10	–	28	–	14	–
Transformer compound (including generator step up transformer, unit and other transformers, overhead line gantry and associated equipment.)	15	–	65	–	60	–
Gatehouse	4.5	–	9	–	8	–
Above Ground Installation	3	–	85	–	35	–
Pipeline inspection gauge facility	3	–	35	–	30	–
Minimum offtake connection	3	–	35	–	35	–
Substation (including the auxiliary building)	14		200		150	

Building or structure	*Maximum height (metres above existing site level of approximately 31.5 metres AOD unless otherwise stated)*	*Minimum height (metres above existing site level of approximately 31.5 metres AOD unless otherwise stated)*	*Maximum length (metres)*	*Minimum length (metres)*	*Maximum width (metres)*	*Minimum width (metres)*
Each Sealing end compound	17	–	45	–	35	–
Transmission tower	49	–	40	–	30	–
Each Temporary tower or mast	55	–	47	–	32	–

* Existing site level is approximately 70 m AOD

** Existing site level is approximately 49 m AOD

Laydown Area

3.2.15 A temporary Laydown Area for the storage of plant and equipment during construction would be provided adjacent to the Generating Equipment Site. This is shown on Figure 1.2.

Access Road

3.2.16 An agricultural access track is already in existence at the Project Site, linking Green Lane to Rookery South Pit. The LLRS, as described in paragraphs 3.1.4 – 3.1.8, includes work to build a new ramp into the Rookery South Pit itself.

3.2.17 The Covanta RRF Project includes provision to upgrade this track further, to a tarmac road suitable for 594 traffic movements a day for the delivery of waste via HGV. Should this road be developed as part of the Covanta RRF Project prior to the development of this Project, it would be suitable to meet both the needs of the Project and the Covanta RRF Project. In this instance, there would be a requirement for a short section of new Access Road ('Short Access Road') of up to 1.4 km in length connecting the end of the Covanta RRF road to the Generating Equipment Site. References in this ES to the "Access Road" mean the up to 2.2 km access road referred to below and includes the Short Access Road. References to the "Short Access Road" refer only to the approximately 1.4 km length road that MPL would construct in the event that the Covanta scheme commenced ahead of the Project. The Short Access Road would be constructed from tarmac bordered by a concrete kerb. The tarmac surface would be 6 m wide allowing for two-way traffic. It is bordered on one side by a footway.

3.2.18 However, because it is not certain when the Covanta RRF Project will be implemented, the Applicant has also included the provision of a complete

Access Road from Green Lane to the Generating Equipment Site within this Project. If the Covanta RRF Project is not built before construction commences for the Project, then the complete Access Road would be built. This complete 2.2 km long Access Road would be constructed from tarmac bordered by a concrete kerb. The tarmacked surface would be 6 m wide allowing for two-way traffic. It would be bordered in part on one side by a footway where there is no existing footpath.

3.2.19 The route of the Access Road from Green Lane would follow the alignment of the access road proposed within the LLRS and Covanta RRF Project along the existing access track which borders Rookery North Pit. On reaching Rookery South Pit, the Access Road (as would also be the case for the Covanta RRF Project's access road) would use the access ramp (built to agricultural standard as part of the LLRS as described below) to enter into the pit and cross through the base of the pit until it reaches the Generating Equipment Site.

3.2.20 Should the Access Road for the Project be constructed first, it would not prevent the Covanta RRF Project or other developments from progressing at a later date, although it may mean that the Access Road would be upgraded as part of the other scheme(s). The upgrade of the Access Road would be the responsibility of Covanta in the event that the permission for that scheme is implemented after any DCO for the Project.

Car Parking

3.2.21 During construction adequate car parking would be provided within the Laydown Area. During operation car parking for operational and maintenance staff would be provided within the Generating Equipment Site and the Substation.

Lighting and Security Fencing

3.2.22 Lighting columns would be erected around the perimeter of the Generating Equipment in order to provide security lighting and lighting for safe working in dark conditions. The lighting columns would be approximately 8 m in height and regularly spaced around the perimeter of the Generating Equipment Site.

Carbon Capture Readiness (CCR) and Carbon Capture and Storage (CCS)

3.2.23 On the basis that the Project's maximum rated electrical output would be 299 MW, the Project would be below the threshold set out in Directive 2009/31/EC29 on the geological storage of carbon dioxide and NPS EN-1 and EN-2 for when operators of combustion plants are required to have assessed the feasibility of: a storage site, transport facilities and economic considerations of the capture of carbon dioxide (CO_2) (e.g. CCR for CCS) produced as a result of the combustion process. Therefore, it is not considered necessary to assess the viability of CO_2 capture or include it further in this ES.

3.2.24 It is noted that the Project consented by the DCO must have a “rated electrical output” of, or less than, 299 MWe and that the Applicant intends to procure a generating station with a rated electrical output of no more than 299 MWe measured at the terminals of the Generating Equipment.

3.2.25 The Applicant will be required to demonstrate that it would not be possible for the operating plant to exceed 299 MWe, in order to comply with the IED that requires all new combustion plants with a rated electrical output of 300 MW or more to have met a number of conditions and ensured space is available for carbon capture and storage.

3.3 Description of Gas Connection

3.3.1 The Gas Connection would comprise all the necessary elements to enable gas to be imported to the Generating Equipment at a suitable rate and pressure to produce up to 299 MW, including a new underground pipeline and AGI.

3.3.2 The underground gas pipeline connection (the Pipeline) would be constructed between the AGI (to be installed at the connection point with the National Transmission System) and the Generating Equipment. The Pipeline and AGI are required in order to connect the Generating Equipment to the existing high pressure National Transmission System so as to provide a reliable supply of fuel. The feasibility and route selection studies undertaken for this connection are described in Chapter 5.

Route

3.3.3 The route of the Gas Connection is approximately 1.8 km in length as shown on Figure 1.2. It involves no major road crossings, one minor road crossing, one farm track crossing, no major or minor water crossings, two ditch crossings and no in-road mains-laying. It also crosses the National Transmission System Feeder 9 gas pipeline and an oil pipeline.

3.3.4 The Pipeline begins at the AGI which would allow connection into the National Transmission System Feeder 9, east of the Millbrook Proving Ground approximately 1.45 km south of the Generating Equipment Site. The Pipeline exits the AGI to the north and immediately crosses a farm track which is connected to Lower Farm. The route then continues in a northerly direction for around 25 m before it turns 45° to the west crossing National Transmission System Feeder 9. It continues west for approximately 20 m before turning 45° back to the east. It continues in this northerly direction for approximately 110 m before crossing a PROW.

3.3.5 After another 70 m, the route turns 45° to the west before crossing Millbrook Road. The route then turns 45° back to the east for 100 m and then 45° further to the east before crossing under a set of overhead lines. After a further 30 m the route turns 45° to the west and continues due north for approximately 250 m before turning a further 22.5° west and crossing between a gap in the hedgerow of a field boundary. After crossing the hedgerow, the route turns a further 22.5° west and after approximately 300 m crosses beneath an oil pipeline. The route then continues in the same direction for approximately 220 m before turning 11.25° to the east and after 80 m crosses a further PROW and a field drain.

3.3.6 The route then continues for a further 100 m before turning 90°west into the Generating Equipment Site.

Connection to the National Transmission System

3.3.7 Connection of the Pipeline to a National Transmission System feeder would require an AGI to be installed which would include: a Minimum Offtake Connection (MOC) facility, which would be owned by National Grid Gas Plc (NGG), and a Pipeline Inspection Gauge (PIG) Facility which would be owned by the Applicant (together, referred to as the AGI).

3.3.8 The MOC (approximately 35 m x 35 m in area) would contain:

- Remotely operable valve (ROV);
- Control and instrumentation kiosk; and
- Electrical supply kiosk.

3.3.9 The PIG Facility (approximately 35 m x 30 m in area) would contain:

- PIG launching facility;
- Emergency control valve;
- Isolation valve;
- Control and instrumentation kiosk; and
- Electrical supply kiosk.

3.3.10 Termination of the Gas Connection would be at the gas receiving station on the Generating Equipment Site.

3.3.11 Two options would be used with regard to access for the Gas Connection. These access options are shown on Figure 12.2, and are as follows:

- through the Rookery South Pit, from the Power Generation Plant Site; and
- from the A421, northwards along the A5141, westwards then southwards for approximately 7km along the B530 (referred to variously along its route as Ampthill Road / Hardwick Road / Bedford Road / Hazelwood Lane) to Millbrook Road.

3.3.12 An existing junction off Houghton Lane onto an existing agricultural track would both be upgraded and used to access the AGI.

3.3.13 During construction, a temporary laydown area would be required adjacent to the AGI for laydown of plant and equipment.

3.4 Description of the Electrical Connection

3.4.1 The Electrical Connection would comprise all the necessary elements to enable power to be exported from the Generating Equipment to the NETS, such as the Substation comprising switchgear bays, gantries, emergency power supply, welfare accommodation, battery rooms, control cubicles and internal site roads.

3.4.2 A grid connection assessment was undertaken in March 2014 in order to define and evaluate the options available for connecting the Generating Equipment to the NETS. This (along with consultations undertaken with NGET) identified that the most suitable point of connection would be a new substation to be located adjacent to the western boundary of the Generating Equipment Site, which would connect into the existing NGET double circuit 400 kV line (forming part of the NETS) which runs from Sundon to Grendon. The 400 kV line is located approximately 320 m southwest of the Generating Equipment Site as shown on Figure 1.2.

3.4.3 Further refinement and discussion with NGET in 2017 have allowed the connection design to be reduced to a single option which is presented in this ES. This comprises one underground 400kV double circuit Tee-in, requiring one new transmission tower, which would replace an existing tower, and be located in the existing Grendon – Sundon transmission route corridor, therefore resulting in no net additional towers. The Electrical Connection would also require two SECs, which will be located on either side of the existing transmission line. Underground cables would be approximately 500 m in length buried in four trenches typically 5 m apart, to a new substation. Three cables would be laid together within each trench to make 12 cables in total.

3.4.4 The SECs and replacement tower may cause a permanent obstruction to the LLRS secondary access. If this is the case, a short permanent diversion would be provided.

Substation

3.4.5 A new 400Kv Substation would be located in Rookery South pit, adjacent to the Generating Equipment Site. A substation can either be an air insulated substation (AIS) or a gas insulated substation (GIS). MPL considers that a Substation with AIS technology is appropriate and acceptable in the location (within Rookery South Pit). The Substation would be approximately 200 m x 150 m.

3.4.6 Two access route options would be used for construction access for the Electrical Connection. They are shown on Figure 12.2 and are as follows:

- through the Rookery South Pit, from the area of the Power Generation Plant Site; or
- from the A421, northwards along the A5141, westwards then southwards for approximately 7 km along the B530 (Ampthill Road / Hardwick Road /

Bedford Road / Hazelwood Lane) to Millbrook Road, Houghton Lane and Station Lane. The secondary access into the southern side of Rookery South Pit that is being constructed as part of the LLRS would then be used to access the Electrical Connection.

3.4.7 An assessment of both access routes has been undertaken and is presented in this ES.

3.5 Activities relating to Construction, Maintenance and Decommissioning

Overview

3.5.1 Construction and commissioning of the Project would take approximately 22 months. The main works associated with the construction phase would be preparation for new foundations, piling (if required), erection of the Generating Equipment, construction of the Access Road and the laying of the Gas Pipeline and erecting the Electrical Connection. No requirements for demolition or remediation have been identified at this stage barring the removal of the existing transmission tower in the existing Grendon – Sundon transmission route corridor.

3.5.2 As referred to in paragraphs 3.1.4 to 3.1.8 above, the option agreement between the Applicant and the landowner ensures that, as a minimum, those highlighted elements of the LLRS would be complete prior to construction of the Project commencing (which is anticipated to be in 2020 at the earliest).

Construction – Power Generation Plant

Site Establishment

3.5.3 If a DCO is granted and 'Start of Development' requirements are approved, work can start on the Power Generation Plant Site.

3.5.4 Haul routes would be established at appropriate locations within the Project Site (away from sensitive residential receptors, waterbodies and the hedgerows and woodland adjacent to the Power Generation Plant Site). The construction laydown area would also be prepared which would include offices and welfare facilities for the management team and construction workers.

3.5.5 In terms of site establishment, vegetation would be cleared, topsoil would be stripped and the land re-profiled as required for the design of the Project.

3.5.6 Suitable steps would be taken to prevent uncontrolled discharge and pollution of surface and ground water from commencement of the works on site.

3.5.7 Additional geotechnical investigations would be carried out to confirm details of ground properties for optimisation of foundation design.

3.5.8 For preparation of the laydown area, an area is cleared and stoned and initial site cabins placed with offices, first aid, changing rooms, mess facilities with temporary sewage system and parking for cars and machinery.

3.5.9 The LLRS, as described in paragraphs 3.1.4 - 3.1.8 includes initial work to build a new ramp into Rookery South Pit. Further work would then be undertaken to upgrade the existing access track from Green Lane to the Generating Equipment Site by reinforcing with suitable sub-grade material and covering with bituminous material bordered by a pre-cast concrete kerb.

Civils

3.5.10 Piling, if required, is carried out using bored or driven piles in high load areas of the site such as plant and building column foundations. Shallow foundations for lighter buildings are excavated.

3.5.11 Vertical drainage is established and then underground services are excavated and placed.

3.5.12 Site roads are excavated, rolled with stone and a base coarse of tarmacadam placed. This greatly aids the cleanliness of the site during construction.

Buildings

3.5.13 Steelwork columns, frames and roof trusses would be delivered and erected on to cured foundations.

3.5.14 Cladding would be fixed to building frames, insulation attached and outer cladding fixed to walls and roof.

3.5.15 Windows and doors would be fitted to make buildings weather tight.

3.5.16 Internal walls would be erected where buildings are divided. All buildings would be fitted out with electrical systems, plumbing and drainage as required.

3.5.17 Cable draw pits and duct banks around the site would be excavated and cast.

Generating Plant Installation

3.5.18 The gas turbine and generator package with auxiliary equipment skid would be delivered to the site and placed over completed foundations with initial alignment.

3.5.19 Prefabricated interconnecting piping spools and ducting would be fitted to the gas turbine and generator package to interconnect its auxiliaries.

3.5.20 Fuel handling equipment skids would be placed and interconnecting piping made up.

3.5.21 Electrical Switchgear is installed and cables pulled through prepared ducts to interconnect systems.

Commissioning

3.5.22 All mechanical systems would be cold commissioned once alignment of rotating parts and pressure test of enclosed systems has been completed.

3.5.23 Electrical systems would be checked, commissioned and energised stage by stage.

3.5.24 All gas turbine generator systems would be checked and cold commissioned, together with control room and NG communications.

3.5.25 When all systems are energised and cold commissioned, the gas turbine is started and 'first fired'. The turbine would be run to full speed no load before synchronising to the grid and producing electrical energy in increasing load steps.

3.5.26 Grid Code compliance tests would be carried out as well as performance, noise and emissions tests.

Indicative Generating Equipment Maintenance Activities

3.5.27 Sufficient spares would be held to ensure reliable operation of the Generating Equipment. Materials and finishes would be selected to ensure that the appearance of the Generating Equipment does not deteriorate with time. Periodic and routine maintenance would take place, on average, once every six months, to ensure optimal operation of the Generating Equipment at all times.

3.5.28 The Generating Equipment would include on line monitoring and operational diagnosis to identify maintenance needs according to lifecycle use.

3.5.29 Maintenance would be planned based on a combination of accumulated start events and / or running hours.

3.5.30 In the event of an issue with the Power Generation Plant, an alarm system would signal instances where there are issues with abnormal operation. The plant would be shut down immediately in such instances and an engineer would attend site. The Power Generation Plant would not start up again until the issue had been resolved.

3.5.31 The shutdown duration is typically 15-20 days. Critical spare parts would be kept on the Power Generation Plant Site in the store building. Air inlet filters are changed based on accumulated pressure loss, in accordance with good industry practice (for example, after three years' service).

Construction - Gas Connection

3.5.32 Construction of the Pipeline would likely take place within a temporary fenced strip of land called the 'working width'. The working width is required to facilitate safe construction and the protection of off-site receptors.

3.5.33 It is likely that the working width would be 50 m along the length of the Pipeline route, although it may be necessary to increase / decrease the working width at specific points. For example, adjacent to road and water crossings it may be necessary to increase the working width to provide additional working areas and storage for materials or special plant. Alternatively, adjacent to areas of conservation or existing services it may be necessary to decrease the working width to reduce potential impacts.

3.5.34 Aside from the special crossings, for example, water and road crossings, where trenchless techniques (e.g. Horizontal Directional Drilling (HDD)) may be used to reduce impact on sensitive areas, it is expected that the Pipeline would be constructed using standard open-cut cross-country pipeline construction techniques. The main activities would include: topsoil stripping; pipe stringing (the process of laying the pipe end to end) and welding; trench excavation; pipe laying (positioning of the welded pipe into the trench); back filling; pressure testing, drying and pipeline pigging operations; and reinstatement of the land.

3.5.35 The Gas Connection would need to cross the Oil Pipeline. It is likely that this crossing could be completed using an open cut crossing technique, however, given the nature of the magnitude of the crossing, a cautious design approach has been proposed which utilises a trenchless crossing technique, specifically an Auger Bore. This approach would be subject to discussions with the operators and may require pre-agreed impact protection slabbing, fencing, method statement and/or construction techniques.

3.5.36 National Transmission System Feeder 9 high pressure gas pipeline would also need to be crossed. It is likely that the crossing would only require a standard open cut crossing technique; therefore, appropriate measures would need to be in place to ensure no third party damage is caused to the existing National Transmission System pipeline. This approach would be subject to discussion with NG and pre-agreed impact protection slabbing, fencing, method statements and/or construction techniques. Invasive ground investigations and more detailed discussions with NG would confirm the appropriateness of this crossing method in this situation.

3.5.37 The total area required for construction of the Gas Connection, including the temporary working width is approximately 6.52 ha.

Indicative Gas Connection Maintenance Activities

3.5.38 The Gas Connection would remain operational for the entire lifetime of the Power Generation Plant. No parts of the Gas Connection would be manned.

Telemetry apparatus (both within the Pipeline trench and at the AGI) would report back any issues to a central control room. Should any issues be identified, the Pipeline would be isolated and the supply switched off, pending investigation of any faults. Access to the AGI during maintenance / repair would be via an existing access off the Houghton Lane, as already described for construction access in section 3.3 above.

3.5.39 The primary maintenance and inspection activities would be as follows:

- visual checks;
- in-line inspection;
- cathodic protection checks; and
- valve operation checks.

Construction – Electrical Connection

3.5.40 The Electrical Connection Site would be surveyed to mark out the boundaries and key features and to fix the equipment centrelines according to the approved planning and engineering drawings.

3.5.41 The perimeter of the secure Electrical Connection Site would be identified and the area cleared of vegetation as necessary, in accordance with the approved drawings. A temporary security fence with locked gates for main and emergency exits would be installed around the SECs and Substation. A security cabin would be established to provide accommodation for full time security personnel for the duration of the works.

3.5.42 Additional geotechnical investigations may be required in order to confirm details of ground properties for foundation design.

3.5.43 Cable installation would follow a similar method to that for the Gas Connection. It would predominantly be carried out in an excavated trench with cable directly buried in the trench (open-cut method). The cable bedding would be laid (at a typical 1 m below ground level, subject to existing conditions and the location of existing buried services) and the cable pull set up. Once the cables are pulled in and the rollers removed, the cable surround can be installed with cable protection cover slabs placed over the cable. Finally, the backfilling and final reinstatement would be undertaken.

3.5.44 In conjunction with the construction of the Electrical Connection a temporary diversion of the existing 400 kV line located adjacent to the three most westerly existing transmission towers within the Project Site would be required. It is anticipated that the temporary diversion is likely to be constructed as a single circuit outage of the existing 400 kV line. The temporary work is likely to require mast(s) or temporary tower(s), of up to 55 m in height. The temporary works are also likely to include the temporary erection of scaffolding over Station Lane for the protection of road users whilst the diversion is installed.

3.5.45 Access for the purposes of installing and dismantling the temporary diversion would be as described for the Electrical Connection above. At this stage, it is anticipated that the installing and dismantling of the temporary works may require the temporary closure of Station Lane for up to approximately 1 day on two separate occasions and that the temporary diversion of the existing 400 kV line would be in place for approximately five months.

3.5.46 The potential effects of the diversion have been assessed and are presented in this ES in each topic chapter under the assessment of the Electrical Connection.

3.5.47 The total area required for construction of the Electrical Connection, including the temporary working width is approximately 19.07 ha.

Indicative Electrical Connection Maintenance Activities

3.5.48 The electrical equipment that is located within the SECs would be subject to periodic inspection. To perform such inspections, pedestrian access is adequate. Electrical equipment that contains moving parts, i.e. 400 kV earthing switches are subject to periodic maintenance, to carry out maintenance operations, essential safety equipment (portable earthing equipment) shall be brought in from a remote storage site.

3.5.49 In order to safely reach parts of the equipment subject to maintenance, a suitable access route for mobile elevated working platform (MEWP) shall be provided. In the case of a major repair requiring replacement of damaged electrical plant, suitable access for a mobile crane and transport shall be provided. Traction for vehicles over the open terrain can be achieved using temporary matting.

3.5.50 High Voltage cable systems are designed to require minimal maintenance during their working life. The route would be regularly checked to ensure that there are no excavation or construction works in the direct vicinity of the cables, that mounds of soil are not deposited above the cables and that trees are not planted above the cables; this should normally require little more than a drive past.

3.5.51 In addition, periodic inspection of any above ground equipment associated with the cable system would be required. The above ground equipment would include cable terminations, and structures, and bonding system link housings; this would require access to the equipment. In some case dirt and debris can deposit on cable termination insulators which may therefore require cleaning. It is also recommended that the integrity of the cable oversheath be tested at least once every two to three years; this would require access to the cable terminations and the bonding system link housings. In the event that the oversheath is found degraded or damaged then a repair may be required which would necessitate some excavation along the cable route (in most cases oversheath damage results from the actions of third parties).

Decommissioning

3.5.52 For the purpose of the EIA and in order to allow a decommissioning assessment to be presented in this ES, assumed working assumption has been used that the Project has an operational lifetime of 25 years. However, it should be noted that it is common for power stations to run for a much longer period than 25 years. In the case of the Project, a decision would be made at the appropriate time as to whether it would be ‘re-powered’ after 25 years (depending on the condition of plant items and the electricity market at the time). As such, the working assumption has been made for the purposes of this assessment that after 25 years, the Generating Equipment would be removed and the Generating Equipment Site re-instated to a similar condition as before construction. Any decommissioning phase would be likely to be of a similar duration to construction i.e. 22 months. A requirement has been inserted into the MPL Draft Order (Document Reference 3.1) to require the decommissioning of the Generating Equipment if it ceases to be used for an extended period.

3.5.53 Again, a working assumption has been used that the above ground elements of the Electrical Connection and Gas Connection would be decommissioned after 25 years. However, it is important to note that elements of both Connections would be owned and operated by NGET and NGG. In accordance with its statutory duties, NGET and NGG may use these assets in the future as part of its wider network. As such, the date of any decommissioning cannot be certain and the 25 years working assumption has been used simply to allow for an assessment of decommissioning effects in this ES. Some elements of the Gas Connection and Electrical Connection may be left in situ as this is likely to cause less environmental effects than removal. This would be the case for the Pipeline, for example.

3.6 Embedded Mitigation

3.6.1 Embedded mitigation is mitigation which is either implicit in the design of the Project or its operation (through standard control measures, such as working within best practice guidance) either of which would routinely be incorporated for the Project or for any similar project constructed in the UK. This embedded mitigation has been assumed in this ES to be in place from the outset, as it is mitigation without which the Project would be unlikely to be granted consent or allowed to commence. This ES has therefore assessed the likely significant effects of the Project, including its embedded mitigation.

3.6.2 The embedded mitigation included within the Project, discussed on a topic-by topic basis, is set out below and in the Key Mitigation Measures Roadmap at Appendix 3.1; it will be secured by the DCO and its requirements (and has been secured in the MPL Draft Order (Document Reference 3.1)).

CEMP

3.6.3 During Construction of the Project a Construction Environmental Management Plan (CEMP) would be followed. The CEMP would set out best practice construction methods and safe working practices to be followed so as to limit construction impacts on the environment. Specific items included in a CEMP for the Project are discussed below topic by topic. An outline CEMP for the Project is included as Appendix 3.2.

Air Quality

<u>Construction</u>

3.6.4 Best practice measures to limit dust would be set out in the CEMP. This includes mitigation relating to: site planning, construction activities and site activities. Key measures include wheel washing, damping down of stockpiles during dry and windy conditions, and sheeting materials to prevent dust migration. Good site management practices (e.g. adherence to guidance such as 'control of dust and emissions from construction and demolition, best practice guidance' 2006) during the construction works will help to prevent the generation of airborne dust. It will be the responsibility of the nominated main contractor and site manager to ensure through the CEMP that sufficient precautionary measures to limit dust generation are undertaken.

3.6.5 Additionally, standard mitigation measures for low risk sites, taken from the Institute of Air Quality Management (IAQM) document 'Dust and Air Emissions Mitigation Measures' tables would also be applied. These are:

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to the local authority when asked.;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in a log book.
- Avoid bonfires and burning of waste materials on site; and
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

<u>Operation</u>

3.6.6 The Project has been designed from the outset to comply with legislative limits for the emissions of pollutants, particularly NOx. Together, NOx control on the turbine (through dry low NOx burners) and an appropriate stack height to ensure adequate dispersion of pollutants mean that breaches of assessment levels for pollutant concentrations during operation of the Project would be extremely unlikely under normal operating conditions.

Noise and Vibration

Construction

3.6.7 The CEMP would incorporate best practice working methods such as:

- All construction activities would be undertaken in accordance with the recommendations of BS 5228 'Noise and Vibration Control on Construction and Open Sites' Part 1 Noise and Part 2 Vibration;
- Construction works shall not take place outside the hours of 07:00 – 19:00 Monday to Friday and 07:00 – 13:00 on a Saturday, with no working on Sundays or Bank Holidays unless otherwise agreed with BBC / CBC;
- Only plant conforming with relevant national or international standards, directives or recommendations on noise or vibrations emissions would be used;
- Construction plant will be operated and maintained appropriately, having regard to the manufacturer's written recommendations or using other appropriate operation and maintenance programmes which reduce noise and vibration emissions;
- All vehicles and plant would be switched off when not in use;
- Approved routes and programming for the transport of construction materials, spoil and personnel to reduce the risk of increased noise and vibration impacts due to the construction of the Project;
- Vehicle and mechanical plant used for the purpose of the works should be fitted with effective exhaust silencers, to be maintained in good working order and operated in such a manner as to be maintained in good working order and operated in such a manner as to minimise noise emissions. The contractor should use plant items that comply with the relevant EU/UK noise limits applicable to all equipment;
- All ancillary plant such as generators, compressors and pumps would be positioned so as to cause minimum noise disturbance (e.g. as far away as practicable from sensitive receptors). If necessary, temporary acoustic barriers or enclosures would be provided;
- The positioning of construction plant and activities to minimise noise at sensitive receptors such as residential properties;
- Equipment that breaks concrete by munching or similar, rather than by percussion, should be used as far as is practicable;
- The use of mufflers on pneumatic tools;
- Where practicable, rotary drills actuated by hydraulic or electrical power should be used for excavating hard materials;
- The use of non-reciprocating construction plant where ever practicable;
- The use, where necessary, of effective sound reducing enclosures;

- The targeting, where possible, of noisy work at times which minimise disturbance; and
- The contractors would be required to produce a noise control plan as part of the CEMP which would provide a noise management system tailored to the specific needs of the construction activities, the Project Site and the surrounding areas. As a minimum the noise control plan would include:
  - Procedures for ensuring compliance with statutory or other identified noise control limits;
  - Procedures for minimising the noise from construction related traffic on the existing road network;
  - Procedures for ensuring that all works are carried out according to the principle of "Best Practicable Means" as defined in the Control of Pollution Act 1974;
  - General induction training for site operatives and specific training for staff having responsibility for particular aspects of controlling noise from the Project Site;
  - A noise monitoring/auditing programme; and
  - Liaison with the EHO at the LPA and the community.

<u>Operation</u>

3.6.8 The design of the Project is such that the plant items which generate the most noise (e.g. the Gas Turbine Generator) have been located as far away as possible from the nearest residential receptor (South Pillinge Farm, located approximately 390 m to the west of the Gas Turbine Generator), within the constraints of the Project Site.

3.6.9 The use of acoustic enclosures on the Gas Turbine Generator is also an inherent part of the project design and will mean that operational noise is limited to 75 dBA at 1 m from the Gas Turbine Generator housing and 106 dBA from the stack. Noise from the Fin Fan Cooler(s) would be limited to 85 dBA at 1m from the coolers.

Ecology

<u>Construction</u>

3.6.10 The CEMP would incorporate measures to protect sensitive ecology during construction such as:

- Work compounds and access tracks etc. would not be located in, or adjacent to, areas that maintain habitat value;

- Site fencing would be used to prevent access to areas outside working areas, particularly in areas adjacent to features of ecological value;
- Procedures would be implemented to address site safety issues, including storage of potentially dangerous materials; and
- Briefings and instruction would be given to contractors regarding the biodiversity issues associated with the Project Site.

<u>Operation</u>

3.6.11 As per air quality considerations, the stack height has been set so as not to give rise to emissions which would impact sensitive ecological sites.

Water Quality and Resources

<u>Construction</u>

3.6.12 The CEMP would include the following best practice working methods to prevent water pollution:

- siting stockpiles away from watercourses;
- refuelling on deignated areas of hardstanding supplied with appropriate spill kits and bunded bowser only away from watercourses and surface drains; and
- installing construction site drainage.

3.6.13 The most appropriate best practice crossing methods would be used for watercourses (in the context of the Gas Connection). These are described in more detail in section 3.5.

3.6.14 All oil and chemical storage tanks and areas where drums are stored would be surrounded by an impermeable bund and located away from watercourses in accordance with as well as COSHH Regulations 2002 and the Control of Pollution (Oil Storage) Regulations 2001. Single tanks would be within bunds sized to contain 110 per cent of capacity and multiple tanks or drums would be within bunds sized to contain the greater of 110 per cent of the capacity of the largest tank or 25 per cent of the total tanks contents. Empty drums and any drums that are identified as leaking would be removed from the Project Site as soon as possible and disposed of appropriately in accordance with the relevant legislation.

3.6.15 Any surface water contaminated by hydrocarbons would be passed through oil/grit interceptors prior to discharge.

3.6.16 Precautions would be undertaken to ensure that silt laden runoff, arisings or chemicals are not allowed to enter watercourses including the use of impermeable liners and fixing agents.

Operation

3.6.17 During operation, the EA would set limits on the quality of water that is discharged from the Project Site under the Environmental Permit.

3.6.18 Operational site drainage would be appropriately designed to meet the needs of the Project and would be managed by the LLRS drainage system. Any surface water contaminated by hydrocarbons would be passed through oil/grit interceptors prior to discharge.

Ground Conditions

Construction

3.6.19 The CEMP would include best practice working methods to prevent pollution to the ground and ground water. These would include:

- The carrying out of a Foundation Works Risk Assessment (FWRA) by the contractor once the proposed foundation solutions are known, which will then form part of the CEMP. This will be in accordance with ‘Piling and Penetrative Ground Improvements Methods on Land Affected by Contamination: Guidance on Pollution Prevention, NGCLC report NC/99/73’ and is required to ensure that the proposed foundations do not adversely affect the water environment beneath the site.
- Construction activities will be carried out in full compliance with appropriate health and safety legislation, at current amendments, and with reference to appropriate guidance documents and approved Codes of Practice published by the Health and Safety Executive (HSE), including where appropriate, HSE Guidance Note HS (G) 66 “The Protection of Workers and the General Public during the Redevelopment of Contaminated Land” HMSO 1991.
- Where there is the potential for instability to occur, temporary works measures including trench sheeting in any excavations will be utilised.
- Apply the following procedures if unidentified contaminant “hotspots” showing visual or olfactory evidence of contamination are discovered during construction works:
  - Stop work immediately;
  - Report the discovery to the Site Manager;
  - Seal off the area to contain the spread of contaminants;
  - Clear the area to ensure there is nothing that could cause fire or explosion;

— Contact the regulator or local authority once it is confirmed that contamination is found;

— Arrange for testing to be carried out and agree changes to the existing contamination strategy;

— Record details of the incident, including photos and relevant information on the Environmental Incident Report Form; and

— Any soils which are considered to be contaminated hotspots) will be removed and disposed of by a suitably licensed contractor or treated on-site.

- Any material which is excavated and free from visual and olfactory evidence of contamination will be stockpiled and tested to assess its suitability for reuse on the Project Site.

- If significant groundwater flows are encountered within excavations, then temporary dewatering pumps will be implemented.

- In the relation to the potential to induce mixing of confined groundwater bodies by construction of piled foundations, the design and construction will be undertaken in accordance with EA guidance 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination' (EA, 2001), and therefore will follow best practice to ensure that groundwater mixing does not occur.

- All water from dewatering activities shall either be transported off site by a suitably licensed contractor or treated on site. Any proposed discharges to existing land drains (or other surface water bodies) will be undertaken in accordance with the requirements of the EA Regulatory Position Statement on temporary water discharges from excavations.

- Where soils are imported onto the Project Site then they shall be subject to testing to ensure they are not contaminated.

- The imposition of speed restrictions onsite to minimise disturbance of bare surfaces. Measures shall also be put into place to ensure that the length of time bare surfaces are left exposed are minimised.

- The imposition of the following measures to ensure that silt laden runoff, arisings or chemicals are not allowed to enter watercourses:

— testing of arisings to see whether they are suitable for reuse on site;

— siting stockpiles well away from watercourses;

— covering stockpiles in inclement weather;

— use of impermeable liners; and

— use of fixing agents.

- Water inflows to excavated areas will be minimised by the use of lining materials, good housekeeping techniques and by the control of drainage in order to prevent the contamination of ground water.

- To minimise the risk of coming into contact with potentially contaminated materials, contractors should comply with the measures set out in the following documents:

  - Protection of Workers and the general public during the development of contaminated land (HSE 1991); and

  - If applicable, a guide to safe working on contaminated sites R132 (CIRIA 1996).

- Construction workers will wear appropriate personal protective equipment (PPE) for the nature of works being undertaken. This will involve standard site PPE, plus overall, gloves and eye protection where required.

3.6.20 Additional mitigation measures that should be implemented are:

- Eating, drinking and smoking will be limited to a designated ‘clean’ area of the Project Site;

- Project Site welfare facilities will be made available;

- All workers will be required to wash their hands and remove overalls/boots when moving from ‘dirty’ to ‘clean’ areas of the Project Site;

- Any soils excavated which are considered to be potentially contaminated (e.g. visual or olfactory evidence) will be reported to site management and left alone until their appropriate treatment. Suitable training will be provided to site personnel to ensure the correct identification of potentially contaminated soils by olfactory means; and

- Water inflows to excavated areas will be minimised by the use of lining materials, good housekeeping techniques and by the control of drainage and construction materials in order to prevent the contamination of ground water. Site personnel will be made aware of the potential impact on ground and surface water associated with certain aspects of the construction works to further reduce the incidence of accidental impacts.

Landscape and Visual Impact

Construction

3.6.21 As the construction period is of a limited duration (approximately 22 months), significant mitigation to limit landscape and visual impacts is not anticipated. However, the following would be applied through a CEMP:

- Land / vegetation clearance and occupation would be limited to the minimum area necessary for the works;
- Temporary protection of vegetation and other vulnerable features to be retained would be undertaken in accordance with prevailing best practice;
- Temporary storage of soils and other material considered of value for retention would be undertaken in accordance with prevailing best practice. Where practical stockpiles would be sited to screen the construction works from sensitive receptors such as PROW;
- Construction areas would be laid out to minimise adverse impacts arising from temporary structures, construction activities and lighting;
- Construction roads would be on the same alignment as permanent access roads where possible;
- Use of construction site lighting outside normal working hours would be restricted to the minimum necessary for workforce and public safety, and for security. Directional luminaries would be used to limit unwanted light spill;
- Maintenance of tidy and contained site compounds;
- Hoardings erected around the area of construction works, for reasons of creating a visual barrier to construction activities and also as a safety measure, to prevent access to the general public;
- Temporal measures including the removal of all temporary structures and stockpiles when no longer required, and prompt reinstatement of construction areas;
- Reinstatement of all agricultural land required temporarily during construction, and a five-year aftercare plan to seek to ensure land is returned to its former productivity; and
- Replacement of all trees, shrubs and hedgerows removed to accommodate the utility Connections, subject to NGET and NGG planting constraints. Any planting would be maintained for a minimum of 12 months to ensure full and successful establishment.

Operation

3.6.22 The Power Generation Plant is to be located in a former clay extraction pit and therefore it would be below ground level. Therefore, the design and siting of the Power Generation Plant is such that visual impacts are inherently limited.

3.6.23 Additionally, the Pipeline and electrical cable elements of the Electrical Connection are underground for the majority of their length and therefore visual impacts have been limited as much as possible.

3.6.24 Furthermore, the Applicant is working with appropriate advisors to ensure good design which would seek to blend the Power Generation Plant into the landscape as much as possible and would be fit for purpose for the lifetime of the Project.

Traffic and Transport

Construction

3.6.25 Separate to the CEMP, the mitigation measures designed to limit potential impacts from construction phase traffic movements are described in an outline Construction Traffic Management Plan (CTMP (Appendix 12.1)) which would include:

- a Route Management Plan to direct HGVs away from the sensitive local transport network;
- a traffic management scheme at the junction with Green Lane and the Access Road to control queuing and to ensure no blocking of the railway develops;
- a traffic management scheme for the Gas Connection access at Houghton Lane;
- a traffic management scheme for the Electrical Connection Access at Station Lane;
- the Construction Vehicle Parking Strategy to control the vehicle generation and minimise impact on the surrounding area;
- a footpath management plan to ensure any footpath route affected by the works are protected, and that the pedestrians may use them safely; and
- an Abnormal Load Delivery strategy to manage the delivery to site of the major items of plant and apparatus that are indivisible.

Operation

3.6.26 Whilst any significant mode shift away from the private car is unlikely for the Project - there are likely to be only a maximum of five workers on site at the same time - a Travel Plan has been created specifically targeting employees to decrease the number of vehicles accessing the Project. This is contained in Appendix 12.1. A range of non-car Initiatives would be implemented to encourage the use of alternative modes of travel to the private car.

Lighting

3.6.27 The Project Site will require artificial lighting during construction and operation to provide a safe working site during hours of darkness. An Outline Lighting Strategy (Appendix 11.2) has been prepared to support the DCO Application.

3.6.28 The contractor should follow relevant guidance and legislation relevant to lighting, including:

- Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light, (2011);
- The English Department for Communities and Local Government (DCLG) Guidance on Lighting in the Countryside: Towards Good Practice (1997);
- Assessment of the Problem of Light Pollution from Security and Decorative Light produced by Temple and NEP Lighting Consultancy on behalf of Defra;
- The Bat Conservation Trust – Bats and Lighting in the UK (May, 2009);
- The Bat Conservation Trust (BCT) – Statement on the Impact and Design of Artificial Light on Bats; and
- Environmental Protection Act 1990 (as amended).

3.6.29 The general design objectives that will be used to ensure that potential adverse effects of lighting associated with construction of the Project are minimised are listed below:

- Use appropriately designed luminaires for the task at hand;
- Use louvres and shields to prevent undesirable light break-out;
- Demolition and construction lighting should be directed away from all sensitive receptors;
- Preference should be given to several, lower lighting units rather than tall, wide beam lighting units to illuminate large areas as it will limit light trespass, glare and sky glow from the Project Site;
- Vehicle lights should be properly directed (conforming to MOT requirements) and lenses must be intact to prevent un-necessary glare and light intrusion;
- Lighting should be reduced or switched off when not required for safety purposes. Security lighting should be kept at the minimum level needed for visual and security protection; and
- Motion sensitive lighting will be used in order to avoid unnecessary lighting.

3.6.30 Light fittings will comply with the specifications and the requirements of CIE 150 (2003) and Institute of Lighting Engineer's Guidance Notes for the Reduction of Obtrusive Light.

4 Environmental Impact Assessment Methodology

4.1 Introduction

4.1.1 This chapter sets out the methodology which has been followed in undertaking the EIA. It describes the EIA process, the stages of consultation and engagement which have been followed to date, and how the scope of the assessment has been defined. The steps in undertaking the EIA have then been described in detail, including how the baseline has been defined, the realistic worst case Project parameters which are being assessed, the assessment methodology, the assumptions and limitations lying behind the assessment, how the assessment of cumulative and in combination effects has been undertaken, the approach taken to defining mitigation measures necessary to limit effects, and how residual effects remaining after mitigation have been assessed.

4.2 EIA Process

4.2.1 In accordance with the PA 2008 and the EIA Regulations, the EIA process for the Project has consisted of the following principal activities:

- establishing, through consultation, the scope of the EIA including obtaining a Scoping Opinion from the SoS;
- consideration of potential technical and environmental alternatives to the Project;
- determining how potential significant adverse environmental effects could be avoided, reduced or off-set through informed design (embedded mitigation);
- determining a realistic worst case scenario for assessment;
- establishing a detailed understanding of the existing baseline environmental conditions for the Project Site and the relevant study areas for each topic;
- identifying the likely potential environmental effects arising from the Project;
- assessing the significance of the likely environmental effects of the Project against the baseline (which includes existing developments that are constructed and/or operational);
- assessing the significance of the likely environmental effects of the Project arising in conjunction with proposed or consented but not yet constructed developments (cumulative effects) as well as certain effects arising from the Project acting in combination with others (in-combination effects);
- determining how any significant adverse environmental effects could be avoided, reduced or off-set through further mitigation (additional mitigation)

as well as how any benefits of the Project may be enhanced (enhancement measures); and

- determining the residual likely significant environmental effects of the Project following the application of the additional mitigation measures.

4.2.2 These steps are discussed in more detail in the following sections.

4.3 Consultation and Engagement

Non-statutory Consultation

4.3.1 The Applicant engaged with the local community and key stakeholders during an early phase of non-statutory consultation during June 2014 which was at a point where the Project was still being actively refined. Local community representatives at the national, regional and local levels were consulted by MPL and public exhibitions were held in Lidlington, Stewartby and Marston Moretaine. As part of this non-statutory phase of consultation, the Applicant explained the rationale and key objectives of the Project, gave reasons why the Power Generation Plant Site had been chosen and presented opportunities for written and verbal feedback on the early, emerging concepts for the Project.

4.3.2 Drawing on this early feedback on the proposals, MPL was able to consider the consultation responses as part of the design development and environmental assessment processes and this phase of non-statutory consultation helped to shape the development of the Project.

Statutory Consultation - Phase 1

4.3.3 MPL conducted a first phase of statutory consultation under s42, s47 and s48 of PA 2008 between 13 October 2014 and 16 November 2014 (the "Phase 1 statutory consultation"). Published in September 2014, the initial Statement of Community Consultation (SoCC) Notice confirmed where and when the SoCC could be inspected by members of the public. Letters were sent to s42 consultees directly, briefly explaining the Project concept as well as the dates and times of exhibitions. Consultation notices were published in national and local newspapers under s48 of the PA 2008.

4.3.4 The statutory consultation phase also coincided with the publication of the 2014 PEIR. The 2014 PEIR provided the environmental information collected in the early stages of the EIA process as well as an assessment, on a preliminary basis, of the likely significant environmental effects of the Project. The 2014 PEIR, together with supporting information and a Non-Technical Summary (2014 PEIR NTS), was compiled to accompany MPL's statutory consultation with both the local community and prescribed consultees in advance of submitting its DCO Application. The feedback received relating to the 2014 PEIR has further helped to inform and refine the EIA process as well as the design and development of the Project.

Statutory Consultation - Phase 2

4.3.5 As the DCO Application for the Project was put on hold in 2015, MPL considered it appropriate to undertake a further phase of statutory consultation, in order to reflect potential changes in the baseline of the area, policy position and to update consultees on key changes to the Project parameters.

4.3.6 The Phase 2 statutory consultation period ran from 29th May – 2nd July 2017 and coincided with the publication of a revised PEIR. The PEIR reflected (and provided information regarding) updates on Project parameters and design evolution, as well as refined EIA processes.

4.3.7 The feedback received relating to the PEIR has further helped to inform and refine the EIA process as well as the design and development of the Project.

4.3.8 A detailed description of all consultation undertaken throughout the pre-application stage of the Project is provided in the Consultation Report which accompanies the DCO Application (Document Reference 5.1).

4.4 Scope of the Assessment

4.4.1 Scoping involves focusing the content of the EIA on those issues of greatest potential significance. It is an important tool for identifying the likely significant environmental effects of a project through its design, construction, operation and decommissioning phases and ensures that appropriate mitigation options are considered, where necessary.

4.4.2 As part of the initial phases of work on the EIA, the Applicant sought a Scoping Opinion from PINS in June 2014, coinciding with the non-statutory consultation phase as described in paragraph 4.3.1 above. The request was accompanied by a Scoping Report that described the anticipated likely significant environmental effects that would require detailed evaluation as part of the EIA. The formal Scoping Opinion was received from PINS in July 2014 and has allowed for agreement on the aspects of the environment on which the EIA should focus.

4.4.3 The Scoping Report and Scoping Opinion can be found on the PINS website and MPL's website (www.millbrook.co.uk), and are provided in Appendix 1.2.

4.4.4 Regulation 37(2)(a) of the 2017 Regulations states that where a scoping opinion has already been requested, or an application or an ES submitted, before the commencement of the new EIA Regulations, the previous EIA Regulations and regime will continue to apply.

4.4.5 Therefore, as a Scoping Report was submitted for the Project in June 2014, the ES has been undertaken in line with the previous (2011) EIA Directive.

4.5 Environmental Baseline

4.5.1 In undertaking an EIA for any project, it is important to identify the environmental baseline for the potential receptors which may be affected. Essentially, this involves forming an understanding of the environmental receptors (e.g. their sensitivity) in an area and the developments that are already affecting those receptors, at the time of the assessment. This allows any future baseline conditions to be determined and the effects of the Project to be compared and / or combined with the baseline in order to ensure an informed assessment is made of the potential effects of a project as well as to allow the identification of the most appropriate mitigation which could be employed to minimise any identified likely significant adverse effects.

4.5.2 To establish the baseline, a study area that is appropriate for each assessment topic is identified which takes into consideration the surrounding context and the likely scale and range of potential significant effects (the study area for noise, for example, would cover a smaller area than that used to assess landscape and visual effects which may be experienced over a wider area, or conversely, the study areas may be the same for certain assessment topics). Confirmation of the study area for each assessment topic is set out in the respective topic chapter.

4.5.3 Next, a range of environmental data is gathered from a combination of sources in respect of each study area. This has included:

- documentary information on the Power Generation Plant Site, Gas Connection and Electrical Connection, and their surroundings within each relevant study area, including information available from previous EIA work for other projects;
- field survey information, including: Phase 2 ecological surveys; landscape character assessments; background noise levels; ground conditions / contaminated land assessments; location of sensitive receptors and existing traffic levels on the road network; and
- data held by both statutory and non-statutory consultees.

4.5.4 It is anticipated that construction of the Project would commence in 2020, if a DCO is granted by the SoS for the Project. The assessment therefore uses a '2020 baseline' to provide a future baseline against which the direct, indirect and cumulative effects during all phases of the Project can be assessed. This baseline includes the developments that the Applicant knows would be completed prior to the commencement of construction of the Project. At this time, the only development which the Applicant is certain would be progressed and would have an interaction with the Project is the LLRS. It does not therefore include the Covanta RRF project in the 2020 baseline; this would be addressed in the assessment of cumulative effects (see section 4.10). Nevertheless, even if construction of the Covanta RRF Project commenced during Examination of the DCO Application for the Project, the cumulative assessments consider a 'worst case scenario' of construction and operation timings in each case so that all potential cumulative effects of the Project can be adequately assessed.

4.6 Realistic Worst Case Scenario for Assessment

4.6.1 As discussed in paragraphs 3.1.25 - 3.1.28 above, as development parameters for the Project have been included in order to provide a degree of design flexibility (for example, the height of the stack to be used), each topic specific assessment has tested a realistic worst case scenario such that the likely significant impacts arising from the Project have been adequately assessed. This realistic worst case scenario is set out in each topic chapter.

4.7 Assessment Methodology

4.7.1 Significance criteria have been used to help understand, evaluate and quantify the likely significant environmental effects of the Project which may be positive (i.e. beneficial) or negative (i.e. adverse).

4.7.2 The significance of environmental effects arising from the construction, operation and decommissioning of the Project are generally presented in this ES using a series of matrices similar to those shown below in Tables 4.1 – 4.3. These have been developed to categorise the sensitivity of receptors (previously defined in the baseline assessment) which have the potential to be affected by the Project and the magnitude of any impacts which are likely to arise. The magnitude of any potential impact and sensitivity of receptor have been considered together, using professional judgement, to give an overall significance of effect. Where it is not possible to quantify effects, a precautionary qualitative assessment has been carried out, based on available knowledge and professional judgement.

4.7.3 In order to provide a consistent approach and enable comparison of effects upon different environmental components, the assessments generally follow the structure and use the terminology set out below in Tables 4.1 – 4.3. However, it is noted that for some environmental topics, significance criteria may need to differ depending on the topic assessment and conditions encountered at the Project Site. Each topic chapter of the ES clearly identifies and explains the specific criteria used.

Table 4.1 – Example Sensitivity Matrix

Sensitivity	Example
Very High	Internationally designated site (e.g. Ramsar / Special Protection Area (SPA) / Special Area of Conservation (SAC) / World Heritage Site).
High	Nationally designated site (e.g. Site of Special Scientific Interest (SSSI), / National Parks / heritage site / Areas of Outstanding Natural Beauty / principal aquifer /main watercourse / human health.
Medium	Regionally designated ecology / secondary aquifer / minor watercourse.
Low (or lower)	Locally designated ecology / heritage site / area of hardstanding / brownfield land / industrial site / low ecological value.
Negligible	No sensitivity to change.

Table 4.2 – Example Magnitude Matrix

Magnitude		Example
Major	Adverse	A permanent or long-term adverse impact on the integrity and value of an environmental attribute or receptor.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	Adverse	An adverse impact on the integrity and/or value of an environmental attribute or receptor, but recovery is possible in the medium term and no permanent impacts are predicted.
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements or improvement of attribute quality.

Magnitude		Example
Minor	Adverse	An adverse impact on the value of an environmental attribute or receptor, but recovery is expected in the short- term and there would be no impact on its integrity.
	Beneficial	Minor benefit to, or addition of key characteristics, features or elements; some beneficial impact on attribute or a reduction in the risk of a negative impact occurring.
Negligible	Adverse	Very minor loss
	Beneficial	Very minor benefit
No Change		No change would be perceptible, either positive or negative.

Table 4.3 – Example Significance of Effects Matrix

		Magnitude of Impact				
		No Change	Negligible	Minor	Moderate	Major
Receptor Sensitivity	Very High	Neutral	Slight	Moderate	Large	Very Large
	High	Neutral	Slight	Moderate	Large	Large
	Medium	Neutral	Slight	Slight	Moderate	Large
	Low	Neutral	Slight	Slight	Slight	Moderate
	Negligible	Neutral	Neutral	Neutral	Neutral	Neutral

4.7.4 Unless otherwise stated, effects of moderate significance or above are considered to be significant for the purposes of the EIA Regulations.

4.8 Assumptions and Limitations

4.8.1 When undertaking the EIA for the Project, the following assumptions have been made and have been followed through to every topic chapter:

Construction / Decommissioning

- the total construction programme would be approximately 22 months, with a start date of approximately 2020 and an end date of 2022;

- the Generating Equipment would be decommissioned and removed at the end of its operational life (a working assumption of 25 years has been used for the purposes of this ES);
- the Pipeline and underground cables of the Electrical Connection would be made safe and left in situ at the end of their operational life;
- the decommissioning phase would be similar in duration to the construction phase; and
- the design, construction and decommissioning phases of the Project would satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge.

Operation

- in order to allow for a decommissioning assessment to be undertaken, the operational life of the Power Generation Plant has been assumed to be 25 years;
- the Generating Equipment could run up to a maximum of 2,250 hours in any given year, provided that the 5 year rolling average does not exceed 1,500 hours. For the purposes of the EIA, a worst case yearly maximum of 2,250 running hours has been assessed where appropriate;
- the Generating Equipment would have a rated electrical output of up to 299 MW (measured as output of the generating station as a whole at the terminals of the Generating Equipment);
- assessments are based on published sources of information and primary data collection;
- assessments are based on the description of the Project as set out in Chapter 3;
- any future development of the Project Site would be determined through separate planning or DCO applications and have not been assessed as part of the assessment presented in this ES; and
- The Project would not constitute a (Control of Major Accident Hazards) COMAH site.

4.9 Mitigation and Monitoring

4.9.1 Full consideration has been given to the mitigation measures which could be used to ensure that any potentially adverse significant environmental effects of the Project are minimised.

4.9.2 In the hierarchy of mitigation, likely significant adverse effects should, in the first instance, be avoided altogether; where this is not possible such effects should then be reduced and, finally, off-set.

4.9.3 Significant adverse effects are best avoided by incorporating appropriate measures into the design process. As such, the iterative nature of the EIA process has helped to inform the development of the final design of the Project that will be the subject of the DCO Application.

4.9.4 Two broad types of potential mitigation measures have been applied in the EIA and are reported in this ES being:

- embedded mitigation - namely design/standard control measures, such as working within best practice guidance, which would routinely be incorporated for the Project or for any similar project constructed in the UK, and as such would be taken into account in the initial assessment as to the likely significant effects of the Project (Further details have been provided in section 3.6 above, in the Key Mitigation Measures Roadmap (Appendix 3.1) and the outline CEMP (Appendix 3.2)); and
- additional mitigation - which may be introduced, where appropriate, following the assessment of the likely significant effects of the Project alone and cumulatively with other projects with embedded mitigation. It is this additional mitigation that has been assessed for effectiveness and that has been taken into account in the assessment of the residual likely significant environmental effects of the Project (i.e. the likely significant environmental effects that remain following the application of additional mitigation).

4.9.5 The Project has been, and at the detailed design stage will continue to be, developed in such a way that the reduction and, wherever possible, elimination of significant adverse environmental effects is integral to the overall design philosophy.

4.10 Cumulative Effects

4.10.1 Schedule 4, Part 1 (paragraph 20) of the EIA Regulations requires an ES to include '…a description of the likely significant effects of the development on the environment, which should cover….cumulative effects'.

4.10.2 PINS Advice Note 17 (AN17) (Version 1, December 2015) provides advice on a 'staged process that applicants may wish to adopt in cumulative effects assessment for NSIPs. The four assessment stages comprise:

- 1. Establish the NSIPs zone of influence and identify a 'long list' of other developments which could potentially have effect interactions with the NSIP;
- 2. Develop a 'short list' of other developments which could potentially have effect interactions with the NSIP. Essentially analysing the 'long list' developed in stage 1 in more detail in order to include only those developments that have potential to give rise to significant cumulative effects by virtue of overlaps in temporal scope; due to the scale and nature of the 'other development'/receiving environment; or any other relevant factors;
- 3. Gather available information on the shortlisted developments; and

- 4. Assessment of likely significant impacts arising as a result of the NSIP cumulatively with the short listed developments identified during stage 2 and available information gathered in stage 3.'

4.10.3 PINS Advice Note 9 (AN9) (Version 1, April 2012) provides a definition of cumulative effects which are described as considering '…other proposed development within the context of the site and any other reasonably foreseeable proposals in the vicinity' (AN9, footnote 12).

4.10.4 AN9 also sets out that 'the potential cumulative impacts with other major developments would also need to be carefully identified such that the likely significant impacts can be shown to have been identified and assessed against the baseline position (which would include built and operational development). In assessing cumulative impacts, other major developments should be identified through consultation with the local planning authorities and other relevant authorities on the basis of those that are:

- under construction;
- permitted application(s), but not yet implemented;
- submitted application(s) not yet determined;
- projects on the Planning Inspectorate's Programme of Projects;
- identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals would be limited; and
- identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.'

4.10.5 Table 3 of AN17 describes potential schemes for cumulative assessment in three tiers and recognises that for each tier, there is a decreasing level of detail likely to be available. The three tiers are:

- Tier 1 – Projects under construction:
  - permitted application(s), whether under the PA 2008 or other regimes, but not yet implemented; and
  - submitted application(s) whether under the PA 2008 or other regimes but not yet determined;
- Tier 2:
  - projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted.
- Tier 3:
  - projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted;

- identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals would be limited; and
- identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

4.10.6 For the purposes of this EIA, cumulative effects have been treated as described below.

4.10.7 The developments which have been included in the assessment of cumulative effects (as agreed with statutory consultees) comprise:

- Covanta RRF Project to the north of the Generating Equipment Site - immediately adjacent to Generating Equipment Site;
- Integrated Waste Management Operations at Rookery South, Bedfordshire – immediately adjacent to Generating Equipment Site;
- Phase 2 of the East-West Rail Scheme, approximately 50 m west of the Electrical Connection;
- Land at Moreteyne Farm at Wood End in Marston Moretaine proposed for residential properties – approximately 2 km west of the Project Site;
- Land at Warren Farm on Flitwick Road in Ampthill proposed for residential properties – approximately 3.5 km south of Gas Connection AGI;
- New settlement at Wixams (under construction) – approximately 5km north east of closest point of Access Road;
- Land off Marston Road, Lidlington – proposed residential development of 31 dwellings - approximately 2 km west of Electrical Connection;
- Land opposite The Lane & Lombard Street, East of Marston Road, Lidlington – proposed residential development of 40 dwellings approximately 2 km west of Electrical Connection;
- Lower Shelton Road, Marston Moretaine - proposed residential development of 15 dwellings approximately 4 km north of Access Road;
- Land East of Ampthill Road and North of Bedford Road, Houghton Conquest - proposed mixed use development including 650 dwellings, park, sports pitches and education use approximately 4 km north-east of Generating Facility;
- Land east of Duck End Lane, Wilstead – up to 250 dwellings approximately 5 km north-east of Access Road;

- Land off Chapel End Road, Houghton Conquest – proposed residential development of 125 dwellings approximately 4 km north-east of Generating Facility;
- Land South of Fields Road and East of Cranfield Road, Wootton – proposed residential development of 600 dwellings – approximately 5 km north of Access Road;
- Land at the former Fullers Earth Quarry, Ampthill Road, Clophill – 50 dwellings approximately 6 km south-east of Gas Connection;
- Marston Vale Business Park, land south of Fields Road, Wootton – commercial/retail approximately 6 km north of Access Road;
- Kiln Road, Kempston Hardwick – B1 office building and auction hall approximately 7 km north of Access Road;
- Land to the West of Mill Road, Cranfield - residential development of 230 units approximately 7 km west of Generating Equipment Site;
- Chantry Avenue, Kempston – redevelopment to provide 52 dwellings approximately 8 km north of Access Road;
- Cemetery Road, Kempston – construction of 55 dwellings approximately 8 km north of Access Road;
- Four Winds Industrial Estate, West End, Haynes, Bedford, MK45 3QT - Redevelopment and expansion of waste transfer station and materials recycling facility approximately 6 km south-east of Gas Connection;
- Land East of Anglia Way, Great Denham – 48 dwellings and associated infrastructure approximately 7km north of Access Road;
- Brogborough Landfill 11kV compound – Reinstatement of two engines to generate 2.3MW of energy using natural gas, and associated infrastructure approximately 7 km south-west of Power Generation Plant Site;
- Brogborough Landfill 33kV compound – Conversion of 10 landfill gas powered engines (either by refurbishment or replacement) to natural gas powered engines, plus associated infrastructure (approximately 7 km south-west of Power Generation Plant Site); and
- The Brickmakers Arms PH Woburn Road Kempston – 16MW Gas fuelled electricity generating plant and associated works, Green Frog Power Ltd approximately 4.5 km north of Access Road.

4.10.8 As part of the initial scoping of the EIA it was determined by the applicant that certain topics such as air quality, noise, traffic and landscape and visual effects are more likely to give rise to potential significant cumulative effects than others, based on the nature of the Project and surrounding development proposals. For example, air quality may give rise to a potential cumulative effect given that there are emissions from the Generating Equipment and also potential emissions from, for example, the proposed Covanta RRF Project. Therefore, those topic assessments have included a detailed, quantitative where practicable, assessment on potential cumulative effects and interactions. All topic chapters have considered cumulative and in-combination effects to an appropriate degree of assessment.

4.10.9 It is noted here that there are no COMAH sites within the vicinity of the Project Site.

4.10.10 It is also noted here that the ES for the Covanta RRF Project assumed that Phase 1 of the LLRS will have been implemented prior to its construction. This differs slightly from the LLRS works which are deemed to have taken place prior to construction of the Project. The assumed LLRS works to be undertaken ahead of the Covanta RRF comprise:

- dewatering of accumulated surface waters within the western half of Rookery South Pit by pumping from the base of Rookery South Pit into the marginal ditch to the west of the pit, sufficient to facilitate subsequent earthworks;
- trapping and relocation of Great Crested Newts from the western half of Rookery South Pit to receptor sites created by localised enhancements to Rookery North Pit;
- redirection of existing surface water ditches and provision of an upper carrier ditch around the southern perimeter of the southern permitted excavation area;
- topsoil stripping and stockpiling of material from the remaining southern permitted extraction area on the southern side of Rookery South Pit to enable the extraction of clay from the southern permitted extraction area for use in the proposed restoration scheme;
- construction of a temporary noise barrier and grassed earth bund to attenuate noise from the restoration works to Pillinge Farm South and Pillinge Cottages;
- construction of a new vehicular access track at the southwestern corner of the pit to provide low level access to the pit, with associated regrading of slopes as necessary;
- excavation of clay soils from the southern permitted extraction area to provide material for the proposed restoration works;
- re-profiling, of the base of Rookery South Pit, graded to falls, utilising clay won from the southern area, resulting in topographic levels in the vicinity of the proposed Operations Area of approximately 30 m AOD – 31 m AOD. Any geotechnically unsuitable materials will be removed and stockpiled within the Phase 2 area for subsequent treatment e.g. drying, and subsequent reuse;

- creation of surface water drainage ditches and attenuation pond. The surface water ditches and attenuation pond will include ecological habitat mitigation and enhancement measures; and
- provision of a pumping station to enable external discharge of collected waters from the attenuation pond to an existing ditch/culvert discharge to Stewartby Lake.

4.10.11 The East West Rail Link project is being promoted by the East-West Rail Consortium, a consortium of local authorities and interested bodies along the route. Phase 1 of the western section of the East West Rail Link project from Oxford to Bicester was approved by the Government in November 2011 (committing £270 million to the scheme), has been constructed and is now operational.

4.10.12 Phase 2 of the western section of the project will connect Bicester to Bedford via Bletchley and the Marston Vale branch line which runs along the west side of Rookery North Pit and Rookery South Pit. Statutory consultation was conducted between 30th June and 11th August on Phase 2 of the East West Rail Link and a member of the management team for the Project attended an event in Marston Moretaine. A meeting was also held with the East West Rail Stakeholder Manager on 10th May 2017. The Marston Vale branch line between the Millbrook level crossing and the Green Lane level crossing (including the level crossings themselves) are not subject to any upgrade works or alterations as part of the Phase 2 proposals.

4.10.13 For these reasons, the East-West Rail Link project has not been considered further as part of the cumulative impacts assessments within the separate topic chapters of this ES.

4.11 Residual Effects

4.11.1 At the end of each topic chapter the residual likely significant effects of the Project are described. These are defined as effects which cannot be fully remedied through the application of both embedded and additional mitigation and therefore remain in place after mitigation has been applied.

5 Alternatives Considered

5.1 Introduction

5.1.1 The EIA Regulations require that an ES should include an outline of the main alternatives that have been studied by an applicant and an indication of the main reasons for the applicant's choice, taking into account the environmental effects. Under the EIA Regulations there is no requirement to assess alternatives, only a requirement to provide information on those alternatives that have been considered.

5.1.2 The design iterations and alternatives considered at this stage in the Project are described below.

5.2 Alternative Development Sites

5.2.1 In deciding upon the location for the Project, Stag Energy has had regard to a number of factors such as those described in NPS EN-2. However, in line with paragraph 2.2.1 of NPS EN-2, "it is for energy companies to decide which applications to bring forward and the government does not seek to direct applicants to particular sites for fossil fuel generating stations."

5.2.2 The key factors considered necessary in selecting a suitable site for a project such as this one were broadly fourfold; technical, environmental, economic, and in line with local planning policy.

5.2.3 As part of a detailed feasibility assessment, Stag Energy looked at a range of sites around the UK to support power generation plants of this nature. This search for potential power generation plant sites across the UK was focused on areas that were capable of meeting the Applicant’s strategic project development criteria, namely:

- Acceptable proximity to the national gas transmission system & the national electricity transmission system or local distribution networks;
- Located within areas that are net importers of electricity; and
- Compatible land use designation/s.

5.2.4 In terms of technical constraints, the size of the site (i.e. large enough to support a power generation plant of up to 299 MW and associated infrastructure) and the proximity of a site to appropriate gas and electrical connection points were both key considerations.

5.2.5 From an environmental perspective, the site must have due regard to close sensitive receptors such as residential properties or sites of ecological importance (to avoid unacceptable impacts from noise and visual disturbance), the current nature of the surrounding area (to limit impacts on the landscape character of the area), previous site uses and land quality (to avoid sterilisation of the best and most versatile agricultural land or mineral assets) and proximity to sensitive ecological habitats.

5.2.6 Based on these factors, the Project Site was considered suitable for the following reasons:

- close proximity to the gas National Transmission System;
- close proximity to a suitable electrical connection (400 kV overhead line);
- the Generating Equipment Site is within previously developed land, lying below ground level;
- it is within an area identified as being potentially suitable for energy infrastructure;
- it has a well-developed road network for access to the Generating Equipment Site;
- the Project Site is outside of areas at risk of flooding;
- there is adequate space to develop the Power Generation Plant and associated infrastructure; and
- the Project Site is located in an area of net electricity import.

5.2.7 Stag Energy's site selection process began in 2010 and considered a range of factors, in accordance with Section 4.4 (Alternatives) of NPS EN-1 and Section 2.2 (Factors influencing site selection by developers) of NPS EN-2. This process included the following main phases, in order to identify a number of potential sites and refine this set of sites through increasingly detailed selection criteria:

- Identification of a large number of potential sites across the UK through existing data sources;
- Refinement of this set of sites, driven mainly by the need for electrical generation capacity to be located as closely as possible to the main sources of demand in the UK;
- Further refinement based on the layout of the electricity and gas transmission networks in the UK, to ensure proximity to these networks; and
- Assessment of the remaining sites based on technical, environmental and economic factors, as well as consideration of whether or not a proposed Project would be in accordance with local planning policy and with the availability of the sites.

5.2.8 As a result of the site selection process outlined above, Drax is bringing forward three other power generation projects through the PA 2008 process. They are: Progress Power Ltd at Eye Airfield in Suffolk (www.progresspower.co.uk): Hirwaun Power Ltd at Hirwaun in South Wales (www.hirwaunpower.co.uk): and Abergelli Power Ltd at Abergelli in South Wales (www.abergellipower.co.uk). The first two projects listed received DCOs in July

2015. It is anticipated that Abergelli Power Ltd will submit an application for its NSIP to the Planning Inspectorate in 2018.

5.3 Generating Equipment

5.3.1 The following technology options have been considered for the Power Generation Plant: OCGT plant; Combined Cycle Gas Turbine (CCGT) plant; Reciprocating Gas Engines (RGE) plant and CHP Plant.

5.3.2 The operation of OCGT plant has been described previously in section 3.2. CCGT plant consist of the same plant items as OCGT, although they also utilise a heat recovery steam generator (HRSG) which uses the waste heat from the exhaust gases to produce steam which is used to power a steam turbine. RGE plant are similar in operation to a large internal combustion engine, with a crankshaft driven by pistons. As described in paragraphs 5.3.5 to 5.3.9, CHP utilises waste heat from the combustion process to feed to other industrial users (deemed off-takers) within the vicinity of the plant. Further information is provided in a separate report prepared regarding the use of CHP at the Project (Appendix 5.1).

5.3.3 OCGT is considered to be the most suitable technology choice for generating up to 299 MW as a peaking plant and operating at up to 2,250 hours at the Project Site based on the following environmental, technical and feasibility considerations:

- visual impact: OCGT plants require shorter stack(s) compared to CCGT plant and therefore are less visually intrusive in views from the surrounding environment;
- water resources: Since no cooling is required for the condensing of steam, the cooling requirements of OCGT plants are significantly lower than, for example, CCGT plants. The auxiliary cooling requirements (for lubrication oil, etc.) would be met via dry air cooling through the use of fin-fan coolers or Air Cooled Condensers (ACC). The water requirement of an OCGT plant is therefore significantly lower than for CCGT plants;
- noise and available space: noise levels from an OCGT plant would typically be lower than for an RGE plant. A larger number of RGE units would be required at the Generating Equipment Site to generate up to 299 MW. Spatially this may not be possible;
- financial: based on the anticipated electricity market, it is essential that the Power Generation Plant of the size proposed would be particularly cost effective, as it would be called upon to operate flexibly to balance out the National Grid and meet changing demands of customers; and
- start-up times: OCGT plants are able to start up and shut down much quicker than similar sized CCGT plants and are, therefore, better suited to meeting variable demands.

5.3.4 Uncertain market conditions in 2014 led to the consideration of a number of different OCGT technologies and as such, the 2014 PEIR and associated formal consultation process was based on the construction and operation of between 1 and 5 Gas Turbine Generators. However, greater clarity on the capacity market rules, further engagement with equipment manufacturers, and consultation with the local community and relevant stakeholders has led to the decision that a single Gas Turbine Generator is the best technology solution for the Project. This change has been reflected in the updated EIA and is reported on in this ES.

Combined Heat and Power (CHP)

5.3.5 CHP is the process by which heat generated as a by-product of the generation of electricity is captured and re-used, rather than being emitted to the atmosphere via stack(s).

5.3.6 Efficient CHP plants are usually designed to meet the known heat demands of a suitable process. This could be on-site (e.g. for the heating of ancillary buildings) or exported off site to a suitable heat user (e.g. industrial process plant or district heating system). The heat demands of industrial processes are usually continuous, and district heating demands are also usually continuous (albeit on a seasonal basis).

5.3.7 This is in direct contrast to the operation of a OCGT peaking plant, which is designed to operate intermittently and unpredictably which is not suitable for CHP where the requirements are for a constant supply of heat. Therefore, any heat loads would be better served, and met more appropriately and efficiently by dedicated CHP plants, allowing the OCGT peaking plant to provide their main function which is as necessary support to the NETS.

5.3.8 In addition, as OCGT plant do not have any associated HRSG / steam turbine plant, the provision of steam from an OCGT plant would not be possible without the provision of additional steam raising plant / equipment, which would require more equipment to be constructed and a larger overall land take.

5.3.9 With this in mind, CHP has not been a significant factor in the technology choice of the plant. Further information will be provided in a separate report prepared regarding the use of CHP at the Project (Appendix 5.1)

5.4 Gas Connection

5.4.1 The Project Scoping Report (Appendix 1.2) described a Gas Connection ‘Opportunity Area’, to the south and east of the Generating Equipment Site, somewhere in which a new underground gas pipeline and AGI would be developed. Following publication of the Scoping Report, further studies refined this Opportunity Area such that there were two remaining Gas Connection Route Corridor Options presented in the 2014 PEIR and formally consulted upon in June 2014 as part of the Phase 1 statutory consultation. A preferred gas connection route and AGI location were also presented within the more southerly Route Corridor Option at that consultation stage.

5.4.2 As a result of further refinement, studies and feedback received from the Phase 1 statutory consultation process, a spatially refined Gas Connection Route Corridor has been brought forward as the selected Gas Connection Option to be used in the design of the Project and assessed in this ES. The Gas Connection Route Corridor was chosen as the most suitable route because it is the most direct and shortest connection between the National Transmission System and the Generating Equipment Site, avoiding obstructions such as roads, other high pressure gas pipelines, railways, large changes in elevation, water bodies and protected sites as much as possible. It is therefore less expensive and damaging to agricultural land. An alternative AGI location to that suggested in the 2014 PEIR has been selected following consultation with the land owner, who was concerned about sterilisation of prime agricultural land.

5.5 Electrical Connection

5.5.1 The EIA Scoping Report described an Electrical Connection Opportunity Area to the south of the Generating Equipment Site, somewhere in which the Electrical Connection would be developed. Following publication of the Scoping Report, further studies were undertaken to refine the available options.

5.5.2 Studies undertaken up to Phase 1 statutory consultation and feedback received during the Phase 1 statutory consultation determined that the most suitable location for the Substation was within Rookery South Pit, adjacent to the Generating Equipment Site. The main reasons for siting the substation in this location are as follows:

- lower visual impact – the Substation would be located entirely within Rookery South Pit, which will be approximately 15 mblg once the LLRS works are complete. The maximum height of the tallest structures within the substation would be 17.5 m, meaning they would be substantially screened by the pit. If the substation were to be developed outside of the Rookery South Pit, it would need to be sited to the south on higher lying agricultural land. In this location, the substation would be far more visually intrusive, particularly if viewed from the south and east;
- reduced effect on agricultural land – as stated above, should the substation be located outside of the Rookery South Pit, it would be developed on agricultural land. This would not only take more greenfield land over and above the three net additional towers, but could also impact on drainage runoff rates as agricultural land would be replaced by hardstanding; and
- reduced effect on previously undisturbed ground – previously undeveloped land outside of the Generating Equipment Site is known to have the potential to support buried archaeology. Therefore, avoiding this area and instead using land in Rookery South Pit which has previously been disturbed, removes a potential impact on the archaeology and cultural heritage of the area.

5.5.3 The 2014 PEIR confirmed that the proposed substation would then connect to the existing 400 kV double circuit Grendon - Sundon 400 kV line, operated by NGET. The line is situated approximately 320 m southwest of the Generating Equipment Site as shown on Figure 3.1.

5.5.4 Although the Substation is located adjacent to the Generating Equipment Site in the Rookery South Pit, the assessment relating to the Substation is presented under the 'Electrical Connection' section within each topic assessment.

5.5.1 With respect to the connection between the Substation to the NETS, a number of options have been considered and ruled out, for technical or financial reasons.

5.5.2 The 2014 PEIR also confirmed that for environmental assessment purposes, a worst case scenario of up to two 400 kV double circuit overhead line circuits with up to seven new transmission towers was considered. It was also explained that one of the proposed towers would replace an existing tower. Consultees were invited to comment on the proposed worst case connection scenario.

5.5.3 MPL explained in the 2014 PEIR (Chapter 5) that further liaison with NGET would take place regarding the indicative design of the [then] proposed connection prior to making a final decision which would be taken forward to the DCO Application.

5.5.4 Following the conclusion of the Phase 1 statutory consultation in 2014 subsequent engagement and technical assessment concluded that there were four potentially viable electrical connection options, including two overhead line and two underground cable options. These four options are summarised below.

5.5.5 **Option 1**: One overhead double circuit transmission line (requiring up to four new towers including the replacement of an existing tower (therefore three net additional towers) located in the existing Grendon – Sundon transmission route corridor. This option would require a new substation and two SECs, one located on each side of the existing transmission line, together with an approximately 100 metre section of underground cable to be constructed at the point of connection to the existing NETS.

5.5.6 **Option 2:** Similar to Option 1, Option 2 would involve one overhead double circuit transmission line (requiring up to four new towers where one will again replace an existing tower) located in the existing Grendon – Sundon transmission route corridor. This option would also require a new substation but does not require any SECs or underground cable.

5.5.7 **Option 3**: The third option would involve one underground double circuit. This would require one new tower (which will again replace an existing tower and be located in the existing Grendon – Sundon transmission route corridor, thereby resulting in no net additional towers). This option would require two SECs, one located on each side of the existing transmission line, and both circuits would then be connected via underground cables approximately 500 m in length to a new substation.

5.5.8 **Option 4:** The fourth option is similar to Option 3 and would involve one underground double circuit. This would require one new tower (which will again replace an existing tower and be located in the existing Grendon – Sundon transmission route corridor, thereby resulting in no net additional towers). This option would require one SEC, which could be located on either side of the existing transmission line, and the circuit would then be connected via underground cables approximately 500 m in length to a new substation (the 'Substation').

5.5.9 The Phase 1 statutory consultation generated a number of responses expressing concerns over the potential impacts of new pylons on the landscape and visual amenity, and in particular the potential for adverse effects on Ampthill Park. During its evaluation of responses, MPL recognised that consultees had expressed a strong preference for the development of an underground cable connection option. These views were taken on board by MPL and a presumption in favour of developing a wholly or partially underground cable option was adopted by the Project team. This was considered to represent more limited potential for significant adverse landscape and visual impacts than an overhead line option.

5.5.10 The resulting two remaining underground Electrical Connection options (options 3 and 4 above) were subsequently taken forward for assessment and were presented in the PEIR (re-named and presented as options 1 and 2) which formed part of the Phase 2 statutory consultation from May – July 2017.

5.5.11 Further discussions with NGET have revealed that option 4, as described above (presented as option 2 in the PEIR for Phase 2 statutory consultation), is unlikely to be feasible for a number of technical and financial reasons.

5.5.12 Therefore, a realistic worst case scenario has been assessed within this ES assuming that option 3 (presented as option 1 in the PEIR for Phase 2 statutory consultation), (one underground double circuit Tee-in and two SECs) would be developed, as described in section 3.4.

6 Air Quality

6.1 Introduction

6.1.1 This Chapter presents the findings of the assessment of likely significant air quality effects arising from the construction, operation, maintenance and decommissioning of the Project.

6.1.2 The Project has the potential to affect air quality due to vehicle emissions and dust generation during construction and decommissioning, and stack emissions during operation of the Generating Equipment.

6.2 Legislation and Policy Context

6.2.1 The legislation and policy context in relation to air quality is described in detail in Appendix 2.6. In summary, the following items of policy, legislation and guidance have been considered in preparing this assessment:

- National Policy Statements (NPS) EN-1, 2, 4 and 5;
- National Planning Policy Framework 2012;
- National Planning Policy Guidance;
- The Air Quality Strategy;
- EU Limit Values;
- Industrial Emissions Directive (IED);
- Environmental Permitting (England and Wales) Regulations 2016;
- Air Quality Standards Regulations 2010;
- The Habitats Directive;
- The Ambient Air Quality Directive
- The Bedford Borough Council Core and Rural Issues Plan 2021;
- The Bedford Borough Council Air Quality Action Plan 2007;
- The Development Strategy for Central Bedfordshire 2014;
- Central Bedfordshire Council Local Plan 2015 - 2035 – 2017 Consultation Paper; and
- Bedford Borough Council Local Plan 2035 – 2017 Consultation.

6.2.2 In particular, the assessment of emissions from the Generating Equipment has been undertaken by assuming that the emissions will be equal to the relevant limit values in the IED, as referenced and enforced through the Environmental Permitting (England and Wales) Regulations 2016.

6.3 Consultation

6.3.1 Specific key comments relevant to the assessment of air quality received throughout the assessment process are presented in Table 6.1 below, along with how these have been responded to.

Table 6.1 – Summary of Key Consultation and Responses Relating to Air Quality

Reference	Comment	Response
SoS (Scoping Opinion)		
3.27	Dust should be considered on-site and off-site, e.g. impacts on PRoW and including along access roads, traffic routes and local footpaths.	The assessment of dust impacts has considered both on-site and off-site receptors in accordance with the methodology described in Section 6.5.
3.28	The study area should be described and reasons for it justified.	The study area for the air quality assessment and the reasons for it and justification are described in Section 6.5.
3.29	Any AQMA within the study area should be identified and adverse changes to air quality should be assessed in relation to compliance with European air quality limit values.	Any AQMAs in the vicinity of the Project Site and/or likely to be impacted by the Project are identified in Section 6.6. Compliance with EU Limit Values and Environmental Assessment Levels is assessed in Section 6.7.
3.3.0 / 3.37	There is a need for the air quality assessment to be consistent with the ecology section and to take into consideration all relevant ecology sites.	A full list of potentially sensitive ecological receptors is presented in section 6.6, and this is consistent with Chapter 8 (Ecology).
3.32	Justification for 1 km study area needs to be through consultation with councils.	The 1 km study (for construction / decommissioning effects of dust on human health) area has been chosen on the basis of professional judgement of the geographical extent within which likely significant effects may occur (see Section 6.5), with the results of this assessment justifying the selection as no likely significant effects have been identified. A 10 km study area has been chosen for assessing likely significant effects in the operational phase as this is current best practice and has been used for other similar projects, as well as the proposed neighbouring development of the Rookery RRF.

Reference	Comment	Response
		No concerns have been raised by any statutory consultees as to the use of these study areas (see below for pre-application response from CBC on 21st October 2015)
3.34	The air dispersion model needs to be clearly explained and the worst case scenario set out.	The modelling scenarios are clearly explained and the realistic worst case scenario has been set out at Section 6.4.
3.35	Consideration should be given to monitoring dust complaints during all phases of the development.	The need for monitoring dust complaints is considered within the methodology that has been used for the dust impact assessment.
	Ampthill Town Council	
Scoping Response Letter	The adverse effect caused by emissions on Cooper's Hill is of concern to us. Sulphur dioxide and Nitrogen Dioxide, both contributing to acid rain and hampering the growth of plants will have an adverse impact. There is also a health risk from dioxins via the food chain and this too is of concern to us, being a farming area. We would need reassurance of how these emissions are to be monitored and procedures in the event of the monitoring system failing.	The fuel for the Generating Equipment is natural gas which contains negligible amounts of sulphur. Therefore, there will be negligible emissions of sulphur dioxide from the Generating Equipment. The effects of oxides of nitrogen emissions are considered within this Chapter, including the increase in nitrogen deposition as a result of the emissions from the Power Generation Plant in Section 6.7. The combustion fuel is natural gas and therefore there will be negligible emissions of dioxins from the Power Generation Plant, and therefore there is a negligible health risk from dioxins. Monitoring and procedures in the event of a failure of the monitoring system will be in accordance with the IED, the Environmental Permit for the Power Generation Plant and the requirements of the Environmental Permitting (England and Wales) Regulations 2016.
	CBC	
Scoping Response Letter	I would advise that the assessment makes use of the guidance held within the Environmental Protection UK guidance, Development Control: Planning for Air Quality.	The assessment has made use of the guidance held within the referenced EPUK document, as well as guidance

Reference	Comment	Response
		published by the Environment Agency for the assessment of impacts to air[3].
Pre-application advice (letter dated 21st October 2015)	Two new recent AQMAs have been declared in Sandy and Ampthill.	These AQMAs are considered to be a sufficient distance (approximately 17 km for Sandy and 4km for Ampthill) from the Generating Equipment so as not to be impacted by emissions resulting from the Project. This is discussed further in Section 6.6.
	BBC	
Consultation Response to PEIR (2017)	The ES should include a full air quality assessment and include any proposed mitigation required to achieve standards in the relevant guidance.	A full air quality impact assessment is provided in this ES to demonstrate no significant air quality effects from the plant.
Consultation Response to PEIR (2017)	Traffic related Air Quality impacts should be considered in any Air Quality Assessment (using figures from the TA).	Traffic related air quality impacts is considered in this air quality impact assessment.
	Luton Borough Council	
Scoping Response Letter	Modelling should include predictions of plume rate of dispersal of NO_x and any other particulates.	There will be negligible emissions of particulates from the Generating Equipment as the fuel is natural gas. Atmospheric dispersion modelling has been used to predict the plume dispersion from the Power Generation Plant, in line with the methodology outlined in Section 6.5 and the results of the modelling are presented in the ES.
	Houghton Conquest Parish Council	
Consultation Response to PEIR (2017)	The Parish Council raises a concern over emissions to air from the stacks.	A full air quality impact assessment is provided in this ES to demonstrate no significant air quality effects from the Generating Equipment.
	Marston Moreteyne Parish Council	
Consultation Response to PEIR (2017)	The Parish Council express concern over the potential increase of ground levels of nitrogen dioxide caused by emissions from the stack, and the	A full air quality impact assessment is provided in this ES to demonstrate no significant air quality effects from the Generating Equipment.

[3] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 28/04/17

Reference	Comment	Response
	subsequent adverse impact that this may have upon ecological and human receptors.	
Consultation Response to PEIR (2017)	Clarification is required as to what level is a detrimental effect deemed significant in relation to Para. 3.2.11 which states that “it is concluded that there are expected to be no likely significant effects during operation ….”.	Acknowledged. MPL confirms that significance is defined in relation to national air quality strategy objectives and assessed in accordance with established guidance.
Consultation Response to PEIR (2017)	Concerns around nitrous oxide: • NO_2 has the potential to be delayed from being dispersed to a specific height; and therefore, • This time delay has the effect that Nitrous Oxide gases could fall to the ground with detrimental effects.	Acknowledged. MPL confirms that the release of NO_2 will not be significantly affected by temperature inversions, since gases will be released at a high temperature and at high momentum.
	Environment Agency	
Consultation Response to PEIR (2017)	An Air Quality assessment including assessment of the Project’s impact on any relevant AQMAs will be completed during a permit determination of the relevant air quality modelling files.	Air dispersion modelling has been undertaken, taking into account permit modelling requirements, including the cumulative effects with the Covanta RRF Project and BAT requirements.
Consultation Response to PEIR (2017)	The operator should clarify the scope of any air quality modelling that will be completed for the DCO with the Combustion Lead for the Installations Team.	The modelling requirements have been discussed with the EA.
Consultation Response to PEIR (2017)	The air quality modelling should take the following into account: • BAT requirements on Energy Efficiency; • cumulative impacts from other relevant emission sources such as the proposed Energy from Waste plant.	
	Natural England	
Consultation Response to PEIR (2017)	There would not be any adverse effects to SSSIs through the construction or decommissioning stages; the main potential for impact to SSSIs would be through changes in air quality during operation of the power plant.	Acknowledged. The air quality assessment has taken account of ecological receptors during operation and no likely significant effects are anticipated.

Reference	Comment	Response
Consultation Response to PEIR (2017)	Air quality impacts from the proposal will not impact upon King's Wood and Glebe Meadows SSSI or Coopers Hill SSSI on the basis that screening has indicated that the process contribution (PC) for all pollutants at all sites will be <1% of the relevant critical level or load for the most sensitive habitat at each site.	Agreed and acknowledged.

6.4 Topic-specific Realistic Worst Case Scenario for Assessment

6.4.1 Modelling of emissions from the Power Generation Plant was undertaken based on manufacturer specific emission rates and flue gas parameters for a range of gas turbine generators. The gas turbine generator that gave the highest maximum ground level concentration of NO_2 was considered to be representative of a 'worst case' emissions profile.

6.4.2 Stack height sensitivity testing has revealed that a stack height of 32.5 m would be required to achieve adequate dispersion of emissions, with the maximum ground level concentrations anywhere within the receptor grid insignificant in accordance with EA criteria[4]. (see section 6.5). This stack height ensures that the requirements of the relevant Air Quality Standards Regulations 2010 are met. Any higher stack than 32.5 m would result in increased dispersion of emissions and therefore lower impacts on sensitive receptors. For this reason, a 32.5 m stack is considered to be a realistic worst case scenario in relation to dispersion of emissions and associated ground level concentrations of pollutants that have potential effects on sensitive receptors.

6.4.3 The Power Generation Plant could run for up to a maximum of 2,250 hours in any given year, provided that the 5 year rolling average does not exceed 1,500 hours. For the purposes of this assessment, a worst case yearly maximum of 2,250 running hours has been assessed for the selection of stack height.

6.5 Assessment Methodology and Significance Criteria

Establishing the Baseline

6.5.1 Information on existing air quality has been obtained by collating the results of monitoring carried out by CBC and BBC. Background concentrations for the

[4] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 28/04/17

Project Site have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid[5].

6.5.2 Existing nitrogen and acid deposition rates within the study area were determined from the Air Pollution Information System ("APIS") website[6].

6.5.3 CBC has one real time analyser sited in Sandy (approximately 18 km from the Project Site) monitoring NO_2, PM_{10} and $PM_{2.5}$. In addition, a network of NO_2 diffusion tube monitors are utilised throughout CBC's district. The nearest diffusion tube was in Brogborough, approximately 4.5 km south west of the Project Site, but this ceased monitoring in 2015. There is no local authority monitoring in the study area as there are no concerns locally regarding poor air quality.

Study Area – Construction and Decommissioning

6.5.4 In relation to construction and decommissioning dust effects, whilst small particles (<10 µm) can travel distances in excess of 1 km, the majority of large dust particles generated by construction activities (greater than 30 µm) are deposited within 100 m of sources, and intermediate sized particles (10-30 µm) are likely to travel up to 200-500 m. However, as the particles are transported downwind their concentration reduces rapidly due to the action of atmospheric dispersion.

6.5.5 The study area is defined in accordance with the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction' (the "IAQM Guidance")[7] which provides screening criteria for the consideration of dust impacts. The screening distances for human and ecological receptors are:

- Human – within 350 m of the boundary of the Project Site, or 50 m of the routes used by construction vehicles on the public highway, within 500 m of the site entrance; and
- Ecological – 50 m of the boundary of the Project Site or 50 m of the routes used by construction vehicles on the public highway, within 500 m of the Project Site entrance.

6.5.6 These distances have therefore been used to set the study area in this assessment as to whether there are any likely significant effects of the Project

[5] Department of the Environment, Food and Rural Affairs (Defra) (2016). 2013 Based Background Maps for NOx, NO_2, PM_{10} and $PM_{2.5}$. Available: http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

[6] Air Pollution Information System (APIS) (2017). 'Site relevant critical loads'. Available at: http://www.apis.ac.uk/

[7] Holman *et al*. (2014). 'Assessment of dust from demolition and construction', IAQM, London

in relation to air quality from dust during the construction phase. Both on-site and off-site dust effects have been considered.

Study Area – Operation (including maintenance)

6.5.7 The study area for emissions to air during operation of the Generating Equipment is 10 km from the approximate centre of the Generating Equipment Site as per the Guidance on air emissions risk assessment for environmental permitting[8].

6.5.8 Whilst the study area extends to 10 km, ambient pollutant concentrations as a result of emissions from the Generating Equipment are likely to be at a maximum concentration within 1 km[9] of the boundary of the Generating Equipment Site and therefore human receptors are most likely to be affected within this distance. For ecological receptors, the study area is 10 km for internationally designated sites (SACs, SPAs, and RAMSARs), and 2 km for nationally designated sites (SSSIs, NNRs, LNRs, CWSs), as per the Guidance on air emission risk assessment for environmental permitting.

6.5.9 Project specific monitoring was not undertaken since, as will be demonstrated in the following sections, the existing data holdings are sufficient to characterise the air quality baseline within the study area.

Vehicle Emissions

6.5.10 The impact of the emissions from vehicles during the construction, operational (including maintenance) and decommissioning phases (both on- and off-site) of the Project has been considered using the methodology prescribed in the Department for Transport 'Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3, Part 1: Air Quality' for the estimation of emissions from vehicles. Receptors are defined in relation to their distance from affected roads, where the distance is up to 200 m from the road. Affected roads are defined as:

- Road alignment will change by 5 m or more; or
- Daily traffic flows will change by 1,000 or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10 km/hr or more; or Peak hour speed will change by 20 km/hr or more.

[8] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 01/08/2017

[9] It is a function of the emissions from the plant and the size of the stacks that are needed to adequately disperse the emissions.

6.5.11 As demonstrated in Chapter 12, it is concluded that there are no air quality effects arising from Project-generated traffic with the exception of a very short duration peak in construction traffic over a 1 to 2 day period.

6.5.12 The trip generation from the Project would only be above 200 vehicles per day for the worst case construction movements over a very short period of time (1 to 2 days). When averaged over a full year, the HDV movements would be less than 200 AADT. The effects of construction vehicle emissions of the Project alone are considered to be not significant and are therefore, scoped out of the assessment.

Ambient Air Quality and the Protection of Human Health

6.5.13 In the case of combustion of natural gas in a power station, the main pollutants produced as a result of that process are NO_2 and Carbon Monoxide (CO). Assessment of these pollutants therefore forms the basis for assessment of emissions to air for the operational phase of the Generating Equipment. The assessment levels for these pollutants are shown in Table 6.2 and have been taken from legislation and guidance described in Appendix 2.6, namely The Air Quality Standards Regulations 2010[10], which implements the European Union’s Directive on ambient air quality and cleaner air for Europe (2008/50/EC).

Table 6.2 - Nitrogen Dioxide and CO Objectives for Human Health

Pollutant	Time Period	Objective
Nitrogen dioxide (NO_2)	1-hour mean	200µg/m^3 not to be exceeded more than 18 times a year
	Annual mean	40µg/m^3
Carbon Monoxide (CO)	8-hour running mean	10,000µg/m^3

Ecological Receptors

6.5.14 Objectives for the protection of vegetation and ecosystems have been set by the UK Government and were to have been achieved by 2000[11]. The objectives only strictly apply a) more than 20 km from an agglomeration (about 250,000 people), and b) more than 5 km from Part A industrial sources, motorways and built up areas of more than 5,000 people. Strictly speaking

[10]Statutory Instrument 2010, No. 1001, The Air Quality Standards Regulations 2010, HMSO, London.

[11] https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-2

therefore, the objectives would not apply in the case of the Project as this would be classified as a Part A industrial source.

6.5.15 The long-term (annual average) limit for NO_x of 30 µg/m^3 is the critical level for the protection of vegetation and ecosystems as set in the Air Quality Strategy. In addition, the EA Air emissions risk assessment guidance for environmental permitting[12] has set a NO_x daily mean concentration assessment level of 75 µg/m^3 in accordance with WHO guidelines[13].

Table 6.3 – Vegetation and Ecosystems Oxides of Nitrogen Assessment Levels

Pollutant	Time Period	Assessment Level
Oxides of Nitrogen (NO_x)	Annual Mean	30µg/m^3
	Daily Mean	75µg/m^3

6.5.16 Critical loads for nitrogen deposition onto sensitive ecosystems have been specified by United Nations Economic Commission for Europe (UNECE). They are defined as the amount of pollutant deposited to a given area over a year, below which significant harmful effects on specified sensitive elements of the environment do not occur, according to present knowledge[14]. Exceedance of a critical load is used as an indication of the potential for harmful effects to occur to an ecological receptor.

6.5.17 The critical loads are specific to the individual ecological receptors. Table 6.11 sets out the critical loads for the ecological receptors being assessed.

Building Downwash

6.5.18 When an air pollution plume flows over nearby buildings or other structures, turbulence is caused on the downwind side of the building. This turbulence can cause a plume from a stack source to be forced down to the ground much sooner than it would if a building or structure were not present. This is known as building downwash.

6.5.19 The downwash effects of buildings are taken into account by the air quality modelling. All buildings are assumed to be located in the indicative layout as shown in Figure 3.1 and to be of the dimensions in Table 3.1. Building

[12] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 28/04/17

[13] WHO (2000) Air Quality Guidelines for Europe; 2nd Edition. WHO Regional Publications, European Series, No. 91.

[14] Air Pollution Information System (APIS) (2017). 'Site relevant critical loads'. Available at: http://www.apis.ac.uk/

downwash is considered to be potentially significant if buildings are within a distance from the stack which is equivalent to five times the stack height and if the building height is greater than approximately 30 per cent of the stack height.

Surface Roughness

6.5.20 The surface roughness length is a representation of the disruption of airflow close to the ground due to obstructions and protuberances, such as buildings, trees and hedges. In this case a surface roughness of 0.2 m has been used, corresponding to agricultural areas (minimum) as the area surrounding the Project Site is primarily open fields, small villages and isolated woodlands.

Receptors and Additional Model Data

6.5.21 The ADMS 5 model was used for the modelling of the dispersion of exhaust gases during operation of the Generating Equipment. ADMS 5 is a second generation air dispersion model developed in the UK and accepted by the EA for the purposes of EIA (and is also used by the EA in the assessment and determination of applications for Environmental Permits).

6.5.22 The ADMS 5 model calculates time averaged ground level concentrations over any set of distances from the source. A 4 km by 4 km Cartesian grid with 44.4 m spacing[15] was used to predict the maximum process contributions to ground level concentrations in the immediate vicinity of the Generating Equipment Site. Pollutant concentrations were also predicted at the particular locations of the identified receptors.

6.5.23 The meteorological data used for this modelling exercise was that from the station at Cranfield (grid reference: x494227 y242215, elevation 111m), 6.9 km west of the Project Site. The data period considered was 2012-2016 inclusive as per current Air quality risk assessment guidance16 for the need to use recent meteorological data over five consecutive years. For each year the predominant wind direction was from the south west. A sensitivity test was carried out using meteorological data from Bedford station (grid reference: x503736 y258727, elevation 84 m), approximately 9.2 km northeast of the Project Site. The sensitivity test results are presented in Appendix 6.1.

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[15] There is a difference between study area and the area over which significant effects occur. In order to identify the maximum ground level concentrations, a smaller grid needs to be used. As the maximum concentrations are insignificant within the 4km grid, they are insignificant outside it as well.

[16] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 28/04/17

6.5.24 Terrain effects generally occur when ground levels change by more than 1 in 10. A terrain file was created to account for the change in levels in the vicinity of the Generating Equipment Site.

6.5.25 The deposition of nutrient nitrogen and the acidity due to nitrogen as a result of operation of the Generating Equipment has been undertaken in accordance with the EA guidance "AQTAG 06 - Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air" (2010). Details of the deposition velocities used are contained in Table 6.4.

6.5.26 Atmospheric dispersion modelling has been used to determine the optimum stack height for the Generating Equipment. The modelling takes into account both terrain data and local meteorological data in order to predict the ground level concentrations of pollutants. The methodology that is followed is standard to all industrial modelling studies undertaken, and will be subject to audit by the EA for the Environmental Permit application for the Project.

6.5.27 The modelling has determined an appropriate stack height such that the maximum predicted ground level concentrations are insignificant in terms of human health impacts (less than 10% of the short term objective and 1% of the long term objective[17]). Given the magnitude of the predicted concentrations it is not envisaged that ambient air quality monitoring would be necessary for the Project. The proposed technology choice for the Generating Equipment (OCGT) results in a release of exhaust gases from the stack which is at an extremely high temperature (over 550ºC) and high pressure. This ensures that although the actual height of the stack will be at least 32.5 m, the effective chimney height (top of the emissions release) is many times higher (of the order of hundreds of metres). Therefore, no issues with temperature inversions are anticipated, as the exhaust gases would be able to penetrate any inversion layers.

6.5.28 Furthermore, the weather data used to feed into the model captures all types of weather conditions, including times when inversions would be most likely to occur.

6.5.29 The models have been run for a complete calendar year and the annual average results pro-rated by the maximum intended annual operating hours of the Power Generation Plant, so as to represent a realistic worst case scenario. Objectives are set out in Table 6.2. For the short term objectives, this modelling approach is conservative as it is unlikely that the Power Generation Plant will be operating during all of the periods in the year that give rise to the highest short term concentrations. Five years' worth of meteorological data has been

[17] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 28/04/17

used in the assessment, and the maximum results from any of the five years reported.

6.5.30 The receptor locations for the assessment are shown in Figure 6.1.

Fuel-specific Dispersion Model Inputs

6.5.31 The air dispersion modelling assumes that the Generating Equipment operates at full load for 2,250 hours per year for the selection of the stack height, i.e. the maximum possible number of operational hours that the plant can run in any one year out of five. This results in insignificant impacts (less than 10% of the short term and 1% of the long term objectives) at the point of maximum ground level concentrations. As the modelling has been undertaken for five years and the maximum annual results reported, the results at individual receptors are reported on the basis of 1500 hours operation per annum. The Power Generation Plant must not exceed an average of 1500 hours operation per annum over a rolling five year period.

6.5.32 All emissions from the combustion of the fuel gases will be discharged from the stack that will be located within the Generating Equipment Site. The indicative emission parameters for the stack are shown in Table 6.4. The only pollutants of concern in relation to gas combustion are NO_x and CO. Gas combustion does not generate significant quantities of particulate matter or sulphur dioxide (SO_2) as the sulphur content in natural gas is negligible. Emissions of NO_x are the controlling pollutant for the determination of the stack height, as the predicted ground level concentrations of CO will be insignificant due to the release rate of this pollutant compared to the assessment level.

6.5.33 Emissions from eight different types of industrial gas turbines were modelled to ascertain the equipment that gave the maximum ground level concentrations of pollutants. Whilst the impacts were all similar, emissions from the worst case gas turbine have been used for the modelling.

Table 6.4 – Model Inputs

Parameter	Value Per Generator
Type	Open Cycle Gas Turbine – Industrial
Number	1
Discharge Location	501374, 240679
Turbine building height	27 m
Discharge Heights Tested (m)	27.5 – 45
Exit Flue Diameter (mm)	7000
Discharge temperature (^oC)	589.9
Flow rate (m^3/s)	1,742
Flow rate (Nm^3/s, dry, reference O_2)	639.1

Parameter	Value Per Generator
Exit velocity (m/s)	45.26
NO_x concentration (mg/Nm^3)	50
NO_x emission rate (g/s)	31.95
CO Concentration (mg/Nm^3)	100
CO emission rate (g/s)	63.91

Atmospheric Chemistry

6.5.34 Emissions of NO_x from combustion sources include both NO_2 and NO, with the majority being in the form of NO. In ambient air, NO is oxidised to form NO_2, and it is NO_2 which has the more significant health impacts. For this assessment, the conversion of NO to NO_2 has been estimated using the worst case assumptions set out in EA guidance[18], namely that:

- For the assessment of long term (annual mean) impacts at receptors 70 percent of NO_x is NO_2; and
- For the assessment of short term (hourly mean) impacts at receptors 35 percent of NO_x is NO_2.

6.5.35 The oxidation of NO to NO_2 is not, however, an instantaneous process and where the maximum impacts occur within up to 1 km of the stacks (as will be the case for the Generating Equipment), the EA assumptions offer a worst case assessment as the conversion rates may be very conservative.

Stack Height

6.5.36 A stack height sensitivity study has been undertaken for the Project. This study examined differing stack heights in 2.5 m intervals from 27.5 m to 45 m (inclusive). The stack height sensitivity study considered long term and short term contributions to ground level concentrations of NO_2.

6.5.37 Based on this analysis it has been determined that a minimum stack height of 32.5 m will be suitable for the Generating Equipment so as to achieve adequate dispersion of air emissions without impacting on sensitive receptors and whilst ensuring compliance with the UK AQS objectives. The impacts have been assessed at this minimum stack height so as to be conservative.

Significance Criteria

[18] Conversion rates of NO_x to NO_2 Air Quality Modelling and Assessment Unit – Environment Agency, http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/static/documents/Conversion_ratios_for__NOx_and_NO2_.pdf. Accessed on 01/08/2017

Construction / Decommissioning

6.5.38 The sensitivity of the study area to construction and decommissioning dust impacts has been defined based on the examples provided within the IAQM Guidance[19] as set out in Table 6.5 below and taking into account and applying professional judgement.

Table 6.5 – Area Sensitivity Definitions

Area Sensitivity	People and Property Receptors	Ecological Receptors
High	>100 dwellings, hospitals, schools, care homes within 50 m 10 – 100 dwellings within 20 m Museums, car parks, car showrooms within 50 m PM_{10} concentrations approach or are above the daily mean objective.	National or Internationally designated site within 20 m with dust sensitive features / species present
Medium	>100 dwellings, hospitals, schools, care homes within 100 m 10 – 100 dwellings within 50 m Less than 10 dwellings within 20 m Offices/shops/parks within 20 m PM_{10} concentrations below the daily mean objective.	National or Internationally designated site within 50 m with dust sensitive features / species present Site with dust sensitive features or particularly important plant species within 20 m
Low	>100 dwellings, hospitals, schools, care homes 100 – 350 m away 10 – 100 dwellings within 50 – 350 m Less than 10 dwellings within 20 – 350 m Playing fields, parks, farmland, footpaths, short term car parks, roads, shopping streets PM_{10} concentrations well below the daily mean objective.	Site with dust sensitive features or particularly important plant species within 50 m Locally designated site with dust sensitive features within 50 m

6.5.39 In accordance with the IAQM Guidance, the dust emission magnitude is defined as large, medium or small (Table 6.6) taking into account the construction / decommissioning activity taking place on a site, combined with applying professional judgement.

Table 6.6 – Risk Criteria for Dust Emission Magnitude

[19] Holman *et al*. (2014). 'Assessment of dust from demolition and construction', IAQM, London

Dust Emission Magnitude	Activity
Large	**Demolition** >50,000 m^3 building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >20 m above ground level
	Earthworks >10,000 m^2 site area, dusty soil type (e.g. clay), >10 earth moving vehicles active simultaneously, >8 m high bunds formed, >100,000 tonnes material moved
	Construction >100,000 m^3 building volume, on site concrete batching, sandblasting
	Trackout >50 HDVs out / day, dusty soil type (e.g. clay), >100 m unpaved roads
Medium	**Demolition** 20,000 - 50,000 m^3 building demolished, dusty material (e.g. concrete) 10-20 m above ground level
	Earthworks 2,500 - 10,000 m^2 site area, moderately dusty soil (e.g. silt), 5-10 earth moving vehicles active simultaneously, 4 m – 8 m high bunds, 20,000 - 100,000 tonnes material moved
	Construction 25,000 - 100,000 m^3 building volume, on site concrete batching
	Trackout 10 - 50 HDVs out / day, moderately dusty surface material, 50 -100 m unpaved roads
Small	**Demolition**

Dust Emission Magnitude	Activity
	<20,000 m^3 building demolished, non-dusty material, <10 m above ground level, work in winter
	Earthworks <2,500 m^2 site area, non-dusty soil, <5 earth moving vehicles active simultaneously, < 4 m high bunds, <20,000 tonnes material moved
	Construction <25,000 m^3, non-dusty material
	Trackout <10 HDVs out / day, non-dusty soil, < 50 m unpaved roads

6.5.40 Based on area sensitivity and dust emission magnitude, the risk of dust impacts is determined as shown in Table 6.7 below, taking into account and applying professional judgement.

Table 6.7 – Risk of Dust Impacts

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

6.5.41 Risk of dust impacts of below medium are considered not significant.

Operation (including maintenance) – Human Health Receptors

6.5.42 The assessment of the effect of emissions to air from the Generating Equipment on human health receptors has been considered in line with criteria in the Air emissions risk assessment guidance[20]. The contribution of the Generating Equipment (the process contribution (or PC)) has been added to an estimate of the background concentration (based on monitoring data) to

[20] Air emissions risk assessment for your environmental permit. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit. Accessed on 28/04/17

provide the predicted environmental concentration (PEC). The PC can be considered to be “significant” if the ground level concentrations exceed 10 percent of the short term objectives and 1 percent of the long term objectives.

6.5.43 In all cases, the PEC should be below the relevant assessment level for the relevant pollutant as set out in Table 6.2. Where a PC causes a breach of the relevant assessment level, and the PC is the significant causal factor for the breach then the PC is unlikely to be acceptable and further controls are likely to be required on the operation of the installation to mitigate the impact (i.e. additional mitigation to reduce emissions or the consideration of the need for a higher stack).

Operation (including maintenance) – Ecological Receptors

6.5.44 The assessment of the effect of emissions to air from the Generating Equipment on ecological receptors has also been carried out in line with criteria set out in the Air emissions risk assessment guidance[16]. The maximum PEC within the habitat should not exceed the critical level as set out in Table 6.3. Where a PC causes a breach of the relevant assessment level, and the PC is the significant causal factor for the breach then the PC is unlikely to be acceptable and further controls are likely to be required on the operation of the installation to mitigate the impact (i.e. additional mitigation to reduce emissions or the consideration of the need for a higher stack).

6.5.45 The maximum predicted deposition (from the process and background), should not exceed the critical load. In the case where the critical level or load are already exceeded as a result of the background concentrations or deposition rates, then the additional contribution from the process should be less than 1 percent of the assessment value, otherwise the additional contribution is potentially significant and a Habitats Regulations Assessment (HRA) would be necessary. However, it is noted here that no HRA is considered necessary for this Project given the distance of Natura 2000 sites from the Project Site (see Chapter 8 for further information).

Gas Connection

6.5.46 It is noted here that the SoS, in the Scoping Opinion (Appendix 1.2), commented that the potential effects of air quality from operation of the Gas Connection could be scoped out of the assessment because operation of the Gas Connection would not be likely to release any emissions to air during its operation.

Electrical Connection

6.5.47 It is noted here that the SoS, in the Scoping Opinion (Appendix 1.2), commented that the potential effects of air quality from operation of the Electrical Connection could be scoped out of the assessment because operation of the Gas Connection would not be likely to release any emissions to air during its operation.

Assumptions

6.5.48 The assumptions for this assessment are set out as per Section 4.8. From an air quality perspective this is that the Generating Equipment will operate for a maximum of 2,250 hours per year, and will not exceed an average of 1,500 hours of operation over a rolling five-year period.

6.6 Baseline Conditions and Receptors

Power Generation Plant

6.6.1 The baseline conditions assume that certain elements of the LLRS are in place prior to construction of the Project in 2020, as per Section 3.1.

6.6.2 The nearest Air Quality Management Area (AQMA) to the Project Site is within Ampthill, approximately 4 km south of the Project Site. The AQMA is declared primarily on the basis of traffic related NO_2.

6.6.3 Monitored concentrations for Brogborough (approximately 5 km from the Project Site), taken from the CBC 2016 Annual Status Report, are shown in Table 6.8.

Table 6.8 – Brogborough Monitoring Data

Location	NO_2 (µg/m^3)				
	2011	2012	2013	2014	2015
N7, Highfield Crescent Brogborough (X 496330, Y 238300)	25.7	26.8	26.9	26.2	33.6[a]

[a] data annualised, site closed July 2015.

6.6.4 In addition, background concentrations for 2017 have been obtained from the national maps (Section 6.5.1) for the study area, Table 6.9.

Table 6.9 – Annual Mean Background Concentrations

Grid Reference	NO_x (µg/m^3)	NO_2 (µg/m^3)	CO (µg/m^3)
502500_242500	19.0	13.5	300
502500_241500	19.5	13.8	300
504500_241500	15.5	11.3	300
503500_241500	16.4	11.8	300
503500_240500	16.3	11.8	300
503500_239500	18.4	13.1	300
502500_238500	20.1	14.2	300
502500_239500	17.9	12.8	300

Grid Reference	NO_x (µg/m³)	NO_2 (µg/m³)	CO (µg/m³)
501500_239500	17.6	12.6	300
500500_240500	16.1	11.7	300
499500_241500	19.6	14.0	300
499500_242500	17.9	12.9	300
501500_238500	17.1	12.3	300
503500_240500	16.3	11.8	300
502500_240500	18.1	12.9	300
Objectives (as set out in Table 6.2)	30[a]	40[b]	10,000[b]

[a] Ecological receptors objective; [b] Human Health objective

6.6.5 The national maps for carbon monoxide have not been updated since 2001 on the basis that there was very little risk of the objectives being exceeded in the future. The background concentrations for this pollutant are likely to be below the values stated.

6.6.6 The NO_x and NO_2 background concentrations are well below the relevant objectives.

Residential Receptors

6.6.7 There are no villages/towns within 1 km of the Generating Equipment Site. Residential receptors within 1 km of the Project Site include those within the nearby settlements of Stewartby and Millbrook. In addition, there are farmsteads outside of the settlements and within 1 km of the Project Site including, but not limited to:

- South Pillinge Farm;
- Church Farm and Church Farm Cottages;
- Lower Farm;
- Ossory Farm;
- Park Farm;
- Manor Farm;
- Manor Farm Cottages;
- Road Farm;
- How End Farm;
- Ampthill Park House; and
- Field Farm.

6.6.8 In terms of potential construction related impacts from dust, receptors within 350 m of the Project Site are limited to South Pillinge Farm and Pillinge Cottages. There are a number of residential properties within 50 m of the routes used by construction vehicles on the public highway, up to 500 m from the site entrance within Stewartby.

6.6.9 In order to identify the points of maximum ground level concentration a Cartesian grid of receptors has been used. The grid resolution is approximately 44 m, which is less than 1.5 times the optimum stack height and therefore complies with the Air emissions risk assessment guidance for the grid resolution. The overall receptor grid was 4 km east to west and north to south; from 499500, 238500 to 503500, 242500. This defined sensitive residential receptors within the vicinity of the Power Generation Plant Site which are set out below in Table 6.10 and shown on Figure 6.1.

Table 6.10 – Receptor Locations

ID	Location	X	Y
Human Health Receptors			
R1	Wootton Pillinge School, Stewartby	502060	242090
R2	The Crescent, Stewartby 1	502060	241920
R3	Stewartby Allotments	502400	241800
R4	The Crescent, Stewartby 2	502120	241940
R5	Houghton Conquest	504150	241330
R6	Road Farm	503280	241060
R7	Manor Farm Cottages	503000	240930
R8	Manor Farm	502890	240560
R9	How End Farm	503240	240670
R10	Houghton Park Residential Care Home	503200	239430
R11	Ampthill Park House	502650	239050
R12	Park Farm	502270	239010
R13	Lower Farm	501660	239150
R14	Church Farm and Church Farm Cottages	500210	240640
R15	South Pillinge Farm	500960	240680
R16	Marston Moretaine 1	499870	241260
R17	Marston Moretaine School	499630	241250
R18	Marston Moretaine 2	499140	242060

ID	Location	X	Y
R19	Ossory Farm	501824	238264
R20	Field Farm	503500	240373
Ecological Receptors			
E1	King's Wood and Glebe Meadows SSSI	504229	240277
E2	Coopers Hill SSSI	502738	238089
E3	Rookery Clay Pit CWS	501741	241390
E4	Stewartby Lake CWS	501151	241545
E5	Millbrook Pillinge Pit CWS	500810	241067
E6	Ampthill Park CWS	502255	238655
E7	Lidlington Pit CWS	500182	240072
E8	Millbrook Churchyard CWS	501488	238566
E9	Millbrook CWS	501315	238508
E10	Heydon Hill CWS	500532	238821
E11	Coronation Pit CWS	502360	242741
E12	Millbrook Warren CWS	501105	238071
E13	Ampthill Cemetery and the Knoll CWS	503770	238429
E14	Ampthill Tunnel CWS	502165	237943
E15	Marston Bypass Roadside Nature Reserve	498917	240887

Ecological Receptors

6.6.10 There are no internationally designated sites within 10 km of the Project Site. Nationally designated sites within 2 km of the Project Site are:

- King's Wood and Glebe Meadows, Houghton Conquest Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR); and
- Coopers Hill, Bedfordshire SSSI and LNR.

6.6.11 Non-statutory ecological sites within 2 km of the Project Site are:

- Rookery Clay Pit County Wildlife Site (CWS);
- Stewartby Lake CWS;
- Millbrook Pillinge Pit CWS;
- Ampthill Park CWS;
- Lidlington Pit CWS;

- Millbrook Churchyard CWS;
- Millbrook CWS;
- Heydon Hill CWS;
- Coronation Pit CWS:
- Millbrook Warren CWC;
- Ampthill Cemetery and the Knoll CWS;
- Ampthill Tunnel CWS; and
- Marston Bypass Roadside Nature Reserve (RNR).

6.6.12 The critical loads for the receptors listed above are listed in Table 6.11, with the background concentrations and baseline deposition listed in Table 6.12. For the SSSIs, the site relevant critical loads from the APIS database are shown. For the CWSs, as there is no site specific information listed on APIS, an appropriate sensitive habitat has been selected based on ecology of the site, and the habitat and location specific information from APIS is shown.

6.6.13 In terms of potential construction related impacts from dust, the only sensitive receptors within 50 m of potential dust generating activities are the Rookery Clay Pit CWS and the Stewartby Lake CWS.

Table 6.11 – Site relevant critical loads

Designated Site	Receptor	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
			(keqN/ha/yr)*	(keqS/ha/yr)**
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Broadleaved, mixed and yew woodland)*	E1a	15 - 20	0.214 – 10.829	10.62
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Neutral grassland)*	E1b	20 - 30	0.928 – 4.928	4.00
Cooper's Hill SSSI *(Lowland Heathlands)*	E2	10 - 20	0.892 – 1.352	0.46
Rookery Clay Pit CWS *(Broadleaved, mixed and yew woodland)*	E3	15 - 20	0.214 – 10.829	10.62
Stewartby Lake CWS *(Calcareous grassland)*	E4	15 - 25	0.928 – 4.928	4.00

Designated Site	Receptor	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
			(keqN/ha/yr)*	(keqS/ha/yr)**
Millbrook Pillinge Pit CWS *(Neutral grassland)*	E5	20 - 30	0.928 – 4.928	4.00
Ampthill Park CWS *(Broadleaved, mixed and yew woodland)*	E6	10 - 20	0.142 – 1.10	0.95
Lidlington Pit CWS *(Neutral grassland)*	E7	20 - 30	0.928 – 4.928	4.00
Millbrook Churchyard CWS *(Calcareous grassland)*	E8	15 - 25	0.85 – 4.85	4.00
Millbrook CWS *(Broadleaved, mixed and yew woodland)*	E9	10 - 20	0.14 – 1.10	0.96
Heydon Hill CWS *(Broadleaved, mixed and yew woodland)*	E10	10 - 20	0.14 – 1.10	0.96
Coronation Pit CWS *(Broadleaved, mixed and yew woodland)*	E11	10 - 20	0.14 – 1.10	0.95
Millbrook Warren CWS *(Broadleaved, mixed and yew woodland)*	E12	10 - 20	0.14 – 1.10	0.96
Ampthill Cemetery and the Knoll CWS *(Acid grassland)*	E13	10 - 15	0.22 – 0.68	0.46
Ampthill Tunnel CWS *(Neutral grassland)*	E14	20 - 30	0.93 – 4.93	4.00
Marston Bypass RNR *(Neutral grassland)*	E15	20 - 30	1.07 – 5.07	4.00

* Minimum critical load minimum nitrogen – minimum critical load maximum nitrogen
** Minimum critical load maximum sulphur

Table 6.12 – Baseline deposition and concentrations

Designated Site	Nitrogen Deposition	Acid Deposition		NO_x
	(kgN/ha/yr)	(keqN/ha/yr)*	(keqS/ha/yr)**	($\mu g/m^3$)
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Lowland mixed deciduous woodland)*	29.40	2.10	0.28	15.2
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Neutral grassland)*	17.22	1.20	0.24	15.2
Cooper's Hill SSSI *(Lowland Heathlands)*	17.10	1.23	0.22	20.1
Rookery Clay Pit CWS *(Broadleaved, mixed and yew woodland)*	29.40	2.10	0.28	19.5
Stewartby Lake CWS *(Calcareous grassland)*	17.22	1.23	0.24	16.3
Millbrook Pillinge Pit CWS *(Neutral grassland)*	17.22	1.23	0.24	16.4
Ampthill Park CWS *(Broadleaved, mixed and yew woodland)*	29.12	2.08	0.26	20.1
Lidlington Pit CWS *(Neutral grassland)*	17.22	1.23	0.24	16.1
Millbrook Churchyard CWS	17.08	1.22	0.22	17.1

Designated Site	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)*	Acid Deposition (keqS/ha/yr)**	NO_x (µg/m³)
(Calcareous grassland)				
Millbrook CWS *(Broadleaved, mixed and yew woodland)*	29.12	2.08	0.26	17.1
Heydon Hill CWS *(Broadleaved, mixed and yew woodland)*	29.12	2.08	0.26	16.2
Coronation Pit CWS *(Broadleaved, mixed and yew woodland)*	29.40	2.10	0.28	19.0
Millbrook Warren CWS *(Broadleaved, mixed and yew woodland)*	29.12	2.08	0.26	17.1
Ampthill Cemetery and the Knoll CWS *(Acid grassland)*	17.08	1.22	0.22	18.5
Ampthill Tunnel CWS *(Neutral grassland)*	17.08	1.22	0.22	21.2
Marston Bypass RNR *(Neutral grassland)*	17.50	1.25	0.23	20.0

Gas Connection

6.6.14 Baseline conditions and receptors in relation to the Gas Connection for the purposes of this assessment are as set out for the Power Generation Plant.

Electrical Connection

6.6.15 Baseline conditions and receptors in relation to the Electrical Connection for the purposes of this assessment are as set out for the Power Generation Plant.

6.7 Assessment of Effects

Power Generation Plant

Construction/Decommissioning

6.7.1 The main potential air quality effects during construction and decommissioning of the Power Generation Plant are dust deposition and associated elevation in PM_{10} concentrations. The following activities have the potential to cause emissions of dust:

- Site preparation including delivery of construction material, erection of fences and barriers;
- Earthworks including digging foundations and landscaping;
- Materials handling such as storage of material in stockpiles;
- Construction and fabrication of units;
- Decommissioning activities; and
- Removal of materials from the site.

6.7.2 Typically, the main cause of unmitigated dust generation on construction / decommissioning sites is from demolition and vehicles using unpaved haul roads, and off-site from the suspension of dust from mud deposited on local roads by traffic. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.

6.7.3 In addition to the generation of dust and PM_{10} emissions, emissions of NO_x can occur from road traffic, plant and equipment used on site.

6.7.4 The study area for dust effects is considered to be of low sensitivity (see Table 6.5). The Power Generation Plant site is located in an area of light industrial development and agricultural land with few residential properties. The closest significant residential developments lie over 500 m from the Power Generation Plant Site boundary, although isolated roadside properties are present within 150 m.

6.7.5 The Power Generation Plant site does not warrant a higher sensitivity rating since local particulate matter concentrations are at low risk of exceedance of the air quality objectives. Locations without permanent habitation such as agricultural land and/or PROW are judged to be of low sensitivity for dust and health effects.

6.7.6 Although Rookery Clay Pit CWS and Stewartby Lake CWS are within 50 m of construction activities, in accordance with Table 6.5 they have been considered to be of low sensitivity given that they are not nationally or internationally designated and do not have any dust sensitive species present.

6.7.7 No demolition works are required during construction of the Project and only a small category of dust emission magnitude is warranted during demolition works in the decommissioning phase given the limit number of buildings on site, many of which are metal and pre-fabricated (i.e. they would be dismantled rather than demolished). No significant earthworks are anticipated for the Power Generation Plant as the LLRS will be responsible for the majority of site preparation. However, the dust emission potential for construction of the Project is assessed as being large (Table 6.6) for earthworks associated with the Power Generation Plant, primarily due to the scale of the development area.

6.7.8 Emissions during construction itself are moderated by the largely prefabricated nature of the installation and have therefore been classed as low in line with Table 6.6.

6.7.9 Emissions from track-out are of medium potential. For the Power Generation Plant, risks arise due to the number of vehicles potentially operating on the Power Generation Plant site.

6.7.10 The dust emission potential is considered in combination with the distance to the nearest receptors to assess the potential risks associated with the construction phase of the Project.

6.7.11 Based on the IAQM criteria (Table 6.7), the highest risk of dust emissions, associated with the construction / decommissioning of the Power Generation Plant, is considered to be low (large dust emissions class of earthworks on a low sensitivity receptor). Appropriate mitigation corresponding to a low risk site is therefore required during the construction phase and is incorporated within the outline CEMP as embedded mitigation, as set out in Section 3.6 and Appendix 3.2.

6.7.12 In accordance with the IAQM criteria (Table 6.5), the study area is considered to be of low sensitivity, as there are no receptors in close proximity to the Access Road. The dust emissions class associated with construction of the Access Road is small. The risk of dust effects associated with the construction of the Access Road is therefore negligible (Table 6.7).

6.7.13 The results of the assessment are summarised below in Table 6.13.

Table 6.13 – Summary of Construction / Decommissioning Effects from Power Generation Plant

Phase of Works	Dust Emissions Class	Distance to Receptors	Sensitivity of Receptors	Risk of Effects (without embedded mitigation)
Demolition (decommissioning)	Small <20,000 m^3 building demolished, non-dusty material,	Rookery Pit CWS <20 m		Negligible risk

Phase of Works	Dust Emissions Class	Distance to Receptors	Sensitivity of Receptors	Risk of Effects (without embedded mitigation)
Earthworks	Large (Total site area > 10,000 m, dusty soils)	Residential <100 m Industrial N/A	Low	Low Risk
Construction	Small (Total volume <25,000 m^3 primarily Prefabricated)			Negligible Risk
Track out	Medium Maximum no vehicles >25 per day			Low Risk

Operation (including maintenance)

6.7.14 Stack height sensitivity testing was undertaken using the emissions data set out in Table 6.4 and meteorological data from 2012 to 2016.

6.7.15 Dispersion model runs were undertaken for various stack heights between 27.5 m and 45 m with a model grid resolution of 44 m. The optimum stack height was determined such that the maximum predicted annual NO_2 concentration was less than 1% of the long term objective (40 µg/m^3) and the maximum predicted hourly NO_2 concentration was less than 10% of the objective (200 µg/m^3 as a 99.78th percentile).

6.7.16 Table 6.14 to Table 6.17 and Insert 6.1 show the results of the stack height sensitivity testing. Significant benefits are seen as the stack height increases from 27.5 m to 45 m, as the effects of building downwash reduce. By 32.5 m, the maximum impact on ground level concentrations of NO_2 anywhere on the grid is less than 1% of the annual mean objective and 10% of the hourly mean objective. Beyond 35 m, whilst benefits are still seen with increasing stack height, the rate of reduction in impacts decreases significantly, especially for annual mean nitrogen dioxide concentrations. Additionally, in terms of balancing environmental effects (i.e. adequate dispersion vs greater visual impacts from a higher stack), 35 m is considered a suitable maximum parameter.

Table 6.14 Stack Height Sensitivity Testing Results – Annual Mean

Stack Height (m)	Maximum Impacts in Study Area (µg/m^3)				
	2012	2013	2014	2015	2016
27.5	2.99	2.92	3.74	2.99	2.82
30.0	1.04	1.06	1.35	1.08	0.99

Stack Height (m)	Maximum Impacts in Study Area (µg/m^3)				
	2012	2013	2014	2015	2016
32.5	0.29	0.31	0.40	0.32	0.28
35.0	0.07	0.08	0.11	0.08	0.07
37.5	0.04	0.04	0.05	0.07	0.04
40.0	0.04	0.04	0.04	0.07	0.04
42.5	0.04	0.04	0.04	0.06	0.04
45.0	0.04	0.04	0.04	0.06	0.03
Objective	**40**				

Table 6.15 Stack Height Sensitivity Testing Results – Annual Mean Percentage Environmental Assessment Level

Stack Height (m)	% EAL				
	2012	2013	2014	2015	2016
27.5	**7.48**	**7.31**	**9.34**	**7.47**	**7.06**
30.0	**2.60**	**2.65**	**3.38**	**2.71**	**2.48**
32.5	0.73	0.78	**1.00**	0.80	0.70
35.0	0.18	0.21	0.27	0.21	0.18
37.5	0.11	0.11	0.12	0.18	0.10
40.0	0.10	0.10	0.11	0.17	0.09
42.5	0.10	0.10	0.10	0.15	0.09
45.0	0.09	0.09	0.09	0.14	0.08
Objective	**1%**				

Table 6.16 Stack Height Sensitivity Testing Results – Hourly Mean

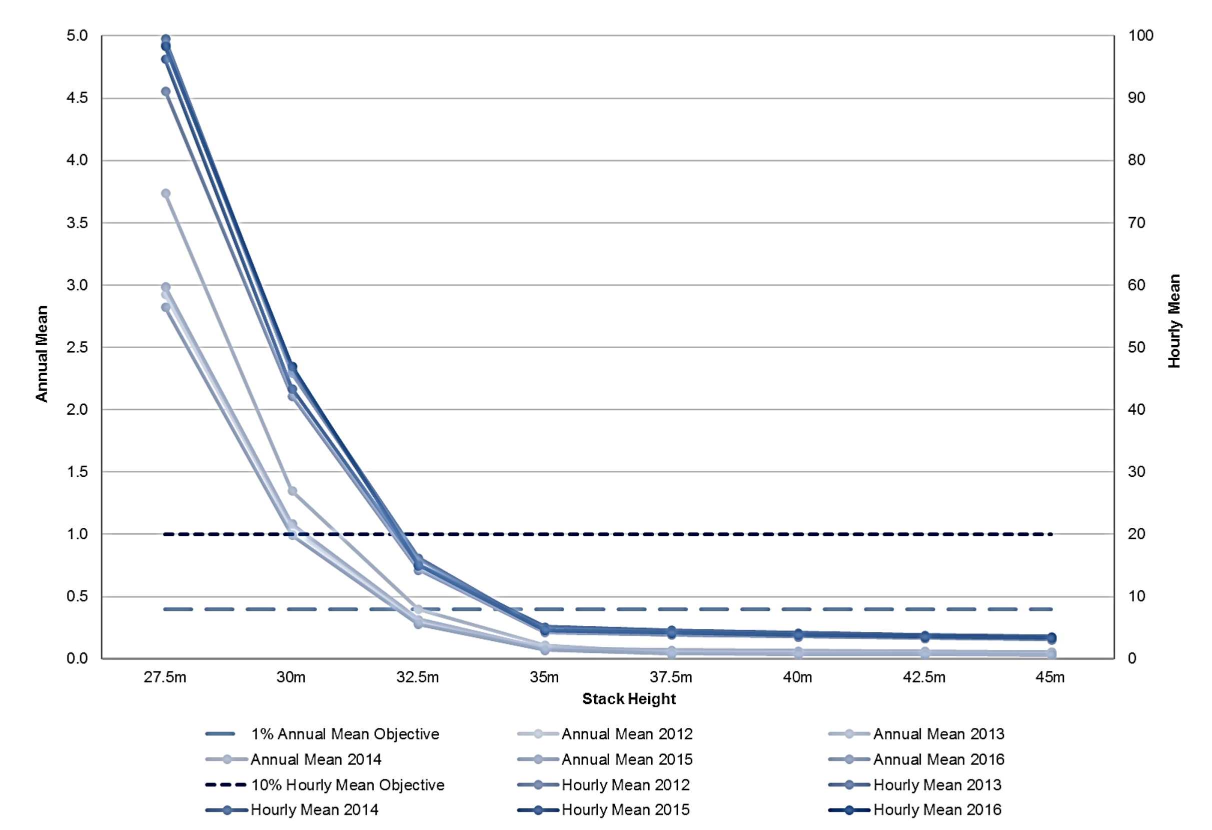
Stack Height (m)	Maximum Impacts in Study Area (µg/m^3)				
	2012	2013	2012	2015	2012
27.5	91.19	98.73	99.55	96.27	98.33
30.0	42.24	45.90	46.41	43.40	47.01
32.5	14.33	15.99	16.20	15.21	15.03

Stack Height (m)	Maximum Impacts in Study Area (μg/m³)				
	2012	2013	2012	2015	2012
35.0	4.27	4.55	4.60	5.16	4.61
37.5	3.88	3.90	4.19	4.64	4.17
40.0	3.60	3.59	3.81	4.17	3.89
42.5	3.38	3.33	3.56	3.86	3.62
45.0	3.17	3.12	3.36	3.60	3.39
Objective	**200**				

Table 6.17 Stack Height Sensitivity Testing Results – Hourly Mean Percentage Environmental Assessment Level

Stack Height (m)	% EAL				
	2012	2013	2014	2015	2016
27.5	**45.59**	**49.36**	**49.77**	**48.13**	**49.17**
30.0	**21.12**	**22.95**	**23.20**	**21.70**	**23.50**
32.5	7.16	7.99	8.10	7.60	7.52
35.0	2.14	2.28	2.30	2.58	2.30
37.5	1.94	1.95	2.10	2.32	2.09
40.0	1.80	1.80	1.90	2.09	1.94
42.5	1.69	1.67	1.78	1.93	1.81
45.0	1.59	1.56	1.68	1.80	1.70
Objective	**10%**				

Insert 6.1 Stack Height Sensitivity Testing



Potential Impacts on Human Health

6.7.17 In this section, the modelled contributions of the Power Generation Plant to pollution and deposition levels are presented as maximum ground level concentrations of NO_2 and CO anywhere within the study area.

6.7.18 Furthermore, the model results are presented as the contribution of the Power Generation Plant on its own (PC), and in combination with background concentrations (PEC).

6.7.19 Within the dispersion modelling, twenty specific human sensitive receptors were defined in close proximity to the site, as set out in Table 6.10.

6.7.20 The maximum predicted ground level concentrations from the realistic worst case scenario for a stack height of 32.5 m are all insignificant when compared to the assessment levels for human health impacts (section 6.5, Table 6.2). As the maximum predicted concentrations are all insignificant, the concentrations at selected human health receptors are also all insignificant. The results for short term contributions and PECs are shown below in Tables 6.18 and 6.19 respectively. The results for long term concentrations are shown in Table 6.20.

Table 6.18 - Short-term Results of Stack Modelling for Human Health Sensitive Receptors (PC)

ID	Nitrogen Dioxide (NO_2)		Carbon Monoxide (CO)	
	Hourly mean PC (99.79th %ile µg/m^3)	Percentage of EAL (%)*	Running 8 hour mean PC (µg/m^3)	Percentage of EAL (%)**
R1	3.1	1.6	16.5	0.2
R2	3.5	1.7	20.5	0.2
R3	3.2	1.6	16.7	0.2
R4	3.5	1.7	20.5	0.2
R5	1.3	0.7	5.9	0.1
R6	1.8	0.9	9.4	0.1
R7	1.9	0.9	11.1	0.1
R8	2.4	1.2	10.5	0.1
R9	1.9	0.9	9.3	0.1
R10	1.4	0.7	8.9	0.1
R11	1.2	0.6	7.4	0.1
R12	0.9	0.5	8.0	0.1
R13	1.0	0.5	9.9	0.1
R14	1.4	0.7	16.4	0.2
R15	1.1	0.5	13.1	0.1
R16	1.1	0.5	8.7	0.1
R17	1.0	0.5	6.7	0.1
R18	1.1	0.6	6.5	0.1
R19	0.8	0.4	6.0	0.1
R20	1.9	0.9	9.2	0.1
Screening Criteria	**20**	**10**	**1,000**	**10**

*200µg/m^3; **10,000µg/m^3

Table 6.19 - Short-term Results of Stack Modelling for Human Health Sensitive Receptors (PEC)

ID	Nitrogen Dioxide (NO_2)		Carbon Monoxide (CO)	
	PEC ($\mu g/m^3$)	Percentage of EAL (%)	Running 8 hour mean PEC ($\mu g/m^3$)	Percentage of EAL (%)
R1	30.1	15.1	616.5	6.2
R2	31.0	15.5	620.5	6.2
R3	30.8	15.4	616.7	6.2
R4	31.1	15.5	620.5	6.2
R5	23.8	11.9	605.9	6.1
R6	25.5	12.7	609.4	6.1
R7	25.4	12.7	611.1	6.1
R8	28.3	14.1	610.5	6.1
R9	25.4	12.7	609.3	6.1
R10	27.7	13.8	608.9	6.1
R11	26.8	13.4	607.4	6.1
R12	26.5	13.3	608.0	6.1
R13	26.2	13.1	609.9	6.1
R14	24.7	12.4	616.4	6.2
R15	24.5	12.2	613.1	6.1
R16	29.1	14.5	608.7	6.1
R17	29.0	14.5	606.7	6.1
R18	26.9	13.5	606.5	6.1
R19	25.5	12.7	606.0	6.1
R20	25.4	12.7	609.2	6.1
Environmental Assessment Level	**200**	**100**	**10,000**	**100**

Table 6.20 - Long-term Results of Stack Modelling for Human Health Sensitive Receptors (PC and PEC)

ID	Nitrogen Dioxide (NO_2)			
	Annual mean PC (µg/m^3)	Percentage of EAL (%)	Annual mean PEC (µg/m^3)	Percentage of EAL (%)
R1	0.03	0.07	13.5	33.8
R2	0.03	0.09	13.8	34.6
R3	0.04	0.11	13.8	34.6
R4	0.04	0.09	13.8	34.6
R5	0.01	0.03	11.3	28.2
R6	0.01	0.03	11.8	29.6
R7	0.01	0.04	11.8	29.5
R8	0.01	0.03	12.9	32.3
R9	0.01	0.03	11.8	29.5
R10	0.01	0.02	13.1	32.8
R11	0.00	0.01	12.8	32.0
R12	0.00	0.01	12.8	32.0
R13	0.00	0.01	12.6	31.5
R14	0.00	0.01	11.7	29.2
R15	0.00	0.01	11.7	29.2
R16	0.00	0.01	14.0	35.0
R17	0.00	0.01	14.0	35.0
R18	0.00	0.01	12.9	32.2
R19	0.00	0.01	12.3	30.9
R20	0.01	0.03	11.8	29.5
Criteria	**0.4**	**1**	**40**	**100**

6.7.21 Isopleths showing the predicted annual average NO_2 concentration and the predicted hourly average 99.79th percentile NO_2 concentration are presented in Figures 6.2 and 6.3 respectively.

<u>Impacts on Ecological Receptors</u>

6.7.22 Impacts on ecological receptors can occur both in terms of impacts on plants exposed directly to airborne pollutants and also through deposition of substances to soil, which subsequently changes soil chemistry.

6.7.23 Within the dispersion modelling, 15 specific ecologically sensitive receptors were defined, in close proximity to the Site, as set out in Table 6.11.

6.7.24 For the ecological receptors, all of the predicted annual mean oxides of nitrogen process contributions are insignificant, i.e. below 1% of the assessment level. When combined with the background concentrations, no breaches of the critical level are predicted to occur.

6.7.25 The predicted daily mean oxides of nitrogen concentrations are not insignificant, but when added to the background concentrations, no breaches of the daily mean critical level are predicted to occur.

6.7.26 All of the predicted nitrogen and acid deposition rates are insignificant when compared to the critical loads for the habitats under consideration.

6.7.27 These results are summarised below in Tables 6.21 – 6.24.

Table 6.21 - Long-term NO_x Results of Stack Modelling for Ecological Receptors

ID	Habitat Type	Background Concentration (µg/m^3)	Critical Level (µg/m^3)	PC (µg/m^3)	PC/CL (%)	PEC (µg/m^3)	PEC/CL (%)
E1	Lowland mixed deciduous woodland	15.23	30	0.01	0.04	15.24	50.8%
	Neutral grassland	15.23	30	0.01	0.04	15.24	50.8%
E2	Lowland Heathlands	20.08	30	0.00	0.01%	20.08	66.9%
E3	Broadleaved, mixed and yew woodland	16.30	30	0.06	0.21%	16.36	54.5%
E4	Calcareous grassland	16.30	30	0.02	0.07%	16.32	54.4%
E5	Neutral grassland	16.44	30	0.01	0.02%	16.45	54.8%
E6	Broadleaved, mixed and yew woodland	20.08	30	0.00	0.02%	20.08	66.9%
E7	Neutral grassland	16.14	30	0.01	0.04%	16.15	53.8%
E8	Calcareous grassland	17.12	30	0.01	0.02%	17.13	57.1%
E9	Broadleaved, mixed and yew woodland	17.12	30	0.01	0.02%	17.13	57.1%
E10	Broadleaved, mixed and yew woodland	16.18	30	0.01	0.04%	16.19	54.0%
E11	Broadleaved, mixed and yew woodland	19.01	30	0.03	0.09%	19.04	63.5%
E12	Broadleaved, mixed and yew woodland	17.12	30	0.01	0.02%	17.13	57.1%
E13	Acid grassland	18.47	30	0.01	0.02%	18.48	61.6%
E14	Neutral grassland	21.23	30	0.00	0.01%	21.24	70.8%
E15	Neutral grassland	20.05	30	0.00	0.01%	20.05	66.8%

Table 6.22 - Short-term NO_x Results of Stack Modelling for Ecological Receptors

ID	Habitat Type	Background Concentration (µg/m³)	Critical Level (µg/m³)	PC (µg/m³)	PC/CL (%)	PEC (µg/m³)	PEC/CL (%)
E1	Lowland mixed deciduous woodland	15.23	75	2.1	2.8%	17.3	23.1%
	Neutral grassland	15.23	75	2.1	2.8%	17.3	23.1%
E2	Lowland Heathlands	20.08	75	1.2	1.6%	21.3	28.4%
E3	Broadleaved, mixed and yew woodland	16.30	75	7.3	9.8%	23.6	31.5%
E4	Calcareous grassland	16.30	75	4.5	6.0%	20.8	27.7%
E5	Neutral grassland	16.44	75	1.8	2.3%	18.2	24.3%
E6	Broadleaved, mixed and yew woodland	20.08	75	2.2	2.9%	22.3	29.7%
E7	Neutral grassland	16.14	75	2.6	3.4%	18.7	24.9%
E8	Calcareous grassland	17.12	75	1.8	2.4%	18.9	25.2%
E9	Broadleaved, mixed and yew woodland	17.12	75	1.6	2.2%	18.8	25.0%
E10	Broadleaved, mixed and yew woodland	16.18	75	2.4	3.2%	18.6	24.8%
E11	Broadleaved, mixed and yew woodland	19.01	75	2.6	3.5%	21.6	28.8%
E12	Broadleaved, mixed and yew woodland	17.12	75	1.8	2.4%	18.9	25.2%
E13	Acid grassland	18.47	75	1.0	1.3%	19.4	25.9%
E14	Neutral grassland	21.23	75	1.6	2.1%	22.8	30.4%
E15	Neutral grassland	20.05	75	2.1	2.9%	22.2	29.6%

Table 6.23 - Results of stack modelling for ecological sensitive receptors: nutrient nitrogen deposition

ID	Habitat Type	Background Deposition (kgN/ha/yr)	Critical Load (kgN/ha/yr)	PC (kgN/ha/yr)	PC/CL (%)	PEC (kgN/ha/yr)	PEC/CL (%)
			Lower		Lower		Lower
E1	Broadleaved, mixed and yew woodland	29.40	15	0.002	0.02%	29.40	**196.0%**
	Neutral grassland	29.40	20	0.001	0.01%	17.22	86.1%
E2	Lowland Heathlands	17.08	10	0.000	0.00%	17.08	**170.8%**
E3	Broadleaved, mixed and yew woodland	29.40	15	0.013	0.08%	29.41	**196.1%**
E4	Calcareous grassland	17.22	15	0.002	0.01%	17.22	**114.8%**
E5	Neutral grassland	17.22	20	0.001	0.00%	17.22	86.1%
E6	Broadleaved, mixed and yew woodland	29.12	10	0.001	0.01%	29.12	**291.2%**
E7	Neutral grassland	17.22	20	0.001	0.01%	17.22	86.1%
E8	Calcareous grassland	17.08	15	0.001	0.00%	17.08	**113.9%**
E9	Broadleaved, mixed and yew woodland	29.12	10	0.001	0.01%	29.12	**291.2%**
E10	Broadleaved, mixed and yew woodland	29.12	10	0.002	0.02%	29.12	**291.2%**
E11	Broadleaved, mixed and yew woodland	29.40	10	0.006	0.06%	29.41	**294.1%**
E12	Broadleaved, mixed and yew woodland	29.12	10	0.001	0.01%	29.12	**291.2%**
E13	Acid grassland	17.08	10	0.001	0.01%	17.08	**170.8%**
E14	Neutral grassland	17.08	20	0.000	0.00%	17.08	85.4%
E15	Neutral grassland	17.50	20	0.000	0.00%	17.50	87.5%

Table 6.24 - Results of stack modelling for ecological sensitive receptors: acid deposition

ID	Habitat Type	Background Deposition (keqN/ha/yr)	Critical Load (keqN/ha/yr)	PC (keqN/ha/yr)	PC/CL (%)	PEC (keqN/ha/yr)	PEC/CL (%)
E1	Broadleaved, mixed and yew woodland	2.10	10.8	0.0002	0.002%	2.10	19.4%
	Neutral grassland	1.23	4.9	0.0001	0.002%	1.23	25.0%
E2	Lowland Heathlands	1.22	1.4	0.0000	0.002%	1.22	90.2%
E3	Broadleaved, mixed and yew woodland	2.10	10.8	0.0009	0.008%	2.10	19.4%
E4	Calcareous grassland	1.23	4.9	0.0001	0.003%	1.23	25.0%
E5	Neutral grassland	1.23	4.9	0.0001	0.001%	1.23	25.0%
E6	Broadleaved, mixed and yew woodland	2.08	1.1	0.0001	0.006%	2.08	**190.0%**
E7	Neutral grassland	1.23	4.9	0.0001	0.002%	1.23	25.0%
E8	Calcareous grassland	1.22	4.9	0.0000	0.001%	1.22	25.1%
E9	Broadleaved, mixed and yew woodland	2.08	1.1	0.0001	0.008%	2.08	**189.6%**
E10	Broadleaved, mixed and yew woodland	2.08	1.1	0.0002	0.014%	2.08	**189.4%**
E11	Broadleaved, mixed and yew woodland	2.10	10.8	0.0004	0.004%	2.10	19.4%
E12	Broadleaved, mixed and yew woodland	2.08	1.1	0.0001	0.007%	2.08	**189.6%**
E13	Acid grassland	1.22	0.7	0.0000	0.007%	1.22	**178.6%**
E14	Neutral grassland	1.22	4.9	0.0000	0.001%	1.22	24.8%
E15	Neutral grassland	1.25	5.1	0.0000	0.001%	1.25	24.7%

Gas Connection

Construction/Decommissioning

6.7.28 The main potential air quality effects during construction and decommissioning of the Gas Connection are dust deposition and associated elevation in PM_{10} concentrations. The following activities have the potential to cause emissions of dust:

- Site preparation including delivery of construction material, erection of fences and barriers;
- Earthworks including digging of pipeline trench; and
- Materials handling such as storage of material in stockpiles.

6.7.29 Typically, the main cause of unmitigated dust generation on construction / decommissioning sites is from demolition and vehicles using unpaved haul roads, and off-site from the suspension of dust from mud deposited on local roads by traffic. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.

6.7.30 In addition to the generation of dust and PM_{10} emissions, emissions of NO_x can occur from road traffic, plant and equipment used on site.

6.7.31 The receptors within the study area are considered to be of low sensitivity (see Table 6.5). The Gas Connection is located in an area of light industrial development and agricultural land with few residential properties. The closest significant residential developments lie over 500 m from the Gas Connection, although isolated properties are present within 150 m.

6.7.32 The Gas Connection Site does not warrant a higher sensitivity rating since local particulate matter concentrations are at low risk of exceedance of the air quality objectives. Locations without permanent habitation such as agricultural land and/or PROW are judged to be of low sensitivity for dust and health effects.

6.7.33 Although Rookery Pit CWS is within 50 m of construction activities, in accordance with Table 6.5 it has been considered to be of low sensitivity given that it is not nationally or internationally designated and does not have any dust sensitive species present.

6.7.34 No demolition works are required for any construction aspect of the Project and only a small category of dust emission magnitude is warranted during demolition works in the decommissioning phase given the limit number of buildings, many of which are metal and pre-fabricated (i.e. they would be dismantled rather than demolished). The Pipeline is also likely to be left in-situ. The dust emission potential for construction of the Project is assessed as being large for earthworks associated with the Gas Connection primarily due to the scale of the development area.

6.7.35 Emissions during construction itself are moderated by the largely prefabricated nature of the installation (length of gas pipeline brought to Gas Connection) and are therefore classed as small.

6.7.36 Emissions from track-out are of medium potential. For the Gas Connection, risks arise due to the number of vehicles potentially operating on the Gas Connection and using unpaved access.

6.7.37 The dust emission potential is considered in combination with the distance to the nearest receptors to assess the potential risks associated with the construction phase of the Gas Connection.

6.7.38 In line with Table 6.6, the highest risk of dust emissions during the construction and decommissioning of the Gas Connection is considered to be large (as a result of earthworks). The study area is considered to be of low sensitivity (Table 6.5). In line with Table 6.7, the risk of dust emissions associated with the construction of the Gas Connection is therefore low. This is summarised below in Table 6.25.

Table 6.25 – Summary of Construction / Decommissioning Effects from Gas Connection

Phase of Works	Dust Emissions Class	Distance to Receptors	Sensitivity of Receptors	Risk of Effects (without embedded mitigation)
Demolition (Decommissioning)	Small <20,000 m^3 building demolished, non-dusty material,	Rookery Pit CWS <20 m Residential <100 m Industrial N/A	Low	Negligible risk
Earthworks	Large (Total site area > 10,000 m, dusty soils)			Low Risk
Construction	Small (Total volume <25,000 m^3 primarily Prefabricated)			Negligible Risk
Track out	Medium [Maximum no vehicles >25 per day			Low Risk

Electrical Connection

Construction/Decommissioning

6.7.39 The main potential air quality effects during construction and decommissioning of the Electrical Connection are dust deposition and associated elevation in PM_{10} concentrations. The following activities have the potential to cause emissions of dust:

- Site preparation including delivery of construction material, erection of fences and barriers;
- Earthworks including digging cable trench; and
- Materials handling such as storage of material in stockpiles.

6.7.40 Typically, the main cause of unmitigated dust generation on construction / decommissioning sites is from demolition and vehicles using unpaved haul roads, and off-site from the suspension of dust from mud deposited on local roads by traffic. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.

6.7.41 In addition to the generation of dust and PM_{10} emissions, emissions of NO_x can occur from road traffic, plant and equipment used on Site.

6.7.42 The receptors within the study area are considered to be of low sensitivity (see Table 6.5). The Electrical Connection is located in an area of light industrial development and agricultural land with few residential properties. The closest significant residential developments lie over 500 m from the Electrical Connection, although isolated roadside properties are present within 100 m.

6.7.43 The Electrical Connection does not warrant a higher sensitivity rating since local particulate matter concentrations are at low risk of exceedance of the air quality objectives. Locations without permanent habitation such as agricultural land and/or PROW are judged to be of low sensitivity for dust and health effects

6.7.44 Although Rookery Pit CWS is within 50 m of construction activities, in accordance with Table 6.5 it has been considered to be of low sensitivity given that it is not nationally or internationally designated and does not have any dust sensitive species present.

6.7.45 No demolition works are required for any construction aspect of the Project and only a small category of dust emission magnitude is warranted during demolition works in the decommissioning phase given the limit number of buildings, many of which are metal and pre-fabricated (i.e. they would be dismantled rather than demolished). The electrical cables are also likely to be left in-situ. The dust emission potential for construction of the Project is assessed as being large for earthworks associated with the Electrical Connection primarily due to the scale of the development area.

6.7.46 Emissions during construction itself are moderated by the largely prefabricated nature of the installation (length of cable brought to Electrical Connection) and are therefore classed as small.

6.7.47 Emissions from track-out are of medium potential. For the Electrical Connection, risks arise due to the number of vehicles potentially operating on the Electrical Connection and using unpaved access.

6.7.48 The dust emission potential is considered in combination with the distance to the nearest receptors to assess the potential risks associated with the construction phase of the Electrical Connection.

6.7.49 The highest risk of dust emissions during the construction/decommissioning of the Electrical Connection is considered to be large (relating to earthworks), as per Table 6.6. The study area is considered to be of low sensitivity (Table 6.5). According to Table 6.7, the risk of dust emissions associated with the construction of the Electrical Connection is therefore low.

6.7.50 The results are summarised below in Table 6.26.

Table 6.26 – Summary of Construction / Decommissioning Effects from Electrical Connection

<table>
<tr><th>Phase of Works</th><th>Dust Emissions Class</th><th>Distance to Receptors</th><th>Sensitivity of Receptors</th><th>Risk of Effects (without embedded mitigation)</th></tr>
<tr><td>Demolition (Decommissioning)</td><td>Small <20,000 m^3 building demolished, non-dusty material,</td><td rowspan="4">Rookery Pit CWS <20 m

Residential <100 m

Industrial

N/A</td><td rowspan="4">Low</td><td>Negligible Risk</td></tr>
<tr><td>Earthworks</td><td>Large (Total site area > 10,000 m, dusty soils)</td><td>Low Risk</td></tr>
<tr><td>Construction</td><td>Small (Total volume <25,000 m^3 primarily Prefabricated)</td><td>Negligible Risk</td></tr>
<tr><td>Track out</td><td>Medium [Maximum no vehicles >25 per day</td><td>Low Risk</td></tr>
</table>

6.8 Cumulative and in Combination Effects

Overview

6.8.1 Construction, decommissioning or operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in Section 4.10. However, the majority of these proposed developments are all distant from the Project Site (greater than 2 km).

6.8.2 These developments and any effects arising from them are outside the study area for this topic within which significant effects could occur (e.g. dust deposition on the same residential receptors as the Project). As such it is considered that no cumulative or in combination effects are likely to arise in relation to air quality during the construction or decommissioning phases of the Project. Furthermore, each of these developments will be bound by its own CEMP and will apply best practice construction methods so as to minimise impacts on air quality.

6.8.3 Similarly, it is considered that these developments are all a significant distance from the Project Site and outside of the study area, and as such are not considered likely to cause any cumulative impacts on air quality in conjunction with the Project. Only limited operational emissions to air (limited to numbers of traffic movements which are considered insignificant in EIA terms) are anticipated to result from these developments during operation. Furthermore, each of these developments will be bound by its own best practice working methods so as to limit operational impacts on air quality.

Construction and Decommissioning

6.8.4 The projects considered to be of relevance to the cumulative effects assessment for this chapter (taken from Section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, (immediately north of the Generating Equipment Site).

6.8.5 Little detail is known about the 'Integrated Waste Management Facilities' proposed for development in the Rookery South Pit. At present, only a high level scoping report has been submitted. No details are set out regarding potential impacts on air quality as a result of the development. However, it is likely that this development will be bound by its own CEMP and best practice construction methods so as to limit impacts on air quality during construction. Should it go ahead, then any application for consent will need to consider the Project to ensure that no significant cumulative effects will arise between it and the Project. Nevertheless, in order to minimise the possibility of cumulative effects arising, a CEMP will be followed during construction of the Project, which will ensure best practice construction methods are followed and limit, as far as practicable, the possibility of impacts occurring to air quality. The measures proposed to minimise impacts during construction are listed in Section 3.6.

6.8.6 Furthermore, given the early stage of the Integrated Waste Management proposals and the likely time required to achieve planning consent, it is considered unlikely that there would be any overlap on the construction periods of these two projects, which further mitigates against any potential cumulative effects.

6.8.7 As set out in Section 4.10, the project with the most potential for simultaneous construction or decommissioning effects is the Covanta RRF to be developed to the north of the Generating Equipment Site.

6.8.8 The construction of both the Project and the Covanta RRF Project at the same time represents the greatest potential for creating cumulative dust and traffic emission impacts and is therefore judged to be a realistic worst case scenario for cumulatively assessing construction impacts. Any other scenario (e.g. operation of one scheme and constriction of the other) would generate less dust and therefore lower impacts.

6.8.9 The ES for the Covanta RRF concluded that there were two main potential pre-mitigation impacts relating to air quality that may arise during the construction and decommissioning of the plant.

6.8.10 These impacts include:

- Dust emissions – (human receptor) minor adverse
- Road traffic emissions – (human receptor) negligible

6.8.11 However, the Covanta RFF ES proposed a number of mitigation measures to reduce these potential impacts, which essentially include working to a Code of Construction Practice (CoCP) and the visual monitoring of dust during a combination of meteorological events (i.e. when there is a wind of greater than 3 m/s, from the northeast during periods when there is no precipitation or the ground is dry). In the event that dust emissions are likely to impact the nearest residential receptor, South Pillinge Farm, onsite measures would be adopted, including water-spray dampening of soils, stockpiles and exposed surfaces.

6.8.12 Subsequent to the implementation of the above mitigation measures, the residual effects of construction dust were judged to be not significant.

6.8.13 Similarly, potential impacts from dust deposition were identified for the Project. However, applying the embedded mitigation described in this Chapter, there are expected to be no effects arising from the construction and de-commissioning of the Project from deposition of dust either. Based on professional judgement and experience and knowledge of other schemes, there are therefore not anticipated to be any significant effects from construction related dust deposition cumulatively from both projects.

6.8.14 It is concluded that, based on professional judgement, with the implementation of the embedded mitigation described in this Chapter along with the implementation of embedded mitigation in the Covanta RRF project, no potential significant cumulative effects will arise in relation to dust as part of construction and decommissioning.

6.8.15 Traffic generated by the Project is compared with other cumulative developments in Chapter 12. Cumulative effects are only expected with the Covanta RRF Project given the close proximity of the two sites, the same location for the main site access and the potential for construction of both projects at the same time. Both projects will use Green Lane as their primary access route for construction.

6.8.16 The trip generation of Covanta RRF Project is significantly greater than that from the Project (Chapter 12). Taking into consideration the cumulative effects of the Project and Covanta RRF, Green Lane would meet the criteria for an assessment of road traffic impacts to be undertaken.

6.8.17 The Covanta RRF Project assessed the impacts of vehicle emissions on Green Lane[21] brought about by the Energy from Waste (EfW) facility, where the increase in HGVs was predicted to be greater than 200 HGVs per day. The assessment indicated that although the additional traffic would result in an increase in airborne pollution at sensitive receptors, the predicted concentrations of NO_2 and PM_{10} would be well below the air quality objectives. On this basis, it concluded that there was unlikely to be any risk of unacceptable impacts to air quality due to road traffic, and impacts were considered not significant.

6.8.18 The cumulative impacts of the Project and Covanta RRF traffic would be not significant, as the impacts of the Project construction traffic would be insignificant by virtue of the traffic being below relevant thresholds for an assessment to be necessary.

Operation (including maintenance)

6.8.19 The projects considered to be of relevance to the cumulative effects assessment for this chapter (taken from Section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, immediately north of the Generating Equipment Site).

6.8.20 Little detail is known about the 'Integrated Waste Management Facilities' proposed for development in the Rookery Pit. At present, only a high level scoping report, requesting a scoping opinion, has been submitted. No details are provided in the scoping report regarding potential impacts on air quality or from acid deposition. However, it is likely that, should any of the proposed waste developments involve combustion processes, they will be bound by their own emissions limits, and will need to consider other cumulative schemes when applying for consent. Should the development go ahead, the application for consent will need to consider the Project to ensure that no cumulative effects will arise between it and the Project as this development will follow development of the Project.

6.8.21 The ES for the Covanta RRF Project to the north of the Generating Equipment Site concluded that there were potential (pre-mitigation) effects from operation of the project resulting from:

- Emissions associated with road traffic (human receptor) – negligible
- Emissions associated with combustion process (human receptor) – negligible

[21] Covanta Rookery South Limited (2010). Environmental Statement Volume I. The Proposed Rookery South (Resource Recovery Facility) Order. Document Reference: 3.1.

- Emissions associated with combustion process (Kings Wood and Glebe Meadows SSSI) – minor adverse

6.8.22 Effective traffic planning and management was referred to, such as design of vehicle routing onsite and optimising waste delivery schedules to minimise vehicle queueing, optimising junction arrangements between the site access and Green Lane, and routing traffic to optimise access to the trunk road network.

6.8.23 The Covanta RRF ES states that although emissions are low, the nutrient nitrogen deposition at the Kings Wood and Glebe Meadows, Houghton Conquest SSSI was predicted to be marginally greater than 1% PEC. It should be noted that this result was based upon the assessment of impacts using a stack height of 100 m, and the extension of the stack to 105 m (as has been subsequently approved by their DCO) would be likely to reduce the impacts to below 1% for the upper limit and therefore there would be no significant effects.

6.8.24 Modelling has been undertaken of the emissions from the Covanta RRF and the Generating Equipment operating together and the results are contained in Appendix 6.3. There are no predicted exceedances of the assessment levels for the two plants operating together at any of the human health receptors. The combined impacts of the two plants at the receptors are all insignificant, and therefore the cumulative effect will be negligible and not significant. As the effects of vehicle emissions from the Project have been scoped out of this assessment, there will be no cumulative traffic effects.

6.8.25 The effect of road traffic emissions associated with the Covanta RRF was assessed in the ES for the development. The increase in traffic was found only to be significant on Green Lane. The effect of this traffic increase was assessed and it was found that it was unlikely to be any risk of unacceptable impacts to air quality due to road traffic, and impacts were considered not significant.

6.8.26 The proposed Covanta RRF project will release both oxides of nitrogen and carbon monoxide from the combustion process. However, the exhaust stack for the Covanta RRF will be much higher than the stack for the Project (105 m compared to 32.5 m) and therefore the location of maximum ground level concentrations will be different from those associated with the Project.

6.8.27 The assessment on ecological receptors for the Project states that all impacts would be insignificant except for the Kings Wood and Glebe Meadows SSSI, where the impact is minor adverse due to nutrient nitrogen deposition. The Covanta RFF stack has been modelled with Millbrook Power Project stack, and it is concluded that the cumulative impact is not significant (Appendices 6.2 and 6.3).

6.8.28 When the Covanta RFF and the Generating Equipment are operating simultaneously, all of the predicted annual mean oxides of nitrogen process contributions are insignificant, i.e. below 1% of the assessment level. When combined with the background concentrations, no breaches of the critical level are predicted to occur. The predicted daily mean oxides of nitrogen concentrations are not significant in EIA terms, and when added to the background concentrations, no breaches of the daily mean critical level are predicted to occur. The combined impacts at the receptors are all insignificant, and therefore the cumulative effect will be negligible and not significant.

Effect Interactions

6.8.29 Whilst the air quality impact assessment is informed by a number of other topics, the primary interactions with other topics are in informing the landscape and visual assessment as to a suitable stack height, and informing the ecology assessment as to the potential impacts on sensitive ecological receptors due to emissions arising during operation of the Generating Equipment.

6.8.30 The stack height was determined by the need to comply with air quality standards and guidelines for the protection of sensitive human receptors and sensitive ecological receptors. As such there was little opportunity for flexibility in the stack height due to visual impacts, with the need to comply with air quality standards and guidelines. The stack height has been set at a minimum of 32.5 m and a maximum of 35 m.

6.8.31 With regard to sensitive ecological receptors, the air quality impact assessment included all nationally protected statutory habitat sites and locally designated sites, and informed the ecological impact assessment based upon the results of the dispersion modelling. The results are set out in Section 6.7.

6.8.32 The number of construction and operational traffic movements presented in Chapter 12 have been used to assess potential effects from exhaust emissions.

6.9 Additional Mitigation

6.9.1 No additional mitigation is considered necessary over and above embedded mitigation described in Section 3.6 to limit air quality effects, either as a result of the Project in isolation or cumulatively with other projects.

6.10 Summary of Residual Effects

6.10.1 Table 6.27 sets out a summary of the likely significant effects arising from the Project during construction, operation and de-commissioning.

6.10.2 The following elements are reported:

- the affected group or receptor;
- the sensitivity of the affected group/receptor;
- potential effect;
- the likely magnitude and duration of the effect;
- the likelihood of occurrence;
- proposed mitigation or response to ameliorate the effect;
- the significance of the residual effect following the incorporation of mitigation.

6.10.3 Also reported are any potential in-combination/synergistic effects arising on a receptor during each phase, as well as any cumulative effects.

Table 6.27 - Summary of Residual Effects

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Construction phase									
Power Generation Plant	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations Elevated concentrations from vehicle and plant emissions	Large (earthworks only)Local Short-term Not significant Local Short-term	Medium Low	CEMP measures to control fugitive dust emissions CEMP measures to control plant emissions.	Not significant Not significant	None required None required	Not significant Not significant
Gas Connection	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations Elevated concentrations from vehicle and plant emissions	Large (earthworks only) Local Short-term Not significant Local	Medium Low	CEMP measures to control fugitive dust emissions CEMP measures to control plant emissions.	Not significant Not significant	None required None required	Not significant Not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
				Short-term					
Electrical Connection	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations Elevated concentrations from vehicle and plant emissions	Large (earthworks only) Local Short-term Not significant Local Short-term	Medium Low	CEMP measures to control fugitive dust emissions CEMP measures to control plant emissions.	Not significant Not significant	None required None required	Not significant Not significant
Project (in combination and synergistic)	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations Elevated concentrations from vehicle and plant emissions	Not significant Local Short-term Not significant Local Short-term	Medium Low	CEMP measures to control fugitive dust emissions CEMP measures to control plant emissions.	Not significant Not significant	None required None required	Not significant Not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Cumulative effects	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations	Not significant Local Short-term	Medium	CEMP measures to control fugitive dust emissions	Not significant	None required	Not significant
			Elevated concentrations from vehicle and plant emissions	Not significant Local Short-term	Low	CEMP measures to control plant emissions	Not significant	None required	Not significant
Operation and maintenance									
Power Generation Plant	Human health receptors	High	Increases in pollutant concentrations	Not significant Local Long-term	High	Embedded mitigation	Not significant	None required	Not significant
	Ecological receptors	High	Increase in NO_x concentrations and nitrogen and acid deposition	Not significant Local Long-term	High	Embedded mitigation	Not significant	None required	

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Project	Human health receptors Ecological receptors	High High	Increases in pollutant concentrations Increase in NO_x concentrations and nitrogen and acid deposition	Not significant Local Long-term Not significant Local Long-term	High High	Embedded mitigation Embedded mitigation	Not significant Not significant	None required None required	Not significant Not significant
Cumulative effects	Human health receptors Ecological receptors	High High	Increases in pollutant concentrations Increase in NOx concentrations and nitrogen and acid deposition	Not significant Local Long-term Not significant Local Long-term	High High	Embedded mitigation Embedded mitigation	Not significant Not significant	None required None required	not significant Not significant
Decommissioning									
Power Generation Plant	Human health receptors	Low	Decommissioning (including demolition) dust soiling and elevated	Not significant Local Short-term	Medium	CEMP measures to control fugitive dust emissions	Not significant	None required	Not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
			PM_{10} concentrations Elevated concentrations from vehicle and plant emissions	Not significant Local Short-term	Low	CEMP measures to control plant emissions.	Not significant	None required	Not significant
Gas Connection	Human health receptors	Low	Decommissioning (including demolition) dust soiling and elevated PM_{10} concentrations	Not significant Local Short-term	Medium	CEMP measures to control fugitive dust emissions	Not significant	None required	Not significant
			Elevated concentrations from vehicle and plant emissions	Not significant Local Short-term	Low	CEMP measures to control plant emissions.	Not significant	None required	Not significant
Electrical Connection	Human health receptors	Low	Decommissioning (including demolition) dust soiling and elevated PM_{10} concentrations	Not significant Local Short-term	Medium	CEMP measures to control fugitive dust emissions	Not significant	None required	Not significant
			Elevated concentrations	Not significant	Low				

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
			from vehicle and plant emissions	Local Short-term		CEMP measures to control plant emissions.	Not significant	None required	Not significant
Project (in combination and synergistic)	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations	Not significant Local Short-term	Medium	CEMP measures to control fugitive dust emissions	Not significant	None required	Not significant
			Elevated concentrations from vehicle and plant emissions	Not significant Local Short-term	Low	CEMP measures to control plant emissions.	Not significant	None required	Not significant
Cumulative effects	Human health receptors	Low	Construction dust soiling and elevated PM_{10} concentrations	Not significant Local Short-term	Medium	CEMP measures to control fugitive dust emissions	Not significant	None required	Not significant
			Elevated concentrations from vehicle and plant emissions	Not significant Local Short-term	Low	CEMP measures to control plant emissions	Not significant	None required	Not significant

6.11 Conclusion

6.11.1 The construction, operation and decommissioning of the Project have the potential to affect air quality both through the generation of dust during the construction and decommissioning phases and the generation of stack emissions during operation.

6.11.2 A desk based assessment, together with air dispersion modelling have been carried out to assess any potential air quality effects resulting from the Project on identified residential and ecological receptors within 10 km of the Project Site.

6.11.3 The nearest AQMA to the Project Site is within Ampthill, approximately 4 km south of the Project Site.

6.11.4 In light of the fact that this AQMA is located approximately 4 km south of the Project Site, and taking account of the results of this assessment, emissions from the Generating Equipment will not impact significantly on this AQMA.

6.11.5 No exceedances of air quality objectives have been identified as likely to occur as a result of the Project.

6.11.6 It is considered unlikely that levels of atmospheric dust would be generated which would constitute a health hazard or nuisance to residential or ecological receptors in the vicinity of the Project Site. The limited numbers of vehicle movements associated with the Project also means that there is not anticipated to be any impacts from exhaust emissions.

6.11.7 Impacts would be minimised through implementation of a CEMP (Appendix 3.2) to support the DCO Application (Document Reference 3.1) which would incorporate appropriate dust mitigation measures such as damping down or covering of stock piles and excavations during dry and windy weather. Additionally, the majority of particulates from construction activities settle within a very short distance of the construction site. Therefore, effects on receptors further afield from the Project Site will be negligible.

6.11.8 Air quality modelling has shown that an appropriate stack height which will achieve adequate dispersion of NO_x to meet legislative limits and prevent any likely significant effects to identified receptors is between 32.5 m and 35 m. It is concluded, therefore, that effects on air quality during operation will be negligible. For nitrogen and acid deposition no significant effects on ecological receptors are expected as a result of the operation of the Generating Equipment.

6.11.9 The assessment presented above has shown that the Project will not result in any likely significant environmental effects in relation to air quality either as a standalone project or cumulatively with other projects, having regard to the design and proposed operation of the Project and embedded mitigation.

7 Noise and Vibration

7.1 Introduction

7.1.1 This Chapter presents the assessment of the noise and vibration effects likely to arise from the construction, operation, maintenance and decommissioning of the Project.

7.1.2 The Project has the potential to affect noise and vibration levels at the nearest noise sensitive receptors due to the construction and decommissioning activities associated with the Power Generation Plant, Gas Connection and Electrical Connection (e.g. excavation for foundations and laying of the Pipeline and electrical cables), and the operation and maintenance of the Power Generation Plant (e.g. from the moving parts of the Generating Equipment, cooling equipment and noise generated from the stack).

7.2 Legislation and Policy Context including guidance:

Noise Policy Statement for England (NPSE) (March 2010)

7.2.1 The Department for Environment Food and Rural Affairs published the *Noise Policy Statement for England* (NPSE) in March 2010.

7.2.2 There are three aims in the NPSE

1. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The first aim of the NPSE requires that significant adverse effects on health and quality of life should be avoided whilst taking into account the guiding principles of sustainable development.

2. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The second aim of the NPSE requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also aking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.

3. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

This aim seeks *"positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding* *principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."*

7.2.3 The explanatory note of NPSE provides further explanation as follows:

"There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

7.2.4 The NPSE does not define the SOAEL numerically, stating at Paragraph 2.22:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

NPS EN-1 'Overarching National Policy Statement for Energy' (July 2011)

7.2.5 The Overarching National Policy Statement for Energy (NPS EN-1) issued by the Department for Energy and Climate Change (as was) sets out national policy with respect to energy infrastructure.

7.2.6 Section 5.11 of NPS EN-1 sets out the requirements for assessing and mitigating noise and vibration from nationally significant infrastructure projects (NSIPs) in the energy sector. It also sets out the approach the Secretary of State (SoS) should adopt when considering noise assessments.

7.2.7 It advises that operational noise from a proposed development and the proximity to noise sensitive receptors, quiet areas or sites designated for ecological reasons will determine the likely impact of noise.

7.2.8 Where noise impacts are likely, a noise assessment should be undertaken in line with details listed in the NPS EN-1.

7.2.9 Operational noise and vibration should be assessed using relevant British Standards (e.g. BS 4142, BS 6472, BS 8233 and BS 5228) and other guidance, including the other NPS's.

7.2.10 NPS EN-1 advises the SoS that the project should:

"*demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission*." (paragraph 5.11.8)

7.2.11 The proposal should meet the following aims before the SoS grants consent:

- *"avoid significant impacts on health and quality of life from noise,*
- *mitigate and minimise other adverse impacts on health and quality of life from noise,*
- *where possible, contribute to improvements to health and quality of life through the effective management and control of noise."* (paragraph 5.11.9)

7.2.12 Paragraphs 5.11.11 to 5.11.13 of NPS EN-1 also sets out advice on mitigation and states:

"The IPC should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. In doing so the IPC may wish to impose requirements. Any such requirements should take account of the guidance set out in Circular 11/95 (see Section 4.1) or any successor to it.

Mitigation measures may include one or more of the following:

- *engineering: reduction of noise at point of generation and containment of noise generated;*
- *lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural barriers, or other buildings; and*
- *administrative: restricting activities allowed on the site; specifying acceptable noise limits; and taking into account seasonality of wildlife in nearby designated sites.*

In certain situations, and only when all other forms of noise mitigation have been exhausted, it may be appropriate for the IPC to consider requiring noise mitigation through improved sound insulation to dwellings."

National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

7.2.13 The National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) issued by the Department for Energy and Climate Change (as was) sets out national policy with respect to energy infrastructure.

7.2.14 Section 2.20 of EN-4 advises that:

"During the pre-construction phase there could be vibration effects from seismic surveys. During construction, tasks may include site clearance, soil movement, ground excavation, tunnelling, trenching, pipe laying and welding, and ground reinstatement. In addition, increased HGV traffic will be generated on local roads for the movement of materials. These types of noise and vibration impacts will need to be assessed. (paragraph 2.20.2)

The commissioning of a new pipeline can involve extensive periods of drying after hydrotesting, using air compressors, and noise mitigation may be required for this type of activity. (paragraph 2.20.3)

A new gas pipeline may require an above ground installation such as a gas compression station on the route of the pipeline to boost transmission line pressure. A new oil pipeline may require pumping stations. These may be located in quiet rural areas, and therefore the control of noise from these facilities is likely to be an important consideration." (paragraph 2.20.4)

7.2.15 Paragraph 2.20.7 of EN-4 also advises on mitigation measures and states:

"Noise mitigation measures for gas and oil pipelines, in particular their associated above-ground installations, include screening or enclosure of compressors and pumps. Other measures could include the use of sound attenuators on ventilation systems, acoustic lagging on pipework, multi-stage (inherently quiet) control valves, gas turbine exhaust silencers, and high efficiency low speed cooler fans, depending on the specific issues. Vibration mitigation measures could include the use of non-impact piling such as augur boring."

The National Planning Policy Framework (NPPF) (March 2012)

7.2.16 The Department for Communities and Local Government published the *National Planning Policy* Framework (NPPF) on 27 March 2012 and upon its publication, the majority of planning policy statements and guidance notes were withdrawn.

7.2.17 The NPPF states that it does not contain specific policies for NSIP's, however it does state that "*These are determined in accordance with the decision-making framework set out in the Planning Act 2008 and relevant national policy statements for major infrastructure, as well as any other matters that are considered both important and relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy, and are a material considerations in decisions on planning applications*."

7.2.18 Therefore, for matters that the Government consider important, decisions on NSIPs may include reference to the NPPF. In addition, the NPPF requires that local planning authorities should work with other authorities and providers to take account of the need for strategic infrastructure, including nationally significant infrastructure within their areas.

7.2.19 The NPPF contains four aims, which are set out at paragraph 123 in Section 11 of the document, titled *Conserving and enhancing the natural environment*:

"Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*."

7.2.20 There are two footnotes to the above guidance. The first footnote refers to the Explanatory Note to the Noise Policy Statement for England, which defines both *"significant adverse impacts on health and quality of life"* and *"adverse impacts on health and quality of life"* as referred to in the first two bullet points.

7.2.21 The second footnote indicates that the third bullet point is "*subject to the provisions of the Environmental Protection Act 1990 and other relevant law*".

Planning Practice Guidance

7.2.22 The National Planning Policy Guidance (PPG) was published on 6 March 2014. It states that the guidance relating to noise provides answers to a number of questions and reiterates the guidance within the NPSE. It states that "*noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment*" (Paragraph: 001 Reference ID: 30-001-20140306).

7.2.23 The PPG provides advice regarding how to determine the impact of noise, including whether or not a significant adverse effect or adverse effect "*is occurring or likely to occur*" and whether or not a "*good standard of amenity can be achieved*".

7.2.24 It provides more descriptive detail for the definitions of NOEL, LOAEL and SOAEL than the NPSE, but refrains from using numerical values. A summary of the advice given in the PPG (Paragraph: 005 Reference ID: 30-005-20140306) is reproduced as Table 7.1.

Table 7.1: Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
		Lowest observed adverse effect level (LOAEL)	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum

Perception	Examples of Outcomes	Increasing Effect Level	Action
		Significant observed adverse effect level (SOAEL)	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable adverse effect	Prevent

7.2.25 The PPG (at Paragraph: 006 Reference ID: 30-006-20141224) also provides guidance regarding what factors influence whether noise could be a concern, including:

- Source and absolute level of the noise
- Time of day
- Number and pattern of noise events (for non-continuous sound)
- Frequency content of the noise
- General character ("i.e. whether or not the noise contains particular tonal characteristics or other particular features"), and
- Local topology and topography.

7.2.26 Additionally, *"when relevant"*:

- The cumulative impact of multiple sources along with the extent to which the noise source is intermittent and of limited duration
- The provision of alternative ventilation if proposed mitigation relies on closed windows most of the time
- Noise Action Plans and Important Areas (as defined in the Environmental Noise Directive) should be taken into account

- The acoustic environment of external amenity space (if it is an intrinsic part of the design) should be considered, so they can be enjoyed as intended
- Increased potential of impact from fast food restaurants, night clubs and public houses, not only noise generated from within the premises but also the noise that may be made by customers within the vicinity.

7.2.27 The PPG provides advice on how the adverse effects of noise can be mitigated. It advises that this will depend on *"the type of development being considered and the character of the proposed location"* (Paragraph: 008 Reference ID: 30-008-20140306). Four broad classifications of mitigation are defined. These include:

- Engineering methods: Reducing the noise generated at source and/or containing the noise generated;
- Layout: Optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening (by natural or purpose built barriers, or other buildings);
- Use of planning conditions/obligations: Restricting activities allowed onsite at certain times and/or specifying permissible noise levels for different time periods (e.g. daytime, evening and night-time), and;
- Mitigating: the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building.

7.2.28 Furthermore, it advises at Paragraph: 009 Reference ID: 30-009-20140306 that the impact of the noise may be "partially off-set if the residents of those dwellings have access to:

- A relatively quiet façade (containing windows to habitable rooms) as part of their dwelling and/or
- A relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur and/or
- A relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or,
- A relative quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance)".

Central Bedfordshire Council Core Strategy and Development Management Policies, November 2009

7.2.29 Policy DM3: High Quality Development states that "*all proposals for new development… will… comply with the current guidance on noise*"

Bedford Borough Council Development Plan Document Core Strategy and Rural Issues Plan, April 2008

7.2.30 In Policy CP21 – Designing in Quality item 7, states that all new development should "*address sustainable design principles including renewable energy resources, energy efficiency, recycling, and sustainable construction practices and… mitigate against the effects of any pollution including air quality, noise, water, light and land contamination*."

BS 4142:2014 Methods for rating and assessing industrial and commercial sound (October 2014)

7.2.31 British Standard 4142: 2014 "*Methods for rating and assessing industrial and commercial sound"* (BS4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

7.2.32 The standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels can be used for the purposes of assessing sound from proposed source(s) of sound of an industrial and/or commercial nature. However, the determination of noise amounting to a nuisance is beyond the scope of the standard.

7.2.33 The standard should not be used to assess sound from the passage of vehicles on public roads and railway systems; recreational activities; music and other entertainment; shooting grounds; construction and demolition; domestic animals; people; public address systems for speech and other sources falling within the scopes of other standards or guidance. The standard cannot be applied to the derivation of indoor sound levels arising from sound levels outside, or the assessment of indoor sound levels.

7.2.34 The procedure contained in BS4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.

7.2.35 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

7.2.36 Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:

- The absolute level of sound.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
  - Façade insulation treatment;
  - Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
  - Acoustic screening.

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1 Noise, (February 2014)

7.2.37 BS 5228-1 does not provide limits for construction nose. The standard provides a 'best practice guide' for noise control and includes sound power level (L_W) data for individual plant as well as a calculation method for the prediction of noise from construction activities.

BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2 Vibration, (June 2014)

7.2.38 BS 5228-2 provides advice on the human response to construction vibration. BS 5228-2 suggests that, for construction activities, it is considered more appropriate to provide guidance in terms of the peak particle velocity (PPV) as measured outside of the building. This parameter is likely to be more routinely measured based upon the more usual concerns over potential building damage.

7.3 Consultation

7.3.1 A list of key consultation responses received to date relating to noise and vibration are presented in Table7.2 below, along with how these have been responded to.

Table 7.2 - Summary of Key Consultation and Responses in Relation to Noise and Vibration

Reference	Comment	Response
SoS Scoping Opinion		
3.13	Operational Noise from Gas Connection can be scoped out of assessment.	Noted. This is referred to in Section 7.5 of the ES Chapter.
3.38	A plan showing sources of noise should be included in the ES.	This is included in Figure 7.1.
3.39	Consideration should be given to limiting noise impacts by siting plant differently in the pit.	The Generating Equipment has been sited as far away from nearest residential receptors as possible within the Power Generation Plant Site.
3.41	The study area needs to be clearly defined and justified.	Study area is shown on Figure 7.1. It is defined by the nearest noise sensitive receptors to the Project Site which all lie within 350 m of the proposed noise sources.
3.42	All activities that could generate noise and vibration impacts at all phases of the proposed development should be fully identified.	An assessment is provided in Section 7.5, based on available information.
3.43	Impacts of noise during the night-time, weekends and public holidays should be assessed.	An assessment is provided in Section 7.7, based on available information.
3.44	Consideration should be given to monitoring noise complaints at all stages of development.	This will be discussed in consultation with CBC at the commencement of construction works. The outline CEMP (section 2.7 of Appendix 3.2) includes provision for a complaints procedure which would deal with nuisance noise complaints during construction. A procedure for monitoring noise complaints during operation is included as a Requirement attached to the DCO (Requirement 12)
3.45	Cross reference should be made with the ecology chapter.	The Ecology Chapter considers potential noise impacts on ecological receptors.
BBC		
Scoping Response Letter	Noise should be assessed in line with BS 4142, rather than WHO or BS 3228.	BS4142:2014 has been used to inform the assessment as outlined in Section 7.5.

Reference	Comment	Response
	1. I do not believe that the draft IEMA/IOA guidance[22] should be used for determining significance. 2. The guidance has been published in a number of draft forms and as such only gives possible examples of significance criteria as part of the consultation, rather than any firm criteria.	1. This is agreed. 2. The significance of the predicted operational noise effects of the Generating Equipment has been assessed taking into consideration guidance contained within BS 4142: 2014 The relevant methodology has been discussed in detail and is outlined in Section 7.5.
	I am surprised that the noise contribution arising from electrical connections has been scoped out at this stage. Given the low frequency and highly tonal nature of noise associated with this, and the potential for a significant impact, even at low decibel levels, I would expect the noise to be assessed.	The Electrical Connection will comprise an underground cable route which will not generate noise; Therefore, operational noise associated with the electrical cables have been scoped out. The substation is considered in greater detail in Section 7.5.
	The proposed construction and decommissioning noise and vibration assessment should look at all NSRs that will be affected by the activities.	This is assessed in Section 7.7.
CBC		
Scoping Response Letter	Noise should be assessed in line with BS 4142, rather than WHO or BS 8233.	BS4142:2014 has been used to inform the assessment as outlined in Section 7.5.
	Draft noise guidance should not be used (e.g. 'Guidelines on Noise Impact Assessment').	The significance of the predicted operational noise effects of the Generating Equipment has been assessed taking into consideration guidance within BS 4142: 2014 The relevant methodology has been discussed in detail and is outlined in Section 7.5.
	Noise from the Electrical Connection should be included in any noise assessment.	The Electrical Connection will comprise an underground cable route which will not generate noise;

[22] Institute of Environmental Management & Assessment (IEMA) / Institute of Acoustics (IoA) guidance document, Draft Guidelines for Noise Impacts Assessment, 2002

Reference	Comment	Response
		therefore, Operational noise associated with the electrical cables have connection route has been scoped out. The substation is considered in greater detail in Section 7.5.
PEIR Response Letter	No account taken of any impact on footpath users as NSRs.	There is no accepted methodology for assessing the impact on footpath users. In addition, the temporary nature of construction/ decommissioning works, the intermittent nature of the operation of the Power Generation Plant and the temporary nature of users passing the site signify that a significant impact is unlikely to occur. Please see Section 7.5.
	BS4142:1997, has been referred to, has been revoked and BS4142:2014 has been published… I would therefore expect to see an assessment undertaken in line with this standard and look to achieve Central Bedfordshire Councils targets in this regard.	Guidance from BS4142:2014 has been used in this assessment and appropriate LOAEL and SOAEL levels have been defined in accordance with BS4142 2014.
	From work on the Covanta Project it came to light that there is a camp site in this vicinity used by the sailing club which should be considered.	This location has been considered in Section 7.7 of this assessment.
Pre Application Advice: Consultation on Full Environmental Statement, prior to submission of NSIP	Central Bedfordshire Council policy states that the NOAEL, LOAEL and SOAEL should be relative standards (i.e. relative to the typical background noise levels at the time corresponding to the activity). As per, BS4142:2014, Public Protection would look to adopt levels in relation to the typical measured background noise levels Public Protection would look to BS4142:2014 which states in section 11 (when the difference between the measured background level and the rating level) that +10 dB or more is likely to be an indication of a significant adverse impact; a difference of + 5 dB is likely to be	Criteria set out in this ES chapter are based on the methodology detailed in BS4142:2014 which requires that the context of the development is considered when undertaking any noise impact assessment.

Reference	Comment	Response
	an indication of an adverse impact. They would base the levels on these criteria from this standard.	
Post PEIR Consultation with CBC Environmental Health Department	CBC agree with the items scoped out of the assessment based on the information provided. CBC notes that the predicted construction noise levels in the report are a worst case scenario, however, the prediction also include a 10dB reduction due to noise attenuation through appropriate acoustic screens /enclosures in accordance with the CEMP. A noise level of 55dBA $L_{Aeq\ 1Hr}$ associated with construction noise should be imposed on the Millbrook Power project in line with the Covanta RRF DCO. As stated in the report, as a worst case these levels may be marginally exceeded if both Millbrook and Covanta are operating to their maximum at the same time. Further baseline monitoring at the nearest receptor has been suggested given the time that has elapsed since the previous monitoring that was undertaken for this application. Concerns have been raised regarding the derivation of the LOAEL and SOAEL for operational noise. It is proposed that the levels for the project are a LOEAL of 0 dB above background noise levels and a SOAEL of +10 dB above background noise levels.	Construction noise limits are noted. Construction noise will be limited by mitigation measures outlined in the CEMP which will be secured by a Requirement attached to the DCO (Requirement 10). The outline CEMP is included in Appendix 3.2. Additional baseline monitoring at the nearest noise sensitive receptor has been undertaken within an agreed time period and location. The comments on the proposed LOAEL and SOAEL are noted. However, our assessment considers both this criteria and the context which the updated BS 4142:2014 standard requires. Requirement 12 of the DCO proposes a noise scheme to be submitted which limits noise levels generated by operation of the Project to no greater than background levels.

7.4 Topic-specific Realistic Worst Case Scenario Assessed

7.4.1 In respect of noise and vibration, the realistic worst case scenario from within the proposed Project parameters (which are described in Chapters 3 and 5 of this ES) is to use warranted sound power levels from the loudest Gas Turbine Generator type which could realistically be installed at the Project Site.

7.4.2 The worst case scenario for the Generating Equipment has been modelled comprising one Gas Turbine Generator with dimensions of 50 m (length) x 13 m (width) x 25 m (height). These dimensions represent the elements of the Gas Turbine Generator which could emit noise. The Gas Turbine Generator has a stack height of up to 35 m. The model also considers the Fin Fan Cooler(s) unit with dimensions of 9 m (Height) x 28 m (Length) x 14 m (Width) as above, these dimensions represent elements of the Fin Fan Cooler(s) which could emit noise.

7.4.3 It is assumed that, as the worst case scenario, all construction activities occur simultaneously, although in reality this is unlikely to happen.

7.4.4 Detailed information in relation to the noise output from the Generating Equipment is not available at this early stage and before procurement of the actual Generating Equipment to be installed. Following discussions with various manufacturers an initial noise impact appraisal has been undertaken based on the following assumptions:

- A sound power noise level of 106 dBA from the stack;
- Sound pressure levels of 75 dBA at 1 m from all façades of the Generating Equipment; and
- Sound pressure levels of 85 dBA at 1 m from all façades of the Fin Fan Cooler(s).

7.4.5 A computer noise model has been built using these parameters. It should be highlighted that the methodology used should be considered as worst case. Modelling the Generating Equipment as a box with sound power area sources at the walls and roof calibrated to provide the suggested sound pressure level is likely to overestimate the impact in the far field. Detailed assessment and informed design may therefore result in lower noise output levels (for instance by orientating ventilation openings away from the noise sensitive receptors).

7.5 Assessment Methodology and Significance Criteria

7.5.1 A glossary of noise terminology is presented in Appendix 7.1.

Noise Sensitive Receptors

7.5.2 This noise and vibration assessment focuses on the noise sensitive receptor (NSR) locations summarised in Table 7.3 and shown on Figure 7.1.

Table 7.3 – Noise Sensitive Receptor Locations

NSR	Item of Potential Impact	Approximate Minimum Distance to Item (m)	Period of Potential Impact[1]
South Pillinge Farm	Gas Turbine Generator, Exhaust Gas Flue Stack and Fin Fan Cooler(s)	390 m to the east	Construction, decommissioning, maintenance and operation
	Electrical Connection	180 m to the east (substation) 90 m to the south east (underground cable)	Construction and decommissioning
	Gas Connection	330 m to the south east	Construction and decommissioning
Pillinge Cottages	Gas Turbine Generator, Exhaust Gas Flue Stack and Fin Fan Cooler(s)	460 m to the north east	Construction, decommissioning, maintenance and operation
	Electrical Connection	350 m to the north east (substation) 190 m to the south east (underground cable)	Construction and decommissioning
	Gas Connection	460 m to the north east	Construction and decommissioning
Lower Farm	Gas Connection	130 m to the east	Construction and decommissioning
Moreteyne House	Electrical Connection	300 m to the south east (underground cable)	Construction and decommissioning
Camp site at Stewartby Water Sports Club	Construction Vehicles	80 m to the east	Construction and decommissioning

[1] Construction / decommissioning is assumed to occur during the daytime only, operation may occur during the daytime or night-time[23].

[23] Daytime is defined in BS 4142 as being typically between 07:00 and 23:00 and night-time, accordingly, is between 23:00 and 07:00.

NSR	Item of Potential Impact	Approximate Minimum Distance to Item (m)	Period of Potential Impact[1]
[2] NSR's to construction will also be NSR's to decommissioning.			

7.5.3 The NSR locations in Table 7.3 were chosen as they are the closest residential receptors to the construction, operation and maintenance and decommissioning activities associated with the Project Site. A 350 m study area around the red line boundary of the Project Site has been considered which is shown in Figure 7.1.

Baseline Environmental Sound Survey

7.5.4 Appendices 7.2 and 7.3 provide full details of the noise surveys, which are summarised here, including the instrumentation used and complete time-history graphs of the survey results.

7.5.5 Previous unattended environmental sound surveys were undertaken between 14 and 18 August 2014 and 21 and 26 November 2014. Given the time which had passed since these initial surveys, and at the request of CBC, an additional environmental sound survey was undertaken over a period of 1 week from approximately 09:00 hours on Friday 08 September 2017 to approximately 09:00 hours on Friday 15 September 2017 in order to determine the current sound climate at the closest noise sensitive receptor.

7.5.6 During the time period 14 and 18 August 2014, an unattended environmental noise measurement was undertaken in the garden of South Pillinge Farm. The sound level meter was located approximately 6 m to the north east of the farmhouse with the microphone positioned approximately 1.4 m above ground level.

7.5.7 During the time period 21 and 26 November 2014, unattended environmental noise measurements were undertaken at two locations (LTN1 and LTN2 as defined in Appendix 7.1). At location LTN1 the sound level meter was located approximately 20 m to the east of South Pillinge farmhouse with the microphone positioned 1.4 m above ground level. At location LTN2 the sound level meter was located approximately 20 m to the south east of the farmhouse with the microphone positioned 1.4 m above ground level

7.5.8 During the time period 08 and 15 September 2017, unattended environmental sound measurements were undertaken at one position LT1. The microphone was located on the western boundary of the Project Site approximately 10 m to the east of the closest façade of South Pillinge farmhouse. The microphone was located at a height of approximately 1.5 m.

7.5.9 The approximate locations of the sound survey locations are shown in Figures 2, 3 and 4 of Appendix 7.1. The methodology for all surveys was agreed with CBC.

7.5.10 Measurements were taken continuously of the $L_{A10,T}$, $L_{A90,T}$, $L_{Aeq,T}$, and L_{AFmax} sound pressure levels over 15-minute periods. Appendix 7.2 7.3 present the time history graphs during the environmental sound surveys.

Construction and Decommissioning Noise

7.5.11 Construction/decommissioning site noise is assessed differently to noise from permanent installations during the operational phase as it is an inevitable by-product of required works and effects are limited in duration. Noise and vibration is considered for the activities associated with the construction and decommissioning of the Power Generation Plant, Gas Connection and Electrical Connection.

7.5.12 BS 5228 provides practical information on construction noise and vibration reduction measures and promotes a 'Best Practice Means' approach to control noise and vibration during construction and decommissioning.

7.5.13 The likely construction and decommissioning noise levels that may arise from construction of the Project have been predicted using general information regarding proposed activities and the methodology set out in BS 5228 Part 1 as follows:

- Obtain an activity $L_{Aeq,T}$ (by direct measurement of similar plant in the same mode of operation, or use the indicative plant noise sound pressure values provided in Annexes C and D of BS 5228 Part 1);
- Correct the $L_{Aeq,T}$ for distance, ground attenuation, reflections, screening and on-time as applicable; and
- Logarithmically add the individual $L_{Aeq,T}$ to predict the total $L_{Aeq,T}$ at the NSR.

7.5.14 Information regarding the noise output of specific items of plant such as an excavator, piling rig, steam roller, compactor and welder likely to be involved in the construction and decommissioning of the Project have been taken from the BS 5228 Part 1 database. The noise levels from all plant items have then been combined using the process above to assume a realistic worst case scenario for noise relating to the construction and decommissioning phase of the Project.

7.5.15 It is assumed that, as the worst case scenario, all construction activities occur simultaneously, although in reality this is unlikely to happen. The shortest distances between a construction area and a NSR are used in the worst case scenario. However, the worst case scenario also considers the use of a CEMP including suitable, temporary sound reducing screens/enclosures around plant and activities (where possible) which provide 10 dB of noise attenuation from construction activities. The outline CEMP, which is to be secured via a DCO Requirement (10), is contained in Appendix 3.2.

7.5.16 The final list of plant to be used and a full construction programme will not be known until a contractor is appointed, hence, worst case assumptions have been used in the assessment of construction/decommissioning noise. Annex C of BS 5228-1 states that the database "*will apply in the majority of cases, but can be lower or higher due to the make and maintenance of the machines, their operation and the procedures adopted when work is carried out*".

7.5.17 It is expected that the decommissioning phase of the Project will involve similar techniques and procedures as used during the construction phase. It is also noted that some elements of the Project may remain in situ at the end of the Project and thus reduce the impact of the decommissioning phase on NSRs. As a worst case assessment, it has been assumed that the noise and vibration levels during the decommissioning phase are the same as those during the construction phase.

Construction and Decommissioning Vibration

7.5.18 BS 5228 Part 2 provides further guidance on the perception of vibration resulting from construction activities within occupied buildings. This provides a simple method of determining annoyance alongside evaluation of cosmetic damage associated with vibration.

7.5.19 Vibration, even of very low magnitude, can be perceptible to people. Vibration nuisance is frequently associated with the assumption that, if vibrations can be felt, then damage is inevitable; however, considerable greater levels of vibration are required to cause damage to buildings and structures, or to cause computers and similar electronic equipment to malfunction. Vibration transmitted from site construction activities to the neighbourhood can, therefore, cause anxiety as well as annoyance.

7.5.20 A simple approach to quantifying the effects of vibration is to use the concept of peak particle velocity (PPV) as measured outside the building. BS 5228 Part 2 suggests that, for construction activities, it is considered more appropriate to provide guidance in terms of the PPV, since this parameter is likely to be more routinely measured based upon the more usual concerns over potential building damage.

7.5.21 Table 7.4 presents potential vibration levels measured in terms of PPV.

Table 7.4 - Guidance on the Effects of Vibration (PPV) Levels

Peak Particle Velocity	Description
0.14 mm/s	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration
0.3 mm/s	Vibration might just be perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

7.5.22 Construction activities, in particular, may impact on adjacent buildings. The criteria used in this assessment relate to the potential for cosmetic, not structural damage. The principle concern is generally transient vibration due to piling. Cosmetic damage is most likely to occur within the first 20 m of piling activities. At greater distances damage is less likely to occur. Likely levels of vibration at given distances can be estimated from existing piling vibration data, as presented in BS 5228 Part 2.

7.5.23 BS 7385 establishes the basic principles for carrying out vibration measurements and processing the data, with regard to evaluating vibration effects on buildings. Recommended PPV Vibration limits for transient excitation for different types of buildings are presented in Table 7.5.

Table 7.5 - PPV Limits for Cosmetic Damage to Buildings

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse(1)	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	
Un-reinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz(2)	22 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
(1) Values referred to are at the base of the building (2) At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded		

7.5.24 When vibration experienced at structures exceeds the values shown in Table 7.5, this would be considered a significant impact.

Operational noise

Road Traffic Noise

7.5.25 There is not expected to be any significant increase in traffic during the operational phase of the Project associated with the Power Generation Plant, Gas Connection or Electrical Connection, as set out in Transport Chapter of this ES. Therefore noise impacts associated with operational road traffic noise have not been considered further in this ES.

Power Generation Plant

7.5.26 The assessment of operational noise at the Power Generation Plant largely comprises noise generated by the Generating Equipment.

7.5.27 To undertake detailed noise calculations of the Generating Equipment, the noise propagation modelling software SoundPLAN version 7.4 has been used. The noise model considers directional and screening effects to predict the noise levels at the NSR locations. The effects of ground and air absorption are also taken into consideration.

7.5.28 The embedded mitigation identified in Section 3.6 of this ES has been considered in the noise model including the location of the Generating Equipment and the use of acoustic enclosures around the Gas Turbine Generator and Fin Fan Cooler(s). These mitigation measures are likely to limit the operational noise from the Gas Turbine Generator and the Fin Fan Cooler(s) to around 75 dBA and 85 dBA at 1 m respectively. A sound power noise level of 106 dB coming out from the top of the stack has also been assessed, based on discussions with EPC contractors.

7.5.29 The significance of the predicted operational noise effects of the Generating Equipment has been assessed taking into consideration guidance within BS 4142: 2014.

7.5.30 BS 4142 highlights the importance of applying an appropriate context when assessing sound from an industrial/commercial source.

7.5.31 BS 4142 does not provide values for LOAEL and SOAEL for sound from commercial/industrial sources which could be used to review whether the aims in NPS EN-1 are met. These levels should be specific to a project and not generic. Proposed levels for this Project and how these have been derived are therefore set out below in Table 7.6.

Table 7.6 Proposed LOAEL and SOAEL for Operational Plant Noise

Adverse Effect Level	Difference Between Rating Level (LAr,Tr) and Typical Background Sound Level (LA90,T)
LOAEL	+ 5 dB
SOAEL	+ 10 dB

NB: The above are rating levels (i.e. equivalent to BS 4142 without a penalty)

7.5.32 In order to derive the above criteria, the following factors have been taken into consideration:

- Response from CBC in 2015 set out in the Pre Application Advice: Consultation on Full Environmental Statement, prior to submission of NSIP (see Table 7.1);
- The level of the typical background noise level ($L_{A90,15mins}$) at the nearest NSR (taking into account the results of the three surveys undertaken in different periods), level of typical background noise levels and difference between night-time and daytime levels;
- The Generating Equipment could run up to a maximum of 2,250 hours in any given year, provided that the 5 year rolling average does not exceed 1,500 hours. For the purposes of the EIA, a worst case yearly maximum of 2,250 running hours has been considered);
- The likely operating regime of the Generating Equipment (i.e. likely to be run during hours of peak electricity demand) which is typically during the daytime (e.g. outside the time when the lowest background noise levels will occur).
- The likely non-tonal nature of cumulative noise from the Generating Equipment;
- A single worst affected NSR;
- The location of the nearby Marston Vale Railway Line;
- The location of the nearby Bedford – London Railway Line;
- Minimal levels of operational vibration;
- The location of the nearby Millbrook Proving ground;
- The location of windows on the NSR which do not overlook the Generating Equipment;
- Potential noise from nearby developments;
- The fact that the LOAEL and SOAEL levels are proposed to be external (e.g. outdoors) noise levels;

- The desirable internal noise levels for residential properties in BS 8233 and World Health Organisation guidelines for bedrooms being 30 dB L_{Aeq8h} during the night-time; and
- The statement in BS 8233 which maintains that a partially open window reduces the composite sound reduction of a façade to around 15 dB.

Significance Criteria

7.5.33 All NSRs identified in Table 7.3 comprise residential uses; therefore, the matrix based approach for significance criteria outlined in Chapter 4, has not been followed on the basis that the sensitivity of the receptors will be the same for all NSRs. The sensitivity of residential receptors is considered to be high.

7.5.34 The significance of noise and vibration effects for construction and decommissioning for residential dwellings is achieved by referencing the values shown in Table 7.7 below, derived from BS 5228 methodology.

7.5.35 Significance of effect levels of moderate and above are considered significant in respect of the EIA regulations.

7.5.36 With respect to the NPPF/NPSE/EN-1 assessment, the proposed LOAEL values are considered to have a slight significance of effect and the proposed SOAEL values are considered to have a moderate significance of effect on a receptor of high sensitivity.

Table 7.7: Significance of effect for Construction and Decommissioning Noise and Vibration on Residential Dwellings

Significance of Effect	Construction and Decommissioning Noise	Construction and Decommissioning Vibration
Neutral	Daytime $L_{Aeq,10h}$ equal to or below 55 dB	Vibration levels below 0.3 mm/s PPV
Slight (LOAEL)	Daytime $L_{Aeq,10h}$ equal to or below 65 dB	Vibration levels above 0.3 mm/s and below 1.0 mm/s PPV
Moderate (SOAEL)	Daytime $L_{Aeq,10h}$ equal to or below 70 dB	Vibration levels above 1.0 mm/s but below 5.0 mm/s PPV
Large	Daytime $L_{Aeq,10h}$ equal to or below 75 dB	Vibration levels above 5.0 mm/s but below 10.0 mm/s PPV
Very Large	Daytime $L_{Aeq,10h}$ above 75 dB	Vibration levels above 10.0 mm/s PPV

7.5.37 Table 7.8 below sets out how the significance of effect is determined for operational noise and vibration.

7.5.38 Effects of moderate and above are considered significant in respect of the EIA regulations.

7.5.39 With respect to the NPPF/NPSE/EN-1 assessment, the proposed LOAEL values are considered to have slight significance of effect and the proposed SOAEL values are considered to have moderate significance of effect on a receptor of high sensitivity. The placement of these levels in Table 7.8 is indicative as levels should be absolute and not relative.

Table 7.8 - Significance of effect for Operational Noise and Vibration on Residential Dwellings

Significance of Effect	Generating Equipment Noise	Vibration
Neutral	Cumulative plant noise level equal to typical background $L_{A90,15min}$ level	Vibration levels below 0.3 mm/s PPV
Slight (LOAEL)	Cumulative plant noise level 5 dB above typically lowest background $L_{A90,15min}$ level	Vibration levels above 0.3 mm/s but below 1.0 mm/s PPV
Moderate (SOAEL)	Cumulative plant noise level 10 dB above typically lowest background $L_{A90,15min}$ level	Vibration levels above 1.0 mm/s but below 5.0 mm/s PPV
Large	Cumulative plant noise level 20 dB above typically lowest background $L_{A90,15min}$ level	Vibration levels above 5.0 mm/s but below 10.0 mm/s PPV
Very Large	Cumulative plant noise level 30 dB above typically lowest background $L_{A90,15min}$ level	Vibration levels above 10.0 mm/s PPV

Items Scoped out of Assessment

7.5.40 Table 7.9 below details the items to be scoped out of the assessments.

Table 7.9 Items to be Scoped Out of Assessments

Item to be Scoped Out	Justification
Construction vibration	Given the distances between construction works and the closest NSRs, it is anticipated that the level of induced vibration will be imperceptible at the nearest sensitive receptors.
Operational traffic noise	There are expected to be approximately 15 car trips per day to the Power Generation Plant (spread over 3 shifts with approximately 5 cars for each shift). Based on the existing 18 hour average annual weekday traffic flows (AAWT) on Green Lane, this would constitute a negligible increase in noise level of 0.04 dB. There is expected to be less than one car trip per week to the Gas Connection and Electrical

	Connection which is considered as no change in noise level on the local road network
Footpaths	Footpaths around the Project Site have not been considered in this assessment for the following reasons: - There is no known methodology for assessing the noise impact on footpath users; - Construction and decommissioning works are considered to be temporary impacts and limited in duration; - The intermittent nature of the operation of the Power Generation Plant; and - The temporary nature of footpath users passing the site.
Electrical connection	The Electrical Connection comprises two major components: the substation and the underground cable. Any background noise caused by corona discharge is barely subjectively discernible outside of the substation fence line. Therefore, given the distance of the substation to NSRs (approximately 100 m), there would be no effect from corona discharge on these receptors. Based on this information, operational noise from the Electrical Connection substation is considered to have neutral significance and has been scoped out of the need for further assessment. The underground cable of the Electrical Connection will not generate any noise as the electrical cables are wrapped in insulating material, buried in a trench approximately 1 m below ground level surrounded by well compacted backfill material and topped with concrete caps to prevent accidental damage. Operational noise from the underground cable has therefore been scoped out of further assessment. Where the underground cable meets the existing overhead line connection, up to two SECs are proposed. Any background noise caused by corona discharge on the cables connecting the underground line to the existing overhead line is barely subjectively discernible outside of the compound fence line. Operational noise associated with the re-routing of the existing 400kV overhead line will not cause an increase in noise at any of the identified NSRs. This is because the location is very similar (e.g. no closer to any of the NSRs) and it will be a single circuit in place of a double circuit, thereby reducing any existing noise currently produced by the overhead line. As such, operational noise from the Electrical Connection underground line is not considered to be significant and has been scoped out of the need for further assessment.

Gas Connection	During operation, there will be small amounts of noise generated by the gas AGI. This may be a low 'hum' noise or 'hiss' type of noise as the AGI regulates the flow of gas from the NTS to the Generating Equipment. This noise is rarely perceptible outside of the AGI compound. The nearest NSR is approximately 130 m to the west of the AGI, therefore, the significance of effect of operational noise from the AGI will be neutral. This is not considered to be significant. As the gas pipeline which connects the NTS to the Power Generation Plant Site is underground, the significance of effect due to operational noise will be neutral. This is not considered to be significant. Operational noise from the Gas Connection and AGI has therefore been scoped out of further assessment.
Operational Vibration	Given the distances involved between the Generating Equipment and NSRs (approximately 390 m to South Pillinge Farm which is the closest NSR), as well as the inherent design by gas turbine suppliers to limit vibration, it is anticipated that the level of induced vibration will be imperceptible at the nearest sensitive receptor (South Pillinge Farm). Additionally, it is unlikely that vibration from the Generating Equipment will be perceived at the Covanta RRF Project due to the distance and the heavy construction of the facility. Operational vibration impacts are thus not assessed further.

7.6 Baseline Conditions and Receptors

Existing Noise Sources

7.6.1 Appendices 7.2 and 7.3 provide full details of the noise surveys undertaken in August and November 2014 and September 2017 at South Pillinge Farm and Lower Farm.

7.6.2 The dominant environmental noise sources at the NSRs are road traffic and train pass-bys.

7.6.3 The Project Site and NSRs identified in Table 7. are bound to the east and west by the Midland Main Line and Marston Vale Line railways respectively.

7.6.4 Additionally, Station Lane, Houghton Lane, and Millbrook Road pass close to Pillinge Cottages, Moreteyne House and Lower Farm to the south of the Project Site.

7.6.5 The wider road network includes the A421 dual carriage way to the north west of the Project Site and the M1 motorway to the south west of the Project Site.

7.6.6 During all of the baseline noise surveys undertaken, no activity was noted at the Millbrook Proving Ground.

August 2014 Environmental Sound Survey

7.6.7 During the site visits associated with the noise survey undertaken in August 2014 at South Pillinge Farm (survey location LTA1), the dominant noise sources were deemed to be distant road traffic, local wildlife and farm animals.

November 2014 Environmental Sound Survey

7.6.8 Construction work associated with the LLRS was underway during the November 2014 noise survey at South Pillinge Farm (survey location LTN1). Noise associated with construction plant was dominant at the commencement of the noise survey as work was being undertaken at the closest point to South Pillinge Farm. However, at completion of the noise survey, construction work had moved further north into the pit and benefitted from screening due to the LLRS earth bund. As such, construction noise was much quieter and did not dominate the noise climate.

7.6.9 The survey was not abandoned due to untypical conditions as it was considered that the evening, weekend and night-time measurements would be recorded under typical conditions. Historically, noise levels measured during these periods are the lowest noise levels.

7.6.10 Other noise sources noted during site visits associated with the noise survey at South Pillinge Farm comprised distant road traffic, trains passing by on the Midland Main Line, bird song and running water in the nearby brook.

7.6.11 The survey locations at South Pillinge Farm are screened by farm buildings from train pass-by noise from the Marston Vale Line. Additionally, at the time of the surveys, trains on the Marston Vale Line only pass once an hour in each direction. The farmhouse also provided noise screening at the survey locations of typical farm activities including tractor movements in the farmyard which is located to the west of the farmhouse.

7.6.12 At Lower Farm, during the November 2014 noise survey (survey location LTN2), the dominant noise sources were road traffic on Houghton Lane and train pass-bys on the Midland Main Line to the east of the survey location. Additionally, distant road traffic and bird song were noted. It was also noted that the farm buildings are used by local businesses and a mix of HGV and LGV deliveries occurred during site visits.

September 2017 Survey

7.6.13 The noise sources noted during the sound survey at South Pillinge Farm comprise distant road traffic, trains passing by on the Midland Main Line, bird song and farm yard activities including tractor movements. The LLRS construction works were not audible at the measurement location.

Generating Equipment

7.6.14 The nearest NSR to the Generating Equipment is South Pillinge Farm.

7.6.15 Noise levels measured at South Pillinge Farm are expected to be quieter than noise levels at Pillinge Cottages due to screening and distance attenuation from existing noise sources including Station Road and Marston Vale Railway Line. As the assessment is based on the typical background noise levels ($L_{A90,T}$), noise levels measured at South Pillinge Farm have also been deemed representative of noise levels at Pillinge Cottages and the campsite by way of considering a worst case scenario. Pillinge Cottages are located approximately 460 m to the south west of the Generating Equipment Site. Apart from this small pocket of dwellings it should be noted that the next noise sensitive receptors are Lower Farm South at around 1300 m, Manor Farm east at around 1400 m and dwelling in Stewartby North at around 1400 m. The campsite is located approximately 500 m from the Generating Equipment Site.

7.6.16 To assess construction noise, the $L_{Aeq,10h}$ values have been determined from the noise surveys at the potentially affected NSRs. Table 7.10_below summarises the relevant noise survey results. The noise survey results are presented in greater detail including time history graphs of the complete data in Appendices 7.2 and 7.3.

7.6.17 Weekend $L_{Aeq,10h}$ levels are also presented due to the presence of LLRS construction noise during the weekdays at survey location LTN1.

Table 7.10 - $L_{Aeq,10h}$ Measured During Baseline Noise Surveys at NSRs close to the Generating Equipment (2014 and 2017)

NSR	Survey Location	Typical Measured $L_{Aeq,10h}$ (dB) (2014)	Typical Measured $L_{Aeq,10h}$ (dB) (2017)
South Pillinge Farm and Pillinge Cottages	Weekday		
	LTA1	48	54
	LTN1	54*	
	Weekend		
	LTA1	49	50
	LTN1	47	
* Includes noise contribution from LLRS construction works			

7.6.18 In order to assist in the assessment of operation noise, the typical $L_{A90,15min}$ recorded during the daytime and night-time measurements at South Pillinge Farm are taken into consideration. The background noise levels have been derived by taking an arithmetic average of the typical $L_{A90,\ 15\ min}$ for each Daytime and night time period of each day during the survey periods. Time history graphs for each day are provided in Appendices 7.2 and 7.3.

7.6.19 The results of the environmental sound survey undertaken in September 2017 have been used to derive the background noise levels at the closet noise sensitive receptor given that these are the most up to date and representative results. Table 7.11 summarises the background noise levels.

Table 7.11 – Typical $L_{A90,15min}$ Measured During Baseline Noise Surveys at NSRs close to the Generating Equipment

NSR	Typical Daytime $L_{A90,15min}$ (dB)	Typical Night-time $L_{A90,15min}$ (dB)
South Pillinge Farm and Pillinge Cottages	46	39

7.6.20 The typical background sound levels are around 3dB above the background sound levels presented in the submitted PEIR from surveys undertaken in 2014 / 2015. There were no clearly identifiable sources of noise in the vicinity of the survey location that were not present during the previous surveys. It is therefore considered that the increase in measured background sound levels is as a result of a general increase in sound levels due to increased development in the area around the Project Site. The LLRS construction works were not audible at the measurement location and are not operational at night, therefore it is unlikely that the LLRS construction works have influenced the measured noise levels.

Gas Connection

7.6.21 The nearest NSRs to the Gas Connection are South Pillinge Farm, Pillinge Cottages and Lower Farm. South Pillinge Farm is located approximately 330 m to the west of the Gas Connection at the closest point and Pillinge Cottages are located approximate 460 m to the south west of the Gas Connection at the closest point. Lower Farm is located approximately 130 m to the south west of the Gas Connection AGI at the closest point.

7.6.22 Noise levels measured at South Pillinge Farm are expected to be quieter than noise levels at Pillinge Cottages due to screening and distance attenuation from existing noise sources including Station Road and Marston Vale Railway Line. As the assessment is based on the typical background noise levels ($L_{A90,T}$), noise levels measured at South Pillinge Farm have also been deemed representative of noise levels at Pillinge Cottages by way of considering a worst case scenario.

7.6.23 To assess construction noise, the $L_{Aeq,10h}$ values have been determined from the noise surveys at the potentially affected NSRs. Table 7.12 below summarises the relevant noise survey results. The noise survey results are presented in greater detail including time history graphs of the complete data in Appendices 7.2 and 7.3.

7.6.24 Weekend $L_{Aeq,10h}$ levels are also presented due to the presence of LLRS construction noise during the weekdays at survey location LTN1.

Table 7.12 - $L_{Aeq,10h}$ Measured During Baseline Noise Surveys at NSRs close to the Gas Connection (2014 and 2017)

NSR	Survey Location	Typical Measured $L_{Aeq,10h}$ (dB) (2014)	Typical Measured $L_{Aeq,10h}$ (dB) (2017)
Weekday			
South Pillinge Farm and Pillinge Cottages	LTA1	48	54
	LTN1	54*	
Lower Farm	LTN2	54	
Weekend			

NSR	Survey Location	Typical Measured $L_{Aeq,10h}$ (dB) (2014)	Typical Measured $L_{Aeq,10h}$ (dB) (2017)
South Pillinge Farm and Pillinge Cottages	LTA1	49	50
	LTN1	47	
Lower Farm	LTN2	53	
* Includes noise contribution from LLRS construction works			

Electrical Connection

7.6.25 The nearest NSRs to the Electrical Connection are South Pillinge Farm, Pillinge Cottages and Moreteyne House.

7.6.26 South Pillinge Farm is located approximately 90 m to the west of the Electrical Connection. Pillinge Cottages are located approximately 190 m to the west of the Electrical Connection. Moreteyne House is approximately 300 m to the north west of the existing transmission tower which is to be replaced as part of the Electrical Connection and proposed SEC(s).

7.6.27 Noise levels measured at South Pillinge Farm are expected to be quieter than noise levels at Pillinge Cottages and Moreteyne House due to screening and distance attenuation from existing noise sources including Station Road and Marston Vale Railway Line. As the assessment is based on the typical background noise levels ($L_{A90,T}$), noise levels measured at South Pillinge Farm have also been deemed representative of noise levels at Pillinge Cottages and Moreteyne House.

7.6.28 It is likely that noise levels at Moreteyne House will be higher than those presented here as it is located immediately adjacent to the Millbrook railway station and overlooks Station Road and will therefore experience greater noise levels associated with trains arriving and departing from the station as well as road traffic. Therefore, the noise levels presented below are considered to provide a realistic worst case assessment of noise levels at Moreteyne House.

7.6.29 To assess construction noise, the $L_{Aeq,10h}$ values have been determined from the noise surveys at the potentially affected NSRs. Table 7.13 below summarises the relevant noise survey results. The noise survey results are presented in greater detail including time history graphs of the complete data in Appendices 7.2 and 7.3.

7.6.30 Weekend $L_{Aeq,10h}$ levels are also presented due to the presence of LLRS construction noise during the weekdays at survey location LTN1.

Table 7.13 - $L_{Aeq,10h}$ Measured During Baseline Noise Surveys at NSRs close to the Electrical Connection (2014 and 2017)

NSR	Survey Location	Typical Measured $L_{Aeq,10h}$ (dB) (2014)	Typical Measured $L_{Aeq,10h}$ (dB) (2017)
South Pillinge Farm and Pillinge Cottages	Weekday		
	LTA1	48	54
	LTN1	54*	
	Weekend		
	LTA1	49	50
	LTN1	47	
* Includes noise contribution from LLRS construction works			

7.7 Assessment of Effects

Power Generation Plant

Construction and Decommissioning

7.7.1 Table 7.14 provides the likely noise levels generated by typical construction activities associated with the Power Generation Plant and predicts the likely noise level contributed by each item of plant at the nearest NSR.

Table 7.14 - Construction Noise Levels, $L_{Aeq,10h}$ (dB), for construction activities associated with the Power Generation Plant

NSR	Site Prep	Ground works	Materials delivery	Concrete pour	Crane	Welding and cutting steel	General site activities	Predicted $L_{Aeq, 10 h}$
South Pillinge Farm	45	44	39	42	47	39	39	52
Pillinge Cottages	42	41	36	39	46	36	36	49

7.7.2 General site activities include the provision of power generation for flood lights and small tools such as drills.

7.7.3 Assuming the worst case scenario of all construction activities occurring simultaneously at the closest point to the NSR, a logarithmic sum of all construction activities predicts an $L_{Aeq,10h}$ of 52 dB at South Pillinge Farm and 49 dB at Pillinge Cottages.

7.7.4 This worst case scenario assumes a noise attenuation of 10 dB through the use of appropriate acoustic screens/enclosures at the construction site in accordance with the outline CEMP (Appendix 3.2).

7.7.5 The significance of the effect of construction noise is therefore predicted to be neutral at the nearest NSRs as defined by the values in Table 7.7 (e.g. a daytime $L_{Aeq,10h}$ equal to or below 55 dB). This effect is not significant.

7.7.6 During decommissioning, similar impacts to those described for construction could result from, for example, plant removal or site reinstatement. However, it is likely that these impacts would be less, given that some items may be left in situ. Therefore, based on the very conservative and worst case construction impacts outlined above, the significance of the effect of noise impacts from the decommissioning phase is predicted to neutral in line with Table 7.7 (e.g. a daytime $L_{Aeq,10h}$ equal to or below 55 dB). This effect is not significant.

Construction Traffic

7.7.7 The peak construction traffic movements are predicted to comprise 125 HGV deliveries per day for concrete pouring and 40 cars per day.

7.7.8 The predicted $L_{Aeq,10h}$ at the NSR closest to the Access Road (the Campsite) due to peak construction plant movements would be 45 dB without the provision of any screening. The significance of effect is deemed to be neutral as defined by the values in Table 7.7 (e.g. a daytime $L_{Aeq,10h}$ equal to or below 55 dB). However, this worst case scenario would only occur for one to two days during the construction period.

7.7.9 Over the course of the entire construction period, the average number of construction vehicles comprises 31 HGV movements and 31 car movements per day.

7.7.10 The predicted $L_{Aeq,10h}$ at the NSR closest to the Access Road (the Campsite) due to average construction plant movements would be 39 dB (without the provision of screening). This is considered to be of neutral significance as defined by the values in Table 7.7 (e.g. a daytime $L_{Aeq,10h}$ equal to or below 55 dB).

7.7.11 In both situations, the effect of noise due to construction traffic at the Campsite would not be significant.

Operation

Power Generation Plant

7.7.12 Details of the assessment of the potential noise impact associated with the operation of the Power Generation plant are presented in Appendix 7.3. The results of the assessment are summarised below.

7.7.13 The computer noise model used to undertake the assessment includes the topography of the Rookery pits post LLRS works.

7.7.14 Table 7.15 presents the calculated rating level of the Generating Equipment at the closest noise sensitive receptor.

7.7.15 The following reported results of the noise modelling are external free field noise levels predicted outside the windows at South Pillinge Farm.

Table 7.15 Calculated Rating Level at South Pillage Farm

Power Generating Equipment	Calculated Rating Level at Closest Noise Sensitive Receptor (dB $L_{Ar,Tr}$)
Gas Turbine Generator, Stack and Fin Fan Cooler(s)	38

7.7.16 Table 7.16 presents an assessment of the potential operational noise impact from all modelled elements of the Generating Equipment (Gas Turbine Generator, Stack and Fin Fan Cooler(s)) at South Pillinge Farm.

Table 7.16 Noise Impact Assessment from Gas Turbine Generator, Stack and Fin Fan Cooler(s) at South Pillinge Farm

Calculation Description	BS4142 Assessment Summary during Time Period	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00)
Combined Rating Level (dB $L_{Ar,Tr}$) at Noise Sensitive Receptor	38	38
Background Sound Level (dB $L_{A90,\ 15\ min}$)	46	39
Excess of Rating over Background Sound Level (dB)	-8	-1
Assessment of Impact	Indication of the specific sound source having a low impact, depending on the context	Indication of the specific sound source having a low impact, depending on the context

7.7.17 Calculations indicate that the rating level associated with the operation of the Generating Equipment is likely to fall below the background sound level at South Pillinge Farm by approximately 8 dB during the daytime and 1 dB during the night-time. With reference to BS4142 this is an indication of the specific sound source having a low impact and therefore not significant, depending on the context.

7.7.18 It is noted that for this assessment, there are several contextual factors which should be taken into consideration as follows:

- The Generating Equipment could run up to a maximum of 2,250 hours in any given year, provided that the 5 year rolling average does not exceed 1,500 hours. For the purposes of the EIA, a worst case yearly maximum of 2,250 running hours has been assessed);
- The likely operating regime of the Generating Equipment (i.e. likely to be run during hours of peak electricity demand which is typically during the daytime (e.g. outside the time when the lowest background noise levels will occur).
- The likely non-tonal nature of cumulative noise from the Generating Equipment;
- A single worst affected NSR;
- The location of the nearby Marston Vale Railway Line;
- The location of the nearby Bedford – London Railway Line;
- Minimal levels of operational vibration;
- The location of the nearby proving ground;
- The location of windows on the NSR which do not overlook the Generating Equipment; and
- Potential noise from nearby developments.

7.7.19 The above contextual factors confirm the assessment of a low, and therefore not significant impact.

Electrical Connection

<u>Construction and Decommissioning</u>

7.7.20 Table 7.17 provides the likely noise levels generated by typical construction activities which may be associated with the Electrical Connection and predicts the likely noise level contributed by each item of plant at the nearest NSR.

Table 7.17 - Construction noise levels, $L_{Aeq,10h}$ (dB) for construction activities associated with the Substation

NSR	Site Prep	Ground works	Materials delivery	Concrete pour	Crane	Welding and cutting steel	General site activities
South Pillinge Farm	48	50	46	47	53	44	42
Pillinge Cottages	42	45	43	41	47	38	42

7.7.21 Table 7.18 provides the likely noise levels generated by typical construction activities which may be associated with laying the cables associated with the Electrical Connection and predicts the likely noise level contributed by each item of plant at the nearest NSR.

Table 7.18 - Construction noise levels, $L_{Aeq,10h}$ (dB), for construction activities associated with laying underground cables

NSR	Site Prep	Ground works	Materials delivery	Concrete pour	General site activities	Cable pull
South Pillinge Farm	52	49	49	53	52	49
Pillinge Cottages	46	43	43	46	45	43
Moreteyne House	42	39	39	43	41	40

7.7.22 Table 7.19 provides the likely noise levels generate by typical construction activities which may be associated with the Electrical Connection temporary works and predicts the likely noise level contributed by each item of plant at the nearest NSR.

Table 7.19 – Construction noise levels, $L_{Aeq,10h}$ (dB), for construction activities associated with the temporary electrical connection works

NSR	Site Prep and materials delivery	Ground works and concrete	General site activities	Crane	Stringing	Scaffold
South Pillinge Farm	41	44	42	47	37	43
Pillinge Cottages	44	48	45	50	40	55
Moreteyne House	41	44	41	47	37	49

7.7.23 General site activities include the provision of power generation for flood lights and small tools such as drills.

7.7.24 Assuming the worst case scenario of all construction activities associated with the substation and underground cable connection and temporary electrical connection works occurring simultaneously at the closest points to the NSRs, the predicted $L_{Aeq,10h}$ is 61 dB at South Pillinge Farm, 60 dB at Pillinge Cottages and 54 dB at Moreteyne House.

7.7.25 This worst case scenario assumes a noise attenuation of 10 dB through the use of appropriate acoustic screens/enclosures at the construction site in accordance with the CEMP (Appendix 3.2).

7.7.26 The significance of the effect of construction noise is therefore predicted to be slight at South Pillinge Farm and Pillinge Cottages and neutral at Moreteyne House as defined by the values in Table 7.7. These effects are not considered to be significant.

7.7.27 During decommissioning, similar impacts to those described for construction could result from, for example, plant removal or site reinstatement. However, it is likely that these impacts would be less, given that some items may be left in situ. Therefore, based on the very conservative and worst case construction impacts outlined above, the significance of the effect of noise impacts from the decommissioning phase is predicted to be slight at South Pillinge Farm and Pillinge Cottages and neutral at Moreteyne House. These effects are not considered to be significant.

Gas Connection

Construction and Decommissioning

7.7.28 Two scenarios have been considered for the assessment of construction noise for the Gas Connection. The first scenario comprises digging a trench along the entire gas pipeline route then returning to lay the Pipeline. The second scenario comprises a rolling construction programme where a section of trench is dug and the Pipeline laid beginning at one end of the route and progressing towards the other end of route. The second scenario is considered to be the realistic worst case with regards to construction noise as a greater number of plant items would be required to be in use during each section of the programme.

7.7.29 Table 7.20 provides the likely noise levels generated by typical construction activities associated with the Gas Connection and predicts the likely noise level contributed by each item of plant at the nearest NSR.

Table 7.20 - Construction Noise Levels, $L_{Aeq,10h}$ (dB), for construction activities associated with the Gas Connection

NSR	Site Prep	Ground works	Materials delivery	Concrete pour	Crane	Welding and cutting steel	General site activities
South Pillinge Farm	43	43	39	42	46	39	38
Pillinge Cottages	40	40	38	39	43	36	34
Lower Farm	51	52	48	50	54	47	42

7.7.30 General site activities include the provision of power generation for flood lights and small tools such as drills.

7.7.31 Assuming the worst case scenario of all construction activities occurring simultaneously at the closest points to the NSR, the predicted $L_{Aeq,10h}$ is 51 dB at South Pillinge Farm, 48 dB at Pillinge Cottages and 59 dB at Lower Farm.

7.7.32 This worst case scenario assumes a noise attenuation of 10 dB through the use of appropriate acoustic screens/enclosures at the construction site in accordance with the CEMP (Appendix 3.2).

7.7.33 The significance of the effect of construction noise is therefore predicted to be neutral at South Pillinge Farm and Pillinge Cottages and slight at Lower Farm as defined by the values in Table 7.7 (e.g. a daytime $L_{Aeq,10h}$ equal to or below 55 dB). These effects are not considered to be significant.

7.7.34 During decommissioning, similar impacts to those described for construction could result from, for example, plant removal or site reinstatement. However, it is likely that these impacts would be less, given that some items may be left in situ. Therefore, based on the very conservative and worst case construction impacts outlined above, the significance of the effect of noise impacts from the decommissioning phase is predicted to neutral at South Pillinge Farm and Pillinge Cottages and slight at Lower Farm. These effects are not considered to be significant.

The Project

7.7.35 Table 7.21 presents the effects of construction noise on the NSRs based in the worst case assessment. In this assessment, it is assumed that all construction work associated with each individual construction activities (Power Generation Plant, Gas Connection and Electrical Connection) assessed above occur simultaneously.

Table 7.21 – Noise Impact Assessment due to Construction Noise from Power Generation Plant, Gas Connection and Electrical Connection at all NSR Locations

NSR	Construction/ Decommissioning noise sources	Noise Level, $L_{Aeq,10h}$ (dB)	Significance of Effect (from Table 7.7)
South Pillinge Farm	Power Generation Plant, Electrical Connection, Gas Connection	62	Slight adverse
Pillinge Cottages	Power Generation Plant, Electrical Connection, Gas Connection	60	Slight adverse
Moreteyne House	Electrical Connection (underground cable and temporary works)	54	Neutral
Lower Farm	Gas Connection	59	Slight adverse
Campsite	Construction Traffic	45	Neutral

7.7.36 The significance of effect of construction noise based on the worst case assessments is not considered to be significant at any of the NSRs.

7.7.37 During decommissioning, similar impacts to those described for construction could result from, for example, plant removal or site reinstatement. However, it is likely that these impacts would be less, given that some items may be left in situ. Therefore, based on the very conservative and worst case construction impacts outlined above, the significance of the effect of noise impacts from the decommissioning phase is also given in Table 7.21. These effects are not considered to be significant.

7.8 Assessment of Cumulative and in Combination Effects

Construction

7.8.1 It is considered that, due to distance attenuation, only the Covanta RRF Project and the integrated waste management facilities at Rookery South Pit have the potential to have a cumulative effect with the Project in terms of construction noise from the developments listed in section 4.10.

7.8.2 However, the integrated waste management facility is currently only a very high level concept with a scoping report submitted six months after the date that the Covanta RRF Project DCO came into force and hence no detailed noise data is available. It is not considered likely that the integrated waste management facility will be constructed at the same time as this Project.

7.8.3 Based on requirement 17 of the Covanta RRF Project DCO, a construction noise limit at South Pillinge Farm and Pillinge Cottages for this scheme has been set as 55 dB $L_{Aeq,1h.}$

7.8.4 It is possible that construction works associated with the Covanta RRF project and the Project may occur concurrently. Assuming that the Covanta RRF project meets its construction noise limit (55 dB) and assuming that all elements of the Project are constructed simultaneously, as per Table 7.21, the total sound level at noise sensitive receptors due to construction noise could be up to 63 dB (a 8 dB difference when compared to the individual limits).

7.8.5 However, it should be noted that the above assumes an absolute worst case scenario of all construction activities for both projects happening at the same time.

7.8.6 Based on the significance of effects scale in Table 7.7 the significance of noise effects from cumulative construction impacts from both schemes is considered to be slight and therefore not significant.

Operation

7.8.7 The DCO granted for the Covanta RRF Project sets out the operational noise limits at NSRs provided in Table 7.22.

Table 7.22 - Noise Limits set out in the DCO granted for the Covanta RRF Project dated 2011

NSR	Operational Noise Limit	
	Daytime $L_{Aeq,1h}$ (dB)	Night-time $L_{Aeq,5min}$ (dB)
South Pillinge Farm	39	35
Pillinge Cottages	35	35

7.8.8 Based on the information set out above a cumulative noise assessment has been undertaken using the calculated rating level of the Generating Equipment set out in Table 7.16 together with the operational noise levels specified for the Covanta RRF project in Table 7.22. The assessment is presented below in Table 7.23.

Table 7.23 Cumulative Noise Assessment (Operation of the Project and Covanta RRF project)

Calculation Description	BS4142 Assessment Summary during Time Period	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00)
Cumulative Combined Rating Level (dB $L_{Ar,Tr}$) at Noise Sensitive Receptor	42	40
Background Sound Level (dB $L_{A90,\ 15\ min}$)	46	39
Excess of Rating over Background Sound Level (dB)	-4	+1
Assessment of Impact	Indication of the specific sound source having a low impact, depending on the context	Indication of the specific sound source having a low impact, depending on the context

7.8.9 Calculations indicate that the cumulative rating level associated with the operation of both the Generating Equipment and the Covanta RRF project is likely to be around 1 dB above background sound levels at South Pillinge Farm during the night-time and -4 dB below the background sound levels during the daytime.

7.8.10 With reference to BS4142 this is an indication of the specific sound source having a low impact, depending on the context. In considering the context of the application, as set out in paragraph 7.7.19 above, this re-affirms the assessment of a low, and therefore not significant impact.

7.8.11 A comparison of the calculated rating level with the LOAEL and SOAEL identified in this ES chapter, indicates that the cumulative rating levels associated with the operation of the Project and the Covanta RRF project are likely to fall below the proposed LOAEL and therefore any effects are not anticipated be significant.

7.9 Mitigation and Assessment of Residual Effects

Construction / Decommissioning

7.9.1 In order to keep noise impacts from the construction/decommissioning phase to a minimum, all construction activities relating to the Power Generation Plant, Gas Connection and Electrical Connection would be carried out in accordance with the recommendations of BS 5228 (as stated in the CEMP), along with the embedded mitigation measures outlined in Chapter 3.6.

Operation

7.9.2 Assessment of the operational noise levels associated with the Generating Equipment suggest that the potential noise impact is likely to fall below the proposed LOAELs.

7.9.3 No additional mitigation over and above the embedded measures outlined in section 3.6 and the outline CEMP (Appendix 3.2) is therefore required to limit noise levels.

7.9.4 Based on the assessment presented above, and taking into consideration the contextual factors presented, we would suggest that a Requirement is attached to the DCO which states:

"Control of noise during operation

12.—(1) Prior to the date of final commissioning a written noise scheme providing for the control of noise generated during the operation of the authorised development must be submitted to and approved by the relevant planning authority. The noise scheme must include the following:

(a) the locations at which noise will be monitored;

(b) the defined representative background sound level at South Pillinge Farm house;

(c) the method of noise measurement (which must be in accord with BS 4142:2014, an equivalent successor standard or other agreed noise measurement methodology appropriate to the circumstances) and when such measurements will be carried out; and

(d) a complaints procedure.

(2) Except in the case of an emergency, noise (in terms of the BS 4142:2014 rating level) emitted from the operation of the authorised development must be no greater than the defined representative background sound level as approved in the noise scheme submitted pursuant to sub-paragraph (1)

(3) The noise scheme must be carried out as approved".

7.9.5 If any abnormal operations occur which lead to noise levels in excess of any agreed planning limits (e.g. any equipment malfunction), the operator will inform the local authority and residents of the reasons for these operations, and the anticipated emergency period.

7.10 Residual Effects

7.10.1 During operation, the cumulative residual effect would remain as not significant.

7.11 Summary of Residual Effects

7.11.1 Table 7.24 sets out a summary of the significant effects arising from the Project during construction, operation and de-commissioning.

7.11.2 The following elements are reported:

- the affected group or receptor
- the sensitivity of the affected group/receptor
- potential effect
- the likely magnitude and duration of the effect
- the likelihood of occurrence
- proposed mitigation or response to ameliorate the effect
- the significance of the residual effect following the incorporation of mitigation

7.11.3 Also reported are any potential in-combination/synergistic effects arising on a receptor during each phase, as well as any cumulative effects.

Table 7.24 - Summary of Residual Effects

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation	Significance of Residual Effect
Construction phase									
Power Generation Plant	South Pillinge Farmhouse	High	Construction noise	Local Short-term	High	Implementation of a CEMP which will include measures such as use of quietest possible construction equipment.	Neutral– Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	High		Neutral – Not Significant	None required	-
	Campsite	High	Construction traffic noise	Local Temporary	Low		Neutral – Not Significant	None required	-
Gas Connection	South Pillinge Farmhouse	High	Construction noise	Local Temporary	High		Neutral – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Temporary	High		Neutral – Not Significant	None required	-
	Lower Farm	High	Construction noise	Local Short-term	High		Slight – Not Significant	None required	-
Electrical connection	South Pillinge Farmhouse	High	Construction noise	Local Short-term	High		Slight – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	High		Slight – Not Significant	None required	-
	Moreteyne House	High	Construction noise	Local Short-term	High		Neutral – Not significant	None required	-

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation	Significance of Residual Effect
Project	South Pillinge Farmhouse	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
	Moreteyne House	High	Construction noise	Local Short-term	Low		Neutral – Not Significant	None required	-
	Lower Farm	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
	Campsite	High	Construction traffic	Local Short-term	Low		Neutral – Not Significant	None required	-
Cumulative effects	South Pillinge Farmhouse	High	Construction noise	Local Short-term	Low	CEMP in place for all projects.	Slight – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
Operation and maintenance									
Power generation plant	South Pillinge Farmhouse	High	Operation of Gas Turbine Generator, Stack and Fin Fan Cooler(s)	Local Long-term but intermittent operation	High	Acoustic enclosures, attenuators	Low – not significant	None required	-

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation	Significance of Residual Effect
	Pillinge Cottages	High	Operation of Gas Turbine Generator, Stack and Fin Fan Cooler(s)	Local Long-term but intermittent operation	Medium		Slight – Not Significant		
Cumulative effects	South Pillinge Farmhouse	High	Operation of Gas Turbine Generator, Stack and Fin Fan Cooler(s)	Local Long-term but intermittent operation	Medium	Acoustic enclosures, attenuators,	Slight – Not Significant	None required	-
	Pillinge Cottages	High	Operation of Gas Turbine Generator, Stack and Fin Fan Cooler(s)	Local Long-term but intermittent operation	Medium		Slight – Not Significant	None required	-
Decommissioning									

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation	Significance of Residual Effect
Power Generation Plant	South Pillinge Farmhouse	High	Construction noise	Local Short-term	High	Implementation of a CEMP which will include measures such as use of quietest possible construction equipment.	Neutral– Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	High		Neutral – Not Significant	None required	-
	Campsite	High	Construction traffic noise	Local Temporary	Low		Neutral – Not Significant	None required	-
Gas Connection	South Pillinge Farmhouse	High	Construction noise	Local Temporary	High		Neutral – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Temporary	High		Neutral – Not Significant	None required	-
	Lower Farm	High	Construction noise	Local Short-term	High		Slight – Not Significant	None required	-
Electrical connection	South Pillinge Farmhouse	High	Construction noise	Local Short-term	High		Slight – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	High		Slight – Not Significant	None required	-
	Moreteyne House	High	Construction noise	Local Short-term	High		Neutral – Not significant	None required	-

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation	Significance of Residual Effect
Project	South Pillinge Farmhouse	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
	Moreteyne House	High	Construction noise	Local Short-term	Low		Neutral – Not Significant	None required	-
	Lower Farm	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-
	Campsite	High	Construction traffic	Local Short-term	Low		Neutral – Not Significant	None required	-
Cumulative effects	South Pillinge Farmhouse	High	Construction noise	Local Short-term	Low	CEMP in place for all projects.	Slight – Not Significant	None required	-
	Pillinge Cottages	High	Construction noise	Local Short-term	Low		Slight – Not Significant	None required	-

7.12 Conclusions

7.12.1 The dominant environmental noise sources currently at the NSRs are road traffic on the local and national road networks, and train pass-bys from the Marston Vale Line and Midland Main Line railways.

7.12.2 Three environmental noise surveys have been undertaken. The first noise survey was undertaken in August 2014 at South Pillinge Farm for four days including a weekend. The second noise survey was undertaken in November 2014 at South Pillinge Farm and Lower Farm for a duration of five days including a weekend. Construction noise associated with the LLRS works was present during the November 2014 survey at South Pillinge Farm however the survey was not aborted as evening, weekend and night-time noise levels at this location were deemed to be representative of typical conditions at this location. Given the time elapsed since these initial surveys, and at the request of CBC an additional environmental sound survey was undertaken over a period of 1 week from approximately 09:00 hours on Friday 08 September 2017 to approximately 09:00 hours on Friday 15 September 2017.

7.12.3 LOAEL and SOAEL levels have been proposed for construction/decommissioning and operational noise based on the context of the site following the guidance of BS 4142, NPPF, NPSE and NPS EN-1. Factors considered in order to derive the adverse effect levels include (but are not limited to) the noise survey results, the number of NSRs in the vicinity of the noise source, existing noise sources, and the characteristics of the proposed noise sources (including the intermittent and temporary nature of operation).

7.12.4 Worst case assessments of construction/decommissioning noise have been undertaken based on the assumption that all noise generating construction plant associated with a construction site are operating at the same time at the closest point of the site to the nearest NSR. In all cases, the significance of effect was no greater than slight and is thus not considered to be significant. It is unlikely that the situation assessed as the worst case will occur in practice.

7.12.5 An assessment of the operational noise from the Gas Turbine Generator has been undertaken with the aid of the noise modelling software SoundPLAN 7.4.

7.12.6 The results of the noise modelling indicate that the rating level associated with the operation of the Generating Equipment is likely to fall below the background sound level at South Pillage Farm by approximately 8 dB during the daytime and 1 dB during the night-time. With reference to BS4142 this is an indication of the specific sound source having a low, and therefore not significant impact, depending on the context. The context described above in paragraph 7.7.19 further confirms the conclusion of a low and not significant impact.

7.12.7 It is possible that construction works associated with the Covanta RRF project and the Project may occur concurrently. Assuming that the Covanta RRF project meets its respective noise limits (55 dB) assuming that all elements of the Project are constructed simultaneously, as per Table 7.21 the total sound level at noise sensitive receptors due to construction noise could be up to 62 dB (a 7 dB difference when compared to the individual limits).

7.12.8 However, it should be noted that the above assumes an absolute worst case scenario of all construction activities for both projects happening at the same time.

7.12.9 Based on the significance of effects scale in Table 7.6, the significance of noise effects from cumulative construction impacts from both schemes is considered to be slight and therefore not significant.

7.12.10 A comparison of the calculated rating level with the LOAEL and SOAEL identified in this ES chapter, indicates that the cumulative rating levels associated with the operation of the Generating Equipment and the Covanta RRF Project are likely to fall below the proposed LOAEL and therefore cumulative noise levels would not be significant.

7.12.11 Based on the assessment presented above, and taking into consideration the contextual factors presented, the following text has been included as a Requirement in the draft DCO (Requirement 12 of Document Reference 3.1) submitted with the Application:

“Control of noise during operation

12.—(1) Prior to the date of final commissioning a written noise scheme providing for the control of noise generated during the operation of the authorised development must be submitted to and approved by the relevant planning authority. The noise scheme must include the following:

(a) the locations at which noise will be monitored;

(b) the defined representative background sound level at South Pillinge Farm house;

(c) the method of noise measurement (which must be in accord with BS 4142:2014, an equivalent successor standard or other agreed noise measurement methodology appropriate to the circumstances) and when such measurements will be carried out; and

(d) a complaints procedure.

(2) Except in the case of an emergency, noise (in terms of the BS 4142:2014 rating level) emitted from the operation of the authorised development must

be no greater than the defined representative background sound level as approved in the noise scheme submitted pursuant to sub-paragraph (1)

(3) The noise scheme must be carried out as approved".

8 Ecology

8.1 Introduction

8.1.1 This Chapter presents the assessment of likely significant ecological effects arising from the construction, operation, maintenance and decommissioning of the Project.

8.1.2 The Project has the potential to result in: indirect noise and vibration disturbance to species, including protected species; loss, disturbance and/or fragmentation of habitat and hedgerows; disturbance effects associated with lighting proposals to bats and other nocturnal species; and indirect air quality effects on retained County Wildlife Site (CWS) habitats within the Rookery Clay Pit associated with dust and particulate matter emissions.

8.2 Legislation and Policy Context

8.2.1 The legislation and policy context in relation to ecology is described in detail in Appendix 2.8. However, in summary, the following items of policy, legislation and guidance have been considered in preparing this assessment:

- National Policy Statements (NPS) EN-1, 2 4 and 5;
- National Planning Policy Framework (2012);
- National Planning Practice Guidance
- Conservation of Habitats and Species Regulations 2010 (as amended);
- Wildlife and Countryside Act 1981(as amended);
- The Natural Environment and Rural Communities Act 2006;
- UK Post-2010 Biodiversity Framework;
- Bedford Borough, Central Bedfordshire and Luton Borough Councils: Minerals and Waste Local Plan Strategic Sites and Policies (adopted January 2014);
- Central Bedfordshire Council Core Strategy and Development Management Policies (November 2009);
- Bedford Borough Council Core Strategy & Rural Issues (April 2008);
- Central Bedfordshire Local Plan 2015 - 2035 Draft Plan July 2017; and
- Bedford Borough Council Local Plan 2035 – 2017 Consultation.
- The Forest of Marston Vale Forest Plan 2000; and
- Bedfordshire and Luton Minerals and Waste Local Plan (Adopted January 2005)

8.3 Consultation

8.3.1 A list of key consultation responses received to date relating to ecology are presented in Table 8.1 below, along with how these have been responded to.

Table 8.1 - Summary of key Consultation and Responses in Relation to Ecology

Reference	Comment	Response
SoS Scoping Opinion		
3.46	Need to consider protecting and enhancing biodiversity and habitats and species processes within the site and surrounding area. The SoS notes the recommendations in the extended phase 1 habitat survey for further surveys either on the Project site or in the vicinity of the site for: bats, badger, water voles, GCN, breeding birds, reptiles and terrestrial and aquatic invertebrates.	Agreed and this has been addressed in Section 8.9 which outlines mitigation measures. The results of these further surveys are presented in appendices 8.1-8.5. The need for aquatic invertebrate surveys has been scoped out of assessment following further detailed study of the Project Site and refinement of the red line.
3.48	Inconsistency between number of SSSIs in para 5.5.5 and Appendix 1 of the Scoping Report	There are seven SSSIs within 5 km of the Project Site, and one SSSI within 2km of the Project Site which is correct and set out in Section 8.6 of this ES.
3.48	Study areas should be clearly defined for each species.	This has been included in Section 8.5 of this ES.
3.49	Stage of LLRS at submission of DCO and how this relates to ecology should be defined.	The baseline is defined in Section 8.5 of this ES, and the stage of completion of the LLRS is discussed at section 3.1. The baseline is defined in relation to Ecology at Section 8.6. The approach to defining the baseline has been discussed and agreed with Natural England (email dated 12.09.14, S42 response dated 06.07.17, and email dated 10.08.17) and CBC (email dated 03.09.14 and S42 response dated 29.06.17). Further detail is provided in Appendix 4.O of the Consultation Report (Document Reference 5.2).
3.51	Consultation with NE with regard to requirement of HRA screening is welcomed (see Section 4 of scoping opinion)	Initial discussions have been held with NE to confirm that given the distance of the nearest Natura 2000 site is 27 km from the Project Site, HRA Screening is not required (email dated 12.09.14 and S42 response dated 06.07.17). Nevertheless, in

Reference	Comment	Response
		accordance with PINS Advice Note 10 a No Significant Effect Report has been produced, as a separate document and sent to NE who have confirmed their agreement with the conclusions (Document reference 5.7).
3.52	Cross reference should be made to other ES sections and assessment of impacts on ecological receptors associated with air quality (including dust), noise, vibration	Reference has been made to Chapters 6 (air quality) and Chapter 7 (noise and vibration) e.g. section 8.7 of this ES.
3.53	Consideration of cumulative and combined impacts are particularly relevant to assessing impacts on ecological interest.	Agreed and the ES includes a cumulative effects assessment in relation to ecology in Section 8.8.
4.2 to 4.6	The SoS is the competent authority, and any information required to carry out a HRA should be provided by the applicant. Refer to PINS Advice Note 10.	A HRA screening assessment has been undertaken, and a No Significant Effects Report produced in accordance with PINS Advice Note 10 (Document ref. 5.7).
4.9-4.12	SSSIs are noted to be nearby. Resolve any issues with NE in advance of submission of the DCO application	It has been agreed with NE during consultation (S42 response dated 06.07.17) that there are no issues in relation to SSSIs as set out in Section 8.7 of this ES.
4.13 -4.17	European Protected Species (EPS) - If EPS licence required, consult with NE and submit a draft licence application in advance of DCO application to ensure all relevant issues have been addressed.	It is unlikely that an EPS licence will be required. This has been agreed with NE during consultation (email dated 10.08.17) and is discussed in Section 8.7 of this ES.
Natural England		
Scoping Response Letter 18.07.14	Natural England is broadly satisfied with the approach to ecology detailed in the scoping report in respect of identification of potential effects and proposed assessment methodology, as pertaining to our remit. The approach is appropriate and compliant with current best practice	Noted.
Consultation meeting 12.08.14	MPL Note: A meeting was held with Natural England on the 12th August 2014, to provide an overview of the Project and to ensure that any concerns that NE has are addressed in the ES.	N/A

Reference	Comment	Response
Consultation phone call and e-mails 12.09.14	MPL Note: Phone call to discuss the approach to the ecological assessment, determining the baseline, and the findings of the baseline surveys.	Confirmation obtained (phone call 12.09.14) that NE is in agreement with the approach to determining the baseline. NE also confirmed (phone call 12.09.14 and subsequent email dated 02.03.15) their agreement that it was unnecessary to undertake a HRA Screening Assessment, given the distance (27km) from the Project Site to the nearest Natura 2000 Site. Further detail is provided in Appendix 4.O of the Consultation Report (Document Reference 5.2). NB. a No Significant Effects Report has been produced in accordance with PINS Advice Note 10 for completeness (Document ref. 5.7).
S42 response 06.07.2017	Natural England advises that air quality impacts from the proposal will not impact upon King's Wood and Glebe Meadows Site of Special Scientific Interest (SSSI) or Coopers Hill SSSI.	Noted
S42 response 06.07.2017	NE confirms its previous advice (email from Ross Holdgate on 2 March 2015) that there would be no likely significant effects to Chiltern Beechwoods Special Area of Conservation, Upper Nene Valley Gravel Pits Special Protection Area and Ramsar Site, either alone or in combination with other plans or projects.	Noted
S42 response 06.07.2017	NE are concerned that if the great crested newt (GCN) exclusion fence (that was part of the licence 2014-1762-EPS-MIT-1) as part of previous translocation work fence is taken down before the DCO works commence then there is likelihood that GCNs may access the site. We require further information as to why it is considered that no further surveys for GCNs are required.	Through the commitment under The Rookery South (Resource Recovery Facility) Order 2011, to amend licence 2014-1762-EPS-MIT-1 in order to retain GCN exclusion fencing until 2020; it is assumed that GCN will remain absent from the footprint of the proposed Power Generation Plant prior to the start of construction, and as such, no further GCN surveys in relation to works in this area of the Project Site, are considered to be necessary. Furthermore, if for any reason, there are delays in the construction programme for either the Covanta Scheme and/ or the MPL Project, there is assurance that GCN will remain excluded from the development footprint through relevant

Reference	Comment	Response
		clauses in the Land Option Agreement between MPL (the Applicant) and O&H (landowner). Given that construction is due to commence six years after the 2014 great crested newt surveys were completed; pre-commencement surveys may be required to confirm the management and/or mitigation measures required in relation to the proposed re-surfacing of the access road, and the installation of the gas and electrical connections which can be expected to be implemented through the CEMP. Great crested newts have not been excluded from these areas of the Project Site which support suitable habitat for this species. If necessary, any such surveys would be completed prior to construction. Whilst the existing 2014 survey data is sufficient to underpin the assessment in this ES; the purpose of such pre-commencement surveys would be to provide up to date survey data (for 2019/ 2020) to inform any necessary management measures to be implemented during construction in 2020, to avoid a breach in the legislative protection afforded to great crested newts.
S42 response 06.07.2017	We note the presence of other protected species including bats and badgers within the proposal area. Should the development involve a requirement for any protected species licences to be issued by Natural England it is important that the details are agreed with us at an early stage, to ensure that Letters of No Impediment can be issued with submission.	Noted. However, at this stage, there is not considered to be any requirement for protected species licences to be issued by Natural England. Natural England have confirmed that they are satisfied that this is the case. Further detail is provided in Appendix 4.O of the Consultation Report (Document Reference 5.2).
Consultation email dated 10.08.2017	We understand that the GCN exclusion fencing will be retained and maintained regarding the footprint of the power generation plant during the interim period prior to the start of the DCO works. On the basis that 2014-1762-EPS-MIT-1 licence modification is deemed acceptable, and that the fence is maintained until construction of the MPL Project, we acknowledge that the proposed area will remain inaccessible	Noted

Reference	Comment	Response
	to GCN and therefore further survey work should not be required. Regarding the access road, and the proposed gas and electrical connection, we acknowledge that updated GCN surveys may be required. The survey results should inform any mitigation measures that would be implemented through the Construction Environmental Management Plan.	
CBC		
Scoping Response Letter 15.07.14 (p 61)	MPL Summary: No concerns raised by CBC Ecological Officer - satisfied with suite of surveys proposed and assumes baseline will be adequate.	Noted.
Consultation phone call and e-mails 03.09.14	MPL Note: Phone call to discuss the approach to the ecological assessment, determining the baseline, and the findings of the baseline surveys. The need to demonstrate achieving a net gain in biodiversity as a result of the Project (in accordance with National Planning Policy Framework (NPPF)) was raised as an issue to be addressed in the EIA process.	Confirmation obtained that CBC is in agreement with the approach to determining the baseline. This has been taken into account in the Landscape and Ecology Mitigation and Management Strategy (LEMMS) (Appendix 11.3). Planting within the Order limits but some distance from the Generating Equipment Site is proposed which has been designed to ensure value for biodiversity is maximised, whilst performing a landscape screening function. In addition a new pond is proposed, which would also be of value for biodiversity. Given the negligible nature conservation value of the habitats affected as a result of the Project, it is anticipated that the creation of a new pond and structurally diverse and species-rich areas of planting, to reflect the species composition within the wider Marston Vale Forest, would be expected to result in a net gain in biodiversity. Further detail is provided in Appendix 4.O of the Consultation Report (Document Reference 5.2).
Consultation Response on 2014 PEIR 03.09.14	MPL Summary: The Council's Ecologist is satisfied that baseline conditions will be based on the implemented low level restoration scheme and acknowledges	Noted

Reference	Comment	Response
	enhancement measures will be undertaken in accordance with NPPF It is considered that the baseline information provided in the PEIR is reasonable to inform the future surveys.	
Pre-application advice (letter dated 2.10.15)	Cumulative Impact The NPS EN-1 states that when considering cumulative effects, the ES should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence). It is not apparent that the additional impacts of the Covanta Energy from Waste plant, which has consent granted, have been taken into account. In some instances, the combined impact could have a greater impact on the range of species identified.	Agreed. Additional details on the consideration of cumulative effects in relation to the Covanta RRF Project have been added to Section 8.8 of this ES.
Pre-application advice (letter dated 21st October 2015)	The Net Gain for Biodiversity Table 8.2 details the ecological receptors and applies a level of consideration/importance (local, parish etc.). This states that in many instances that they will be considered as an "…'other ecological receptor' requiring appropriate management to avoid breach of legislation". However, the NPS EN-1 states that 'the applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests'. This would go beyond action to avoid breach of legislation and should demonstrate consideration of enhancement opportunities more clearly.	Agreed. Biodiversity enhancement opportunities have been incorporated in the LEMMS for the scheme (Appendix 11.3) which will benefit these 'other' ecological features. Planting within the Order Limits but some distance from the Generating Equipment Site is proposed which has been designed to ensure value for biodiversity is maximised, whilst performing a landscape screening function. Tree and shrub planting will provide nesting and foraging resources for breeding birds. In addition, a new pond is proposed, which would also be of value for biodiversity including newts and reptiles such as grass snake. Given the negligible nature conservation value of the habitats affected as a result of the Project, it is anticipated that the creation of a new pond and structurally diverse and species-rich areas of planting, to reflect the species composition within

Reference	Comment	Response
		the wider Marston Vale Forest, would be expected to result in a net gain in biodiversity.
Pre-application advice (letter dated 21st October 2015)	It is noted that the proposal will deliver ponds to increase the wetland habitat, as well as planting and reinstating tree and hedgerow habitat. The applicant should investigate further opportunities e.g. for enhanced grassland, ditches as well as opportunities linked to the built development itself.	The outline LEMMS is set out in Appendix 11.3. The surface water management ditches have been incorporated into the LEMMS. These wetland features will be managed to enhance their biodiversity value. The strategy also includes the creation of wildflower grassland areas.
Pre-application advice (letter dated 21st October 2015)	It is noted that the draft CEMP will relate to landscape and ecological mitigation strategy, given that the works will not commence prior to 2017 further survey updates will be required. The report accepts that habitats will continue to evolve during the intervening period and one would expect the mitigation strategy will need to be informed by up to date ecological information.	Agreed. Updated surveys may be required to refine the management measures required and/ or it may be appropriate to adopt a precautionary approach.
Consultation email dated 26.06.2017	MPL summary: email to confirm formal consultation comments on the PEIR that CBC has no concerns regarding the information submitted, and therefore that no further consultation with CBC is necessary at this time.	Noted
S42 response 29.06.2017	As with the 2014 PEIR I have no concerns regarding the information submitted. I note that a Phase 1 habitat survey and Phase 2 species surveys have been undertaken to investigate potential impacts on key ecological receptors of the proposals. Necessary mitigation will be species specific. I am satisfied that baseline conditions will be based on the implemented LLRS and I acknowledge	Noted

Reference	Comment	Response
	enhancement measures will be undertaken in accordance with NPPF.	
Bedfordshire Wildlife Trust		
Consultation phone call and e-mails 16.09.14	MPL Note: Phone call to explain the approach to the ecological assessment, determining the baseline, and the findings of the baseline surveys. A request was made that consideration be given the creation of a pond within this habitat creation area, as this would contribute towards the current Froglife project in the Marston Vale, which is aiming to increase the number of ponds available for meta-populations of newts within the Vale. This could be a seasonal pond, and could be relatively simple to achieve as part of any landscaping proposals that are already proposed.	N/A A series of smaller ponds have been incorporated into the landscape design for the Project, the exact location of which will be agreed with consultees prior to construction of the Project. This is discussed in Section 8.9 of this ES.
Consultation phone call 20.06.2017 and e-mails dated 22 & 23.06.2017	MPL summary: phone call to discuss the main changes to the Project since previous consultation in 2014; results of the updated walkover survey; approach to the assessment; and mitigation / enhancement proposals. BWT confirmed that they are happy with the approach discussed. BWT queried how confident MPL can be that the LLRS will be completed prior to construction. BWT welcomed proposals to include a series of ponds within the landscape design, and questioned whether a strategic approach had been taken to determining ecological mitigation and enhancement – for example linking with similar proposals in the wider district.	Follow up emails sent to BWT to summarise discussion and to provide additional information on red line boundary and to explain how completion of the LLRS prior to construction has been secured (e.g through the land option agreement as explained in section 3.1 of the ES). PBA explained that mitigation/ enhancement proposals have taken account of the measures that will be implemented as part of the LLRS and the adjacent Covanta RRF project.

8.4 Topic-specific Realistic Worst Case Scenario for Assessment

8.4.1 Modelling was undertaken based on manufacturer specific emission rates and flue gas parameters for a Gas Turbine Generator considered representative of a ‘worst case’ emissions profile from several potential makes and models of Gas Turbine Generators. This was required in order to identify the realistic worst case option for the Power Generation Plant.

8.4.2 Stack height sensitivity testing has revealed that a minimum stack height of 32.5m would be required to achieve adequate dispersion of emissions to meet relevant air quality standards under the IED. Any higher stack than 32.5 m would result in a better dispersion of emissions and therefore lower impacts on sensitive ecological receptors. For this reason, a 32.5m stack is considered a realistic worst case scenario in relation to dispersion of emissions and associated ground level concentrations of pollutants that have potential effects on sensitive ecological receptors. Further discussion is provided in Chapter 6.

8.5 Assessment Methodology and Significance Criteria

8.5.1 The Project has the potential to have direct and indirect ecological effects. The distance of some ecological features from the Project Site and the mobility of others are such that ecological impacts have the potential to occur at some distance from the Project Site. For the purposes of this Ecology Chapter of this ES, the study area has been split into the following distinct areas as described in Section 1.1:

- Power Generation Plant Site;
- Electrical Connection; and
- Gas Connection.

8.5.2 Additionally, the wider study area is defined as the area within 1 km of the Project Site in relation to desk study information on protected / notable species and non-statutory designated sites; and any nationally and internationally statutory designated sites within 2 km and 10 km of the Project Site, respectively (as explained further in paragraph 8.5.3, below).

8.5.3 The assessment of direct impacts of the Project is limited to the Project Site as no land outside of the Project Site will be directly disturbed. However, the construction, operation and decommissioning of the Project has the potential to result in indirect impacts on some ecological features, primarily as a result of changes to air quality and chemical deposition rates, in the wider area. The significance of these more distant potential impacts is therefore considered with reference to internationally designated sites within 10km and national statutory nature conservation sites (Appendix 8.1, Figure 1b) within 2 km of the Project Site, in accordance with criteria in the EA's 'Air Emissions Risk Assessment for your Environmental Permit' guidance. In addition, the potential for impacts on non-statutory designated sites within 2km of the Project Site has also been assessed (see section 8.7 and: Chapter 6 (Air Quality)).

Desk Study

8.5.4 Existing data in relation to the Project Site and the wider study area were obtained during 2014 in order to secure a better understanding of the ecological context of the Project Site. Biological records in relation to statutory and non-statutory nature conservation sites within 2 km of the Project Site boundary, were obtained from Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC). Records and other information in relation to protected and notable species were also obtained from BRMC up to 2 km from the Project Site boundary. On-line resources, including data available through the Multi Agency Geographic Information for the Countryside website (www.magic.gov.uk) complemented information obtained from BRMC. This information was supplemented by previous survey and mitigation work undertaken by BSG Ecology on The Rookery Clay Pit CWS, including land within and immediately north of the survey area (PBA, 2009; BSG Ecology 2013); see Appendices 8.1 and 8.3.

8.5.5 Up to date information on the boundary of Rookery Clay Pit County Wildlife Site (which lies within the Project Site) has been obtained from BRMC in April 2017 and the boundary has been confirmed to be unchanged since 2014.

Field Surveys

8.5.6 A wide range of habitat and protected or notable species surveys were undertaken by BSG Ecology in 2014 to inform this assessment. The information below confirms the field surveys that have been undertaken, their timing and the extent of the study area relevant to each survey type. It is noted that the Project Site as defined in the original 2014 Scoping Report covered a larger area than the current Project Site (the original Project Site boundary is shown within the Scoping Report and Scoping Opinion in Appendix 1.2).

- Extended Phase 1 habitat survey - February 2014 and updated throughout the survey season. The study area was the Project Site as that term was defined in the Project Scoping Report (see Appendix 8.1, Figure 2);
- Terrestrial invertebrate surveys between May and September 2014. Habitat within the Project Site (as that term was defined in the Project Scoping Report) assessed as having potential to support a valued invertebrate assemblage was surveyed (see Appendix 8.2, Figure 1);
- Great crested newt surveys (between mid-April and mid-June 2014); ponds within the Project Site and within 250 m of the Project Site (as that term was defined in the Project Scoping Report) were surveyed (see Appendix 8.3, Figure 1);
- Reptile surveys (between end-April and late-August 2014); suitable habitat within the Project Site (as that term was defined in the Project Scoping Report) was surveyed (see Appendix 8.3, Figure 3);
- Breeding bird surveys (April, May and June 2014) the Project Site (as that term was defined in the Project Scoping Report), plus a 50 m buffer were surveyed (see Appendix 8.4, Figures 1 to 3);
- Bat activity survey (May, July and September 2014); transects in the north and south of the Project Site (as that term was defined in the Project Scoping Report) were undertaken (see Appendix 8.5, Figure 2a and 2b);
- Emergence/ re-entry bat surveys of the building complex at South Pillinge Farm (July 2014) (see Appendix 8.5, Figure 3 and Figure 4);

- Otter and water vole surveys (May 2014); all suitable watercourses within the Project Site (as that term was defined in the Project Scoping Report) (see Appendix 8.5, Figure 5); and
- Badger survey (July 2014); the Project Site (see Appendix 8.5, Figure 1).

8.5.7 A summary of the survey methodologies and results is provided in Appendices 8.1 to 8.5, inclusive of this ES.

8.5.8 An ecological walkover survey was completed by Peter Brett Associates LLP on 4th April 2017 of the Project Site. This updated the previous Phase 1 habitat survey information, confirming the nature and extent of the habitats now present within the Project Site. The current suitability of the habitats for which species specific surveys were previously undertaken was re-assessed in order to determine any requirement for existing survey information to be updated so as to define an adequate baseline for assessment.

Impact Assessment

8.5.9 This ecological assessment has been undertaken having regard to guidance set out in the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment (2016) ('the CIEEM Guidelines'). The CIEEM Guidelines state that 'EcIA is a process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on habitats, species and ecosystems'. It requires an assessment of likely significant effects on important ecological features, and as such, does not require consideration of effects on every species or habitat that may be present within the Project Site.

8.5.10 In order to determine whether there are likely to be significant effects, it is first necessary to identify whether an ecological feature is 'important', and therefore whether an effect upon it could be significant, and thus, material in decision-making. To achieve this, where possible, animal species and their populations have been valued on the basis of a combination of their rarity, status and distribution, using contextual information where it exists. Habitats and plant communities have been evaluated against existing selection criteria, wherever possible (such as those developed to aid the designation of SSSIs or non-statutory designated sites).

8.5.11 This assessment examines effects on important ecological features with reference to the extent, magnitude, duration, timing, frequency, and reversibility of the impacts. For each ecological feature within the relevant study area, the baseline is identified and evaluated. For each important ecological feature, relevant impacts are characterised; effects defined and their significance assessed; mitigation identified and residual impacts reported. This exercise is performed for each phase of the Project.

Determining the Importance of Ecological Features

8.5.12 The importance of each ecological feature within the Study Area has been determined having regard to a number of contributory factors relating to conservation value.

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

- International and European;
- National;
- Regional (East of England);
- County (Bedfordshire); and
- Local (Bedford Borough and Central Bedfordshire).

8.5.14 Once the importance of each ecological feature that will potentially be affected by the Project has been determined, those features that are deemed to be important, and therefore require full consideration in the impact assessment, are identified. These features are those that are important within a 'Local' context or above. This approach allows exclusion of those ecological features that are of less than 'Local' importance i.e. those that may be considered to be important only within the context of the parish/ neighbourhood or Project Site.

Establishing Potential Air Quality Effects

8.5.15 The potential for impacts on sensitive ecological features, as a result of an increase in NOx either during the construction/ decommissioning or operational phase of the Project has been addressed in Chapter 6 of this ES.

8.5.16 An assessment of the deposition of nutrient nitrogen and the acidity due to nitrogen as a result of operation of the Power Generation Plant has been undertaken in accordance with the EA guidance "AQTAG 06 - Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air" (2010).

8.5.17 Critical loads (to be used as standards for the assessment of significance) have been obtained from the Air Pollution Information System (APIS) (see section 6.5 of this ES). The assessment has shown that the predicted nitrogen and acid deposition rates are insignificant when compared to the critical loads for the habitats under consideration (see Section 6.7 in Chapter 6 of this ES).

Determining Significance

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

8.5.19 An effect on an important ecological feature may be significant at the same geographic scale at which the feature is determined to be important (see Section 8.5.13), or at a lesser geographical scale, depending on the characterisation of the impact. By way of example, limited impacts on a woodland of county importance might be assessed as being significant at a local level of importance. This methodology supports an evidence based approach and supersedes and replaces the matrix-based assessment methodologies outlined in Tables 4.1-4.3 (Chapter 4) of this ES.

8.5.20 The mitigation/ compensation response to a significant effect relates directly to the geographic scale at which the effect is considered to be significant. As such, an effect which is significant at a national level can be expected to generate objectives and actions designed to mitigate/ compensate at a national scale.

Assumptions and Limitations

8.5.21 The assumptions used in this Chapter of the ES are as per section 4.8. It is assumed that the footprint of the Generating Equipment Site will be left free of ecological constraints following the re-profiling of the pit during the LLRS. This is because the LLRS includes measures (such as newt fencing) to keep ecological features out of the pit. It is assumed that the LLRS will be completed before construction of the Project commences, as described in Section 3.1. It is also assumed that the herpetofauna exclusion fencing will remain in place in the intervening period to the start of construction of the Project, and that the base of the pit will be free of ecological constraints. The mechanism for this is through a commitment under The Rookery South (Resource Recovery Facility) Order 2011, to amend licence 2014-1762-EPS-MIT-1 in order to retain exclusion fencing in situ until 2020; as well as through relevant clauses in the Land Option Agreement between MPL (Applicant) and O&H (landowner).

8.5.22 The Project Site as defined at Scoping comprised a larger area than that assessed within this ES, but did not include an arable field at the southern extent of the Project Site. This arable field and surrounding hedgerows was therefore not included in the survey area for the species-specific surveys undertaken in 2014. However, the update survey carried out in April 2017 included a walkover survey of this additional area, and it was considered to support similar habitats as those surveyed in 2014. Similar numbers and assemblages of species can therefore be expected in this additional area as those recorded within the 2014 survey area, and this has been assumed to be the case in this assessment. This approach has been agreed with consultees. Further detail is provided in Appendix 4.O of the Consultation Report (Document Reference 5.2). see Table 8.1 above).

8.6 Baseline Conditions and Ecological Features

8.6.1 This section sets out the baseline conditions and evaluates the importance of ecological features in accordance with the methodology set out in Section 8.5, to identify those important ecological features which are subject to the Assessment of Effects in Section 8.7. Whilst the evaluation of each ecological feature has not been specifically discussed and agreed with statutory consultees; no concerns regarding the identification of important ecological features were raised during the consultation period.

Power Generation Plant

Background and approach

8.6.2 It would be the rate of habitat re-establishment and species re-colonisation following implementation of the LLRS, as opposed to the specific commencement date of the Project (being 2020), that is the primary factor in determining baseline conditions relevant to this ecological assessment. However, the baseline for the ecological assessment is based on the assumption that elements of the LLRS are implemented, including re-profiling of Rookery South Pit as described in Sections 3.1. Additionally, the land option agreement, between the landowner and applicant includes a clause which guarantees a development site which would be free of ecological constraints.

8.6.3 Baseline ecological conditions (designated sites, habitats and species) are therefore informed by the desk and field studies undertaken in 2014 and 2017, and determined on the basis of their predicted status and importance during the construction, operational and decommissioning phases, taking into account the assumptions set out in Section 8.5.21 above. The base of the pit will be re-profiled and the footprint of the Power Generation Plant Site will be excluded from the habitat creation associated with the LLRS; it will not be returned to agriculture. It will be maintained as a clay base, following the excavation of clay to win material for re-profiling works within the wider Rookery South Pit. For the purposes of this assessment, it is assumed that the Rookery South Pit will be constraint free in terms of valuable habitats and the continued absence of protected species following completion of the great crested newt and reptile translocation.

8.6.4 The extended Phase 1 habitat survey undertaken in February 2014 – Appendix 8.1 – confirmed that the base of the south-western corner of Rookery South Pit comprised sparsely vegetated ground, swamp vegetation (including drying reedbeds) and bare ground. Significant areas of the western half of the base of Rookery South Pit were levelled following completion of Phase 1 of a programme to translocate great crested newts as part of the LLRS (see paragraph 8.6.16 below). The surrounds of the pit comprised a patchy mosaic of bare ground, species-poor neutral grassland and woodland/scrub habitats that had developed since clay extraction ceased. The access track comprised a mosaic of bare ground with ephemeral vegetation and scrub. These habitats are shown on the Phase 1 habitat map in Appendix 8.1, Figure 2.

8.6.5 No material changes in the nature and extent of habitats within the Project Site were identified during the walkover survey undertaken in April 2017 (see updated Phase 1 map in Appendix 8.1). The base of the Rookery South Pit was dominated by a mosaic of sparsely vegetated and bare ground, with occasional channels and pools of standing water supporting emergent vegetation including reed grasses and sedges. This was also the case in those areas of the pit which had previously not been mapped as part of the 2014 Phase 1 habitat survey. The surrounds of the pit continued to support a mosaic of bare ground, sparsely distributed low-growing plant species, species-poor neutral grassland and woodland/scrub habitats. An area of bare ground which was previously present on the southern bank of the pit in 2014, had since been colonised by ephemeral/ short perennial vegetation; and an adjacent area of species-poor neutral grassland appeared to have been removed as part of the LLRS mitigation works.

8.6.6 The access track comprised bare ground and sparsely vegetated areas bordered by trees and shrubs. Much of the scrub that was previously recorded along the edges of the access track appeared to have been removed, and there was clearance in progress at the time of the 2017 walkover survey. The southern end of the access track, which had previously not been mapped as part of the 2014 Phase 1 habitat survey, also comprised bare ground. Trees, shrubs and a wet ditch were present along the north-western edge of the access track.

Statutory Designated Sites

8.6.7 Desk studies identified that there are no Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites within 10 km of the Power Generation Plant Site. Together, SACs and SPAs form the Natura 2000 network, which aims to assure the long-term survival of Europe's most valuable and threatened habitats. The nearest Natura 2000 site is the upper Nene Valley SAC, which is approximately 27 km to the south-west of the Project Site. As such, Natural England has agreed the Project is unlikely to result in any significant effects on the integrity of the special interest of any European Site and that a Habitats Regulation Assessment undertaken in accordance with the Conservation of Habitats and Species Regulations 2010 (as amended) is not required (see Table 8.1). Nevertheless, in accordance with PINS Advice Note 10, a No Significant Effects Report has been produced to formally record this assessment (Document Reference 5.7).

8.6.8 There is one SSSI within 2 km of the Power Generation Plant Site (Cooper's Hill SSSI) which is approximately 1.2 km to the south-east. The grid references and principal reasons for designation of the SSSIs within the study area are given in Appendix 8.1. This site is also designated as a Local Nature Reserve (LNR).

8.6.9 Given the distances of these statutory designated sites from the Power Generation Plant Site, no direct or indirect impacts are anticipated on any statutory designated sites. The air quality assessment presented in Chapter 6) concluded that no breaches of the critical level are predicted to occur at Cooper's Hill SSSI and LNR, and that all of the predicted nitrogen and acid deposition rates are insignificant when compared to the critical loads for the habitats under consideration. The sensitivity of nationally designated sites to construction and decommissioning dust impacts are defined (in Section 6.6) as those supporting dust sensitive features which are located within 50 m of the Project Site. As Cooper's Hill SSSI and LNR are located more than 50 m from the Project Site, the potential to have a significant effect on these ecological features due to dust is considered to be negligible. These statutory designated sites were screened out of the Air Quality assessment in Section 6.6 of this ES and consequently will not be considered any further in the ecological impact assessment. This approach has been agreed with Natural England (see S42 response dated 06.07.2017 in Table 8.1).

Rookery Clay Pit CWS

8.6.10 Rookery Clay Pit CWS comprises Rookery North Pit and Rookery South Pit. Rookery South Pit will be directly affected by the Power Generation Plant; although by the time of construction the area to be affected will have already been re-profiled as part of the LLRS works. The existing access track, which is located along the western margin of Rookery North Pit, comprises bare ground with ephemeral vegetation, lined with young silver birch (*Betula pendula)* and alder (*Alnus glutinosa*) trees. A proportion of the scrub habitat which was recorded in this location in the 2014 PEIR (dominated by hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*)) has now been removed as preparatory works for the construction of the access road for the Covanta RRF Project.

8.6.11 At the time of the protected species surveys in 2014, the base of Rookery South Pit had been subject to dewatering operations, but still contained small areas of standing water and swamp habitat, along with areas of bare clay. It was noted during the 2017 survey that the areas of standing water and swamp habitat had decreased further in extent. All of this area will be re-profiled as part of the LLRS. By 2020, being the date of the commencement of the construction phase of the Project, these more valuable habitats within Rookery

South Pit and those recently associated with the Rookery Clay Pit CWS will therefore no longer exist. This is assured by the commitments in the land option agreement between the land owner and Applicant to undertake the LLRS works as specified in section 3.1 of the ES and to provide the applicant with a site which is free of ecological constraints.

8.6.12 The desk study revealed that ecological surveys undertaken in 2008 – 2009 showed the Rookery Clay Pit CWS to have supported a large population of great crested newts; a small population of grass snakes; and a medium population of common lizards. The studies also confirmed that the Rookery Clay Pit CWS supported a valuable invertebrate fauna, along with numerous bird species of conservation importance (see Appendices 8.2, 8.3 and 8.4, for further information) in 2008-2009.

8.6.13 At the time that the Project begins construction in 2020, it is assumed that all great crested newts and reptiles will have been removed from the base of the Rookery South Pit and surrounding area as part of the translocation operation which has been completed as part of the LLRS (see below). It is also assumed that measures will remain in place to prevent re-colonisation by great crested newts and reptiles (see Section 8.5.21). In addition, the LLRS re-profiling works will replace any terrestrial habitat currently suitable for great crested newts, reptiles, breeding birds and/or invertebrates within Rookery South Pit with clay, rendering it of negligible nature conservation value for protected or notable species.

8.6.14 The baseline at the time of implementation of the Project in 2020 will constitute any colonisation of ephemeral vegetation within the re-profiled Rookery South Pit following completion of the LLRS re-profiling works. Without intervention, the re-colonisation by protected species (including great crested newts, and reptiles) would also be expected. However, as identified in 8.5.21, it is assumed for the purposes of this assessment that the site will remain constraint free, in terms of valuable habitats and the continued absence of protected species (following completion of the great crested newt and reptile translocation). A commitment under The Rookery South (Resource Recovery Facility) Order 2011, to retain herpetofauna exclusion fencing in situ until 2020, together with relevant clauses in the Land Option Agreement between MPL (the Applicant) and O&H (landowner) provide assurance that this will remain the case. Nevertheless, the habitats and features of value supported by Rookery North Pit will be retained, and the potential exists for indirect impacts on this site of 'County' importance for nature conservation. This is considered in Section 8.7, below.

<u>Other non-statutory designated sites</u>

8.6.15 A further 11 non-statutory designated sites are present within 2 km of the Project Site. These include the large water bodies that dominate the base of the Marston Vale as well as woodland and grassland sites which are present both in the base and on the sides of the Marston Vale. The grid references and principal reasons for designation of these CWS are set out in Appendix 8.1 of this ES. Given the distances of these other non-statutory designated sites from the Power Generation Plant Site, no impacts are anticipated on these other CWS within 2 km of the Generating Equipment Site. The sensitivity of locally designated sites to construction and decommissioning dust impacts are defined (in Section 6.5) as those supporting dust sensitive features which are located within 50 m of the Project Site. Although Stewartby Lake CWS is within 50 m of construction activities, it is considered to be of low sensitivity (see Table 6.5) as it is not nationally or internationally designated and no dust sensitive species are present. Similarly, during the operation phase, no indirect impacts are anticipated on these sites as the air quality assessment (Section 6.7) concluded that no breaches of the critical level are predicted to occur, and all of the predicted nitrogen and acid deposition rates are insignificant when compared to the critical loads for the habitats under consideration. No significant effects on these ecological features are considered likely and they have not been considered in the ecological impact assessment. This has been confirmed by Natural England (see Table 8.1).

<u>Great crested newts</u>

8.6.16 Trapping and translocation of great crested newts (and reptiles) has taken place under a mitigation licence, issued by Natural England in 2011 as part of the LLRS. This has affected the southern half of the Rookery Clay Pit CWS incorporating the southern portion of the Access Road and a proportion of the arable land in the south of the Project Site. The translocation programme in Rookery South Pit was completed in November 2014, although it was noted during the 2017 survey that the great crested newt fencing had been retained in place. The baseline at the time of implementation of the Project will be the re-profiled base of Rookery South Pit following completion of the LLRS re-profiling works, along with any habitat re-establishment during the intervening period up to 2020. However, the assessment has assumed that the Rookery South Pit will be constraint free at the time of construction.

8.6.17 The existing access track, along the alignment of the proposed Access Road, on the western edge of Rookery North Pit, comprises areas of scrub, ephemeral vegetation and bare ground with cracks and crevices located outside of the exclusion area described above. These habitats, including the voids in the bare ground, could be used by the meta-population of great crested newts supported by Rookery North Pit during their terrestrial phase.

8.6.18 Great crested newts are relatively common and widespread throughout the county. The desk study has confirmed that the base of the Marston Vale supports several large and robust meta-populations (including in nearby habitats). Furthermore, the majority of the suitable habitat for great crested newts within the Power Generation Plant Site will already have been lost as a result of the LLRS. Overall the meta-populations of great crested newts within the Power Generation Plant Site are therefore considered to be important at less than ‘Local’ level. As such, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, great crested newts are not considered to be an important ecological feature and hence no impact assessment for this species is required.

8.6.19 Whilst the great crested newt meta-populations within the Power Generation Plant Site are not of sufficient importance to trigger consideration in the impact assessment, the potential exists for construction of the Access Road (which is outside of the area where the LLRS will be completed) to result in incidental harm to great crested newts using suitable features associated with terrestrial habitat along the route of the proposed Access Road. Appropriate management measures will therefore be implemented to ensure there is no breach of the legislation that protects great crested newts. These measures are further explained in section 8.9.

Reptiles

8.6.20 The existing access track along the alignment of the Access Road, on the western edge of Rookery North Pit comprises areas of scrub, ephemeral vegetation and bare ground with cracks and crevices which could be used by common species of reptiles associated with Rookery North Pit.

8.6.21 The baseline at the time of implementation of the Project will be the re-profiled base of Rookery South Pit following completion of the LLRS re-profiling works, along with any habitat re-establishment during the intervening period up to 2020. As identified in 8.5.21, it is understood that measures will be implemented during the intervening period, to ensure that reptiles remain absent from the base of the pit. The terrestrial habitats adjacent to the access track, suitable for use by reptiles would be expected to remain unchanged, although reduced in extent due to the construction of the Access Road.

8.6.22 Given that other similar habitat is widespread in Marston Vale and the surrounding area, and only small to medium populations of reptiles have been confirmed during the baseline surveys, and any remaining suitable habitat will be removed as part of the LLRS works, the reptile populations within the area required for the Power Generation Plant are considered to be important at less than ‘Local’ level. As such, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, reptiles are not considered to be an important ecological feature and hence no impact assessment is required for this species group.

8.6.23 Whilst the reptile populations within the Power Generation Plant Site are not of sufficient importance to trigger consideration in the detailed impact assessment process, the potential exists for construction of the Access Road to result in incidental harm to reptiles using terrestrial habitat along the route of the proposed Access Road. Appropriate management measures will therefore be implemented to ensure there is no breach of the legislation that protects reptiles. These measures are reported in Section 8.9 of this ES.

Breeding Birds

8.6.24 A relatively diverse assemblage of 65 species of breeding birds (either confirmed or potentially breeding) was recorded during the 2014 surveys. Of these, 31 species appear on one or more schedules or lists of species of conservation importance (see Appendix 8.4 for more information). The majority of these were recorded within Rookery South Pit, which is subject to the ongoing LLRS and will be re-profiled before the construction phase of the Project in 2020. The areas of scrub along the existing access track can be expected to support nesting birds, and during the 2014 surveys a pair of song thrush were confirmed breeding, along with probable breeding white throat (two pairs) bullfinch, turtle dove, stock dove and dunnock.

8.6.25 The baseline at the time of implementation of the Project will be the re-profiled base of Rookery South Pit following completion of the LLRS re-profiling works, along with any habitat re-establishment during the intervening period up to 2020. Vegetation suitable for use by nesting birds would not be expected to re-colonise the base of the pit during this time, and in any event, there is a commitment to ensure the site remains free of ecological constraints (Section 8.5.21). The habitats along the existing access track would expect to remain unchanged, although reduced in extent due to the construction of the Access Road.

8.6.26 The most valuable habitats for breeding birds within Rookery South Pit will have been lost ahead of the time of construction as a result of implementation of the LLRS. It is considered that breeding birds using the remaining habitats within the Power Generation Plant Site are important at less than 'Local' level. As such, breeding birds are not considered to be an important ecological feature and hence no impact assessment is required.

8.6.27 Nevertheless, appropriate management measures will therefore be implemented to ensure no breach of the legislation that protects breeding birds. These measures are set out in Section 8.9 of this ES.

<u>Bats</u>

8.6.28 A diverse bat assemblage was recorded during the activity and automated static bat detector surveys undertaken in May, July and September 2014, which focussed on the existing access track to the west of Rookery North Pit. A total of nine species were recorded, including barbastelle (*Barbastella barbastellus)*, noctule (*Nyctalus noctula*), Leisler's (*N. leisleri*), serotine (*Eptesicus serotinus*), long-eared bat (*Plecotus auritus*), Myotis spp. Nathusius' pipistrelle (*Pipistrellus nathusii*), common pipistrelle (*P. pipistrellus*) and soprano pipistrelle (*P.* pygmaeus) bats. Common and soprano pipistrelle bats were recorded most frequently; further information is provided in Appendix 8.5 of this ES.

8.6.29 The majority of bats were recorded foraging and commuting along the tree/ scrub-lined access track, which constitutes a 'green corridor', linking the known bat roosts at South Pillinge Farm (see below) with valuable foraging habitat to the north, associated with Rookery North Pit and beyond. The ecological function of the access track as a green corridor would be expected to remain unchanged at the time of implementation of the Project in 2020.

8.6.30 Although a diverse assemblage of bats has been recorded using the Power Generation Plant Site, albeit it in relatively small numbers (with the exception of common and soprano pipistrelle bats), similar habitats are widespread elsewhere within Marston Vale, and these can be expected to be used by a similar range of bat species associated with wetlands and surrounding habitats. The bat populations using the Power Generation Plant Site are therefore considered to be important at less than 'Local' level. As such, bats are not considered to be an important ecological feature and hence no impact assessment is required.

8.6.31 Nevertheless, appropriate management measures will be implemented in relation to the legislative protection afforded to bats. These measures are reported in Section 8.9 of this ES.

Other mammals

8.6.32 There are no features suitable for use by water voles or otters within the Power Generation Plant Site. Although signs of badger activity were recorded in the vicinity of the Power Generation Plant Site, no setts were revealed during the surveys. These species will not therefore be considered any further in the EIA process.

Gas and Electrical Connection

8.6.33 The baseline conditions of the Gas Connection and Electrical Connection are extremely similar in ecological terms, and were assessed together as one large area for the purposes of the extended Phase 1 habitat Survey and detailed protected species surveys in 2014, and the update walkover survey in 2017. They have therefore been grouped together for the purposes of this assessment.

8.6.34 The baseline surveys undertaken in 2014 (see Appendices 8.1 – 8.5) related to the Project Site boundary as reported in the Project Scoping Report (see Appendix 1.2). This encompassed a wider survey area than the footprint of the Project Site which is the subject of this ES. For the purposes of this Ecology Chapter, relevant information has been extracted from the baseline surveys to cover the Gas Connection and Electrical Connection, as described in Sections 3.3. and 3.4.

8.6.35 Two additional arable fields and an access track in the south of the Project Site (to the east of Lower Farm), were beyond the limits of the 2014 survey areas for breeding birds, water vole and otter, invertebrates, reptiles and badger surveys. This additional area was subject to an updated Phase 1 habitat survey in 2017, and has been considered in the baseline information below.

8.6.36 The majority of the habitats within the areas proposed for the Gas and Electrical Connection comprise intensively managed agricultural land, characterised by large arable fields, with grassy field margins which are bound by young species-poor hedgerows. A small number of plantation woodlands, which appeared, during the surveys, to be relatively recent in origin (less than 30 years old) are present within the areas proposed for the Gas and Electrical Connection. These habitats are considered to be important at less than 'Local' level, being common and widespread, and hence no impact assessment is required. Parts of the Gas Connection and Electrical Connection (e.g. the Substation) are within Rookery South Pit. The habitats within the footprint of these areas are assumed to be the same as for the Power Generation Plant Site (see Sections 8.6.4 and 8.6.5).

Invertebrates

8.6.37 The diversity of invertebrates recorded in the more valuable areas of habitat within areas proposed for the Gas and Electrical Connection (woodland plantations, ponds and field margins) during the 2014 surveys, was limited. This is largely due to their setting within intensively managed arable land and their associated field margins and managed hedgerows. The majority of the species recorded are common and widespread across England. Of the 155 species recorded, three are nationally scarce and nine are Species of Principal Importance, including beetles and moths. Similar to other areas within the land required for the Gas and Electrical Connections, the land in the south of the Project Site, which was beyond the 2014 invertebrate survey limits, comprised arable fields and species-poor hedgerows. These habitats were considered to be of limited value for terrestrial invertebrates during the 2017 update survey.

8.6.38 Overall, the terrestrial invertebrate populations within the areas proposed for the Gas Connection and Electrical Connection are considered to be of less than 'Local' importance. The assemblage does not therefore constitute an important ecological feature and hence, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, no impact assessment is required.

8.6.39 Further information is provided in Appendix 8.2 of this ES.

Great crested newts

8.6.40 Surveys were undertaken of 13 ponds within 250 m of the Project Site (Project Site boundary as reported in the Scoping Report) in 2014, to confirm the presence or likely absence of great crested newts. The presence of great crested newts was confirmed in eight of the ponds; full details are provided in Appendix 8.3 of this ES.

8.6.41 The population assessments confirmed three small populations and one medium population of great crested newts, in ponds to the north, east, west, and to the south, respectively; as indicated in Appendix 8.3, Figure 2 of this ES. Population A (within Pond C) supported a small population of great crested newts, to the north-east of the Gas Connection, with Population D (within Ponds H, J and K) supporting a medium population of great crested newts, adjacent to the proposed AGI for the Gas Connection. These ponds are set within an intensively managed agricultural landscape, and suitable terrestrial habitat for great crested newts is limited to hedgerows, plantation woodland, and field margins.

8.6.42 Great crested newts are relatively common in the county and are widespread within the vicinity of the Project Site (comprising four meta-populations recorded during the surveys, a large population associated with the receptor sites from the Rookery South Pit translocation, and robust meta-populations known to occur elsewhere within the base of Marston Vale). The great crested newt populations associated with the areas proposed for the Gas Connection and Electrical Connection are therefore considered to be of less than ‘Local’ importance. As such, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, the great crested newt populations are not considered to be an important ecological feature and hence, no impact assessment is required.

8.6.43 Whilst the great crested newt populations are not sufficiently important to trigger consideration in the impact assessment process (see Section 8.5), the potential exists for construction of the Gas Connection and Electrical Connection to result in incidental harm to great crested newts using suitable terrestrial habitat within 250 m of Ponds C and H see Figure 2 in Appendix 8.3) which have been confirmed to support great crested newts. Appropriate management measures will therefore be implemented to ensure no breach of the legislation that protects great crested newts. This approach has been confirmed with Natural England (see Table 8.1).

Reptiles

8.6.44 The baseline surveys undertaken in 2014 confirmed the presence of small populations of common lizard and grass snake within the areas proposed for the Gas and Electrical Connection, specifically associated with the Bletchley to Bedford railway corridor, field boundaries and areas of broadleaved woodland. Peak counts of adult common lizard and grass snake were eight and three, respectively; further information is provided in Appendix 8.3, Figure 3 of this ES. The land in the south of the Project Site, which was beyond the 2014 reptile survey limits, comprised arable fields and species-poor hedgerows during the 2017 update survey. These habitats were considered to be of limited value for reptiles but as for elsewhere within the land required for the Gas and Electrical Connections, the field margins could potentially support similarly small populations of common lizard and grass snake.

8.6.45 The suitability of reptile habitat within the areas proposed for the Gas Connection and Electrical Connection is limited due to the intense management of the arable farmland. There are more valuable reptile habitats in the surrounding area, including Rookery North Pit; and reptiles are widespread in Marston Vale and the county. Based on the 2014 and 2017 survey information, the reptile populations within the areas proposed for the Gas Connection and Electrical Connection are considered to be of less than 'Local' importance. The reptile populations do not therefore constitute an important ecological feature and, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, will not be considered in the impact assessment.

8.6.46 Nevertheless, appropriate precautionary mitigation measures will be implemented in advance of the site clearance works in order to avoid a breach of the protective legislation relating to reptiles. These measures are set out in Section 8.9 of this ES.

Breeding Birds

8.6.47 The majority of the areas proposed for the Gas Connection and Electrical Connection are of limited value for breeding birds, consisting of large arable fields, delineated by species-poor hedgerows and ditches. The majority of the species recorded during the 2014 surveys are generalist species, breeding within the hedgerows, scrub and small wooded copses within the areas proposed for the Gas and Electrical Connection with only skylark recorded as probable breeding in the open fields. Similar habitats were recorded in the land in the south of the Project Site, which was beyond the 2014 breeding bird survey limits, such that a similar assemblage of breeding birds can be expected to be present.

8.6.48 No evidence of breeding barn owls was recorded during the surveys of the farmhouse buildings. A single barn owl was incidentally recorded foraging during the bat activity surveys. The areas proposed for the Gas Connection and Electrical Connection as a whole however, are considered to be of limited value to foraging barn owls, due to the intensive management of the agricultural land which has poor suitability for supporting suitable prey.

8.6.49 Overall, the assemblage of breeding birds associated with the areas proposed for the Gas Connection and Electrical Connection is considered to be of less than 'Local' importance. Breeding birds are not therefore considered to be an important ecological feature and in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, no impact assessment is required.

8.6.50 Nevertheless, appropriate management measures will be implemented in relation to the legislative protection afforded to breeding birds. These measures are set out in Section 8.9 of this ES.

Bats

8.6.51 During the bat activity surveys undertaken in May, July and September 2014, a total of four species were recorded within the areas proposed for the Gas and Electrical Connections. These were noctule, Myotis spp., common pipistrelle and soprano pipistrelle bats. Common and soprano pipistrelle bats were recorded most frequently; further information is provided in Appendix 8.5 of this ES. The majority of bats were recorded foraging and commuting along the edge of plantation woodlands, field margins and roadside species-poor hedgerows. Similar results can be expected over the land in the south of the Project Site which was beyond the limits of the 2014 bat activity survey extents, and supported similar habitats.

8.6.52 Emergence and return to roost surveys of the building complex at South Pillinge Farm confirmed the continued presence of bat roosts (previously identified during surveys undertaken by BSG in 2008 at the Power Generation Plant Site in relation to the LLRS (see Appendix 8.5 of this ES). A small number of small, non-breeding summer roosts for common pipistrelle, soprano pipistrelle and brown long-eared bats were recorded within a brick-built barn building (see B5 on Figure 4 in Appendix 8.5 of this ES), the farmhouse (B6) and a brick-built out-building (B8); further detail is provided in Appendix 8.5. Whilst these buildings will not be directly affected by the Project, the potential exists for disturbance impacts associated with any bats using these roosts during the construction phase of the Gas Connection and Electrical Connection.

8.6.53 The bat species recorded during the activity surveys are relatively common and widespread, and the habitats present within the Project Site are typical of the surrounding area. The bat populations associated with the areas proposed for the Gas Connection and Electrical Connection are therefore considered to be of less than 'Local' importance and, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, an impact assessment on this species group is not required. Nevertheless, appropriate management measures will be implemented to avoid a breach of the legislation that protects bats and their roosts. These measures are set out in Section 8.9 of this ES.

Badgers

8.6.54 Although badger activity was recorded throughout the survey area in 2014, no setts were recorded within the areas proposed for the Gas Connection and Electrical Connection. The large arable fields are considered to be of limited value to foraging badgers, with more valuable habitat being provided by the areas of plantation woodland. Overall, the badger population associated with the areas required for the Gas and Electrical Connections is considered to be of less than 'Local' importance and, in accordance with CIEEM guidelines and the methodology set out in Section 8.5 above, an impact assessment on this species group is not required.

Other mammals

8.6.55 No signs of water voles were recorded during the 2014 surveys within the areas proposed for the Gas and Electrical Connection. The ditches were considered to constitute sub-optimal habitat, as the majority were shallow in depth, shaded by trees and scrub, and lacked fringes of emergent vegetation which would be required for food and shelter. No changes to the assessment of the suitability of ditches within the Project Site for water voles were identified during the 2017 update walkover survey. Similarly, none of the features in the areas proposed for the Gas and Electrical Connection were considered suitable for use by otters, and they had limited connectivity to more suitable habitat in the wider area. No habitat suitable for water vole or otter was recorded in the land in the south of the Project Site which was beyond the limits of the 2014 survey extent. As a consequence, no further consideration is given to 'other mammals' in this assessment.

Importance of Ecological Features

8.6.56 This section summarises the importance of the ecological features associated with the Project. As described in paragraph 8.5.14, in accordance with the CIEEM assessment methodology, those features which are determined to be important ecological features, and which are considered to be potentially impacted as a result of the Project, are selected for inclusion in the impact assessment. These are identified below for the Power Generation Plant (Table 8.2) and the Gas Connection and Electrical Connection (Table 8.3).

Table 8.2 - Summary of Ecological Features and Importance associated with the Power Generation Plant

Ecological Feature	Importance (geographical frame of reference)	Considered in detailed impact assessment?
Statutory Designated Sites	European/ National	No direct or indirect impacts anticipated; scoped out of further assessment. See also No Significant Effects Report (Document Reference 5.7)
Rookery Clay Pit CWS	County	Yes – Important Ecological Feature. Potential for indirect impacts associated with disturbance to retained habitats/ species within Rookery North Pit.
Other non-statutory designated sites	County	No. Significant adverse effects considered unlikely; scoped out of further assessment.
Great crested newts	Less than Local	No. Insufficient importance to trigger inclusion in the impact assessment. Appropriate management required in relation to legislative protection.
Reptile population	Less than Local	

Ecological Feature	Importance (geographical frame of reference)	Considered in detailed impact assessment?
Breeding bird assemblage	Less than Local	
Bat population	Less than Local	
Other mammals	Less than Local	N/A

Table 8.3 - Summary of Ecological Features and Importance associated with the Gas Connection and Electrical Connection

Ecological Feature	Importance (geographical frame of reference)	Considered in detailed impact assessment?
Invertebrates	Less than Local	No. Insufficient importance to trigger inclusion in the impact assessment. Appropriate management required in relation to legislative protection.
Great crested newts	Less than Local	
Reptile population	Less than Local	
Breeding bird assemblage	Less than Local	
Bat population	Less than Local	
Badgers	Less than Local	N/A
Other mammals	Less than Local	

8.7 Assessment of Effects

8.7.1 In accordance with CIEEM Guidelines, the following section assesses the potential effects of the topic-specific worst case scenario for assessment (Section 8.4) on the individual 'Important Ecological Features' identified in Section 8.6, in the absence of additional mitigation or enhancement measures. Measures that have been incorporated into the design of the Project to minimise any potentially significant effects (embedded mitigation) are outlined in Section 3.6 of this ES, and have been considered in this section.

8.7.2 Only one Important Ecological Feature (Rookery Clay Pit CWS) has been identified and this is subject to the detailed assessment process below.

Power Generation Plant

<u>Rookery Clay Pit CWS</u>

Construction/Decommissioning– effects upon Important Ecological Features

<u>Direct effects: Habitat loss</u>

8.7.3 There will be direct habitat loss within Rookery Clay Pit CWS associated with the construction of the Power Generation Plant. As identified above, the re-grading works associated with the LLRS within Rookery South Pit will replace any terrestrial habitat suitable for newts, reptiles, breeding birds and/ or reptiles. Impacts are therefore limited to the loss of any new habitat that would have been created associated as part of the LLRS restoration strategy, in the absence of the Project. The area affected by Power Generation Plant would have been returned to agricultural use, and is described on the LLRS Restoration Strategy as 'base of pit, levelled, graded and grassed', which would be expected to be of negligible ecological value. Although two surface water management ditches are proposed as part of the LLRS Restoration Strategy in the vicinity of the Power Generation Plant, the Landscape and Ecology Strategy for the Project will re-align these features to ensure there is no net reduction in the habitats that would have been created as a result of the LLRS (as illustrated on the Outline LEMMS Appendix 11.3). Habitat loss within the CWS will therefore be limited to areas of ephemeral vegetation and scrub habitat on the peripheral areas of the western edge of Rookery North Pit, including along the Access Road, if vegetation removal is required.

8.7.4 The construction of the Access Road may result in the removal of bird nesting opportunities, habitat suitable for use by reptiles and potentially great crested newts (see paragraphs 8.9.5-8.9.6, below). However, the more valuable habitats within Rookery North Pit, including the pools and associated reedbed (swamp), marshy grassland and unimproved neutral grassland will not be affected, and an appropriate buffer zone will be maintained to protect the retained habitats.

8.7.5 Given that the LLRS will be completed by the time of construction of the Project, and Rookery North Pit will be retained, the effect of habitat loss upon Rookery Clay Pit CWS before mitigation is considered to be 'Not Significant'.

Indirect effects: Pollution

8.7.6 The presence of machinery and plant on site, with storage of fuel oils and other materials, may present an increased risk of pollution incidents and accidents (e.g. spillages and emissions) during construction. This will be particularly relevant for the new habitats to be created as part of the LLRS Restoration Strategy and the Ecology and Landscape Strategy for the Project.

However, the embedded mitigation for the Project includes the implementation of a CEMP, as outlined in Section 3.6 of this ES, to limit construction impacts on the environment, and to protect retained ecological features. Assuming the effective implementation of the CEMP, the effect of indirect impacts on Rookery Pit CWS is considered to be Not Significant. This assessment is supported by the Water Quality Chapter in Section 9.7 of this ES, which concludes that there will be no significant effects due to the contamination of surface waters during construction/ decommissioning. An outline CEMP is provided in Appendix 3.2.

Operation and maintenance – effects upon Important Ecological Features

8.7.7 The operational impacts of the Power Generation Plant on ecological features are limited to the potential for emissions of NOx, nitrogen and acid deposition to have an effect on the retained habitats within the Rookery Clay Pit CWS, in particular Rookery North Pit.

8.7.8 The Air Quality Chapter (Chapter 6) has assessed the potential impacts of pollutants arising from the operation of the Power Generation Plant on the retained habitats within Rookery Pit CWS. This has confirmed there are unlikely to be significant effects from oxides of nitrogen emissions, nitrogen and acid deposition during the operational phase of the Project on the CWS, as the maximum ground level concentrations are such that for a stack height of 32.5 m, they are considered to be Not Significant. Further information is provided in Section 6.7.

8.7.9 No likely significant effects are anticipated to result from the Access Road during operation given the very limited number of vehicles and hence limited exhaust emissions. See Chapter 6.

Gas Connection / Electrical Connection

8.7.10 None of the ecological features within the Gas Connection and Electrical Connection are considered sufficiently important to be included in the impact assessment. Nevertheless, they still warrant consideration during the design and mitigation of the Project on the basis of their legal protection; see paragraphs 8.9.3 to 8.9.24.

Project as a whole

8.7.11 The Summary of Effects Table 8.4 below includes a section on the effects of the Project as a whole (i.e. the combined effects of the Power Generation Plant, Gas Connection and Electrical Connection).

8.7.12 No likely significant effects are predicted on Important Ecological Features from any of the individual elements of the Project or from the Project as a whole.

8.8 Cumulative and in Combination Effects

Overview

8.8.1 Construction, decommissioning or operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in section 4.10.7. However, the majority of these developments are distant from the Project Site (at least 2 km).

8.8.2 These developments and any effects arising from them are outside the study area for this topic within which significant effects could occur. As such it is considered that no cumulative or in combination ecological effects are likely to arise during the construction or decommissioning phases of the Project. Furthermore, each of these developments will be bound by its own CEMP and will apply best practice construction methods so as to minimise impacts on ecology.

Construction/Decommissioning

8.8.3 The projects considered to be of relevance to the cumulative effects assessment for this chapter (taken from section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, immediately north of the Generating Equipment Site.

8.8.4 Little detail is known about the ‘Integrated Waste Management Facilities’ proposed for development in the Rookery South Pit. At present, a request for a scoping opinion has been submitted by the promoter of the project although no details are provided regarding potential impacts on ecology as a result of the project. However, it is likely that this development will be bound by its own CEMP and best practice construction methods so as to limit impacts on ecology during construction. Should it go ahead, then it will need to consider the Project to ensure that no significant cumulative effects will arise between it and the Project. Nevertheless, in order to minimise the possibility of cumulative effects arising, a CEMP will be followed during construction of the Project, which will ensure best practice construction methods are followed and limit, as far as practicable, the possibility of impacts occurring to the ecology. The measures proposed to minimise impacts during construction are listed in section 3.6 of this ES e.g. site fencing will be used and pollution prevention guidelines would be followed to prevent pollution of water courses.

8.8.5 Furthermore, given the early stage of the Integrated Waste Management proposals and the likely time required to achieve planning consent, it is considered unlikely that there would be any overlap on the construction periods of these two projects, which further mitigates against any potential cumulative effects.

8.8.6 The ES for the Covanta RRF Project to the north of the Generating Equipment Site concluded that there were potential impacts arising from construction and decommissioning of the project on ecology.

8.8.7 The potential for cumulative effects on Rookery Clay Pit CWS has been assessed, as the Covanta Scheme will result in the loss of an area of Rookery Clay Pit CWS. However, one of the pre-commencement DCO requirements for the Covanta Scheme states that construction works may not commence until the early stages of the LLRS (Phase 1, as described in Section 4.10) have been completed. The ES for the Covanta Scheme states that the baseline ecological conditions will therefore comprise habitats of limited or no value to protected species. Furthermore, an Ecological Management Scheme has been produced as part of the pre-commencement DCO requirements which describes measures that will be implemented to safeguard retained valuable habitats, protected and notable species, and enhance biodiversity post-construction.

8.8.8 The effects on the Rookery Clay Pit CWS associated with construction of the Project considered together with the effects associated with construction of the Covanta RRF Project will not give rise to a significant cumulative effect or give rise to new or different effects that would occur if the projects are constructed independently of one another. The Environmental Statement for the Covanta RRF Project concluded that there would be no residual significant effects on non-statutory designated sites. Similarly, no significant effects on Rookery Clay Pit CWS are expected as a result of the Project given the limited extent of habitat loss after completion of the LLRS and the embedded mitigation. In light of this, and based on professional judgement in relation to the potential effects of the two projects, there are not anticipated to be any effects on ecology cumulatively from the construction and decommissioning of the Project and the Covanta RRF project.

8.8.9 In relation to Air Quality (see Section 6.8), in the ES for the Covanta RRF Project, the residual effects of construction dust were judged to be not significant with appropriate mitigation measures in place. The construction period for the Covanta RRF Project could coincide with that for the Project, however both projects will employ appropriate mitigation measures. Indeed, DCO requirement 16 for the Covanta RRF Project requires that all construction works are undertaken in accordance with the Code of Construction Practice. Similarly, appropriate mitigation in relation to dust emissions will be implemented as part of the Project during the construction phase and is incorporated within the Outline CEMP as embedded mitigation (see Section 6), The Air Quality chapter (Chapter 6) for the Project has concluded no significant residual effects during construction, operation or decommissioning.

8.8.10 The effects on ecology from Air Quality associated with construction of the Project considered together with the effects associated with construction of the Covanta RRF Project will not give rise to a significant cumulative effect or give rise to new or different effects that would occur if the projects are constructed independently of one another. This is supported by the conclusion of the Air Quality cumulative assessment (Section 6.8). Based on professional judgement, there is therefore not anticipated to be any effects on ecology cumulatively from the construction and decommissioning of the Project and the Covanta RRF project.

8.8.11 The Landscape Strategy associated with the Covanta RRF has been taken into account when designing the outline LEMMS for the Project (Appendix 11.3). All areas of proposed planting and habitat creation associated with the Covanta Scheme have been taken into account in the context of the Outline Landscape and Ecology Mitigation and Management Strategy. Should areas of landscape mitigation planted as part of the Covanta RRF Project need to be disturbed by the construction of the Project, provision has been made for the areas to be replaced, re-planted or equivalent planting placed appropriately so as not to detract from the overall mitigation screening or habitat creation originally envisaged by the Covanta RRF landscape and ecology strategy. If mitigation planting used at the Covanta RRF Project is disturbed by the Project, it would be the responsibility of the developer of the Project to replace this planting.

8.8.12 With the implementation of the embedded mitigation described in this ES, the effects arising from the construction and de-commissioning of the Project are anticipated to be not significant. With the proposed embedded mitigation in place for the Covanta RRF Project it is considered that no potential cumulative or in combination effects with Covanta RRF are likely to arise in the construction phase of the Project.

Operation

8.8.13 As above, the projects considered to be of relevance to the cumulative effects assessment for the operation of the Project (taken from section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, immediately north of the Generating Equipment Site).

8.8.14 Impacts during the operational phase of the Project are limited to the potential for emissions of NOx, nitrogen and acid deposition to have an effect on the retained habitats within the Rookery Clay Pit CWS, in particular Rookery North Pit.

8.8.15 Little detail is known about the ‘Integrated Waste Management Facilities’ proposed for development in the Rookery Pit. At present, only a high level scoping report, requesting a scoping opinion, has been submitted. No details are provided in the scoping report regarding potential impacts on ecology from air quality or acid deposition. However, if any of the proposed waste developments involve combustion processes, they will be bound by their own emissions limits under relevant environmental permits, and will also need to consider other cumulative schemes when applying for planning or development consent. Should the development go ahead, then it will need to consider the Project to ensure that no cumulative effects will arise between it and the Project, as this development will follow development of the Project.

8.8.16 The proposed Covanta RRF project to the north of the Generating Equipment Site will release both oxides of nitrogen and carbon monoxide from the combustion process. However, the exhaust stack for the Covanta RRF will be much higher than the stack(s) for the Project (105m compared to 32.5 m) and therefore the location of maximum ground level concentrations will be different from those associated with the Project. The assessment of cumulative Air Quality effects during operation is discussed in Section 6.8, and is summarised here.

8.8.17 Modelling has been undertaken of the emissions from the Covanta RRF and the Generating Equipment together and the results are contained in Appendix 6.1. There are no predicted exceedances of the assessment levels for human health impacts for the two plants operating together and therefore the cumulative effect will be negligible and not significant.

8.8.18 For the ecological features, all but one of the predicted annual mean oxides of nitrogen process contributions is insignificant, i.e. above 1% of the assessment level when the plants are operating simultaneously. In one case, (at Rookery Clay Pit CWS) there is a minor breach in annual mean oxides of nitrogen process contributions, at 1.7% of the assessment level. However, when combined with the background concentrations, no breaches of the critical level are predicted to occur and therefore the significance of effect is minor and not significant. The predicted daily mean oxides of nitrogen concentrations are not significant in EIA terms, and when added to the background concentrations, no breaches of the daily mean critical level are predicted to occur.

<u>Effect interactions</u>

8.8.19 This Chapter has identified one Important Ecological Feature (Rookery Clay Pit CWS). In-combination effects on Rookery Clay Pit CWS have been considered as an integral part of the assessment in Section 8.7, where reference is made to the Air Quality and Water Quality assessments.

8.8.20 Whilst the ecology assessment is informed by a number of other topics, the primary interactions with other topics are from the potential impacts on sensitive ecological receptors due to emissions arising during operation of the Generating Equipment.

8.8.21 With regard to sensitive ecological receptors, the Air Quality Impact Assessment included all nationally protected statutory habitat sites and locally designated sites, and informed the ecological impact assessment discussed in Section 8.7 above, based upon the results of the dispersion modelling. The Air Quality Assessment results are set out in Section 6.7.

8.8.22 This Chapter has also assessed the potential indirect effects of pollution on ecological receptors in Section 8.7. This has been informed by the results of the Water Quality Assessment set out in Section 9.7.

8.9 Mitigation and Assessment of Residual Effects

Important Ecological Features

8.9.1 Given that no likely significant effects are predicted on Important Ecological Features (Rookery Pit CWS), no Project specific mitigation is required in addition to the embedded design mitigation described in Section 3.6.

8.9.2 The outline Landscape and Ecology Mitigation and Management Strategy for the Project will ensure that any habitats of ecological value that would have been created as part of the LLRS (in the absence of the Project) will be incorporated into the design of the Project. These include surface water management ditches, and areas of tree and scrub planting. Should the construction of the Access Road result in the loss of any vegetation, this would be replanted with appropriate native species. In addition, the enhancement of retained vegetation and creation of new habitats, through tree and hedgerow planting and new ponds (as detailed in the LEMMS at Appendix 11.3) would be expected to result in a net gain in biodiversity. Further information is provided in paragraphs 8.9.23 to 8.9.25 and in Chapter 11 of this ES.

Ecological Features Requiring Appropriate Management in Relation to Legislative Protection

8.9.3 A number of ecological features are considered to be of insufficient importance to be included in the assessment. Nevertheless, due to their protection under the Conservation of Habitats and Species Regulations 2010 (as amended) or the Wildlife and Countryside Act 1981 (as amended), consideration needs to be given to appropriate management measures during the design and implementation of the Project, so as to ensure no breach of the protective legislation. These measures are identified for each ecological feature, below.

8.9.4 Biodiversity enhancement measures which will deliver on relevant policy objectives, including those for the ecological features discussed below, have been incorporated into the landscape and ecology design for the scheme. These are also considered below.

Great crested newts

<u>Power Generation Plant</u>

8.9.5 Great crested newts and their places of shelter are protected under the Conservation of Habitats and Species Regulations 2010 (as amended). They are also protected under the Wildlife and Countryside Act 1981(as amended). The management measures identified below are required in order to avoid the incidental mortality/ injury of great crested newts during the implementation of the Project, and to ensure that the favourable conservation status of the local great crested newt population is maintained.

8.9.6 Whilst no ponds would be directly affected by the construction of the Power Generation Plant, short sections of the Access Road are located approximately 490 m from the Rookery North Pit large population of great crested newts, as illustrated on Figure 2 in Appendix 8.3 of this ES. The LLRS will involve upgrading the existing track to be agricultural standard, and the Covanta RRF Project includes provision to further upgrade the track to be a tarmac road. The new Access Road will be 6 m in width, with a concrete curb. A new section of Access Road will be constructed within Rookery South Pit, which has been 'cleared' of great crested newts, as part of the licensed translocation associated with the LLRS.

8.9.7 The potential exists for the incidental mortality of great crested newts, associated with the re-surfacing works. Approximately 250 m of the 1.7 km Access Road is located on the edge of the 500 m buffer zone from the newt breeding ponds within Rookery North Pit; although newts can travel up to 1 km from a breeding pond, they are most likely to be encountered within 250 m, and habitats within 50 m are the most important for them. In addition, the areas of terrestrial habitat within the retained Rookery North Pit constitute optimal great crested newt terrestrial habitat, between the ponds and the existing access track, which are likely to be more attractive to newts. Finally, the resurfacing works will be limited in extent and will avoid the removal of trees and scrub habitat. As a consequence, the risk of encountering newts as a result of the works is considered to be very low.

8.9.8 Using Natural England's Rapid Risk Assessment tool (which helps to determine the need for a great crested newt licence), the likelihood of an offence being committed as a result of the Access Road improvements is considered to be 'highly unlikely'. Any requirement to carry out the works under a precautionary method statement included within the CEMP or a derogation licence issued by Natural England to ensure that no newts are harmed during the construction process, will be determined prior to construction. This will be based on the historical context of mitigation works associated with great crested newts in and adjacent to the Project Site. If required, appropriate mitigation measures will involve the appropriate timing of works, avoidance of suitable terrestrial habitat as far as possible, and the careful removal/ dismantling by hand of any suitable refugia beneath the footprint of the works.

8.9.9 The mitigation strategy associated with the LLRS to maintain the favourable conservation status of the local great crested newt population present within Rookery North Pit is focussed on the retained waterbody within the pit, and the series of small new pond(s) created within the Project Site. The Restoration Strategy associated with the LLRS would have returned the area affected by the Power Generation Plant to agricultural land, which would be unsuitable for great crested newts; this did not form part of the habitat creation for the great crested newt mitigation strategy. The surface water management ditches proposed as part of the LLRS Restoration Strategy will be incorporated into the Landscape and Ecology Mitigation Strategy for the Project, albeit with minor realignments to the north and south of the Power Generation Plant. These features may be of value to great crested newts, depending upon any flow in the ditches. In addition, a small number of ponds/ scrapes have been incorporated into the landscape design for the Project, which will be specifically designed to be of value for great crested newts. They will have shallow sloping edges planted with marginal vegetation to provide egg laying opportunities for newts. Overall, the Project would not be expected to be detrimental to the maintenance of the population of great crested newts at favourable conservation status. Indeed, the new pond creation would be expected to contribute towards relevant targets in the Bedfordshire and Luton Biodiversity Action Plan, which is aiming to increase the number of ponds available for meta-populations of newts.

Gas Connection and Electrical Connection

8.9.10 The AGI associated with the Gas Connection will be installed within 75 m of Pond H. Together with Ponds I, J and K, these ponds are considered to support a medium meta-population of great crested newts. Although the baseline surveys confirmed the absence of great crested newts from Pond I (within 50 m of the AGI), it was determined to be of ‘good’ suitability in the HSI assessment, and therefore this pond is likely to be used by great crested newts in the future.

8.9.11 The location of the AGI has been carefully selected to minimise potential impacts on great crested newts. The footprint of the AGI, as described in Section 3.3, will comprise an area of approximately 0.3 ha. The small copse of trees surrounding Pond I has been avoided and the footprint of the AGI will be located within a ploughed arable field, considered to constitute unsuitable terrestrial habitat for newts. In addition, Pond H (where the presence of great crested newts has been confirmed) is to the west of Houghton Lane, and the AGI location is to the east; although this lane does not constitute a significant barrier to the movement of newts, they are more likely to use suitable habitats immediately surrounding the pond and the terrestrial habitat at the base of the roadside hedgerow to the west of Houghton Lane, rather than cross Houghton Lane. Using Natural England’s Rapid Risk Assessment tool, the likelihood of an offence being committed as a result of the AGI construction is calculated as being ‘likely’, due to the relatively close proximity to the known breeding pond (within 100 m) and the footprint of the AGI (0.1-0.5 ha). However, this is a simplistic tool, which does not take into account the habitat suitability affected by the works. Given that suitable terrestrial habitat for newts will be avoided, and that the AGI will be installed within an arable field (unsuitable newt terrestrial habitat), the likelihood of encountering great crested newts during the construction of the AGI is considered to be low. For this reason, a licence from Natural England is not considered necessary for the works to proceed. This approach has been confirmed with Natural England (see Table 8.1 in

Section 8.3 Further detail is provided in Appendix 4.O of the Consultation Report (Document Reference 5.2).

8.9.12 The route of the Gas Connection is 1.82 km in length, involving a 50 m working width corridor with 10 m permanent land take. A total of five sections of hedgerows will be removed, four of which are located within 250 m of Pond H. The working width through the hedgerows will be minimised as far as possible and gaps will be used in the hedgerows to reduce the habitat loss. The Gas Connection will be installed across arable fields, which constitute largely unsuitable terrestrial habitat for newts. Given the small area of suitable habitat for newts affected by the installation and the distances involved, the likelihood of encountering newts is considered to be low.

8.9.13 The Electrical Connection will be installed within 250 m of Pond C which supports a small population of great crested newts (Population A). The potential for impacts is limited to the footprint of the cable trench, the majority of which is located within arable fields. Although a strip of plantation woodland (indicated by Target Note 2 on Figure 2, Appendix 8.1 of this ES) will require removal within 250 m of this pond, the area of trees which require clearance has been reduced to 0.17 ha (85 m x 20 m). A proportion of this vegetation will be coppiced/ pollarded to reduce ground disturbance. There is also suitable terrestrial habitat closer to the pond, which great crested newts would also be expected to use. As a consequence, the likelihood of encountering newts is considered to be low.

8.9.14 Using Natural England’s Rapid Risk Assessment tool, the likelihood of an offence being committed as a result of the Gas Connection and Electrical Connection installation is considered to be ‘highly unlikely’. As for the Power Generation Plant, any requirement to carry out the works under a precautionary method statement included within the CEMP or a derogation licence issued by Natural England to ensure that no great crested newts are harmed during the construction process, will be determined prior to construction. This will be based on the historical context of mitigation works associated with great crested newts in and adjacent to the Project Site. Given that construction is due to commence six years after the 2014 great crested newt surveys were completed; updated surveys may be required to confirm the management and/or mitigation measures required which can be expected to be implemented through the CEMP. This approach has been agreed with Natural England (see Table 8.1 in Section 8.3).

Reptile population

8.9.15 The majority of the habitats affected by the Project are considered to be largely unsuitable for reptiles, constituting the re-profiled base of Rookery South Pit, and arable land. The exception is the scrub and ephemeral habitats present along the existing access track, which constitutes suitable reptile habitat, although only a limited amount of habitat will be affected, as described in paragraph 8.9.6, above.

8.9.16 The most valuable habitats within the Project Site and adjacent habitats specifically associated with the Bletchley to Bedford railway corridor, field boundaries and the majority of the plantation woodland will not be affected by the Gas and Electrical Connection. However, the potential exists for suitable reptile habitat to be affected by the felling works to allow the installation of the Electrical Connection, in particular associated with the glade and the narrow strip of species-rich grassland to the east of this plantation woodland.

8.9.17 Reptiles are afforded protection under the Wildlife and Countryside Act 1981 (as amended). Any elements of the Project affecting the limited areas of potential reptile habitat will give due regard to the legislation protecting common and widespread reptile species, i.e. protection against injury and killing through implementation of precautionary mitigation measures (this approach was agreed with Natural England – see Table 8.1 in Section 8.3 of this ES). This will be achieved through the displacement of any reptiles present into areas of retained habitat within and adjacent to the Project Site prior to construction works commencing through the following approach:

- Progressive removal of suitable low-lying vegetation, including long grass, ruderals and scrub, using hand-held tools. The final stages of clearance to ground level should take place during suitable climatic conditions at a time of year when reptiles are active (generally April to September inclusive).
- Dismantling of any potential hibernacula or refugia by hand, including compost heaps and log piles.
- Where appropriate, ground level clearance work will be overseen by a suitably experienced ecologist who would relocate any reptiles encountered to an area of suitable retained habitat within and adjacent to the site.
- Following the clearance of vegetation, the vegetation will be maintained at ground level to prevent re-colonisation prior to works commencing.

8.9.18 This is outlined in the LEMMS (Appendix 11.3) and the CEMP (Appendix 3.2). Given that construction is due to commence six years after the 2014 reptile surveys were completed; updated surveys may be required to confirm the management/mitigation measures that will be implemented through the CEMP.

Breeding birds

8.9.19 Nesting birds are protected under the Wildlife and Countryside Act 1981(as amended). Any clearance or cutting of woody vegetation will avoid the breeding bird season (generally taken to be March to August inclusive) in order to avoid the destruction of active birds' nests. If this is not possible, the vegetation will be checked prior to removal for the presence of any active birds' nests. If active nests are present, an appropriate exclusion zone will be retained around the nest and such works will be delayed until the young birds have fledged and the nest becomes inactive.

8.9.20 This will be outlined in the LEMMS (Appendix 11.3) and the CEMP (Appendix 3.2).

Local bat population

8.9.21 All species of bats in the UK are European protected species, benefiting from protection under the Conservation of Habitats and Species Regulations 2010 (as amended). They are also protected under the Wildlife and Countryside Act 1981 (as amended).

8.9.22 The Project layout has been designed to ensure that the tree and scrub-lined Access Road, which was found to constitute an important resource for foraging and commuting bats will be retained. Similarly, the plantation woodland edge, field margins and road side hedgerows will be retained (as outlined in the Landscape and Ecological Mitigation Strategy). In addition, the Bletchley to Bedford Railway corridor will not be affected by the Project.

8.9.23 There will be no night time working associated with the construction phase of the Project. The lighting scheme associated with the operation of the Project has been sensitively designed to minimise potential impacts on bats including the following:

- Use appropriately designed luminaires for the task at hand;
- Use louvres and shields to prevent undesirable light break-out;
- Demolition and construction lighting should be directed away from all sensitive receptors;
- Preference should be given to several, lower lighting units rather than tall, wide beam lighting units to illuminate large areas as it will limit light trespass, glare and sky glow from the Project Site;
- Vehicle lights should be properly directed (conforming to MOT requirements) and lenses must be intact to prevent un-necessary glare and light intrusion;
- Lighting should be reduced or switched off when not required for safety purposes. Security lighting should be kept at the minimum level needed for visual and security protection; and
- Motion sensitive lighting will be used in order to avoid unnecessary lighting.

8.9.24 Light fittings will comply with the specifications and the requirements of CIE 150 (2003) and Institute of Lighting Engineer's Guidance Notes for the Reduction of Obtrusive Light.

8.9.25 An outline lighting strategy, setting out measures to minimise effects from lighting at the Project Site has been prepared and is included as Appendix 11.2.

Enhancement measures

8.9.26 Whilst the scope for enhancement measures within the Project Site is limited due to the restricted land-take for the Project, opportunities have been maximised to increase the nature conservation value of the area within the Order limits, as illustrated on the Landscape and Ecology Strategy Plan. This is included in the LEMMS (Appendix 11.3).

8.9.27 The planting proposed has been designed to ensure the value for biodiversity is maximised, whilst performing a landscape screening function. This will involve the creation of a new structurally diverse and species-rich belt of woodland planting, to reflect the species composition within the wider Marston Vale Forest. The existing species-poor hedgerow would be augmented and additional planting and appropriate management of existing blocks of planted woodland would be expected to enhance their nature conservation value. Native species of local provenance will be used, wherever possible. These new areas of planting linking existing habitats would be expected to increase the connectivity of the site for wildlife, including amphibians, reptiles and bats. The tree and shrub planting will also provide nesting and foraging resources for breeding birds.

8.9.28 The surface water management ditches proposed as part of the LLRS Restoration Strategy will be incorporated into the Landscape and Ecology Mitigation Strategy for the Project, albeit with minor realignments to the north and south of the Power Generation Plant. These features may be of value to great crested newts, depending upon any flow in the ditches. In addition, a series of small ponds will be created within the Project Site, designed to be of value to wildlife, with shallow sloping edges planted with marginal vegetation to provide egg laying opportunities for newts. The creation of suitable ponds will contribute towards objectives in the Bedfordshire and Luton Biodiversity Action Plan, which includes an action plan for great crested newts. The exact location of the ponds would be defined prior to construction, in liaison with stakeholders.

8.9.29 Given the negligible nature conservation value of the habitats affected as a result of the Project, it is anticipated that the creation of new ponds and structurally diverse and species-rich areas of planting, will result in a net gain in biodiversity.

8.10 Summary of Residual Effects

8.10.1 Table 8.4 sets out a summary of the significant effects arising from the Project during construction, operation and de-commissioning.

8.10.2 The following elements are reported:

- the affected feature
- the sensitivity of the affected feature
- potential effect

- the likely magnitude and duration of the effect
- the likelihood of occurrence
- proposed mitigation or response to ameliorate the effect
- the significance of the residual effect following the incorporation of mitigation

8.10.3 Also reported are any potential in-combination/synergistic effects arising on a feature during each phase, as well as any cumulative effects.

Table 8.4 - Summary of Residual Effects

Project component/ Effect types	Feature/ Affected group	Sensitivity of feature	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Construction phase									
Power Generation Plant	Rookery Clay Pit CWS	Medium	Pollution and disturbance to retained habitats in Rookery North Pit	District Short-term	High	CEMP measures to control fugitive dust and construction vehicle emissions and pollution Appropriate buffer zone maintained from Power Generation Plant	Not significant	None required	Not significant
Gas Connection	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Electrical Connection	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project (in combination and synergistic)	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative effects	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation and maintenance									

Project component/ Effect types	Feature/ Affected group	Sensitivity of feature	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Power Generation Plant	Rookery Clay Pit CWS	Medium	Pollution and disturbance to retained habitats in Rookery North Pit	District Short-term	High	Stack height for adequate air dispersion Appropriate buffer zone maintained from Power Generation Plant	Not significant	None required	Not significant
Gas Connection	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Electrical Connection	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative effects	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Decommissioning									
Power Generation Plant	Rookery Clay Pit CWS	Medium	Pollution and disturbance to retained habitats in Rookery North Pit	District Short-term	High	CEMP measures to control fugitive dust and construction vehicle emissions and pollution Appropriate buffer zone maintained	Not significant	None required	Not significant

Project component/ Effect types	Feature/ Affected group	Sensitivity of feature	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
						from Power Generation Plant			
Gas Connection	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Electrical Connection	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Project	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative effects	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

8.11 Conclusions

8.11.1 Baseline conditions at the Power Generation Plant Site comprise the Rookery South Clay Pit which forms part of the Rookery Clay Pit CWS. The Gas and Electrical Connections are mainly located within agricultural land.

8.11.2 At the time that the Project begins construction in 2020 it is assumed that great crested newts and reptiles will be absent from the base of the Rookery South Pit and surrounding area following completion of the LLRS translocation operation and implementation of measures to ensure that the base of the pit remains free of ecological constraints. In addition, the LLRS re-profiling works will replace any terrestrial habitat suitable for great crested newts, reptiles, breeding birds and/or invertebrates within Rookery South Pit with clay, rendering it of negligible nature conservation value for these species. Nevertheless, Rookery Clay Pit CWS is considered an Important Ecological Feature.

8.11.3 Construction of the Project could result in the loss, disturbance and/or fragmentation of scrub habitat and hedgerows; cause disturbance effects associated with lighting proposals to bats and other nocturnal species; and cause indirect air quality effects on the retained CWS habitats within the Rookery Clay Pit associated with dust and particulate matter emissions. However, following the implementation of embedded mitigation measures, no likely significant effects have been identified as a result of construction, operation or decommissioning of the Project.

8.11.4 A series of appropriate management measures will be implemented during the construction of the Project, to avoid a breach of legislation associated with notable and protected species, including nesting birds, reptiles, great crested newts, and foraging and commuting bats.

8.11.5 The LEMMS (Appendix 11.3) for the Project will ensure that any habitats of ecological value that would have been created as part of the LLRS (in the absence of the Project) will be incorporated into the design. This includes surface water management ditches, and areas of tree and scrub planting. In addition, the creation of a series of new ponds/ scrapes (locations to be defined prior to construction), and new planting between retained and proposed woodland within the Order Limits, would be expected to result in a net increase in biodiversity. This is in accordance with national and local planning policy and guidance (NPPF, 2012; ODPM, 2005, and NPS EN1) and the 2006 NERC Act.

8.12 Assessment of Effects on Natural Features (APFP Regulations 2009)

8.12.1 In addition to the assessment of significant effects presented in this ES, it is also necessary to consider all potential effects on sites, features, habitats or bodies likely to affected by the Project, not just those effects which are significant in EIA terms. This accords with the requirements of Regulation 5(2)(l) of the APFP Regulations (2009).

8.12.2 Potential significant effects are assessed in Section 8.7 above. Appendices 8.1-8.5 also present information on sites, features, habitats or bodies likely to effected by the Project, as required under Regulation 5(2)l of the APFP Regulations (2009). In addition, a plan showing the location of statutory and non-statutory sites of nature conservation importance is included as Figure 8.1 in this ES.

8.12.3 Habitat receptors considered for the Natural Features assessment are those habitats situated within the Project Site only and therefore potentially subject to direct impacts. Any indirect disturbance (in the form of increased dust, noise, vibration and lighting) that may occur to adjacent habitats will be mitigated through the implementation of avoidance measures detailed in the CEMP. This will reduce any effects to a negligible level and therefore indirect impacts are not considered necessary for inclusion. All species receptors identified were included in the Natural Features assessment.

8.12.4 The majority of effects on Natural Features are negligible or neutral when taking mitigation measures that will be delivered by the Project into account. Where no mitigation has been proposed the receptors are of such limited value for nature conservation that mitigation is not considered.

8.12.5 The conclusions of this Chapter are that the construction, operation and maintenance and decommissioning of the Project does not result in any likely significant effects on ecology, either when considered alone or cumulatively with other developments.

9 Water Quality and Resources

9.1 Introduction

9.1.1 This Chapter presents the assessment of likely significant effects on water quality, water resources, hydrology and flood risk arising from the construction, operation, maintenance and decommissioning of the Project. An assessment of likely significant effects on groundwater are presented in Chapter 10.

9.1.2 The Project has the potential to affect water quality and water resources due to construction activities, including earthworks operations, and contamination of surface water run-off arising from the Access Road and areas of hardstanding associated with the Power Generation Plant.

9.1.3 There is also the potential for the Project to affect the existing surface water drainage regime and for the Project to be affected by current or future flooding events arising from watercourses lying adjacent to or in close proximity to the Project Site.

9.2 Legislation and Policy Context

9.2.1 The legislation and policy context in relation to water quality, water resources hydrology and flood risk is described in detail in the Flood Risk Assessment (FRA) (Document Reference 5.4) and Appendix 2.9. However, in summary, the following items of policy, legislation and guidance have been considered in preparing this assessment:

- National Policy Statements (NPS EN 1, EN 2, EN 4 and EN 5);
- National Planning Policy Framework (2012) and associated Planning Practice Guidance titled 'Flood risk and coastal change' (2014);
- National Planning Practice Guidance
- The Flood Risk Regulations 2009;
- The Flood and Water Management Act 2010;
- House of Commons Written Statement (HCWS161) – Sustainable Drainage Systems (2014)
- The Water Resources Act 1991;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- Land Drainage Act 1991;
- The Environmental Permitting (England and Wales) Regulations 2016;
- Flood Risk Assessments: climate change allowances (Environment Agency, 2016);
- The Surface Waters Plan - Plan for Strategic Management of Surface Waters and their Local Environment in the Forest of Marston Vale

(Bedfordshire and River Ivel Internal Drainage Board and the Forest of Marston Vale, June 2002);

- Central Bedfordshire Council Local Plan 2015-2035:2017 Consultation Paper; and
- Bedford Borough Council Local Plan 2035 – 2017 Consultation.

9.2.2 Further policy specifically relevant to flood risk and drainage (e.g. Central Bedfordshire Council Local Flood Risk Management Strategy, February 2014) is considered in the FRA (Document Reference 5.4).

9.3 Consultation

9.3.1 A list of key consultation responses received during the EIA process relating to water quality, water resources, hydrology and flood risk is presented in Table 9.1 below, along with how these have been responded to.

Table 9.1 – Summary of Key Consultation and Responses Relating to Water Quality and Resources

Reference	Comment	Response
SoS Scoping Opinion		
3.55	The SoS welcomes the fact that an FRA will be undertaken. It should form an appendix to the ES.	Noted. The FRA is presented as Document Reference 5.4.
3.13	The SoS agrees that impacts on water quality and water resources from operation of the Gas and Electrical Connection can be scoped out of the assessment.	Noted. The elements scoped out of the assessment are described in Section 9.5 and 9.6 of this ES.
3.57	The applicant should ensure that the assessment of impacts on water resources identifies and considers all watercourses that may be affected, including Mill Brook.	Noted. The FRA (Document Reference 5.4) considers the potential impact of the Project upon the Mill Brook, as does Section 9.6 of this ES. The FRA also considers the nature of flood risk arising from the Mill Brook and how this may affect the Project. All water courses in the vicinity of the site have been identified and are shown on Figure 9.1.
3.58	It should be made clear in the ES whether the proposed development includes any discharges to water and, if so, impacts should be robustly assessed.	No discharges to watercourses will occur as a result of the Project. It is noted that surface water is pumped from the LLRS surface water balancing pond to the Mill Brook at a rate consistent with an existing IDB consent. This is discussed in Section 9.5 of this ES.

Reference	Comment	Response
		This is set out in the LLRS, so is not a 'new' arrangement for the Millbrook Project.
3.59	All water body crossing locations should be identified in the ES and all potential techniques identified and assessed.	Noted. Crossing methods are described in Section 9.7 of this ES.
3.61	Impacts of climate change, in relation to rises in sea level and increased run off, should be considered.	Rises in sea level are not considered relevant to the scope of this EIA given the significant distance of the Project Site from the coast. The surface water drainage strategy developed as part of the LLRS has been designed in accordance with the climate change contingency allowances set out in the NPPF as described in Section 9.6 of this ES.
	Network Rail	
Scoping response letter (dated 18th June 2014)	Identifies issues to be considered for the asset protection of the railway, including surface water disposal and whether this will affect railway infrastructure, especially culverts.	Noted. Provisions for drainage will be as per the LLRS which has been consented and will not impact on Network Rail Assets.
	Environment Agency	
Response to 2014 PEIR	The current proposals are to utilise the existing drainage system to discharge surface water. It must be clearly demonstrated that the system has sufficient capacity to cope with run-off from the new development…….and that the project does not increase risk to the site or third parties.	Noted. Details are presented in Sections 9.6, 9.7 of this ES and the FRA (Document Reference 5.4).
	We require further information regarding pollution prevention, such as arrangements during construction, operation and decommissioning of the proposal.	Noted. Measures for pollution control are included as embedded mitigation (Section 3.6 of this ES) and measures associated with the surface water drainage strategy are also presented in Sections 9.6 and 9.7 of this ES and in the FRA (Document Reference 5.4).
	It is the responsibility of the applicant to ensure that the development will not affect any water features (i.e. wells, boreholes, springs, streams or	Noted. Water features will be safeguarded by the embedded mitigation measures incorporated within the Project and the surface water drainage strategy brought

Reference	Comment	Response
	ponds) in the area, including licensed and unlicensed abstractions.	forward as part of the LLRS as described in Sections 3.6, 9.6, and 9.7 of this ES.
	The responsibility for the provision of a mains water supply lies with the water undertaker, Anglian Water Services. If the proposal will require the abstraction of water the applicant should be made aware that under the terms of the Water Resources Act 1991, an Abstraction Licence may be required from the Environment Agency for the abstraction of water from any inland water or underground strata.	Noted. No abstraction of water from any inland water or underground strata will occur as a result of the Project, as outlined in Section 9.7 of this ES.
Response to 2017 PEIR	The site is located entirely within Flood Zone 1 (lowest probability of flooding) on our Flood Map.	Noted. This is consistent with the conclusions of the FRA (Document Reference 5.4)
	The site is considered to be of moderate sensitivity and could present potential pollutant/contaminant linkages to controlled waters.	Noted. Chapter 8 considers the potential effects of pollution on sensitive ecological receptors and chapter 10 considers pollution and effects on groundwater in more detail.
	Please contact the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) for drainage advice.	Both the LLFA and IDB have been re-consulted (July 2017) and the 2015 FRA revised/updated in accordance with their requirements.
	We understand that due to the ground conditions of the site, that infiltration SuDS are not being considered as part of the proposed development.	A surface water drainage system, comprising a balancing pond, network of interceptor channels and pumping station, will be implemented as part of the LLRS. This will manage surface water run-off within Rookery South Pit. Surface water run-off arising from the SECs will be managed by way of soakaways on the perimeter of the SECs.
	At this stage of the process there is limited information on the surface water and foul sewage disposal for both the proposed power station and the Laydown Area to be used during construction.	A surface water drainage system, comprising a balancing pond, network of interceptor channels and pumping station, will be implemented as part of the LLRS. This will manage surface water run-off within Rookery South Pit. Full details are presented in the

Reference	Comment	Response
		FRA (Document Reference 5.4). The CEMP sets out measures for the management of surface water run-off during the construction stage. Foul water would most likely be sent to a septic tank given the limited numbers of staff on site during the operational period.
	The development lies within the area traditionally supplied by Anglian Water Services Ltd. It is assumed that water will be supplied using existing sources and under existing abstraction licence permissions. Advise should be sought from the water company to find out whether this is the case or whether a new source needs to be developed or a new abstraction licence sought.	Noted. No abstraction of water from any inland water or underground strata will occur as a result of the Project, as outlined in Section 9.7 of this ES.
	It is the responsibility of the applicant to ensure that no local water features (including streams, ponds, lakes, ditches or drains) are detrimentally affected, this includes both licensed and unlicensed abstractions.	Noted. The Applicant is not proposing to abstract water from watercourses or water bodies.
Bedford Group of Internal Drainage Boards		
E-mail dated 4th July 2017	On the basis that the pumped discharge rate for surface water from Rookery Pit into Millbrook Brook will remain unchanged i.e. maintains the status quo and does not increase flows into Stewartby Lake, the proposal is acceptable.	The rate of pumping from Rookery South Pit to the Mill Brook watercourse will not change as a result of the proposals. Details are presented in the FRA (Document Reference 5.4).
Houghton Conquest Parish Council		
Letter dated 31st May 2017	There are some concerns regarding the attenuation pond and the risk flooding	The attenuation pond forms part of the system for managing surface water run-off accumulating within Rookery South Pit. The drainage strategy has been agreed with both the Internal Drainage Board and CBC as the Lead Local Flood Authority. A FRA (Document Reference 5.4) has been prepared in support of

Reference	Comment	Response
		the proposals and demonstrates that (i) the proposed power generation infrastructure will not be at risk of flooding and (ii) the proposals will not increase flood risk elsewhere.
Central Bedfordshire Council		
Pre-application advice (letter dated 21st October 2015)	Sets out the criteria and design principles that should be applied in respect of surface water management (SuDS).	The FRA (Document Reference 5.4) sets out proposals for surface water management, prepared in accordance with the requirements of both the Environment Agency and the Internal Drainage Board, the foundation of the drainage strategy being provided by the LLRS.

9.3.2 Both the EA and the Bedfordshire and River Ivel Internal Drainage Board (IDB) were consulted at several points during the pre-application phase of the Project to identify the issues to be addressed and the scope of work required to be undertaken to prepare an ES for the Project, along with the supporting FRA that is compliant with the NPPF, National Planning Policy Guidance (NPPG) and NPSs.

9.4 Topic-specific Realistic Worst Case Scenario for Assessment

9.4.1 In respect of water quality, water resources, hydrology and flood risk, the range of proposed Project parameters (which are described in Chapters 3 and 5 of this ES) has no bearing on potential effects on water quality and water resources.

9.5 Assessment Methodology and Significance Criteria

Assessment Methodology

9.5.1 The study area extends to include the reaches of watercourse and surface water drainage infrastructure shown in Figure 9.1 as (in the professional opinion of the assessor) these have the potential for significant interaction with the Project. The study area has also been defined following previous consultation with the EA and IDB.

9.5.2 To facilitate an understanding of the watercourses and associated structures and general landform of the area in and surrounding the Project Site, the Project Site was visited by a qualified hydrologist.

9.5.3 Data collected as part of the desk based assessment to support preparation of this ES and the associated FRA (Document Reference 5.4) includes:

- Topographical survey;

- Water quality data from watercourses in the study area;[24,25]
- Anglian Water sewer records; and
- EA flood maps.

9.5.4 In addition, and to further assess the nature of flood risk associated with the Mill Brook, a hydraulic model of the Mill Brook and its tributary has been developed using topographical survey of the Mill Brook corridor undertaken in 2009. The hydraulic model extends from a point approximately 200m downstream of the Marston Vale Railway and extends to include the Mill Brook tributary that lies in close proximity to the southern edge of Rookery South Pit, as outlined in Figure 9.1. The hydraulic model is used to estimate water levels associated with flood events of different magnitudes or frequency (i.e. rarity). The hydraulic model is presented in more detail in the FRA (Document Reference 5.4).

Elements which have been Scoped out of the Assessment

9.5.5 It is anticipated that the operation of the Pipeline of the Gas Connection would have no impacts upon water quality and water resources as it does not require any water during operation. It will not be at risk from flooding as it is within Flood Zone 1 and there will be no increase in impermeable surfaces associated with the Pipeline so it will not cause flooding elsewhere and it will not cause the release of any silt or contaminants. As agreed by the SoS in the Scoping Response (Appendix 1.2), the operational impacts of this part of the Gas Connection have therefore been scoped out of this assessment.

9.5.6 It is anticipated that the operation of the underground cable part of the Electrical Connection would have no impacts upon water quality and water resources as it does not require any water during operation. It will not be at risk from flooding as it is within Flood Zone 1 and there will be no increase in impermeable surfaces associated with the cable and so therefore it will not increase the risk of causing flooding elsewhere and it will not cause the release of any silt or contaminants. As agreed by the SoS in the Scoping Response (Appendix 1.2), the operational impacts of these parts of the Electrical Connection have therefore been scoped out of this assessment.

9.5.7 Information collated as part of the Ground Conditions Chapter (Chapter 10) and the Geo-environmental Phase 1 Report (Appendix 10.1) have not identified any evidence of elevated groundwater levels or records of

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[24] CLA 2000. Ground Investigation – Rookery South Proposed Landfill Site, Bedfordshire. Report no: 2690072. March 2000. CL Associates.

[25] PBA 2009b. Peter Brett Associates. Proposed Resource Recovery Centre – Rookery South, Stewartby. Report on Geotechnical and Geoenvironmental Ground Investigation. Ref 21780/016/GI/Rev1.

groundwater flooding. Flooding arising from groundwater sources is not therefore considered to be an issue at the Project Site.

9.5.8 Water Framework Directive (WFD) screening has been undertaken to identify the extent to which the Project is likely to affect waterbodies in the vicinity of the Project Site.

9.5.9 The study area (zone of influence) extends to include the reaches of watercourse and surface water drainage infrastructure shown in Figure 9.1 as (in the professional opinion of the assessor) these have the potential for interaction with the Project. The study area has also been defined following previous consultation with the EA and IDB.

9.5.10 The screening has been undertaken in accordance with PINS Advice Note 18 'Water Framework Directive'.

9.5.11 The impact on all waterbodies shown on Figure 9.1 is considered to be negligible (see assessment of effects in section 9.7), and the Project is not regarded to pose a risk of deterioration or a risk to the water body status of Stewartby Lake (the only identified River Basin Management Plan water body in the vicinity of the Project Site). As such, a WFD compliance assessment has been scoped out. Further information on baseline status of waterbodies is provided in section 9.6 and an assessment of effects is provided in section 9.7.

Assumptions and Limitations

9.5.12 The assumptions and limitations used in this assessment are as per Section 4.8 of this ES. Additionally, it has been assumed that no water will be required for NOx control for the Generating Equipment, that no water would be required for typical operation of the Gas Connection or Electrical Connection and that the LLRS works will proceed as outlined in section 3.1.

Significance Criteria

9.5.13 There are no 'industry standard' significance criteria for the consideration of water quality, water resources, hydrology and flood risk impacts and it has therefore been necessary to employ a qualitative approach based upon available knowledge and professional judgement.

9.5.14 The significance of effects has been assessed through consideration of their magnitude, duration and nature (i.e. reversible or irreversible) and also the geographic context (i.e. highly localised or widespread). The significance criteria are outlined in Table 9.2 below. Effects of moderate or above are deemed to be significant.

Table 9.2 – Significance of Effects

Significance Criteria	Definition
Large Beneficial	Major reduction in risk to receptors. Significant local scale/widespread reduction in flood risk, significant improvement in water quality.
Moderate Beneficial	Moderate reduction in risk to receptors. Moderate reduction in localised flood risk, moderate improvement in water quality.
Slight Beneficial	Minor reduction in risk to receptors. Minor reduction in localised flood risk.
Negligible	No appreciable impact - any minor adverse effects are short-lived and reversible.
Slight Adverse	Temporary and reversible detrimental effect on watercourses. Minor localised flooding.
Moderate Adverse	Moderate detrimental effect on watercourses. Severe temporary flooding or temporary change to flow characteristics of watercourses.
Large Adverse	Severe detrimental effect on watercourses. Permanent changes to flooding regime or flow characteristics of watercourses. Increase in the potential for flooding upstream, downstream or within the Project Site.

9.6 Baseline Conditions and Receptors

Power Generation Plant

9.6.1 Rookery South Pit will be subject to the LLRS works prior to construction of the Project in 2020, as described in paragraph 3.1.4 of this ES. This will result in changes to watercourses, surface water drainage characteristics and the nature of flood risk within and in the vicinity of Rookery Pit, as outlined below in paragraph 9.6.7. The completion of the LLRS works therefore provides the baseline for the assessment of likely significant environmental effects relating to water quality, water resources, hydrology and flood risk associated with the Project.

9.6.2 The Mill Brook flows to the north, close to the western boundary of Rookery South Pit, and drains a predominantly rural catchment of approximately 2.9 km^2. It passes through a culvert beneath the Marston Vale Railway Line and ultimately outfalls to Stewartby Lake a further 400 m downstream. A tributary watercourse draining a catchment of 0.9 km^2 joins the Mill Brook to the east of South Pillinge Farm. These watercourses are shown on Figure 9.1.

9.6.3 The EA's Flood map for planning (https://flood-map-for-planning.service.gov.uk) does not include the Mill Brook watercourse and its tributary on account of the small size of the contributing catchment area.

9.6.4 The nature of flood risk associated with the Mill Brook has therefore been assessed using a hydraulic model, the results of which are presented in detail in the FRA (Document Reference 5.4). The model provides a series of design flood levels for the 1 in 100 year and 1 in 100 year plus climate change (i.e. increase in fluvial flows of 35 percent, as defined by the EA guidance titled 'Flood risk assessments: climate change allowances (February 2016)' events. The modelling analysis suggests that floodwater may spill into the south east corner of Rookery South Pit during the 1 in 100 year event.

9.6.5 The Power Generation Plant Site landform is such that any floodwater spill into the Pit will be intercepted and routed to the Rookery South Pit attenuation pond as part of the drainage works implemented as part of the LLRS.

9.6.6 The principal components of the LLRS works in respect of surface water drainage are as follows:

- Excavation to form an attenuation pond within the north west area of Rookery South Pit, sized to provide sufficient storage to accommodate the 1 in 100 year rainfall event (plus climate change) and cater for a 1 in 10 year (plus climate change) event following within one week of the 1 in 100 year (plus climate change) rainfall event;

- Re-profiling of the base of the Pit such that surface water run-off sheds towards the attenuation pond;

- In addition to re-profiling the base of the Pit, an interceptor channel will have been constructed to intercept surface water run-off and convey it to the attenuation pond;

- Surface water run-off that collects within the Rookery South Pit attenuation pond will be pumped to Rookery North Pit as a strategic attenuation facility at a rate of 100 l/s and to Mill Brook at a rate of 23 l/s in accordance with an existing Consent to Discharge (surface water flows). Water will be discharged from Rookery North Pit back to the attenuation pond in Rookery South Pit at a rate of no more than 23 l/s[26];

- The normal water level within Rookery North Pit will have been drawn down from 36 m to 35 m AOD to allow Rookery North Pit to be used as a strategic attenuation facility;

9.6.7 It is noted here that one of the LLRS surface water drainage channels is currently planned to be located where the Generating Equipment is located. However, this will be re-aligned prior to construction of the Project and the surrounding landform re-profiled so that there will be no conflict between the LLRS surface water management strategy and the Project.

9.6.8 On this basis, that part of Rookery South Pit that will accommodate the Power Generation Plant will not be affected by flooding associated with either the 1 in 100 year or 1 in 100 year plus climate change events.

9.6.9 In 2015 it was agreed with the EA that, following implementation of the LLRS, the Power Generation Plant Site would be classified as Flood Zone 1.

9.6.10 In accordance with the Flood Risk Vulnerability Classification set out in Table 2 of the NPPF Planning Practice Guidance, the Generating Equipment is classified as Essential Infrastructure. Essential Infrastructure is defined as that which is essential to the needs of the country and includes ‘electricity generating power stations’.

9.6.11 Taken together, the Flood Zones and the Flood Risk Vulnerability Classification are used to provide a Flood Zone ‘Compatibility’ matrix, as set out within Table 3 of the NPPF Planning Practice Guidance (included as Insert 9.1 below). This matrix indicates that construction of the Power Generation Plant within Flood Zone 1 is appropriate from a flood risk perspective.

[26] This consent is dated May 1998 and was awarded to City and St James Property (now O&H Properties Ltd). O&H retains responsibility for the maintenance of the surface water drainage infrastructure implemented as part of the LLRS.

Insert 9.1 Flood Zone Compatibility Matrix

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	**Highly vulnerable**	**More vulnerable**	**Less vulnerable**	**Water compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required	✗	✗	✗	✓*

Key: ✓ Development is appropriate ✗ Development should not be permitted.

9.6.12 The relevant sewerage and water undertaker for the study area is Anglian Water. There are no existing public sewers located within or adjacent to the Project Site.

9.6.13 Assessment of the water quality of the surface water bodies in the vicinity of the Generating Equipment Site has been undertaken since 1999[27,28]. During this time, surface water samples have been taken from the lakes in Rookery South Pit (prior to the implementation of any works associated with the LLRS) and Rookery North Pit, Harrowden Brook, the Mill Brook tributary, Mill Brook watercourse and Stewartby Lake.

9.6.14 Analyses have included testing for a range of potential contaminants.

[27] CLA 2000. Ground Investigation – Rookery South Proposed Landfill Site, Bedfordshire. Report no: 2690072. March 2000. CL Associates.

[28] PBA 2011b. Peter Brett Associates. Marston Vale Study Area, Bedfordshire. Report on Surface Water Quality Monitoring Ref 18311-204/R1/Rev0. (Reproduced as Appendix 10.1).

9.6.15 The data[29] shows that the ammonia concentration within all of the water bodies is generally low. The Biological Oxygen Demand (BOD) concentration is also generally low.

9.6.16 Sulphate concentrations within the Rookery North Pit and the Rookery South Pit lakes are consistently higher than those within the surrounding ditches and within Stewartby Lake. The sulphate concentrations within the Rookery North Pit and Rookery South Pit lakes are also considerably higher than the threshold for the protection of controlled waters (400 mg/l) and the threshold for the protection of human health (250 mg/l).

9.6.17 The chloride concentrations and electrical conductivity are also generally higher in the Rookery North Pit and Rookery South Pit lakes than the surrounding water bodies, although elevated concentrations are recorded on occasion within Mill Brook and Harrowden Brook. The chloride concentrations are generally below the threshold criteria for the protection of controlled waters and for the protection of human health (other than a single exceedance recorded in the Rookery North Pit Lake in 2000). The electrical conductivity values recorded within the Rookery North Pit and Rookery South Pit lakes are intermittently above the threshold criteria for the protection of human health (no available criteria for the protection of controlled waters).

9.6.18 The lakes within the Rookery North Pit and Rookery South Pit (prior to the implementation of the LLRS) collected surface water run-off from a large area across the base and sides of the pits that are underlain by Oxford Clay. The elevated concentrations of sulphates that have been recorded within the water bodies of the Rookery North Pit and Rookery South Pit reflect the naturally occurring high sulphate levels within the Oxford Clay. The waters within the surrounding brooks and the nearby Stewartby Lake are also influenced by the geochemistry of the underlying Oxford Clay but to a lesser extent since these water bodies are subject to some degree of natural attenuation and/or dilution during periods of rainfall when flowing waters may be present within the brooks.

9.6.19 The concentration of Volatile Organic Compounds (VOC), Semi Volatile Organic Compounds (SVOC), Polychlorinated Biphenyl (PCB), dioxins, furans and pesticides have all been consistently below or very close to the laboratory detection limits and the data[5] shows no evidence of contamination having occurred at the Power Generation Plant Site.

[29] CLA 2000. Ground Investigation – Rookery South Proposed Landfill Site, Bedfordshire. Report no: 2690072. March 2000. CL Associates. PBA 2009b. Peter Brett Associates. Proposed Resource Recovery Centre – Rookery South, Stewartby. Report on Geotechnical and Geoenvironmental Ground Investigation. Ref 21780/016/GI/Rev1.

9.6.20 On the basis of the measures outlined above, the historic water quality information set out for Rookery North and South Pits, Stewartby Lake, Mill Brook and its tributaries, and Harrowden Brook is considered to represent a robust baseline within the context of water quality with which to assess the likely significant effects on water quality and water resources arising from the development of the Power Generation Plant.

9.6.21 The area in which the Project Site is located is administered by the Anglian River Basin Management Plan (RBMP) and the Ouse Upper and Bedford management catchment. The EA does not include RBMP data on the Mill Brook on account of its small size, however, status objectives are available for the Stewartby Lake (approximately 75 m from the Access Road at its closest point) which is the only RBMP waterbody identified in the vicinity of the Project Site. Stewartby Lake has been classified by the EA as having an overall waterbody status of Moderate, with a chemical status of Good, an ecological status of Moderate, and a hydromorphological status of 'Supports Good'.

Gas Connection

9.6.22 The Mill Brook tributary rises approximately 700 m to the south of Rookery South Pit in the vicinity of the point where the Millbrook Road crosses the Midland Mainline Railway. The tributary passes close to the Gas Connection Route Corridor at a point approximately 500 m south of Rookery South Pit. In the vicinity of the south east corner of Rookery South Pit the tributary turns to the west and follows a route a short distance to the south of the southern edge of Rookery South Pit. The tributary passes through the Route Corridor at a point approximately 500 m from the south eastern corner of Rookery South Pit.

9.6.23 The hydraulic modelling analysis has shown that floodwater may spill from the tributary into the south east corner of Rookery South Pit during the 1 in 100 year event. However, the spill occurs in a very localised area along the upper reach of the tributary and the rate of floodwater spill is very low.

9.6.24 The Gas Connection crosses a ditch/field drain (immediately to the north of the Millbrook Road) and the Mill Brook Tributary (flowing along the southern edge of Rookery South Pit).

9.6.25 Water quality in the vicinity of the Gas Connection is as reported for the Power Generation Plant.

Electrical Connection

9.6.26 The Mill Brook passes immediately to the west of the point of connection to the existing National Grid infrastructure and the Mill Brook tributary passes beneath the Electrical Connection. The hydraulic modelling analysis has shown that the area of the Electrical Connection is not affected by flooding.

9.6.27 Water quality in the vicinity of the Electrical Connection is as reported for the Power Generation Plant.

9.7 Assessment of Effects

Power Generation Plant

Construction / Decommissioning

9.7.1 The main construction / decommissioning activities associated with the Power Generation Plant are outlined in Section 3.5 of this ES.

9.7.2 The main construction activities which have the potential to impact on water quality and water resources are the compaction of the ground caused by construction plant and an increase in the extent of impermeable surfaces associated with access tracks and compounds, which has the potential to increase surface water run-off to the Rookery South Pit interceptor channels and surface water balancing pond.

9.7.3 As set out in Section 9.6 of this ES, the LLRS includes works to facilitate the management of surface water run-off within Rookery South Pit and these works will be implemented prior to construction of the Project. The Power Generation Plant Site falls within the catchment of the LLRS surface water drainage system, which has been designed assuming that the entire Pit is impermeable. The LLRS drainage system therefore offers adequate capacity to accommodate run-off arising from additional impermeable areas associated with the Power Generation Plant Site. The effect from flooding is therefore considered to be Negligible and is Not Significant.

9.7.4 Construction / decommissioning activities also have the potential to give rise to the contamination of surface waters resulting from spilled hydrocarbons/petrochemicals from construction plant, and the mobilisation of silts during earthworks operations leading to increased silt loading in watercourses. However, such impacts would be controlled by the embedded mitigation measures implicit within the Project, as outlined in Section 3.6 of this ES, for example industry standard/best practice and other embedded mitigation secured by way of a CEMP. The extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence. On this basis, the effect is considered to be Negligible and is therefore Not Significant.

Operation

9.7.5 The Power Generation Plant Site will give rise to an increase in the impermeable area within Rookery South Pit, thereby increasing run-off to the Rookery South Pit interceptor channels and surface water balancing pond. However, as noted above, the Power Generation Plant Site falls within the catchment of the LLRS surface water drainage system, which offers adequate capacity to accommodate run-off arising from additional impermeable areas within Rookery South Pit. As the baseline takes into account the LLRS no further mitigation is therefore required over and above that embedded into the design of the Project. The extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence. The impact in flood risk terms is therefore considered to be Negligible and is Not Significant.

9.7.6 The additional impermeable area associated with the length of Access Road extending from Green Lane to the north-west corner of Rookery South Pit (e.g. outside of the catchment of the Rookery South Pit LLRS drainage system) equates to approximately 17,200 m^2. It is proposed that surface water run-off from this area drains via channels on either side of the Access Road to the Rookery South Pit attenuation pond. Calculations undertaken as part of the FRA (Document Reference 5.4) have shown that there would be sufficient capacity in the LLRS drainage system and attenuation pond to accommodate this run-off. As the baseline takes into account the LLRS no further mitigation is therefore required over and above that embedded into the design of the project. The extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence. The impact in flood risk terms is therefore considered to be Negligible and is Not Significant.

9.7.7 During the operational phase, there is the potential for the contamination of surface water resulting from the flushing of silts and hydrocarbons from areas of hardstanding within the Power Generation Plant Site. However, such impacts would be controlled by the embedded mitigation measures referred to above, comprising industry standard/best practice and measures required to ensure legislative compliance, contained within an operational environmental management plan, to be developed by the operator prior to commissioning of the Project. The extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence. On this basis, the impact is considered to be Negligible and is therefore Not Significant.

Gas Connection

<u>Construction / Decommissioning</u>

9.7.8 Construction of the Gas Connection is described in Section 3.5 of this ES, which may include temporary drainage/de-watering measures to prevent water-logging of the pipeline trench and enable the crossing of field drains.

9.7.9 The potential effects along the Gas Connection would be associated with installation of the Pipeline by either standard open-cut, cross-country pipeline construction techniques or trenchless techniques. Construction of the Pipeline will necessitate the crossing of a ditch/field drain (immediately to the north of the Millbrook Road) and the Mill Brook Tributary (flowing along the southern edge of Rookery South Pit).

9.7.10 Although the field drain and tributary are over 1 m deep, environmental surveys and visual inspection suggests that an open cut crossing technique is preferred. Further study into the depth or local significance of the field drain may require that a trenchless crossing be considered in the future, however the investigations to date have shown no such concern. Standard techniques for pumping around the crossing for the duration of the open cut works will maintain the flow.

9.7.11 The laying of temporary surfacing material for access purposes, establishment of temporary construction compounds, stockpiling areas and compaction of the ground due to construction plant has the potential to reduce the permeability of the ground, leading to increased surface water run-off to nearby watercourses. Similarly, the installation of temporary drainage/de-watering measures could potentially increase flows in nearby drains/ditches/watercourses. Construction activities also have the potential to give rise to the contamination of surface waters resulting from spilled hydrocarbons/petrochemicals from construction plant and the mobilisation of silts during earthworks operations and open-cut works, leading to increased silt loading in watercourses.

9.7.12 Such impacts will be controlled by the embedded mitigation measures implicit within the Project as outlined in Section 3.6 of this ES and set out in the CEMP. The extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence. On this basis, all of the above impacts are considered to be Negligible and therefore Not Significant.

9.7.13 The crossing of ditches/drains/watercourses using open-cut techniques has the potential to reduce the flow capacity and/or change the flow regime, thereby leading to a temporary increase in localised flood risk. However, flows will be managed by over-pumping or the creation of flow diversion channels, in accordance with the methodologies set out in the embedded mitigation measures in section 3.6. The extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence, such that impacts would be Negligible and therefore Not Significant.

Operation

9.7.14 The only above ground structure associated with the Gas Connection is the AGI. This will give rise to an increase in the impermeable area within the catchment of the Mill Brook tributary, thereby increasing surface water run-off to the watercourse. However, the surface water drainage would be managed by way of soakaways on the perimeter of the AGI. The extent of any effects would be local, and there would be a low likelihood of occurrence. The impact in flood risk terms is therefore considered to be Negligible and is Not Significant.

Electrical Connection

Construction / Decommissioning

9.7.15 The principal activities associated with construction / decommissioning of the Electrical Connection are described in Section 3.5 of this ES.

9.7.16 Construction / decommissioning activities associated with the Electrical Connection have the potential to reduce the permeability of the ground, leading to increased surface water run-off. Construction activities also have the potential to give rise to the contamination of surface waters resulting from spilled hydrocarbons/petrochemicals from construction plant and the mobilisation of silts during earthworks operations and excavation for the cable trench and SECs, leading to increased silt loading in watercourses.

9.7.17 Such impacts will be controlled by the embedded mitigation measures implicit within the Project as outlined in Section 3.6 of this ES set out in the CEMP. These are:

- siting stockpiles away from watercourses;
- refuelling on areas of hardstanding only away from watercourses and surface drains; and
- installing construction site drainage.

9.7.18 On this basis, the impacts are considered to be Negligible and therefore Not Significant.

Operation

9.7.19 The Substation will give rise to an increase in the impermeable area within Rookery South Pit, thereby increasing run-off to the Rookery South Pit interceptor channels and surface water balancing pond. However, the substation falls within the catchment of the LLRS surface water drainage system, which offers adequate capacity to accommodate run-off arising from additional impermeable areas within Rookery South Pit. No additional mitigation is therefore required and the impact in flood risk terms is considered to be Negligible and is Not Significant.

9.7.20 The SECs will give rise to an increase in the impermeable area within the catchment of the Mill Brook tributary, thereby increasing surface water run-off to the watercourse. However, the surface water drainage would be managed by way of soakaways on the perimeter of the SECs. The extent of any effects would be local, and there would be a low likelihood of occurrence. The impact in flood risk terms is therefore considered to be Negligible and is Not Significant.

9.7.21 During the operational phase, there is the potential for the contamination of surface water resulting from the flushing of silts and hydrocarbons from areas of hardstanding within the substation compound. There is also the risk of leakage from any oil-filled electrical apparatus contaminating surface waters. However, such impacts would be controlled by the embedded mitigation measures implicit within the Project, comprising industry standard/best practice and measures required to ensure legislative compliance and the use of an operational environmental management plan (secured as part of the Environmental Permit). During operation, the EA will set limits on the quality of water that is discharged from the Project Site under the Environmental Permit. On this basis, the impact is considered to be Negligible and is therefore Not Significant.

Water Framework Directive

9.7.22 An assessment of potential effects has been undertaken which considers the main construction, operation and decommissioning activities that have the potential to impact on water quality and water resources. The assessment concluded that although there is potential for temporary contamination of surface waters resulting from spilled hydrocarbons/petrochemicals from construction plant and the mobilisation of silts during earthworks operations, the extent of any effects would be local, the duration short term and there would be a low likelihood of occurrence. Any impacts would be controlled by the embedded mitigation measures implicit within the Project, such as a CEMP (outlined in Section 3.6). On this basis, the impact on all waterbodies shown on Figure 9.1 is considered to be Negligible (see assessment of effects in section 9.7), and the Project is not regarded to pose a risk of deterioration or a risk to the water body status. As such, a WFD compliance assessment has been scoped out.

9.8 Cumulative and in Combination Effects

Overview

9.8.1 Construction, decommissioning or operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in Section 4.10. However, the majority of these proposed developments are distant from the Project Site (greater than 2 km).

9.8.2 These developments and any effects arising from them are outside the study area for this topic and there is no overlap in the study areas within which significant effects could occur. As such it is considered that no cumulative or in combination effects are likely to arise in relation to water quality and water resources during the construction, decommissioning or operation phases of the Project. Furthermore, each of these developments will be bound by its own CEMP and will apply best practice construction methods to minimise impacts on water quality and water resources. To be policy compliant, other schemes must incorporate measures to ensure development does not increase flood risk elsewhere, and that water quality is not adversely affected. Based on professional judgement, there are therefore not considered to be any cumulative effects from these projects.

Construction and Decommissioning

9.8.3 The projects considered to be of relevance to the cumulative effects assessment for this chapter (taken from Section 4.10 of this ES) are:

- The Integrated Waste Management Facility at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, (immediately north of the Generating Equipment Site).

9.8.4 Little detail is known about the Integrated Waste Management Facility proposed for development in the Rookery South Pit. It is understood that a request for a scoping opinion was previously submitted by the promoter of the project, although no details are provided regarding potential impacts on water quality or water resources as a result of the project. However, it is likely that this development will be bound by its own CEMP and best practice construction methods to limit impacts on water resources during construction. Should it go ahead, then it will need to consider the Project to ensure that no significant cumulative effects will arise between it and the Project. Nevertheless, to minimise the possibility of cumulative effects arising, a CEMP will be followed during construction of the Project, which will ensure best practice construction methods are followed and limit, as far as practicable, the possibility of impacts upon water quality. The measures proposed to minimise impacts during construction are listed in Section 3.6 of this ES and include e.g. siting stockpiles away from watercourses and refuelling on areas of hardstanding only.

9.8.5 Furthermore, given the early stage of the Integrated Waste Management proposals and the likely time required to achieve planning consent, it is considered unlikely that there would be any overlap on the construction periods of these two projects, which further mitigates against any potential cumulative effects.

9.8.6 The ES for the Covanta RRF Project to the north of the Generating Equipment Site concluded that there were (pre-mitigation) potential impacts arising from construction and decommissioning of the project on water quality and water resources.

9.8.7 These include impacts on controlled waters from the potential release of contaminants and silts.

9.8.8 However, the Covanta RRF ES concluded that embedded mitigation measures required, such as the use of a CoCP, CEMP and working within best practice guidelines, will prevent the release of contamination and therefore negate any effects on controlled waters during construction and decommissioning. The implementation of the embedded mitigation described in this Chapter means that there will be no effects arising from the construction and de-commissioning of the Project on controlled waters either.

9.8.9 The effects on controlled waters associated with construction of the Project (no effect) considered together with the effects associated with construction of the Covanta RRF Project (no effect) would not give rise to a significant cumulative effect or give rise to new or different effects that would occur if the projects are constructed independently of one another.

Operation

9.8.10 As above, the projects considered to be of relevance to the cumulative effects assessment for the operation of the Project (taken from Section 4.10) are:

- The Integrated Waste Management Facility at Rookery South Pit; and

- The Covanta RRF Project at Rookery South Pit (immediately north of the Generating Equipment Site).

9.8.11 Little detail is known about the Integrated Waste Management Facility proposed for development in the Rookery Pit. As set out above, it is understood that a request for a scoping opinion was previously submitted by the promoter of the project. However, no details are provided in the scoping report regarding potential impacts on water quality and water resources. Should the development go ahead, then it will need to consider the Project to ensure that no cumulative effects will arise between it and the Project as this development will follow development of the Project. Nevertheless, the assessment set out in this ES has shown no significant effects on water quality and water resources associated with the Project.

9.8.12 The ES for the Covanta RRF Project concluded that there were a number of (pre-mitigation) potential impacts arising from operation of the project on water resources.

9.8.13 These include potential impacts on surface water run-off.

9.8.14 However, the Covanta RRF ES demonstrated that embedded mitigation measures required as part of the Covanta RRF Project, such as surface water attenuation provision as part of Phase 1 of the LLRS, will be sufficient to accommodate the increase in impermeable area and associated increase in surface water run-off. Therefore, embedded mitigation measures will negate any negative effects.

9.8.15 The effects on water quality and water resources associated with operation of the Project (no effects) considered together with the effects associated with operation of the Covanta RRF Project (no effects) will not give rise to a significant cumulative effect or give rise to new or different effects that would occur if the projects are operational independently of one another.

9.8.16 Following the granting of the DCO for the Covanta RRF Project, Requirement 12 was set out relating to surface water and foul water drainage. It states:

"(1) Except where the authorised development is constructed in accordance with the approved drainage strategies, details of the surface and foul water drainage system (including means of pollution control and information demonstrating compliance with the best practice for sustainable drainage schemes) must be submitted to and approved in writing by Central Bedfordshire Council. Unless otherwise agreed in writing by Central Bedfordshire Council, such details must accord with the principles of the drainage strategy submitted with the application, making provision for the construction of Work No. 3, and must be implemented in accordance with the approved details.

(2) The drainage strategy must provide that all drains provided as part of the authorised development must, where necessary and appropriate, contain trap gullies or interceptors".

9.8.17 The drainage strategy outlined in this Chapter, and the FRA (Document Reference 5.4), have taken account of the drainage strategies proposed by Covanta in their DCO Application. Both drainage strategies are also based largely on the wider drainage strategy for the Rookery South Pit, to be delivered as part of the LLRS. There are therefore not anticipated to be any conflicts between the two projects.

Effect Interactions

9.8.18 Chapter 8 considers the potential effects of pollution (e.g. entering watercourses) on sensitive ecological receptors.

9.8.19 Chapter 10 considers effects of pollution and effects on groundwater in more detail.

9.9 Additional Mitigation

9.9.1 Following the implementation of the embedded mitigation measures adopted as part of the Project, as outlined in Section 3.6 of this ES, it is concluded that impacts associated with the construction, operation and decommissioning phases are Not Significant. On this basis, no project specific mitigation is required in addition to the embedded design mitigation that is proposed.

9.10 Summary of Residual Effects

9.10.1 Table 9.3 sets out a summary of the significant effects arising from the Project during construction, operation and de-commissioning.

9.10.2 The following elements are reported:

- the affected group or receptor;
- the sensitivity of the affected group/receptor;
- potential effect;
- the likely magnitude and duration of the effect;
- the likelihood of occurrence;
- proposed mitigation or response to ameliorate the effect; and
- the significance of the residual effect following the incorporation of mitigation.

9.10.3 Also reported are any potential in-combination/synergistic effects arising on a receptor during each phase, as well as any cumulative effects.

Table 9.3 - Summary of Residual Effects

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Construction phase									
Power Generation Plant	Power Generation Plant	High	Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Power Generation Plant	Surface water bodies	Moderate	Contamination	Local Short term	Low	CEMP, best practice working methods outlined in section 3.6 of this ES.	Negligible – not significant	None required	Negligible – not significant
Gas Connection	Gas Connection	Low	Flooding	Local Short-term	Low	CEMP, best practice working methods outlined in section 3.6 of this ES.	Negligible – not significant	None required	Negligible – not significant
Gas Connection	Surface water bodies	Moderate	Contamination	Local Short term	Low	CEMP, best practice working methods outlined in ES3.6 of this ES.	Negligible – not significant	None required	Negligible – not significant
Electrical Connection	Surface water bodies	Moderate	Contamination	Local Short term	Low	CEMP, best practice working methods outlined in section 3.6 of this ES.	Negligible – not significant	None required	Negligible – not significant
Electrical Connection	Electrical Connection	Low	Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Project (in combination and synergistic)	Surface water bodies	Moderate	Contamination	Local Short term	Low	CEMP, best practice working methods outlined in section 3.6 of this ES.	Negligible – not significant	None required	Negligible – not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Project (in combination and synergistic)			Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Cumulative effects			Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Cumulative effects	Surface water bodies	Moderate	Contamination	Local Short term	Low	CEMP, best practice working methods outlined in section 3.6 of this ES.	Negligible – not significant	None required	Negligible – not significant
Operation and maintenance									
Power Generation Plant	Power Generation Plant	High	Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Gas Connection	Gas Connection	Low	Flooding	Local Short-term	Low	None required	Negligible – not significant	None required	Negligible – not significant
Electrical Connection	Electrical Connection	Low	Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Project	Project	High	Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant
Cumulative effects			Flooding	Local Short-term	Low	None required.	Negligible – not significant	None required	Negligible – not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Decommissioning									
Power generation plant	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction
Gas connection	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction
Electrical connection	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction
Project	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction
Cumulative effects	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction	As Construction

9.11 Conclusions

9.11.1 The Mill Brook flows to the north, close to the western boundary of Rookery South Pit, and drains a predominantly rural catchment of approximately 2.9 km^2. It passes through a culvert beneath the Marston Vale Railway Line and ultimately outfalls to Stewartby Lake a further 400 m downstream. A tributary watercourse draining a catchment of 0.9 km^2 joins the Mill Brook to the east of South Pillinge Farm. These watercourses are shown in Figure 9.1.

9.11.2 The flood risk associated with the Project Site has been assessed using a hydraulic model and undertaking a separate FRA (Document Reference 5.4).

9.11.3 Construction of the Project has the potential to mobilise silts and contamination as well as construction and operational activities themselves being at risk from flooding. However, following the implementation of embedded mitigation measures, no likely significant effects have been identified as a result of construction, operation or decommissioning of the Project.

9.11.4 The assessment of the potential effects of the Project on water quality and water resources presented in this ES has shown that the Project will not result in any likely significant environmental effects in relation to water quality and water resources either as a standalone project or cumulatively with other projects.

10 Ground Conditions

10.1 Introduction

10.1.1 This Chapter presents the assessment of likely significant effects of the Project on ground conditions (including land stability and geological hazards) arising from the construction, operation and maintenance, and decommissioning of the Project.

10.1.2 The Project has the potential to affect ground conditions due to the potential release of pollution during construction and decommissioning activities and the introduction of new pathways between groundwater aquifers during installation of foundations. It is also recognised that the groundwater within the underlying strata within the Rookery South Pit has the potential to be under artesian pressures and as such needs to be considered in relation to the construction practices, final development levels and any buried structures of the Project once constructed.

10.2 Legislation and Policy Context

10.2.1 The legislation and policy context considered in preparation of this assessment and in relation to ground conditions is described below;

- National Policy Statements (NPS EN 1, EN 2 EN 4 and EN5);
- National Planning Policy Framework, 2012;
- National Planning Practice Guidance, 2014
- Environmental Protection Act 1990
- The Environment Act 1995 (Section 57)
- Contaminated Land (England) Regulations 2006
- Water Act 2003
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
- Model Procedures for the Management of Contaminated Land (CLR11);
- The Building Regulations 2010
- BBC Core Strategy policy CP26: Climate Change and Pollution

10.3 Consultation

10.3.1 Table 10.1 below summarises the key consultation responses received to date in relation to ground conditions and how they have been responded to during the EIA process.

Table 10.1 – Key Consultation and Responses Relating to Ground Conditions

Comment Ref	Comment	Response
PINS (Scoping Response)		
3.64	LLRS needs to be clearly explained in the section (e.g. how ground levels will change).	Noted. The LLRS has been clearly described in the baseline in Chapter 3, section 3.1 of this ES.
3.65	The ES should provide an assessment of potential effects on aquifers.	Noted. Potential impacts on hydrogeology are described in the Phase 1 Ground Condition Assessment supporting report presented in Appendix 10.1.
3.67	Study area for this topic needs to be clearly defined and justified.	Noted. The study area is clearly defined and justified in section 10.5.
Coal Authority		
Scoping Response Letter	The Coal Authority has reviewed the proposals and confirmed that the proposed EIA development is located outside of the defined coalfield.	Noted.
Public Health England		
Scoping Response	We would expect the promoter to provide details of any contamination present on site. Emissions to and from the ground should be assessed during construction and operation as well as the potential impact on nearby sensitive receptors.	The existing baseline conditions at the site are described in the Phase 1 Ground Condition Assessment presented in Appendix 10.1 and summarised in Section 10.6 and the assessment of likely significant effects on ground conditions and receptors are outlined in Section 10.7.

Comment Ref	Comment	Response
	CBC	
Consultation response to 2014 PEIR	No comment to make regarding the information on ground conditions provided within the PEIR, full assessment shall be undertaken when the information is provided within the EIA.	Noted.
	Environment Agency	
Consultation response to 2014 and 2017 PEIR	A Foundation Works Risk Assessment (FWRA) will need to be produced to determine the risks to the underlying aquifers from proposed possible piled foundations, as much of the site is understood to be underlain by a shallow depth of clay above the Kellaways Sand (Secondary A Aquifer). A better understanding should be made to the sensitivity of the Blisworth Limestone Formation (Principal Aquifer), which we understand to be uplifted due to faulting to the north of the site. This highly sensitive aquifer may be adjacent to the proposed piles.	Noted. Reference to a FWRA has been included in Section 10.7. An assessment of the sensitivity of the underlying aquifers is presented in section 10.6 and the Phase 1 Ground Condition Assessment in Appendix 10.1.
Consultation Response to PEIR (2017)	The Agency is in agreement with the proposed groundwater monitoring programme. Borehole Logs should be included for trial pits and boreholes.	Noted. The results are described in Section 10.6 and Appendix 10.1. Noted. These have been included in Appendix 10.1 where available.

Comment Ref	Comment	Response
	Phase 2 assessment proposed for the Generating Equipment Site is welcomed.	Noted. This has been secured as a DCO Requirement and will be undertaken prior to construction.
Natural England		
Consultation Response to PEIR (2017)	An agricultural land survey and soil resources assessment should be considered for the Project Site to quantify any impacts on agricultural land and soil quality.	Further detail on soil quality and agricultural land is provided in section 10.5.

10.4 Topic-specific Realistic Worst Case Scenario for Assessment

10.4.1 In respect of ground conditions, the range of proposed Project parameters (which are described in Chapters 3 and 5 of this ES) have no bearing on potential effects on ground conditions as the worst case total area for development has been assumed throughout the ES.

10.5 Assessment Methodology and Significance Criteria

10.5.1 The study area is defined as the Project Site and a 1km radius from the Project Site as, based on professional judgement and accepted industry practice, this is considered to represent the likely zone of influence of any impacts on ground conditions or from contamination. Where impacts have the potential for effects further afield than this, this has been identified.

10.5.2 The assessment of the ground conditions at the Project Site has been undertaken by following a tiered approach as recommended within the industry guidance (namely the Model Procedures for the Management of Contaminated Land (CLR11)):

- Tier 1 – a qualitative assessment of historical and published information, together with a site reconnaissance, undertaken in order to develop a preliminary conceptual site model and inform a preliminary risk assessment;
- Tier 2 – an assessment of ground condition data using published generic assessment criteria to screen the site and establish whether there are actual, or potential, unacceptable risks; and (if required);
- Tier 3 - detailed - a quantitative assessment involving the generation of site specific assessment criteria (SSAC).

10.5.3 For this assessment, Tier 1 and Tier 2 assessments have been undertaken. The requirement for a Tier 3 assessment has not been identified following the completion of the Tier 2 Assessment, which showed no actual, or potential, unacceptable risk that required a Tier 3 assessment. The results of the Tier 1 and Tier 2 assessments form the basis for the baseline conditions and assessment of effects within this ES chapter.

10.5.4 The assessment has involved a study of available desk based information (including the results of previous soil sampling for investigations undertaken within the wider Rookery Pit) as well as a site walkover survey together with groundwater monitoring of existing boreholes and surface water monitoring at the site undertaken in 2014 and 2017.

10.5.5 In order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences a source-pathway-receptor methodology is adopted, with the underlying principle that the identification of pollutant linkages consists of the following three elements:

- A source/hazard (a substance or situation that has the potential to cause harm or pollution);
- A pathway (a means by that the hazard moves along / generates exposure); and
- A receptor/target (an entity that is vulnerable to the potential adverse effects of the hazard).

10.5.6 Without a pollutant linkage, the contamination may be a potential *hazard* but does not constitute a *risk* unless all three elements are present. Therefore, in assessing the potential for contamination to cause a significant effect, the extent and nature of the potential source or sources of contamination must be assessed, pathways identified, and sensitive receptors or resources identified and appraised, to determine their value and sensitivity to contamination related impacts.

10.5.7 The methodology adopted in this chapter is qualitative with a progression from factual information (stated with reasonable certainty) regarding the baseline conditions, to appraisal informed by professional judgement and expression of opinions on the relative significance.

10.5.8 Baseline conditions for the study area have been identified for the purpose of this ES using a Phase 1 Ground Condition Assessment (GCA) for the site, undertaken by PBA in 2014 and updated in 2017 which presents information on the geotechnical and geoenvironmental setting of the Project Site and study area, included as Appendix 10.1, combined with a walkover of the site in July 2017.

10.5.9 The PBA 2017 report describes the types and locations of:

- Potential Sources of Contamination (PSCs), based on identification of current and historic land use; and
- Potential Geological Hazards (PGHs), (such as ground stability hazards that may result from artificial and natural cavities, and potential adverse foundation conditions that may be affected by compressibility, shrinkage/swelling of clay stratum, groundwater and drainage).

10.5.10 The GCA report also identifies the type and sensitivity of potential receptors (including consideration of human health, buildings, groundwater, surface water and certain ecological systems) and identification of possible migration or transportation pathways.

Elements Scoped out of the Assessment

10.5.11 There are not considered to be any potential impacts on ground conditions as a result of the operation and maintenance of the Gas Connection as the operational phase will not result in any ground disturbance, nor will there be any potential release of contaminants to land or water as no operational requirements need any potentially polluting substances. This has therefore been scoped out of the assessment.

10.5.12 There are not considered to be any potential impacts on ground conditions as a result of the operation and maintenance of the Electrical Connection as the operational phase will not result in any ground disturbance, nor will there be any potential release of contaminants to land or water as no operational requirements need any potentially polluting substances. This has therefore been scoped out of the assessment.

Agricultural Land and Soils

10.5.13 The majority of the Project is sited within brownfield land (Power Generation Plant, Substation, Laydown Area and Access Road). The Gas Pipeline part of the Gas Connection and the underground cable element of the Electrical Connection would both be buried in agricultural land.

10.5.14 The remaining elements of the Project sited on agricultural land include the Gas Connection AGI (approximately 0.5ha) and the Electrical Connection SECs (approximately 0.4ha). Although these elements are sited on agricultural land, it is Grade 3 according to the Agricultural Land Classification and therefore not the best quality or most fertile land (Grades 1 and 2). Although the areas have not been assessed as part of the post 1998 agricultural land assessment, land immediately to the east of the Access Road has, which further classifies this land as Grade 3b – *"Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year".* Therefore, there is a high possibility that land on which the Gas and Electrical Connections sit is also Grade 3b.

10.5.15 Additionally, the area required for the SECs has already been taken out of agricultural tenancy and is no longer farmed.

10.5.16 A CEMP would be produced prior to construction on site, along with method statements for construction of the Gas Connection and Electrical Connection. These documents would advise on the most appropriate working methods to protect, as far as is possible and practicable, agricultural land and soil quality. An outline of the CEMP is included as Appendix 3.2.

10.5.17 Methods to protect soils and agricultural land outlined in the CEMP will include:

- stockpiling of any excavated materials in discreet horizons, in reverse order of excavation to test whether any can be re-used on site and also to ensure that proper reinstatement (where appropriate) can take place;
- methods to prevent compaction of soils such as constructing access roads first and ensuring traffic only uses designated access routes;
- ensuring any exposed soils are re-vegetated as soon as practical to prevent excess runoff or wind erosion and all agricultural land required temporarily during construction would be reinstated, with a five-year aftercare plan to ensure land is returned to its former productivity.

10.5.18 Taking all of the above into consideration, it is not anticipated that there would be a significant impact on soil resources or agricultural land as a result of the Project and therefore this has been scoped out of the assessment. This has been agreed with key stakeholders (e.g. Natural England as highlighted in Table 10.1).

Assumptions and Limitations

10.5.19 The assumptions and limitations used in this assessment are as per Section 4.8.

Significance Criteria

10.5.20 The significance of the effects is defined using a combination of the value of the potential receptor and the potential consequence of the effect. Tables 10.2-10.4 illustrate how the value of the receptor and the magnitude of the impact determine the significance level of the effect which can be “negligible”, “minor”, “moderate”, or “major”.

10.5.21 The classifications have been generated using descriptions of environmental receptor importance and value given in various guidance documents including NHBC 2008[1] and DETR 2000[2]. Human health and buildings classifications have been generated by PBA using the attribute description for each class based on professional judgement.

Table 10.2 Criteria Used in Ground Conditions for Classifying Receptor Value or Sensitivity

Classification	Definition
High Receptor of national or international importance	Groundwater: Source Protection Zone Surface water: (General Quality assessment (GQA) Grade A or B High Ecological Status Ecology: Special Areas of Conservation (SAC and candidates), Special Protection Areas (SPA and potentials) or wetlands of international importance (RAMSAR) Buildings: World Heritage Site or Conservation Area Human health: Residential and uses where children are present
Medium Receptor of county or regional importance	Groundwater: Principal aquifer & Secondary A aquifer Surface water: GQA Grade C or D Good or Moderate Ecological Status Ecology: SSSI, National or Marine Nature Reserve (NNR or MNR) County Wildlife Sites (CWS) Buildings: Area of Historic Character Human health: Employment
Low Receptor of local importance	Groundwater: Secondary B aquifer or Unproductive Surface water: Poor Ecological Status Ecology: local habitat resources or no designation Buildings: Replaceable/Local value Human health: Transient or Limited Access. Unoccupied/Industrial land use and construction workers*

* assuming that construction workers will adopt appropriate health and safety and personal protective equipment procedures as will be required through the Construction Environmental Management Plan (CEMP).

Table 10.3 Magnitude of Impact on Ground Conditions

Magnitude		Example
Major	Adverse	A marked impact that causes a key attribute of the receptor to be lost/degraded.
	Beneficial	A marked improvement in relation to a key attribute of the receptor.
Moderate	Adverse	A noticeable impact that exceeds a standard (for example a generic assessment criteria (GAC)) but that does not cause a key attribute of the receptor to be lost/degraded.
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements or improvement of attribute quality.
Minor	Adverse	A discernible impact that is below a standard (for example a generic assessment criteria (GAC)) and does not cause a key attribute of the receptor to be lost/degraded.
	Beneficial	A discernible improvement in relation to a key attribute of the receptor.
Negligible	Adverse	No discernible impact.
	Beneficial	No discernible impact.
No Change		No change would be perceptible, either positive or negative.

10.5.22 The matrix for assigning the significance of effects is presented as Table 10.4. Effects of ‘moderate’ significance or above are considered significant in EIA terms.

Table 10.4 Significance of Effects for assessing Ground Conditions

Sensitivity/ Value of Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
High	Large	Large	Moderate	Slight
Medium	Large	Moderate	Slight	Slight
Low	Moderate	Slight	Slight	Neutral

10.6 Baseline Conditions and Receptors

10.6.1 Baseline conditions for the Project Site and study area have been identified using the GCA as described above, as well as reports for previous investigations undertaken within the Project Site and the wider Rookery Pit in 2000 by CLA and in 2009 and 2011 by PBA[3, 4, 5][30]

10.6.2 The baseline for the ground condition assessment has assumed that the LLRS works as noted in Section 3.1 of this ES will have been completed, prior to the commencement of construction of the Project in 2020.

Power Generation Plant

Site History

10.6.3 A description of the historical land use both on-site and off-site is provided in the Phase 1 GCA presented in Appendix 10.1. However, in summary, the Power Generation Plant site is indicated by historical maps as being agricultural fields until the 1970s when the Rookery Pits are first shown. The clay pits are predominantly shown as disused by 1982/1983 and in the more recent maps (2014) are indicated to be partly water filled.

Geology

10.6.4 A summary of the baseline geology associated with the Power Generation Plant Site is presented in Table 10.5 below.

[30] PBA 2011. Peter Brett Associates. Additional Ground Investigations Technical Note. Forming Appendix F of PBA 2011. Peter Brett Associates. Rookery Pit Low Level Restoration Scheme Planning Permission Ref BC/CM/2000/8 Site Environmental Management Plan. Ref 14081/052/Rev 1

Table 10.5 Summary of Baseline Geology at the Power Generation Plant Site

Formation	Sub-Unit	Thickness	Description
Superficial Deposits			
Alluvium		<3 m (inferred)	Quaternary deposits comprising clay and silt. Indicated by British Geological Survey (BGS) records as present associated with the Mill Brook.
Head Deposits		<3 m (inferred)	Quaternary deposits comprising clays, silt, sand and gravel. Indicated by BGS records as present along the far western extent of The Rookery South pit.
Bedrock Geology			
Oxford Clay Formation	Peterborough Member	~20m where undisturbed. 0m to 1.3m in the base of the pit *	Greenish or bluish grey fissile and organic rich clay shale that weathers to a plastic clay. The weathered clay can be locally referred to as 'Callow'. The unweathered clay is locally referred to as 'Knotts Clay'.
Kellaways Formation	Kellaways Sand Member	3.5m – 5.5m *	Kellaways Sand Member – Greenish grey clayey silt and clayey fine sand, cemented in parts.
	Kellaways Clay Member	1m – 1.5m *	Kellaways Clay Member – Medium to dark grey shelly fissured clay.
Great Oolite Group	Cornbrash Formation	1.2m – 1.9m *	Shelly and often flaggy limestone
	Blisworth Clay Formation	2.6m – 3.1m *	Dark grey mottled mudstone (formerly called the 'Great Oolite Clay').
	Blisworth Limestone Formation	>7.6m – 13m **	Shelly limestone with mudstone and siltstone beds (formerly called the 'Great Oolite Limestone').
Upper Estuarine Series		~2m – 6m	Pale greenish sandy limestone, sand and mudstone
Grantham Formation		~2m – 6m	Pale grey mudstone and sand

Notes:

* - Recorded within the Power Generation Plant Site during the CLA (2000)[3] and PBA (2009b)[5] investigations

** - The maximum penetration proved by the CLA (2000)[3] and PBA (2009b)[5] investigations was 7.4m. Historical ground investigation data from approximately 3km to the northeast of the Project Site recorded a thickness of 8.5 – 9.7m (Williams, 1985). BGS information indicates thicknesses of 6m – 13m (BGS 1:10,000 map sheet).

10.6.5 Following excavation of the unweathered Oxford Clay (‘Knotts Clay’) from The Rookery clay pits for brick manufacture, the overlying weathered Oxford Clay (‘Callow’), which was not suitable for brick making process, was cast back into the worked pits as “Callow Clay Fill”. The investigations undertaken within 100 m of the Power Generation Plant Site[3,5] have encountered Callow Clay Fill at all locations at thicknesses in excess of 4.7m, although more typically the thicknesses are in the region of 2m, tapering to a thin veneer, or are absent altogether close to the pit edges. Furthermore, deposits of Callow Clay Fill were slurried and then deposited back into the Rookery North pit as well as the north eastern corner of Rookery South, during the historic operations of the pit. These were subject to ground investigations by CLA 2000 and PBA 2011.

10.6.6 The base of the Oxford Clay has a persistent pyritic shell bed less than 0.5m above the base. This was unsuitable for brick making and typically accounts for the horizon of clay left at the base of the pits following the completion of clay extraction. The ground investigations have typically encountered up to 2.0m of remnant Oxford Clay underlying the Callow Clay Fill, albeit that it was absent in some isolated areas.

10.6.7 Along the western edge of the Power Generation Plant Site the ground levels rise from the base of the pit (pre LLRS works) at approximately 28m AOD to approximately 38m AOD. The slope is formed at an angle of approximately 1(Vertical):2(Horizontal) to 1(Vertical):3(Horizontal). Boreholes situated on the top of the western slope have encountered 1.65m – 3.0m of clayey Made Ground overlying in-situ Oxford Clay (Knotts). The borehole records indicate that this slope is formed from in-situ Oxford Clay deposits, i.e. it represents a cut profile rather than an embankment of entirely Callow Clay Fill.

10.6.8 In addition to the geological stratum identified above, a horizon of engineered fill will be placed across the base of the Rookery South Pit as part of the LLRS works. Fill will be formed from reworked Oxford Clay deposits extracted from a permitted excavation area to the south of the Rookery South Pit. Fill will be placed and compacted in layers according to predefined method statements. Across the footprint of the Generating Equipment Site, engineered fill will be placed at thicknesses of generally 1m – 2m but will be up to 3m in places where existing topographic levels are lowest. The base of the pit would be around 15mbgl following the LLRS works.

Hydrogeology

10.6.9 The main water bearing strata present below the Power Generation Plant Site are the Blisworth Limestone Formation and, to a lesser extent, the Cornbrash Formation and the Kellaways Sand. The clay formations present (Oxford Clay, Kellaways Clay and Blisworth Clay) are all of low mass permeability and, as such, act as aquicludes, retaining the groundwater bodies in the underlying water bearing strata.

10.6.10 The EA classifies the Kellaways Sand Member and Cornbrash Formation as Secondary A aquifers and the Blisworth Limestone Formation as a Principal aquifer. However, site specific assessment together with extensive historical published information[3] has shown that the permeability of the Kellaways Sand, the Cornbrash Formation and the Blisworth Limestone Formation is relatively low and the quality of the groundwater within these strata is generally poor. Therefore, it is considered that these deposits do not constitute a significant water source for abstraction purposes and that they act as aquitards.

10.6.11 The Power Generation Plant Site does not lie within a Groundwater Source Protection Zone (as defined by the EA).

10.6.12 The Power Generation Plant Site is situated in a low sensitivity geoenvironmental setting for the following reasons:

- there are no significant groundwater abstractions or source protection zones in the vicinity of the Power Generation Plant Site;
- the Secondary Aquifers of the Kellaways Sand and Cornbrash Formation are of limited thickness, low permeability and poor quality;
- the Principal Aquifer of the Blisworth Limestone Formation is of low permeability, poor quality and is protected by the overlying Blisworth Clay Formation.

10.6.13 Further information on historical groundwater levels and groundwater monitoring is included in the GCA, report (2017) presented within Appendix 10.1.

10.6.14 In 2017, a total of three groundwater samples and three surface water samples were obtained from the Project Site and submitted for geoenvironmental laboratory testing as described in Appendix 10.1. In general, the recent results are broadly similar to the available historical data and many determinands, particularly metals and hydrocarbons were recorded at concentrations below the laboratory limit of detection. It is considered that the results are typical of naturally occurring conditions and that there is no indication of anthropogenic contamination.

Sites of Geological Importance

10.6.15 The closest site designated for its geological interest is at Biddenham Pit, approximately 8 km north of the Power Generation Plant Site. It is designated for its outcrop of terrace gravel including interglacial mollusca and mammalian remains and Palaeolithic evidence.

Geoenvironmental Conditions – Soils

10.6.16 As part of wider historical ground investigations in Rookery South Pit (in 2009), two trial pits were excavated, six window sample boreholes and fourteen boreholes were sunk in the base of the pit within and in the vicinity of the Power Generation Plant area. No visual or olfactory evidence of contamination was noted within any of these exploratory holes.

10.6.17 As part of the ground investigation undertaken in 2009, a total of fifteen soil samples were submitted to the laboratory for geoenvironmental testing for a range of metals, Extractable Petroleum Hydrocarbons (EPH) and Polyaromatic Hydrocarbons (PAHs). The results of this testing were compared to relevant assessment criteria for the protection of human health and there was no evidence of significantly elevated concentrations of any of the determinands.

10.6.18 As part of historical PBA ground investigations in 2009[6], supported by further investigations undertaken by PBA in 2011 in support of discharge of planning conditions associated with the LLRS[31], soil samples were taken from the north-eastern quarter of Rookery South for geoenvironmental laboratory analysis in order to target the area known to have been previously subject to deposition of Callow sludge waste. None of the determinants tested showed any evidence of elevated concentrations when compared to relevant assessment criteria.

<u>Geoenvironmental Conditions – Groundwaters</u>

10.6.19 The historical ground investigation works[3,5] have included assessment of the water quality within the Kellaways Sand, Cornbrash Formation and Blisworth Limestone Formation. Analyses have included testing for a range of potential historical contaminants.

10.6.20 In general, groundwater quality in the Kellaways Sand, the Cornbrash Formation and the Blisworth Limestone Formation in the region has been identified as being poor, with saline conditions reported from the historical investigations undertaken in 2009[4,6].

10.6.21 Historical monitoring of water quality[3,5] within the Kellaways Formation and the Blisworth Limestone Formation has identified that the quality of the groundwater within both formations is similar in nature, with naturally elevated concentrations of electrical conductivity, chloride, sulphate, ammoniacal nitrogen, boron, iron and zinc when compared to the relevant assessment criteria at the time, and as described in the Phase 1 GCA.

10.6.22 Groundwater and surface water analysis for hydrocarbons has also been undertaken within the wider Rookery South Site. During the more recent PBA monitoring (2014 and 2017) hydrocarbon analysis was undertaken and found to be below the laboratory detection limit at each monitoring location.

[31] PBA 2011. Peter Brett Associates. Rookery Pit Low Level Restoration Scheme Planning Permission Ref BC/CM/2000/8 Site Environmental Management Plan. Ref 14081/052/Rev 1

Gas Connection

10.6.23 The geological and hydrogeological baseline in the vicinity of the Gas Connection is similar to the natural strata which would have existed at the Power Generation Plant Site and in the Rookery South Pit prior to excavation of clay.

Geology

10.6.24 BGS Borehole records for the area in which the Gas Connection would be sited indicate the following geological sequence:

- weathered Oxford Clay described as 'Callow', overlying
- Oxford Clay described as 'Knotts' to generally between about 15m and 30m depth below ground level, overlying
- The Kellaways Formation

Hydrogeology

10.6.25 The clayey deposits of the Callow /Callow Clay Fill, Oxford Clay, Kellaways Clay and Blisworth Clay Formation underlie the Gas Connection Route. They have been shown to be of extremely low permeability and can be considered as being aquicludes. Whilst the Kellaways Sand and Cornbrash Formation are classified as Secondary A aquifers, they have been shown to be insignificant water resources during previous investigations[3,5] due to their limited thickness, low permeability and poor water quality and are considered herein to act as aquitards.

Sites of Geological Importance

10.6.26 The closest site designated for its geological interest is at Biddenham Pit, approximately 8km north of where the Gas Connection connects to the Generating Equipment. It is designated for its outcrop of terrace gravel including interglacial mollusca and mammalian remains and Palaeolithic evidence.

Geoenvironmental Conditions – Soils, Groundwater

10.6.27 No ground investigation works have been undertaken directly on the route of the Gas Connection (other than for the part within Rookery South Pit which is as described above for the Power Generation Plant). However, as the land on which the Gas Connection has not previously been developed and ground investigations on surrounding land (e.g. the Rookery South Pit) have not revealed any evidence of contamination, it is very unlikely that land on which the Gas Connection will be sited is contaminated either as no potential sources of significant contamination have been identified in the Phase 1 GCA.

Electrical Connection

10.6.28 The baseline ground conditions of the parts of the Electrical Connection located outside of Rookery South Pit (e.g. buried cables and SECs) are as described above for the Gas Connection. The baseline conditions underlying the substation are as described for the Power Generation Plant Site.

10.6.29 No ground investigation works have been undertaken directly on the route of the Electrical Connection (other than for the part within Rookery South Pit which is as described for the Power Generation Plant). However, as the land on which the Electrical Connection has not previously been developed and ground investigations on surrounding land (e.g. the Rookery South Pit) have not revealed any evidence of contamination, it is very unlikely that land on which the Electrical Connection will be sited is contaminated either, as no potential sources of significant contamination have been identified in the Phase 1 GCA.

10.7 Assessment of Effects

Power Generation Plant

Construction/Decommissioning

10.7.1 On-site construction workers have the potential to be affected by unstable slopes through the construction of any deep excavations and/or cuttings into the toe of the western slope of the Rookery South Pit where there is the potential for instability to occur. However, the embedded mitigation measures as outlined in Section 3.6 of this ES, such as, temporary works measures including trench sheeting in any excavations will be utilised. Therefore, there is anticipated to be a negligible adverse effect on a receptor of medium sensitivity, resulting in a slight significance of effect and therefore not significant.

10.7.2 High groundwater levels and potential for hydraulic uplift have the potential to affect construction workers. Due to historical clay extraction at the Generating Equipment Site, groundwater levels are close to existing ground levels (before completion of the LLRS) in the base of the Rookery South Pit. Once the LLRS works have been completed in the Generating Equipment Site, groundwater levels are anticipated as being at circa 29m AOD compared to an average development platform level for the LLRS of 31.5m AOD. The shallowest groundwater body in the base of the pit is around 29m AOD with a corresponding (current) ground elevation of around 29.9m OD. Hence at the moment groundwater is at around 0.9m below ground level in places. The groundwater levels will be at much the same elevation after the implementation of the LLRS, but the base of the pit will be raised by up to 3m in places, hence the depth to groundwater consequently will be greater, not the groundwater elevation. High piezometric groundwater levels may have the potential to result in ground heave and groundwater influx in the base of any deep excavations (around 2m or 2.5m bgl depending on the elevation of the base of the pit) during construction. However, permeability test results have shown that the deposits are of limited permeability and seepage rates will be slow. If significant groundwater flows are encountered within excavations then temporary (embedded) mitigation measures including dewatering pumps will be implemented. Following the implementation of these measures there is anticipated to be a negligible adverse effect on a receptor of medium sensitivity, resulting in a slight significance of effect.

10.7.3 Potential contamination within the soils and groundwater has the potential to affect construction workers. Whilst ground investigations have shown no evidence of contamination present at the Power Generation Plant Site, there remains the potential for small, localised, inclusions of potentially contaminated materials within any residual Made Ground/reworked deposits present at the Power Generation Plant Site. Any as yet undiscovered potential sources of contamination may cause health impacts as a result of direct or indirect contact with contaminated materials. No additional mitigation measures are considered necessary, over and above the embedded mitigation referred to above and in Section 3.6 (e.g. construction workers will undergo appropriate health and safety training and will wear personal protective equipment in conjunction with appropriate hygiene facilities and a CEMP will be implemented). Following the implementation of these measures there are not anticipated to be any effects.

10.7.4 Any pollution releases during construction/decommissioning works have the potential to affect construction workers. During construction works there is potential to introduce new sources of contamination into the environment (for instance; uncontrolled leaks and spills from machinery). To mitigate this potential, no additional measures are required over and above the embedded mitigation referred to in Section 3.6 that will be included in the CEMP. Once the embedded mitigation measures are implemented, there are not anticipated to be any effects.

10.7.5 A potential effect of the construction/decommissioning of the Generating Equipment will be the mixing of aquifer bodies through the creation of new pathways. The construction of piled foundations extending through the Kellaways Sand Member, Cornbrash Formation and into the Blisworth Limestone Formation has the potential to introduce new pathways between aquifer bodies. However, no special mitigation measures are considered necessary over and above the embedded mitigation referred to in Section 3.6. This includes the provision of a Foundation Works Risk Assessment (FWRA) which will be undertaken by the contractor once the proposed foundation solutions are known. EA guidance ‘Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination’ (EA, 2001) and a requirement to carry out such an assessment will be incorporated into the CEMP (which is secured via a requirement on the draft DCO). Once these mitigation measures are implemented there are not anticipated to be any effects.

Operation (which includes maintenance)

10.7.6 High piezometric groundwater levels may have the potential to result in ground heave in the base of the pit if piezometric pressures exceed confining pressures from the overlying structures, resulting in the potential for uncontrolled release of groundwaters. However, given the placement of engineered low permeability fill across the base of the pit as part of the LLRS, widespread heave is not expected to occur. However, this cannot be confirmed until further ground investigations have been undertaken (as described in Section 10.9) and therefore a precautionary approach has been taken to the assessment. This represents a potential major adverse impact on a receptor of medium sensitivity, resulting in a large adverse significance of effect (without mitigation in the form of further investigations).

10.7.7 These further assessments will form part of the additional mitigation measures required and will include Phase 2 investigations to confirm the findings of Phase 1 studies to date, along with the determination of an appropriate foundation solution and a subsequent reappraisal of risk. These have been secured as a requirement attached to the DCO (Requirement 8). There are not expected to be any effects following the implementation of these additional mitigation measures.

Gas Connection

Construction/ Decommissioning

10.7.8 During construction and decommissioning of the Gas Connection there is potential for mobilisation of silt and contamination associated with the excavations required during construction.

10.7.9 Embedded mitigation will be implemented to offset mobilisation of silt and contamination which will be included in the CEMP including the installation of silt interceptors at the Project Site. Once these measures are implemented, there is expected to be a negligible impact on a receptor of medium sensitivity and therefore a slight significance of effect and ‘not significant’.

Operation (including maintenance)

10.7.10 Based on this assessment, there are not considered to be any potential impacts on ground conditions as a result of the operation of the Gas Connection. This has therefore been scoped out of the assessment as per Section 10.5.11.

Electrical Connection

Construction/ Decommissioning Electrical Connection

10.7.11 During construction and decommissioning of the Electrical Connection there is potential for mobilisation of silt and contamination during construction. Embedded mitigation will be implemented to offset mobilisation of silt and contamination which will be included in the CEMP. Once these measures are implemented, there is expected to be a negligible impact on a receptor of medium sensitivity and therefore a slight significance of effect and 'not significant'.

Operation (including maintenance)

10.7.12 Based on this assessment, there are not considered to be any potential impacts on ground conditions as a result of the operation of the Electrical Connection. This has therefore been scoped out of the assessment as per Section 10.5.12.

10.8 Cumulative and in Combination Effects

Overview

10.8.1 Construction, decommissioning or operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in Section 4.10 However, the following proposed developments are all distant from the Project Site and outside of the study area:

- Land at Moreteyne Farm;
- Land at Warren Farm on Flitwick Road in Ampthill;
- The proposed new settlement at Wixams,
- Land off Marston Road, Lidlington – proposed residential development;
- Land opposite The Lane & Lombard Street, Lidlington – proposed residential development;
- Lower Shelton Road, Marston Moretaine – proposed residential development;
- Land to the rear of Cowlgrove Parade – Flitwick – proposed multi storey car park;
- Land east of Ampthill Road at Houghton Conquest – proposed mixed use development;
- Land off Chapel End Road at Houghton Conquest – proposed residential development;
- Land at Wootton – proposed residential development.

10.8.2 These developments and any effects arising from them are outside the influence area for this topic within which significant effects could occur (e.g. mobilisation of contamination) meaning that any cross over in study areas and therefore effects would be extremely unlikely. As such it is considered that no cumulative or in combination effects are likely to arise in relation to ground conditions or from contamination during the construction or decommissioning phases of the Project. Furthermore, each of these developments will be bound by its own CEMP and will apply best practice construction methods so as to minimise impacts on ground conditions and from contamination.

Construction and Decommissioning

10.8.3 The projects considered to be of relevance to the cumulative effects assessment for this chapter (taken from Section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, (immediately north of the Generating Equipment Site).

10.8.4 Little detail is known about the 'Integrated Waste Management Facilities' proposed for development in the Rookery South Pit. At present, a request for a scoping opinion has been submitted by the promoter of the project although no details are provided regarding potential impacts on ground conditions or human health as a result of the project.

10.8.5 The construction of both the Project and the Integrated Waste Management Facilities at the same time represents the greatest potential for creating cumulative effects on ground conditions as this represents the greatest potential for ground disturbance across the two projects. This is therefore judged to be a realistic worst case scenario for cumulatively assessing construction impacts. Any other scenario (e.g. operation of one scheme and construction of the other) would generate less ground disturbance and therefore less impacts.

10.8.6 However, it is likely that this development will be bound by its own CEMP and best practice construction methods so as to limit impacts on ground conditions during construction. Should it go ahead, then it will need to consider the Project to ensure that no significant cumulative effects will arise between it and the Project. Nevertheless, in order to minimise the possibility of cumulative effects arising, a CEMP will be followed during construction of the Project, which will ensure best practice construction methods are followed and limit, as far as practicable, the possibility of impacts occurring to ground conditions. The measures proposed to minimise impacts during construction are listed in Section 3.6 and include e.g. spill response procedures and correct handling of any hazardous substances.

10.8.7 Furthermore, given the early stage of the Integrated Waste Management proposals and the likely time required to achieve planning consent, it is considered unlikely that there would be any overlap on the construction periods of these two projects, which further mitigates against any potential cumulative effects.

10.8.8 The construction of both the Project and the Covanta RRF Project at the same time represents the greatest potential for creating cumulative effects on ground conditions as this represents the greatest potential for ground disturbance across the two projects. This is therefore judged to be a realistic worst case scenario for cumulatively assessing construction impacts. Any other scenario (e.g. operation of one scheme and construction of the other) would generate less ground disturbance and therefore less impacts.

10.8.9 The ES for the Covanta RRF Project to the north of the Generating Equipment Site concluded that there were a number of potential (pre-mitigation) impacts arising from construction and decommissioning of the project on ground conditions. These include:

- Impacts on controlled waters from potential release of contaminants and silts (minor adverse);
- Slope instability (moderate adverse);
- High groundwater levels leading to uplift (minor adverse);
- Mixing of groundwater aquifers (moderate adverse); and
- Impacts from existing contamination on construction workers (moderate adverse).

10.8.10 However, a number of mitigation measures were proposed within the Covanta RRF ES to limit these potential impacts. These were subsequently imposed by the Order (Requirements 13 and 14). In the main, these include working to best practice guidance and stringently adhering to a Code of Construction Practice (CoCP). Some slope stabilisation measures were also proposed in the western edge of the Operations Area and reliance was placed on the completion of phase 1 of the LLRS prior to construction (e.g. low permeability fill in the base of the pit to prevent uplift).

10.8.11 In all cases, once mitigation was taken into consideration, there were deemed to be no residual effects on ground conditions from construction or decommissioning of the Covanta RRF Project as stated in the Covanta RRF ES.

10.8.12 Similarly, potential effects on controlled waters from potential release of contaminants and silts was identified for the Project. However, applying the implementation of the embedded mitigation described in section 3.6 of this ES (including adherence to a CEMP) it has been concluded that there will be no effects arising from the construction and de-commissioning of the Project on controlled waters.

10.8.13 Therefore, it is considered that, based on professional judgement, the effects on controlled waters associated with construction of the Project (no effect) considered together with the effects associated with construction of the Covanta RRF Project (no effect) would not give rise to a significant cumulative effect or give rise to new or different effects that would occur if the projects are constructed independently of one another.

10.8.14 Slope instability was also identified as a potential effect relating to both the Project and the Covanta RRF Project. However, the LLRS works, which have been assumed as part of the baseline for the Project would mean that any effects would be reduced to ‘slight’ adverse. Further to this, the two projects would be constructed in different phase areas of the LLRS within Rookery South Pit and therefore would not involve excavations into the same areas of the pit or the same slopes.

10.8.15 Based on professional judgement, there is therefore not anticipated to be any effects from slope stability cumulatively from the construction and decommissioning of the Project and the Covanta RRF Project. The effects of slope instability associated with construction of the Project (slight) considered together with the effects associated with construction of the Covanta RRF Project (no effects) will not give rise to new or different effects that would occur if the projects are constructed independently of one another.

10.8.16 Potential effects on human health were also identified from e.g. mobilisation of contamination from construction of the Project. However, the implementation of the embedded mitigation described in section 3.6 and Appendix 3.2, there would be no effects arising from the construction and de-commissioning of the Project on human health. Based on professional judgement, there is therefore not anticipated to be any cumulative effects on human health from the two projects.

10.8.17 The potential for effects from hydraulic uplift have also been identified for the Project. However, based on professional judgement, even considering the combined pressure, provided that embedded mitigation measures were followed including the use of a CoCP/CEMP, working within best practice guidelines, and the placement of a low permeability fill as part of the LLRS works, then the resulting effect is likely to be slight.

Operation (including maintenance)

10.8.18 As above, the projects considered to be of relevance to the cumulative effects assessment for the operation of the Project (taken from section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, immediately north of the Generating Equipment Site).

10.8.19 Little detail is known about the 'Integrated Waste Management Facilities' proposed for development in the Rookery Pit. At present, only a high level scoping opinion has been submitted. No details are proposed regarding potential impacts on ground conditions or human health as a result of the project. However, it is likely that this development will adopt practices to limit impacts on ground conditions and human health. The assessment set out in this Chapter has shown no significant effects on ground conditions are anticipated to arise from the operation and maintenance of the Project. Accordingly, then given that the Project alone is anticipated to have no significant effects on ground conditions it is anticipated that no cumulative impacts will occur with this development during operation and maintenance.

10.8.20 The ES for the Covanta RRF Project to the north of the Generating Equipment Site concluded that there were potential (pre-mitigation) effects from operation of that project resulting from:

- Impacts on controlled waters from potential release of contaminants and silts (minor adverse);
- Slope instability (moderate adverse);
- High groundwater levels leading to uplift (major adverse);
- Mixing of groundwater aquifers (moderate adverse);
- Impacts from existing contamination on construction workers (moderate adverse); and
- Contamination resulting from the waste reception area, hazardous materials storage area and site access roads (minor adverse).

10.8.21 However, a number of mitigation measures were proposed within the Covanta RRF ES to limit these potential impacts. In the main, these include working to best practice guidance and stringently adhering to an environmental permit. Some slope stabilisation measures were also proposed in the western edge of the Operations Area and reliance was placed on the completion of phase 1 of the LLRS prior to construction (e.g. low permeability fill in the base of the pit to prevent uplift).

10.8.22 In all cases, once mitigation was taken into consideration, there were deemed to be no residual effects on ground conditions from operation and maintenance of the Covanta RRF Project.

10.8.23 The assessment set out in this Chapter has shown that the only potential significant effect on ground conditions anticipated to arise from operation and maintenance of the Project is the potential for hydraulic uplift. Accordingly, this will be the subject of detailed additional mitigation (see Section 10.9) which would mean that there would be no residual effects. Based on professional judgement, even considering the combined pressure, provided that embedded mitigation measures were followed including the use of a CEMP, working within best practice guidelines, and the placement of a low permeability fill as part of the LLRS works, then there would be no cumulative effects.

10.9 Additional Mitigation

10.9.1 A detailed assessment of the uplift forces acting upon any permanent buried structures will be undertaken prior to construction and following confirmation of the construction technique and therefore the mass of any buried structures. This will form part of the ground investigation works which would be secured by a Requirement to the DCO (Requirement 8). If uplift forces exceed the mass of the structure and any permanent contents, then foundations will be designed to accommodate uplift forces with appropriate factors of safety. Appropriate method statements and foundation works risks assessments will be developed in accordance with industry guidelines. A range of different foundation designs can all be incorporated within the boundary of the Generating Equipment Site.

10.9.2 There are not expected to be any significant effects following the implementation of these additional mitigation measures.

10.10 Summary of Residual Effects

10.10.1 Table 10.6 sets out a summary of the likely significant effects arising from the Project during construction, operation and maintenance and de-commissioning.

10.10.2 The following elements are reported:

- the affected group or receptor
- the sensitivity of the affected group/receptor
- potential effect
- the likely magnitude and duration of the effect
- the likelihood of occurrence
- proposed mitigation or response to mitigate the effect
- the significance of the residual effect following the incorporation of mitigation

10.10.3 Also reported are any potential cumulative effects arising on a receptor during each phase.

Table 10.6 - Summary of Residual Effects

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Construction and Decommissioning Phase									
Power generation plant	Construction Workers (Human Health)	Medium	Unstable slopes Potential soil and groundwater contamination High groundwater levels	Negligible Local Short-term	Low	Further embedded mitigation to include provision of hygiene facilities, H&S training and construction best practice as outlined in the CEMP Temporary groundwater control if required for deep structures.	Slight adverse – not significant	Further assessment via Phase 2 investigations and reappraisal of risk as a requirement.	Negligible - not significant
	Controlled Waters	Medium	Foundations may create preferential pathways between groundwater bodies and allow aquifer mixing	Negligible Local Long Term	Low to Medium	Implementation of construction best practice and development of an appropriate foundation solution A FWRA will be undertaken by the contractor and incorporated into the CEMP	Negligible - not significant	None	Negligible - not significant
Gas Connection	Surface waters	Medium	Mobilisation of contamination / silts.	Negligible Local Short Term	Low	Implementation of best working methods included in CEMP.	Negligible - not significant	None	Negligible - not significant
Electrical Connection	Surface waters	Medium	Mobilisation of contamination / silts.	Negligible Local Short Term	Low	Implementation of best working methods included in CEMP.	Negligible - not significant	None	Negligible - not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Cumulative effects (Project)	No cumulative effects anticipated.								

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Operation and maintenance									
Power generation plant	Generating Equipment	Medium	Uncontrolled release of groundwaters, structural damage due to heave if piezometric pressures exceed confining pressures	Large Local Long Term	Low	Appropriate foundation design and a FWRA will be undertaken by the contractor and incorporated into the CEMP	Major adverse	Phase 2 investigations to confirm findings of Phase 1 studies to date, along with the determination of appropriate foundation solution and a reappraisal of risk and implementatio n of that solution	Negligible
Gas and Electrical connection	None affected								
Cumulative effects	No cumulative effects anticipated.								

10.11 Conclusions and ongoing work

10.11.1 Baseline conditions at the Power Generation Plant Site comprise the Rookery South former clay extraction pit. The Gas and Electrical Connections are mainly located on previously undeveloped agricultural land.

10.11.2 The geological sequence underlying the Project Site broadly comprises the Oxford Clay Formation overlying the Kellaways Formation (sand and clays) which overlie Blisworth Clay and Limestone.

10.11.3 In order to determine appropriate design solutions for foundations and any associated infrastructure design, additional structure specific Phase 2 ground investigation will be undertaken, which will further inform the appropriate risk assessments and the need for any site specific mitigation measures. This will be secured as a Requirement of the DCO (Requirement 8).

10.11.4 Construction of the Project has the potential to mobilise silts and contamination, and construction and operation of the Project has the potential for experiencing uplift groundwater pressures from high groundwater levels and slope instability. However, following the implementation of both the Low Level Restoration Scheme (future baseline), and embedded and additional mitigation measures, no likely significant effects have been identified as a result of construction or decommissioning of the Project on ground conditions, either when considered alone or cumulatively with other developments.

10.11.5 The conclusions of this Chapter are that the construction, operation and maintenance and decommissioning of the Project does not result in any likely significant effects on ground conditions, either when considered alone or cumulatively with other developments.

11 Landscape and Visual Impact Assessment (LVIA)

11.1 Introduction

11.1.1 This Chapter presents the assessment of likely significant effects on the landscape character of the study area for this topic and the visual amenity of sensitive receptors arising from the construction, operation and decommissioning of the Project.

11.1.2 The Project has the potential to affect the landscape, including landscape character, and people's views and visual amenity due to the processes involved in construction (e.g. ground clearance, use of large plant) and decommissioning (e.g. dismantling structures, restoring land) as well as during operation from the introduction of new large structures into the landscape (e.g. the stack of the Generating Equipment and SECs associated with the Electrical Connection).

11.2 Legislation and Policy Context

11.2.1 The legislation and policy context in relation to landscape and visual effects is described in detail in Appendix 2.11 of the ES. However, in summary, the following items of policy, legislation and guidance have been referred to in preparing this assessment:

- National Policy Statements (NPS):
  - NPS EN-1: Overarching NPS for Energy;
  - NPS EN-2: Fossil Fuel Electricity Generating Infrastructure;
  - NPS EN-4: Gas supply Infrastructure and gas and oil pipelines; and
  - NPS EN-5: Electricity Networks Infrastructure.
- National Planning Policy Framework, 2012;
- The Central Bedfordshire Core Strategy and Development Management Policy, adopted November 2009 – Policy CS14: High Quality Development; Policy CS15: Heritage; Policy CS16: Landscape and Woodland; and Development Management Policy DM14: Landscape and Woodland;
- The Bedford Borough Local Plan, adopted October 2002.
- The Central Bedfordshire Development Strategy, revised pre-submission draft May 2014 - Policy 58: Landscape;
- Bedford Borough Core Strategy and Rural Issues Plan (adopted April 2008) – Policy CP24: Landscape Protection and Enhancement.
- Bedford Borough Council Local Plan 2035 2017 Consultation Paper

11.3 Consultation

11.3.1 A list of consultation responses received to date relating to landscape and visual effects are presented in Table 11.1 below, along with details of how these have been responded to.

Table 11.1 - Summary of consultation and responses

Reference	Comment	Response
SoS Scoping Opinion		
3.71	The landscape and visual cumulative impacts assessment should include not just other proposed large industrial developments in the area, but also other types of development that could contribute to a cumulative effect. The SoS recommends that the wind turbine in the Marston Vale Millennium Country Park is included in the assessment of potential cumulative effects of this Project, and that consideration should be given to the potential for a further turbine at Stewartby landfill site.	Cumulative impacts are described in section 11.9 the application for the proposed turbine at Stewartby has been withdrawn and has not been considered further. As the turbine at the Marston Vale Millennium Country Park is already operational, it has been considered in the baseline assessment (Section 11.6).
3.72	Study area should be clearly defined - is 1km large enough?	The study area is described in section 11.5.
3.73	Reference is made in this section to a Zone of Theoretical Visibility (ZTV) plan. The SoS advises that the ES should describe the ZTV model used, and provide information on the area covered, the timing of any survey work, and the methodology used. The SoS welcomes the intention to provide photomontages, and recommends that the locations of viewpoints are agreed with the relevant local authorities.	The ZTV methodology is described in Section 11.5, as are fieldwork methodology and timings. Viewpoints have been agreed with key consultees (e.g. CBC).
3.74	Further info should be provided on the Chilterns AONB and more justification as to why it has been scoped out.	The Chilterns AONB has been scoped out of the assessment given the distance between it and the Project Site (approximately 12 km) intervening topography and the size of the Project. The ZTV has shown that the Project will not be visible from the AONB.
3.75	The ES should include a plan showing all landscape features including PRoW.	Noted this is included on Figure 11.3.

Reference	Comment	Response
3.77	Careful consideration needed of siting, use and materials and colours to minimise visual impacts.	The Applicant has produced an outline design that ensures that the siting, use and materials and colours are complimentary to the landscape context.
3.78	Night lighting and visible plumes also need to be considered.	An outline lighting strategy which addresses lighting at night is submitted alongside the ES (Appendix 11.2). This chapter provides an assessment of lighting effects. There will be no visible plume from the Power Generation Plant.
Ampthill Town Council		
Scoping Response Letter	The size of the plant will have a major impact on the visual quality of the landscape and will adversely impair the views from the Vale to the surrounding Greensand Ridge and the panoramic views from the ridge, especially those seen from Ampthill Park a Grade II listed historic park and Houghton House ruins, a Grade I English Heritage site	This Chapter presents a landscape and visual impact assessment. Assessment of Effects is set out in Section 11.7. The assessment includes potential effects on the views from the Greensands Ridge, representative of Houghton House and from Ampthill Park and its environs.
	Local policy seeks to protect, conserve and enhance the County's scheduled ancient monuments, conservation areas, parks and gardens and their settings. The proposed EFW is contrary to these policies.	It is considered that the Project, which is not an energy from waste plant, aligns with local policy in that it is an appropriate development to site in the Rookery South Pit. Further details on local policy are provided in Chapter 2.
CBC		
Scoping Response Letter	It would be helpful to have a viewpoint from the crest of Ampthill Hill as this provides an oblique viewpoint over the Vale.	This is provided in Table 11.11, Viewpoint 3.
	The EIA would need to provide details of the landscape mitigation, including any proposed off site planting	This is provided in Section 11.11 and an outline LEMMS which is included as Appendix 11.3.

Reference	Comment	Response
	Would like to see a green roof on the GTGs.	The Applicant has considered this request but the provision of a green roof on the Gas Turbine Generator is not practical given the limited roof space available and the nature and finish of the materials to be used for the Gas Turbine Generator. Final layout and design will be subject to approval of CBC.
	The colour palette would also be an important factor in terms of mitigation.	Comment addressed as per response to SoS Comment 3.77 above.
Response to 2014 PEIR	The LVIA is not as comprehensive as required for a development of this nature. The Zone of Visual Influence has been limited to a 5 km radius - whilst this area will experience the greatest change, the impact over 10km would highlight the communities which would be affected by the proposal.	Following the publication of the 2014 PEIR and receipt of comments, the ZTV was extended further north to show full extent of theoretical visibility.
	The ZTV diagram Figure 11.1 does not differentiate between the visibility of the vertical features and the built form of the plant and substation. It would be preferable to have a conventional ZTV map showing visual impact of these different aspects over a wider area.	The ZTV represented the visibility of the Project based on the maximum height of 35m for the stack.

Reference	Comment	Response
	The viewpoints chosen are appropriate, but six further viewpoints should be assessed. The report acknowledges that additional winter survey work is required to test visibility. This would then inform the assessment of visual effects. Suggested further locations - i) From the eastern boundary of the Millennium Country Park *ii)* From Footpath 14*.* iii) From Pillinge Farm. iv) A view looking across the development with the Greensand ridge as the back ground. *v)* From London Lane, Houghton Conquest*).* vi) From Houghton Conquest - including Footpaths 3 or 10.	A winter site visit was made in January 2015 and winter photomontages were produced. A further visit was made in March 2017 and updated winter montages were produced. These are set out in Document Reference 7.1, as are separate photosheets from individual, single frame photographs. The location of the Photographs is set out on Figure 11.2 and include: VP15, from the Millennium Country Park, as close to South Pillinge Farm as possible from a publicly accessible place. VP10 and 13, looking east across the Project Site with the Greensands Ridge in the background. VP2, which provides a worst case view from Houghton Conquest. VP7 which covers Footpath 14 Views from South Pillinge Farm are not anticipated due to surrounding vegetation. The ZTV indicates partial theoretical visibility from the London Lane, Houghton Conquest area; however landform and intervening vegetation prevent views. Site work included visit to Houghton Conquest and Footpaths 3 and 10; however, there were no clear views of the Project Site.

Reference	Comment	Response
	The montages currently available highlight the intrusive nature of the transmission towers. Although there is a line of pylons already (one of which would be removed) and the railway catenary, these structures are considered to be detracting features, particularly in the view from the Ridge. Photomontages 6, 6b and 15 are from the Country Park. Viewpoint 7 is adjacent to Ampthill Park House. Views from Millbrook Village were assessed on site and no views were established. Additional photo montages are also required, particularly for short distance views from the Country Park, Millbrook village and Ampthill Park House.	No additional towers are proposed as the electrical connection will be underground, which is now reflected in the updated photomontages. The views included in the assessment are considered to be representative of the range of views, both long and short distance views, available from the topic study area around the Project Site. Viewpoint 15 is short range from the Country Park, Viewpoint 16 provides a worst case view from the edge of Millbrook Village, Viewpoint 7 is from the public footpath in front of Ampthill Park House.

Reference	Comment	Response
	The cumulative impact of the development has not been fully examined e.g. the PEIR has not taken the visual impact of the wind turbine at the Millennium Country Park and the proposed turbine at Stewartby landfill site into consideration. (Forest of Marston Vale turbine is illustrated in the photomontages). The information provided with the EIA should illustrate in drawing form the impact of the MP proposal without Covanta - and without the benefits of the Covanta landscape scheme. In the photomontages - the Covanta Energy from Waste (EfW) building acts as a screen in views from the north. As the development is without significant landscape screening, the power station would be seen from the rights of way and some residential properties in Stewartby. Whilst the latter is an issue for BBC, the visual impact from public access routes needs to be fully considered and mitigation designed accordingly.	The Millennium Park turbine forms part of the baseline; the Stewartby turbine application has been withdrawn and is not considered further. The outline Landscape and Ecology Mitigation and Management Strategy drawings (Appendix 11.3) shows significant new plantings and the effect of the planting has been addressed in the LVIA.
	The "Illustrative Visual" (consultation leaflet) of the MP development does not show strategic landscape planting on the Application site. The "woodland" planting to the south is part of the Low Level Restoration Scheme, the land for which is currently being excavated. The proposed planting would need around 15 year's growth to achieve partial screening of the proposal. The rest of Rookery Pit appears "green" as if it was open space.	This is correct –the Low Level Restoration Scheme (LLRS) planting has been shown because it forms part of the baseline – there is a commitment to this being carried out. The rest of the pit is shown as green space because the only plans available (for the LLRS) show it as such. The Landscape and Ecology Strategy Plan shows the combined mitigation (LEMMS) Appendix 11.3)).

Reference	Comment	Response
	Considerations of the Water Courses in the vicinity of the site should be undertaken including the route of the Bedford - Milton Keynes Waterway; this should be mapped on the water resources plan.	There will be no views from any of the waterways linking the River Great Ouse to the Grand Union Canal, along the proposed route of the of the Bedford - Milton Keynes Waterway to the Project Site, given the low lying nature of the waterway and of the Project Site. The waterway is approximately 5km from the Project Site and will not be affected by the Project.

	The Site is within the Forest of Marston Vale for which the long term aim is to achieve the target of 30% woodland cover in the Forest area by 2030. Policy CS16 of the Core Strategy and Development Management Policies for Central Bedfordshire (North) 2009 should be adhered to.	Policy CS16 has been added to the policy context at 1.2 and reflected in the text at 1.6.24.
	It would be useful to provide a plan showing trees and hedgerows to be removed and what they consist of.	Lengths of hedgerow and areas of woodland to be removed are shown on the Landscape and Ecology Strategy Plans in the LEMMS and described in the Landscape Effects Table at Appendix 11.1.
Pre Application Advice: (letter dated 21 October 2015)	NCA 88 – Bedfordshire Claylands. The update of the NCA places greater emphasis on the need to recognise the sense of place created by the brickwork industry. The ES could reflect this with reference to the NCA.	Included are the key characteristics of NCA 88 set out at 11.6.
	Landscape designation: the Site falls within the landscape designation of Community Forest. As one of only 12 Forests nationally, the Forest is considered an environmental designation of significance. The Forest of Marston Vale work with developers to achieve 30% tree cover across the Forest area. The text should be amended to reflect this.	Added to Table 11.2 and added to the text at 11.6.
	If the Covanta development is withdrawn, there may be a need for further landscape integration, including consideration of planting within the Millennium Country Park.	
	Long Distance Paths: ensure that Sustrans route 51 is included.	NCN Route 51 added to Table 11.2: Landscape Designations and shown on Figure 11.4.

Reference	Comment	Response
	Cumulative landscape impact: Brogborough Wind Farm has not been progressed. There are proposals to electrify the Marston Vale Line as part of the east-west rail scheme. The visual impacts of Millbrook Power need to be considered with the catenary and other structures proposed. This infrastructure is in the initial stages of consultation but has the potential to increase vertical structures in the Rookery corridor.	Brogborough Wind Farm has been deleted from the list of projects for cumulative assessment as set out in Chapter 4. Phase 2 of the East-West Rail Link Project has been described in section 4.10 of the ES. Little detail is known on the scheme or the timings and so it has not been considered at this stage. Should more details be made available prior to submission of the DCO Application for the Project, they will be included within the ES.
Forestry Commission		
Scoping Response Letter	We are aware of the ambition for the Forest of Marston Vale which is close to this therefore we hope that the developers will seek to avoid any deforestation. Should this be a requirement we would like to see compensatory new plantings in the ratio of at least 4:1 i.e. four trees planted to one removed, this precedent having been set in other planning applications	Approximately 0.2ha of woodland will be managed for the temporary diversion of the 400kV line, but the trees can be left to grow back once construction is complete. Approximately 0.2ha of woodland will be removed as a result of the construction of the SECs and almost 0.9ha. will be planted to compensate for the loss (i.e. greater than a 4:1 ratio). The distance from Marston Vale Forest Centre is approximately 1km from the Power Generation Plant, located to the west of the Project Site beyond a railway line.

Reference	Comment	Response
Luton Borough Council		
Scoping Response Letter	May be useful to have views from Warden Hills in Luton and from the A6 across Barton Le Clay.	It is considered that these views would not have any sight of the Project given their distance (approximately 17km south of the Project Site). Analysis of the ZTV has shown that there will be no views of the Project from this location.

11.4 Topic-specific Realistic Worst Case Scenario for Assessment

11.4.1 In respect of landscape and visual effects, the realistic worst case scenario for the proposed Project parameters (which are described in Chapters 3 and 5 of this ES) is to assume that the Power Generation Plant will have a 35m high stack.

11.4.2 The reason that this represents the realistic worst case for the Power Generation Plant in relation to landscape and visual effects is that a taller stack height will increase the magnitude of visual and landscape effects as the Power Generation Plant will be more prominent, and it will be visible over a larger geographical area.

Assumptions and Limitations

11.4.3 The assumptions and limitations for undertaking this assessment are as per Section 4.8. Specifically, in relation to LVIA they assume the maximum Project parameters as set out in Table 3.1.

11.5 Assessment Methodology and Significance Criteria

11.5.1 The methodology used for undertaking the LVIA is set out below and is based on professional experience as well as the Landscape Institute / Institute of Environmental Management and Assessment 'Guidelines for Landscape and Visual Impact Assessment' (3rd Edition, 2013) (GLVIA3).

11.5.2 The assessment of landscape and visual effects aims to be as objective as possible, however, as explained in GLVIA3:

"Professional judgement is a very important part of LVIA. While there is some scope for quantitative measurement of some relatively objective matters, for example the number of trees lost to construction… much of the assessment must rely on qualitative judgements, for example about what effect the introduction of a new development or land use change may have on visual amenity, or about the significance of change in the character of the landscape and whether it is positive or negative".

(Paragraph 2.23, page 21, GLVIA3)

11.5.3 This chapter considers effects of the Project on:

- landscape character;
- landscape features (the 'landscape fabric'); and
- views available to people and their visual amenity, from publicly accessible viewpoints.

11.5.4 Cultural Heritage issues have been covered in Chapter 13 along with Cultural Heritage assets and designations.

Study Area

11.5.5 A Zone of Theoretical Visibility (ZTV) plan has been created by selecting spot locations to simulate the tops of the stack, assigning a maximum height of 35m above the floor of Rookery South Pit after the LLRS has been completed. Another ZTV has been run with the addition of the replacement electrical tower at a height of 49m. The ZTV computer software processes landform data and other selected features influencing the extent of visibility (visual barriers), for example, woodland and settlements, in order to identify the theoretical extent of the area from which the Project is likely to be visible. It is important to note that the ZTV illustrates the worst-case scenario, in that it will only take into account the landform and principal areas of woodland and settlements. In reality other features, such as hedgerows or street trees or isolated properties, are likely to provide additional filtering of views.

11.5.6 The ZTV has been used to guide the initial selection of representative viewpoints to be included within the visual impact assessment and provides the maximum extent of the study area. It has been tested on the ground during site visits which have confirmed the typical viewpoints used in the assessments.

11.5.7 The ZTV is provided as Figure 11.1. It covers a 15km square centred on the Power Generation Plant Site.

11.5.8 A data search has been undertaken to establish the baseline landscape fabric and landscape character information, including topography, landscape planning designations and published sources of landscape character set out in Tables: 11.1a (Visual Effects Table); and 11.1b (Landscape Effects Table).

Site Survey and Photographic Record

11.5.9 Site visits were made to the Project Site and surrounding area in July and August 2014 and January 2015 and a photographic record to represent views of the selected assessment viewpoints was undertaken during summer and winter (when vegetation gives less screening to the Project Site) in order to:

- determine the extent of visibility of existing built structures;

- determine the potential visibility of the Project, utilising the results from the ZTV plan to guide the field work;
- gain further understanding of the components which create the landscape fabric and character; and
- carry out the assessment of landscape and visual effects.

11.5.10 The selection of viewpoints was made on the basis of the following types of publicly accessible viewpoints:

- representative viewpoints (for example representing views of users of a particular footpath);
- specific viewpoints (for example a key view from a specific visitor attraction);
- illustrative viewpoints (chosen to demonstrate a particular effect/specific issue); and
- any important sequential views (for example along key transport routes).

11.5.11 Potential visual receptors include:

- public footpath and cycle route users, pedestrians;
- people using public open spaces and parks;
- people living in, working in, or visiting the nearby settlements such as Ampthill, How End, Marston Moretaine, Millbrook, Stewartby, Lidlington, Houghton Conquest and the neighbouring isolated properties and farmsteads; and
- people using roads or railways.

11.5.12 Given that the Project was put on hold in 2015 and over two years have passed since photomontages were last produced, a further site visit and an additional set of photomontages was produced in April 2017. This was in order to capture any changes in baseline conditions in the period between 2015 and 2017 in order to create accurate visual representations of the Project.

11.5.13 A Plan showing the location of viewpoints is presented in Figure 11.2

11.5.14 The viewpoint assessment is informed by and illustrated by a range of tools including wireframes, photographs and photomontages (Document Reference 7.1). The photographs used to produce the photomontages have been taken in RAW format using a Canon EOS 5D Mark II Digital SLR camera with a fixed 50mm lens and provides a focal length that is in accordance with best practice. The camera is mounted and levelled at 1.5 m above ground to the centre of the lens. The photographs are taken in landscape format at 20 degree intervals giving a 50% overlap between frames, digitally joined to create a fully cylindrically projected panorama with a 72-degree field of view.

11.5.15 Photomontages of the Project have been produced to provide an image of how the Project Site might look from a number of specific representative viewpoints within the study area. For these photomontages the Project Site has been modelled in SketchUp Pro 3D software from AutoCAD drawings of the indicative layout of the plant, supported with a schedule of the indicative dimensions and heights of each component, to provide an accurate impression of the likely location and form of each of the development components that make up the Project.

11.5.16 Indicative wireline models of the proposed electrical transmission tower and SECs are shown and a 3D model of the adjoining, consented, Covanta scheme (as described in Chapter 3) has also been included in the model to provide an indication of the cumulative context in which the Project could be seen. The wireline models of the proposed transmission tower, SECs and the consented Covanta RRF scheme have been used as the basis for visual modelling of the photomontages and the assessment of effects of the Project.

11.5.17 The 3D model of the Project is positioned accurately in a digital terrain model of the study area using visualisation software from which views are exported and brought into Adobe Photoshop, where it is positioned and rendered against the baseline photograph to create a realistic and accurate photomontage image. Wirelines and photomontages have been produced to illustrate the Project with and without the Covanta scheme.

11.5.18 The location of each photograph has been identified during field survey using a hand held GPS device, which allows accurate positioning within the 3D model.

11.5.19 The Covanta scheme has been included in one set of photomontages, as, if built, it would be viewed cumulatively with the Project from all viewpoints given its proximity to the Generating Equipment. Photomontages have also been produced without Covanta, in the event that it is not constructed. As a result, the assessment has taken account of views with and without Covanta.

11.5.20 In Advice Note 01/11, Photography and Photomontage in Landscape and Visual Impact Assessment, The Landscape Institute states on page 2 that it is essential to recognise that:

> *"Two-dimensional photographic images and photomontages alone cannot capture or reflect the complexity underlying the visual experience, and should therefore be considered an approximation of the three-dimensional visual experiences that an observer would receive in the field;*
>
> *As part of a technical process, impact assessment and considered judgements using photographs and/or photomontages can only be reached by way of a visit to the location from which the photographs were taken".*

Landscape Assessment

11.5.21 The assessment of landscape effects assesses how the Project will affect the landscape components of the study area (the 'landscape fabric', for example: landform, land use, hedgerows and trees, public rights of way, ponds or other features), and the key characteristics which contribute to its distinctive character (the 'landscape character').

11.5.22 The assessment of landscape receptor sensitivity has combined judgements on the value attributed to the landscape receptor and the 'susceptibility to change' of the receptor to the Project.

11.5.23 The value of potentially affected landscape receptors has been assessed. Landscapes may be valued at community, local, national or international levels. Existing landscape designations have been taken as the starting point for the assessment, and the value of undesignated landscapes has also been assessed.

11.5.24 A methodical consideration of each effect upon each identified landscape receptor has been undertaken, in order to determine the significance of effects, in terms of:

- Value and susceptibility to change (sensitivity of the landscape receptor); and
- Size / scale, extent, duration and reversibility (magnitude of the landscape effect).

11.5.25 Relevant Landscape designations for the Power Generation Plant Site and surrounding area are shown on Figure 11.4, and set out in Table 11.2 below:

Table 11.2: Landscape Designations

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Project Site and Surrounding Area
Conservation Areas	Sites, features or areas of national importance with settings of high quality.	National (High)	Project Site: None Surrounding Area: • Ampthill (300m south-east of Project Site); • Maulden (3.8km south-east of Project Site); • Millbrook (200m south-west of Project Site); • Steppingley (3.5km south of Project Site) (Central Bedfordshire); and • Stewartby (adjacent to Access Road); and; • Wootton (3km north west of Project Site) (Bedford).
Listed Buildings- within a 2km radius of a site	Sites, features or areas of national importance with settings of high quality.	National (High)	Project Site: None Surrounding Area: • Over 70 within 2 km of Power Generation Plant Site.

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Project Site and Surrounding Area
Registered Parks and Gardens of Special Historic Interest	Sites, features or areas of national importance with settings of high quality.	National (High)	Project Site: None Surrounding Area: • Ampthill Park (350m south-east of the AGI site); • The Alameda (1.5km south-east of Project Site); and • Woburn Abbey (just over 5 km south west of the Power Generation Plant Site).
Scheduled Monuments -within 2km of the Project Site	Sites, features or areas of national importance with settings of high quality.	National (High)	Power Generation Plant Site: None Surrounding Area: • Houghton House (2km east of Project Site); • Ampthill Castle (800m south-east of Project Site); • Long Barrow and Bowl Barrow near Bury Farm (3.7km east of Project Site); • All Saints Church, Segenhoe (4.9km south-west of Project Site); and • various moated sites and associated settlements.

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Project Site and Surrounding Area
Woodlands	Sites, features or areas of national importance with settings of high quality.	National (High)	Power Generation Plant Site: None Surrounding Area: • Various small areas of ancient woodland; and • Marston Vale Community Forest.
Long distance paths / National Cycle Network	Sites, features or areas of regional importance with intact character.	Regional (High/ Medium)	Power Generation Plant Site: None Surrounding Area: • John Bunyan Trail; • Greensand Ridge Walk; • Marston Vale Trail; and • National Cycle Network Route 51.
Designated Public Open Space, Tree Preservation Orders (TPO)	Sites, features or areas of district importance.	District (Medium or Low)	Project Site: None Surrounding Area: • Marston Vale Forest Centre (1km from Site); • Ampthill Park; and • Picnic Site at Folly Wood, Lidlington (3.2km from Project Site).

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Project Site and Surrounding Area
Probably no designation, local public right of way	Sites, features or areas valued at a local level.	Local (Medium/ or Low)	Power Generation Plant Site: None Surrounding Area: • Various local public rights of way – See Appendices 12.1 and 12.2.

11.5.26 Other factors which may influence landscape value are set out in Table 11.3, below, as taken from the Guidelines for Landscape and Visual Impact Assessment 3, paras.5.19-5.31.

Table 11.3: Factors Which Influence Landscape Value

Attribute	Criteria
Landscape Quality	Intactness or physical condition of the landscape or of the individual elements which contribute to landscape character.
Sense of Place	Aesthetic and perceptual qualities which create distinctiveness.
Scenic Quality	General appeal of the landscape to the senses.
Rarity	Rarity of landscape character areas, types or features.
Representativeness	Particular characteristic/feature/element considered an important example.
Cultural Interest	The presence of wildlife or cultural heritage interest which contributes positively to the landscape.
Recreation Value	Evidence that the landscape experience forms an important part of recreational activity, e.g. as established in guidebooks.
Associations	Relevant associations with notable figures, such as writers or artists, or events in history that contribute to landscape value.

11.5.27 Susceptibility of landscape receptors to change arising from the Project will be based on the criteria set in Table 11.4:

Table 11.4: Landscape Receptor Susceptibility to Change

Susceptibility	Criteria
High	Little ability to accommodate the Project without undue consequences for the maintenance of the baseline landscape and/or the achievement of landscape planning policies and strategies.
Medium	Some ability to accommodate the Project without undue consequences for the maintenance of the baseline landscape and/or the achievement of landscape planning policies and strategies.
Low	Substantial ability to accommodate the Project without undue consequences for the maintenance of the baseline landscape and/or the achievement of landscape planning policies and strategies.

11.5.28 An overall assessment of sensitivity will be made for each landscape receptor, based on a combined judgement of the above value and susceptibility to change criteria, using the typical scales set out in Table 11.5.

Visual Assessment

11.5.29 The assessment of effects on views and visual amenity has assessed how the Project will affect the publicly accessible views available to people and their visual amenity (see 11.5.10 for potential visual receptors). A methodical consideration of each visual effect upon each identified visual receptor has been undertaken, in order to determine the significance of effects, in terms of:

- Value and susceptibility to change (sensitivity of the visual receptor, or viewer); and
- Size / scale, extent, composition, duration and reversibility (magnitude of the visual effect).

11.5.30 The following terminology has been used to describe the approximate distance between the representative viewpoint and the Project:

- Local: under 0.5 km;
- Medium distance: 0.5 km – 2 km; and
- Long distance: beyond 2 km.

11.5.31 The types of view, and the number of viewers likely to experience the view, are described in the following terms:

- Glimpsed (i.e. in passing) / Filtered / Oblique / Framed / Open Views; and
- Few / Moderate / Many Viewers (see GLVIA3 para.6.15).

11.5.32 In line with the GLVIA guidance, viewpoints for the visual impact assessment are from publicly accessible places. However, where appropriate, representative viewpoints have been selected from publicly accessible locations within or on the edge of main settlements, property groupings or other buildings potentially affected by the Project.

Significance Criteria

11.5.33 A three-stage assessment process has been adopted for the LVIA, in accordance with the GLVIA3. Firstly, the nature of receptors (sensitivity) is being assessed. Secondly the magnitude of impacts likely to result from the Project is being assessed. Lastly, the significance of the identified landscape and visual effects on receptors is being assessed by a combination of the above and the use of professional judgement by assessors who are chartered members of the Landscape Institute.

11.5.34 Effects may be temporary, permanent or reversible over time. The following terminology will be used to describe the duration of landscape and visual effects arising as a result of the development of the Project:

- Short term: less than 1 year;
- Medium term: 1-15 years; and
- Long term: longer than 15 years.

11.5.35 The nature of effects may be beneficial or adverse and direct or indirect. Direct effects are those which result directly from the Project; whereas indirect, or secondary, effects may arise as a consequential change resulting from the Project, for example: changes to offsite and downstream vegetation as a result of alterations to a drainage regime.

Landscape Criteria

11.5.36 The sensitivity of a particular landscape considers the factors described in Tables 11.2, 11.3 and 11.4 combining value and susceptibility to change, using the following typical criteria set out below in Table 11.5.

Table 11.5: Landscape Sensitivity

Landscape Sensitivity	Description
High	An area possessing a particularly distinctive sense of place and character, and / or attributes which make a particular contribution to the landscape or landscape character, for example: • in good condition; • highly valued for its scenic quality; • highly valued for its landscape character; • an area with a low tolerance to change of the type proposed; • cultural heritage features or walks with cultural associations;

Landscape Sensitivity	Description
	• valued for contribution to recreational activity; • important cultural or historic associations; • irreplaceable landscape features or character; and • part of a long distance footpath.
Medium	An area with a clearly defined sense of place and character, and / or attributes which contribute to the landscape or landscape character, such as: • in moderate condition; • some scenic quality valued at a local or regional level; • landscape character intact and valued at a local or regional level; • an area with partial tolerance to change of the type proposed; and • maybe undesignated landscape.
Low	An area with a weak sense of place or poorly defined character, and / or attributes which make a contribution to the landscape or landscape character, such as: • in poor condition; • no particular scenic qualities; • disjointed or weak landscape character; • contains a high level of discordant or detracting features; • no cultural interest; • an area that is tolerant of substantial change of the type proposed; • undesignated landscape; • a degraded landscape; and • strongly influenced by detracting land uses and buildings.

Magnitude of Effects

11.5.37 The size or scale of change in the landscape relates to the loss or addition of features in the landscape which are likely to result from the Project, and takes into account:

- The extent/proportion of landscape elements that are lost or added;
- The contribution of those elements to landscape character and the degree to which aesthetic/perceptual aspects are altered; and
- Whether the effect is likely to change the key characteristics of the landscape, which are critical to its distinctive character.

11.5.38 The following criteria set out in Table 11.6 have been used to assess the size and scale of landscape effects, based on the degree of change that will occur as a result of the Project:

Table 11.6: Landscape Magnitude of Effects

Category	Criteria
Major adverse landscape effect	The proposals will result in a total change in the key characteristics of landscape character: • will introduce elements totally uncharacteristic to the attributes of the receiving landscape such as its massing, scale, pattern and features; and/or • will destroy or permanently degrade the integrity of landscape character; or • is in total conflict with established planning objectives for landscape and visual elements of enhancement of the landscape; and/or • result in a substantial or total loss, or alteration of key elements/features/characteristics.
Moderate adverse landscape effect	The proposal will result in a partial change in the key characteristics of landscape character: • will introduce elements uncharacteristic to, out of scale or at odds with the attributes of the receiving landscape, such as its massing/ scale/pattern and features; and/or • will result in partial loss, or alteration of key elements/features/characteristics; or • will be in conflict with established planning objectives for landscape and visual elements of enhancement of the landscape.
Slight adverse landscape effect	The proposals will result in little change in the key characteristics of landscape character: • will introduce elements that do not quite fit with the attributes of the receiving landscape such as its massing, scale, pattern and features; and/or • will result in a minor loss or alteration of elements/features/characteristics; and/or • contribute to degrading the landscape character.
Negligible adverse landscape effect	The proposals will result in a just discernible change to landscape character/elements/features/characteristics, which is not quite in keeping with the existing landscape and landscape character.
No change	The proposals will not cause any change to the landscape character/elements/features/characteristics.

Category	Criteria
Neutral effect	As a result of the proposals, there will be a change to the landscape elements/features/characteristics, but the change will be in keeping with, and complement, the existing landscape character such that the existing character is maintained and does not cause degradation or enhancement of the character.
Negligible landscape benefit	The proposals will result in a just discernible improvement to the landscape character/elements/characteristics, such as massing, scale, pattern or features.
Slight landscape benefit	The proposals will achieve a degree of fit with the landscape character/elements/features/characteristics and provides some enhancement to the condition or character of the landscape.
Moderate landscape benefit	The proposals will: • achieve a good fit with the landscape character/elements/features/characteristics, such as massing/scale, and pattern; • or would noticeably improve the condition or character of the landscape, and enhance characteristic features through the use of local materials; • and/or support established planning objectives for landscape and visual elements of enhancement of the landscape.
Major landscape benefit	The proposals will: • totally accord with the landscape character/elements/features/characteristics, including scale, pattern, massing; • or would restore, recreate or permanently enhance the condition or character of the landscape and enhance characteristic features through the use of local materials or planting; • and/or delivers established planning objectives for landscape and visual elements of enhancement of the landscape.

Visual Effects Criteria

11.5.39 The assessment of visual receptor sensitivity has combined judgements on the value attributed to the visual receptor and the ‘susceptibility to change’ of the receptor to the specific type of development proposed.

11.5.40 The value assigned to views has had regard to a number of factors, including:

- Recognition through planning or heritage assets; and

- The popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps, and the facilities provided to enable enjoyment of the view.

11.5.41 The criteria for the assessment of the value of views is summarised in Table 11.7 below; note that these are provided for guidance and are not intended to be absolute.

Table 11.7: Value of Views

Value	Criteria
High	Views from landscapes/viewpoints of national importance, or highly popular visitor attractions where the view forms an important part of the experience, or with important cultural associations.
Medium	Views from landscapes/viewpoints of regional/district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations.
Low	Views from landscapes/viewpoints with no designations, not particularly popular as a viewpoint and with minimal or no cultural associations.

11.5.42 The susceptibility of people to changes in views is a function of:

- The occupation or activity of the viewer at a given location; and
- The extent, therefore, to which a person’s attention or interest may be focussed on a particular view and the visual amenity experienced.

11.5.43 For the purposes of the visual impact assessment, visual receptors’ susceptibility to change has been based upon the Table 11.8 below:

Table 11.8: Visual Receptor Susceptibility to Change

Susceptibility	Type of Receptor
High	• Residents; • People engaged in outdoor recreation, including users of public rights of way, whose attention is likely to be focussed on the visual environment of the landscape and on particular views; • Visitors to heritage assets, landmarks or other attractions where views of the surroundings are an important part of the experience; • Communities where views contribute to the landscape setting enjoyed by residents; and • Travellers on scenic routes.
Medium	• Travellers on road, rail or other transport routes, where the view is moderately important to the quality of the journey (e.g. on a scenic route); and • People using local parks, open spaces, public realm, or walking on streets or local public rights of way, with moderate interest in their visual environment.
Low	• People engaged in outdoor sport or recreation, which does not involve appreciation of, or focus upon, views; • People at their place of work, where the landscape setting is not important to the quality of working life; and • Travellers, where the view is fleeting and incidental to the journey.

11.5.44 The magnitude of a visual effect has been assessed in terms of its size or scale, the geographical extent of the area influenced and its duration and degree of reversibility.

11.5.45 The size or scale of change in the view relates to the degree of contrast to, or integration with, the visual composition, which is likely to result from the Project; and is influenced by the relative time over which a view is experienced and whether it is a full, partial or glimpsed view.

11.5.46 The following criteria will be used to assess the magnitude of visual impacts, based on the degree of change to the view or composition as set out below in Table 11.9 below:

Table 11.9: Visual Effects: Magnitude of Impact

Magnitude of Visual Impact	Criteria
Major adverse or beneficial	The proposals will cause a dominant or complete change or contrast to the view, resulting from the loss or addition of features in the view and will substantially alter (degrade or enhance) the appreciation or composition of the view.
Moderate adverse or beneficial	The proposals will cause a clearly noticeable change or contrast to the view, which would have some effect on the composition, resulting from the loss or addition of features in the view and will noticeably alter (degrade or enhance) the appreciation of the view.
Slight adverse or beneficial	The proposals will cause a perceptible change or contrast to the view, but which would not materially affect the composition or the appreciation of the view.
Negligible adverse or beneficial	The proposals will cause a barely perceptible change or contrast to the view, which would not affect the composition or the appreciation of the view.
No change	The proposals will maintain the existing view and cause no change to the view.
Neutral	There will be a change to the composition of the view, but the change will be entirely in keeping with the existing elements of the view and maintain the composition of the existing view.

11.5.47 The significance of landscape and visual effects has been determined from a combination of the receptor sensitivity and the magnitude of impact, as set out in Table 11.10 below. Effects of moderate significance and above are reported as 'significant' in EIA terms, and are highlighted in bold in Table 11.10. Minor and negligible levels of significance are identified as 'not significant'.

Table 11.10: Significance Levels of Landscape and Visual Effects

Sensitivity of Receptor	Major Effect	Moderate Effect	Slight Effect	Negligible Effect	Neutral Effect
High	**Severe**	**Major**	**Moderate**	Minor	Not Significant

Sensitivity of Receptor	Major Effect	Moderate Effect	Slight Effect	Negligible Effect	Neutral Effect
Medium	**Major**	**Moderate**	Minor	Not	Not Significant
Low	**Moderate**	Minor	Minor	Not	Not Significant

11.6 Baseline Conditions and Receptors

Context

11.6.1 The Power Generation Plant Site is mainly located within Rookery South Pit. For the purposes of assessing the baseline it has been assumed that Rookery South Pit will be restored to low grade agricultural land with stabilised and re-profiled pit sides pursuant to the implementation of the LLRS, as described in paragraphs 3.1.4-3.1.8 and 4.10.10. The ground level of the pit is 15m below the surrounding ground level.

11.6.2 The history of extensive clay extraction and brick making in the area is evident in the large flooded pits, re-vegetated spoil heaps, the four chimneys approximately 70m tall and associated buildings of the former Stewartby brickworks and the model village of Stewartby, built in the 1920s for the workers of The London Brick Company.

11.6.3 Rookery North Pit, to the north of the Generating Equipment Site, is occupied by a lake resulting from the flooding of the former pit. To the south, southeast and west of the Generating Equipment Site, low ridges rise up to define the edge of Marston Vale whilst to the north the floor of the Vale continues to the edge of Bedford.

11.6.4 The nearest property is South Pillinge Farm, approximately 130m west of the Project Site boundary and 390m west of the Generating Equipment Site, although it is separated by at least two belts of mature vegetation and an earth embankment. Most settlements and outlying properties are also protected by screening vegetation and as the landform is generally level so the vegetation is more effective.

11.6.5 Recreational receptors include users of:

- Open spaces such as the Marston Vale Millennium Country Park, Ampthill Park and Folly Wood near Lidlington;
- Cycle ways across the Marston Vale;
- Footpaths and other public rights of way across the Marston Vale and surrounding ridges; and

- Heritage assets such as Houghton House and Ampthill Park.

11.6.6 The sensitivity of the receptors is set out in the Visual Effects Table at Appendix 11.1.

11.6.7 Landscape and visual receptors within the study area which are not likely to experience a significant effect, due to distance, landform and intervening vegetation, have been scoped out of this LVIA and are not considered further. These are described in Table 11.2.

Landscape Features

11.6.8 Landscape features of the Project Site include the landform, woodland, hedgerows and public rights of way.

11.6.9 The landform comprises the sunken area of the Rookery South Pit. To the south, south-east and west low ridges rise to define the edge of Marston Vale; to the north the floor of the vale continues to the edge of Bedford.

11.6.10 There are young mixed woodland plantations bordering and partly within the Project Site, with a broadleaved woodland area on the western side and a few species-poor hedgerows.

11.6.11 A public right of way crosses the Project Site south of South Pillinge Farm and another crosses the gas connection corridor north of Lower Farm (see Table 11.2).

Landscape Character

11.6.12 Published sources describing the landscape character of the area at the National, Regional and District level are:

- National Character Area 88: Bedfordshire and Cambridgeshire Claylands (Natural England, September 2013);
- National Character Area 90: Bedfordshire Greensand Ridge (Natural England, 2014b);
- 5D: North Marston Clay Vale, Central Bedfordshire Landscape Character Assessment (Land Use Consultants, January 2015);
- 6B: Mid Greensand Ridge, Central Bedfordshire Landscape Character Assessment (Land Use Consultants, January 2015); and
- The Forest of Marston Vale: Forest Plan (The Forest of Marston Vale, 2000).

11.6.13 Figure 11.3 illustrates landscape character areas applicable to the Project Site and surrounding area.

11.6.14 Their key characteristics are set out below, and their sensitivity is set out in the Landscape Effects Table at Appendix 11.1.

National Landscape Character

11.6.15 Most of the Project Site lies within National Character Area 88: Bedfordshire and Cambridgeshire Claylands but part of the Gas Connection is within National Character Area 90: Bedfordshire and Greensand Ridge to the south.

11.6.16 Key characteristics of National Character Area 88: Bedfordshire and Cambridgeshire Claylands, of relevance to the Project Site and locality, include:

- Gently undulating, lowland plateau divided by shallow river valleys that gradually widen as they approach The Fens NCA in the east;
- Brickfields of the Marston Vale and Peterborough area form distinctive post-industrial landscapes with man-made waterbodies and landfill sites. Restoration of sand and gravel workings has left a series of flooded and restored waterbodies within the river valleys;
- Variable, scattered woodland cover comprising smaller plantations, secondary woodland, pollarded willows and poplar along river valleys, and clusters of ancient woodland;
- Predominantly open, arable landscape of planned and regular fields bounded by open ditches and trimmed, often species-poor hedgerows which contrast with those fields that are irregular and piecemeal";
- "Wide variety of semi-natural habitats supporting a range of species;
- A number of historic parklands, designed landscapes and country houses… combine with… brickfields to provide a strong sense of history and place;
- Settlements cluster around major road and rail corridors, with smaller towns, villages and linear settlements widely dispersed throughout, giving a more rural feel; and
- Recreational assets include… Forest of Marston Vale Community Forest… woodland and wetland sites, an extensive rights-of-way network and two National Cycle Routes.

11.6.17 Key characteristics of National Character Area 90: Bedfordshire Greensand Ridge, of relevance to the Project Site and locality, include:

- Narrow escarpment resulting from the erosion-resistant sediments of the Lower Greensand Group, with a distinct scarp slope to the northwest and dip slope to the south-east;
- The rolling and elevated Ridge provides a north-west-facing wooded skyline offering extensive panoramic views across the lower-lying Bedfordshire and Cambridgeshire Claylands and towards the Chilterns;
- Substantial blocks of ancient woodland and coniferous plantation are found on the Ridge and steeper slopes. Wood pasture and numerous hedgerow trees, copses and shelterbelts are associated with the estate farmland and parkland trees;

- Mixed field and roadside boundaries range from mature shelterbelts to gappy, short flailed boundaries to intact evergreen hedgerows;
- A patchwork of semi-natural habitats including mire habitats, lowland heathland and lowland mixed deciduous woodland species;
- Historic parklands and estates associated with grand country houses such as Woburn;
- Dispersed settlement pattern along the Greensand Ridge, with the majority of towns and villages lying along the river valleys and southern dip slopes; and
- Road and rail links cut north–south through the Ridge.

County Landscape Character

11.6.18 The Central Bedfordshire Landscape Character Assessment characterises the area encompassing most of the Project Site as landscape character area 5D: North Marston Clay Vale. The key characteristics of this character area, which are relevant to the Project Site, are:

- A large scale, open vale, defined by Oxford Clay geology, located between the elevated landscapes of the Wooded Greensand Ridge (6b) and the Cranfield to Stagsden Clay Farmland (1a) that provide a sense of containment;
- An agricultural landscape fragmented by current and former industrial activity including brick works, open cast clay pits, landfill, distribution centres and industrial estates;
- A legacy of clay extraction (for brick making) has resulted in a disturbed landscape, currently subject to large scale restoration - evoking a landscape in transition;
- The establishment of Country Parks and the Forest of Marston Vale with its Forest Centre provides valuable ecological, recreational and landscape resources;
- Flooded clay pits form a series of lakes throughout the vale such as at Stewartby Country Park. These have created significant recreational value and ecological interest;
- Mature woodland is relatively scarce;
- Arable farming is the predominant land use of the area typically occurring in large, open fields with short-flailed, sparse hedgerow boundaries and drainage channels;
- A number of busy transport routes cut north south through the landscape - including the A421(T) the A6 (forming the eastern boundary of the area) and the main railway lines running from Bedford to London and Milton Keynes;
- Lines of pylons cut across the landscape and are highly visible - extending from the Greensand Ridge;

- Stewartby – a model village begun in 1926 by the Stewart family, owners of the London Brick Company. Characterised by consistent red-brick houses set around large areas of green space. The adjacent chimney stacks dominate views; and
- Numerous public rights of way cut through the landscape and provide connections to the recreational routes on the adjacent landscapes - the John Bunyan Trail and the Greensand Ridge Walk.

11.6.19 Landscape character area 6B: Mid Greensand Ridge is located to the south of area 5D. The southernmost tip of the Project Site crosses into this area. The key characteristics of this character area, which are relevant to the Project Site are:

- A large scale ridge with a gently undulating ridge top; forming part of the prominent band of Greensand that extends SW- NE across the county;
- Agricultural land is primarily in arable cultivation but with some variation of land use i.e. pockets of pasture and free-range pig farming that bring localised variation. There is a greater proportion of pasture on the northwest facing slope;
- Strong underlying heathland character with fine examples of remnant heathland and neutral/acid grassland;
- Strong wooded context with extensive areas of deciduous woodland (a large proportion of which is ancient), mixed woodland and coniferous plantations e.g. Exeter Wood, Maulden Wood and Rowney Warren Wood;
- Woodland located along the northwest facing slope and northern half of the ridge top forms part of The Forest of Marston Vale - one of 12 Community Forests in England;
- The contrast of arable land and densely wooded areas creates contrasting perspectives from open and exposed to enclosed and sheltered;
- A large number of historic parks and gardens impart a designed character - including the Grade II* listed Southill Park and Old Warden Park and the Grade II listed Moggerhanger Park, Ickwell Bury and Ampthill Park;
- Parkland is a dominant land use, influencing not just the land within the park boundary but also the wider landscape for example through the creation or retention of tree clumps as part of significant vistas;
- Variable fields and roadside boundaries - ranging from mature shelterbelts to gappy, short flailed boundaries to intact holly hedges (surrounding Southill Park);
- Primary transport routes including the M1 and A6 (T) and Midland Mainline railway cross north-south through the ridge and reduce tranquillity although large areas of the ridge have a remote character;
- Settlements comprise medium to small villages and hamlets (predominantly linear). Some have a varied character (due to modern expansion) e.g. Maulden and Silsoe with others (including estate villages)

being consistent in terms of material and style such as Haynes (red bricks, clay tiles and timber-framed houses);

- The John Bunyan Trail and Greensand Ridge Walk cross significant tracts - connecting the ridge with the adjacent area; and
- Bordered by the town of Ampthill that brings some urban edge characteristics to the landscape.

District Landscape Character

11.6.20 The Forest of Marston Vale: Forest Plan (The Forest of Marston Vale, 2000) includes a landscape assessment, dividing the forest into four landscape zones. The Power Generation Plant Site falls within the Brickfields landscape zone, with the Gas and Electrical Connections falling within the Greensand Ridge and East Vale landscape zone.

11.6.21 The Brickfields landscape zone is described as follows:

> *"This is the heart of the Forest of Marston Vale and is dominated by clay pits and their varying after uses, transport infrastructure and expanding village settlements".*

11.6.22 The assessment of the area states that:

- This is the core area of the Vale where there is a need to secure a higher level of new planting than elsewhere in the Community Forest. The derelict land and pits associated with the brick industry, expanding settlements and busy transport links require substantial planting to offer landscape, wildlife, recreation and amenity benefits;
- The relationship of new woods with open waterbodies such as Stewartby and Brogborough lakes will be very important and a mix of waterside landuses including open land, wetlands and woodland should be developed;
- Substantial tree and shrub planting will encourage a sense of place but wider views need to be retained particularly where features such as lakes, the Greensand Ridge and church towers can be seen; and
- Farming is still important in this area and is characterised by large, open fields surrounded by ditches and over trimmed, sparse hedges.

11.6.23 Proposals for the area state that:

- The Team will work with landowners to secure a higher proportion of woodland planting in this area than the more agriculturally productive land to either side of the Vale. All land types will need to be targeted to deliver the level of planting needed and landscape impacts of project work will need to be assessed from both the Vale floor and elevated positions on the ridges; and

- Poplar belts and other existing tree belts will be managed to develop stronger and more natural screens for clay extraction and landfilling operations.

11.6.24 These proposals are reinforced by CBC's Core Strategy (2009) Policy CS16: Landscape and Woodlands, which states that the Council will:

11.6.25 'Continue to support the creation of the Forest of Marston Vale recognising the need to regenerate the environmentally damaged landscape through woodland creation to achieve the target of 30% woodland cover in the Forest area by 2030.'

11.6.26 The Greensand Ridge and East Vale is described as follows:

11.6.27 "The Ridge provides the most wooded area in the Community Forest and the east Vale is good agricultural land with much remaining evidence of estate management practices. It is quite open in nature, affording excellent views of the Cardington Hangars, and settlements located towards the Ouse".

11.6.28 The assessment of the area states that:

- The Ridge and its scarp provides one of the most wooded areas of the Community Forest and is an important backdrop to the work planned for the core of the Vale;
- Opportunities should be sought to strengthen the existing woodlands, improve the hedgerow network and to add features such as copses on knolls;
- Points of topographical interest such as outcrops of greensand and small valleys should not be obscured by planting;
- The existing areas of scrub and sites that could be developed as acidic grassland could offer much to the diversity of the Ridge landscape and tree planting must not detract from this variety. For some sites, management will be required to maintain the diversity of habitats that generates such landscape interest; and
- Villages and infrastructure such as roads can be better assimilated into the landscape by the planting of more blocks of trees and the use of screening belts, but long distance views of the Greensand Ridge must not be obscured.

11.6.29 Proposals for the area state that:

- Different geology and landforms will offer landscape opportunities different from those of the clay Vale floor such as stands of copses. Where possible, the Team will identify these sites and put forward proposals for diversifying the landscape particularly on the Greensand Ridge. Links with features on the lower slopes and Vale floor such as Wilstead Wood, will be developed; and

- The creation of other habitats will be an important feature of project work on the Ridge and the landscape value of habitats such as acidic grassland, will be assessed along with ecological and other benefits.

Project Site Character

11.6.30 The Power Generation Plant will be located in Rookery South Pit, which will have been restored in accordance with the LLRS, as set out in Section 4.7.

11.6.31 The LLRS will include rough grassland, newly planted trees and scrub and a network of ditches. However, it has been assumed that the planting will not have had time to become established and therefore have any mitigating effects prior to construction of the Project. The defining characteristics are the topography and the ditches.

11.6.32 The Gas and Electrical Connection cross arable farmland on a gently rising land form, with a pattern of large fields defined by hedges and plantations, with mature plantations to the west. The fields are crossed by existing electricity transmission towers. The Midland Mainline and Marston Vale Lines form strong linear boundaries to the eastern and western edges of The Rookery. The relocated transmission tower and the SECs will be to the south-west of the LLRS and Rookery South Pit, with a small part within an area of existing woodland. All the characteristics of the Project Site have been assessed as having low sensitivity as they are common in the area and are readily replicated, with the exception of footpaths where the sensitivity is medium owing to the effects at diversion in changing the experience for the user.

Representative Viewpoints

11.6.33 As a result of reviewing the ZTV and potential visual receptors, the following representative viewpoints are considered to have potential to experience significant visual effects and therefore have been used for the visual impact assessment. These are set out in Table 11.11 below and shown on Figure 11.2.

Table 11.11: Selection of Representative Viewpoints for Visual Impact Assessment

Viewpoint Reference	Location	Comments
1 (photomontage)	Footpath south of Stewartby Way	View south west towards Project Site beyond railway embankment, in context of existing wind turbine.
2 (photomontage)	Footpath opposite Chequers public house	View west towards Project Site beyond railway embankment, in context of existing wind turbine.
3 (photomontage)	Katherine’s Cross, Ampthill	Wide views from high ground in registered parkland and public park.

Viewpoint Reference	Location	Comments
4 (photomontage)	Rear elevation, Houghton House	Wide views from high ground from scheduled monument with public access.
5 (photo view)	In front of cottages, track to Houghton House	Views from track adjacent to residential property and footpath with access to Houghton House.
6 (photomontage)	Footpath on outskirts of Ampthill	Views looking north west towards Project Site
6a (photomontage)	Marston Vale Forest Centre including the approach track	Views from country park and Cycle Route 51 above woodland and in context of existing turbine.
6b (photomontage)	Marston Vale Millennium Country Park	Views from country park and Cycle Route 51 above woodland and in context of existing turbine.
7 (photo view)	Public footpath in front of Ampthill Park House	Low level view across Vale to Project Site, with Ampthill Park House on slightly elevated ground behind.
8 (photomontage)	Rear of St Mary's Church, Marston Moretaine	Views only from footpaths (Marston Vale Trail LDP) in fields to east of church owing to intervening vegetation.
9 (photomontage)	Marston Vale Trail to the north of Lidlington Village	Limited views owing to intervening vegetation across Vale to Project Site.
10 (photomontage)	John Bunyan Way. Wood End Road, Cranfield	Elevated and extensive views of vale and surrounding ridges, including existing industrial/energy development.
11 (photomontage)	Picnic site at Folly Wood, Lidlington	Elevated and extensive views across Proving Ground to Project Site and wide context of vale.
12 (photomontage)	Location of access road off Green Lane	View of Project Site access from public road.
13 (photomontage)	From bridleway near Hill Farm off Beancroft Road	Elevated and extensive views of vale and surrounding ridges, including existing industrial/energy development.
14 (photomontage)	From footpath adjacent to vehicle proving ground.	Elevated and relatively close views to site and within connection option area.
15 (photomontage)	From footpath within Country Park near railway.	View across railway to Power Generator site.

Viewpoint Reference	Location	Comments
16 (photo view)	From footpath west of Ampthill Park House and north-east of Lower Farm.	View south across field to AGI Site.

11.6.34 The following views, set out below in Table 11.12 have been scoped out of the assessment.

Table: 11.12 Scoped Out Views

Location / Area	Reasoning
Stewartby	(intervening vegetation), prevents views
Sand Hill Close, Millbrook	(intervening vegetation/buildings), prevents views
Warden Hills in Luton	approximately 17 km away, too far to be visible
A6 across Barton Le Clay	approximately 17 km away, too far to be visible
Chilterns AONB	approximately 40 km away, too far to be visible

11.7 Assessment of Effects

11.7.1 The assessment of effects on landscape and visual amenity is presented in tables in Appendix 11.1. The following paragraphs provide a summary of this assessment. The significant visual effects and landscape effects are summarised in Tables 11.13 and 11.14 respectively.

Power Generation Plant

Construction

11.7.2 The main works associated with the construction / decommissioning phases of the Power Generation Plant will be excavation and site levelling for new foundations and potential piling (if required) and using cranes to locate the Gas Turbine Generator units into position. Adverse temporary landscape and visual effects have the potential to arise from the following activities during construction and decommissioning:

- Site clearance, removal of vegetation and topsoil stripping;
- Earthworks to construct platforms and excavate foundations;
- Construction of an internal road for access to the buildings and Laydown Area;
- Movement of traffic including delivery and removal of materials to and from the Project Site, off-site road traffic including workers travelling to and from Project Site;

- General construction / decommissioning activities including the movement of large scale construction equipment, i.e. tower cranes, smaller cranes, batching plants drilling rigs etc.; site compounds; and
- Construction site lighting, in particular during the winter months.

Visual Effects

11.7.3 The construction phase is of a limited duration (22 months) and the effects listed above will not all occur simultaneously. Furthermore, most of the activities will take place within Rookery South Pit and will therefore be approximately 15m below the surrounding ground level, so will have limited potential for having visual effects on viewpoints listed in Table 11.11.

11.7.4 In terms of the Access Road, construction will involve lower vehicles than for the Power Generation Plant Site where cranes will be needed (e.g. tipper trucks rather than cranes) and the work will be undertaken on the route of the existing access track.

11.7.5 Landscape Effects

11.7.6 Landscape effects during the construction phase will be limited to direct effects on the Power Generation Plant Site, and some intervisibility with adjacent character areas.

11.7.7 Along the Access Road approximately 78 linear metres of roadside hedges and trees will be removed in association with the construction of the junction and visibility splays for the access from Green Lane, and approximately 690 linear metres of intermittent trees and scrub along the western side of the access past the Rookery North Pit.

11.7.8 However, this is a worst case scenario, which assumes that MPL would need to construct the entire length of Access Road (i.e. independently of Covanta. Should Covanta construct the Rookery RRF project first, MPL would only need to construct the Short Access Road, which would not require the removal of this vegetation.

11.7.9 <u>Operation</u>

Visual Effects

11.7.10 Although the Power Generation Plant Site is already well screened as it is mainly within Rookery South Pit (which is approximately 15m deep), and by surrounding vegetation and landform, the stack is still likely to be visible from certain locations close to the Project Site, such as Viewpoints 14 and 15, as well as from further afield.

11.7.11 Therefore, the key potential visual effects arising from the Power Generation Plant during the operational phase will be in relation to the 35m high stack.

11.7.12 Due to the local topography in the area, views are mainly limited to the south and south east of the Project Site, along higher ground, particularly around the Greensand Ridge as at Ampthill Park (Viewpoints 3 and 6) and local views (Viewpoints 14 and 15).

11.7.13 In most cases however, views of the Power Generation Plant Site will be seen in the context of the existing wind turbine at the Millennium Country Park, existing railways with gantries, catenary and embankments, the large transmission towers associated with the existing 400kV Sundon to Grendon line and the four remaining chimneys at the former brickworks at Stewartby. Views of the Power Generation Plant Site will also be filtered by intermediate hedges and belts of woodland.

11.7.14 Landscape Effects

11.7.15 Landscape effects during operation will be limited to direct effects on site resulting from the loss of existing vegetation, and indirect effects arising from some intervisibility with adjacent character areas.

11.7.16 Although a substantial amount of new planting will have been implemented, it will not provide effective mitigation initially; however, from year 15 onwards the planting will provide a landscape benefit.

Decommissioning

Visual Effects

11.7.17 The decommissioning phase is likely to be of a similar duration to the construction phase and the effects will not all occur simultaneously. As before, most of the activities will take place within Rookery South Pit and will therefore be approximately 15m below the surrounding ground level, so will have limited potential for having visual effects.

Landscape Effects

11.7.18 Landscape effects during the decommissioning phase will be limited to direct effects within the Power Generation Plant site, and some intervisibility with adjacent character areas.

11.7.19 All above ground structures will be removed and the Power Generation Plant Site will be restored.

Gas Connection

Construction

11.7.20 Construction of the Gas Connection will largely comprise excavating a trench across fields, limited hedge removal and the construction of the AGI. The AGI and its security fence will be a maximum of 3m high.

Visual Effects

11.7.21 Visual effects will include movement of vehicles and plant and construction of the AGI. From many of the viewpoints the construction will be screened by intervening vegetation and landform. Where there are views, they are often filtered by intervening vegetation, with the exception of Viewpoint 16 where there will be an open view.

Landscape Effects

11.7.22 Landscape effects during the construction phase will be limited to the removal of sections of hedgerow crossed by the gas connection and the temporary diversion of footpaths (FP7 and FP65).

11.7.23 <u>Operation</u>

11.7.24 During operation, the Pipeline will be buried and the ground re-instated. Gaps in the hedges will be replanted.

Visual Effects

11.7.25 The AGI, which will be located approximately 120m east of a residential property at Lower Farm, will be a relatively modest structure in comparison to the Generating Equipment. It will incorporate screen planting on all sides to reduce visual effects. Views will be screened by existing trees and hedges. As it matures the perimeter planting will also provide screening.

11.7.26 Landscape Effects

11.7.27 The Gas Connection will result in landscape effects where it crosses hedge boundaries, but these crossings will be replanted.

11.7.28 Public rights of way will be reinstated to their original lines and will benefit from the addition of new woodland belts and hedgerows.

11.7.29 <u>Decommissioning</u>

11.7.30 The Pipeline will remain underground on decommissioning although there will be activities associated with the dismantling of the AGI and its security fence, which will be short term and localised.

Visual Effects

11.7.31 Adverse visual effects will result from the decommissioning activities but none will be significant apart from Viewpoint 16 in the vicinity of the AGI.

Landscape Effects

11.7.32 All working areas will be reinstated and vegetation will be retained.

Electrical Connection

Construction

11.7.33 High vehicles including cranes will be required for erecting the temporary and permanent transmission towers, dismantling the existing tower and constructing the SECs.

Visual Effects

11.7.34 Construction activities will result in some adverse visual effects, the most severe being on Viewpoint 14, the nearest viewpoint, on Footpath 7 to the south.

Landscape Effects

11.7.35 Clearance of approximately 2,075m2 of existing woodland and coppicing of approximately 1,310m2 of existing woodland will result from the electrical connection construction.

11.7.36 One public right of way, Footpath 14, will need to be temporarily diverted during the construction phase.

Operation

11.7.37 The SECs will be located partly within existing woodland, which will be cleared, and partly within an open field. The new transmission tower will be approximately 40m to the south-east of the existing tower, with a maximum height from 49m.

Visual Effects

11.7.38 From many of the viewpoints the lower part of the tower is screened by intervening vegetation and development, but the upper part of the tower is visible, often seen against the distant ridge, in the context of existing wind turbine, pylons and chimneys within the Vale. However, views of the SECs are limited to the local area, such as from Viewpoint 14.

Landscape Effects

11.7.39 The loss of the approximately 2,075m^2 of woodland will be mitigated by the planting of approximately 8,790m^2 of new woodland and 3,590m^2 of scrub and grassland matrix around the compound, as shown in Appendix 2 of the LEMMS report (Appendix 11.3). The area of coppiced woodland will have been allowed to regrow.

11.7.40 The public right of way will be reinstated to its original line and will benefit from the addition of new woodland belts and hedgerows.

Decommissioning

11.7.41 The removal of the SECs will require similar equipment to that required for its construction. The area will be reinstated to contribute towards the matrix of woodland, scrub and grass. The transmission tower will remain in operation.

Visual Effects

11.7.42 Views of the SECs removal will be limited to the local area, such as from Viewpoint 14.

Landscape Effects

11.7.43 Working areas will be reinstated and the maturing woodland, scrub and grassland matrix will continue to be managed.

Summary of Significant Visual Effects

11.7.44 The Visual Effects Table at Appendix 11.1 sets out details of the assessed visual effects of the Project on each of the 18 viewpoints, taking into account the value of views, the susceptibility of the receptor to change and therefore the overall sensitivity, the magnitude of effects and proposed mitigation.

11.7.45 Visual effects are assessed for each of the components of the Project, comprising the Power Generation Plant, the Gas Connection and the Electrical Connection. In accordance with guidance in GLVIA3, the interaction of components is taken into account in assessing the overall significant effects, as summarised below for each assessment period.

11.7.46 Viewpoints likely to experience significant effects are summarised as follows:

Construction

Power Generation Plant

11.7.47 Significant visual effects are predicted at Viewpoints 3, 5, 6, 7, 14 and 15. Viewpoints 3 and 6 are sensitive viewpoints to the south-east, and viewpoint 14 is a local viewpoint to the south where construction activities will be partly screened by boundary hoardings at ground level.

Gas Connection

11.7.48 Significant visual effects are predicted at Viewpoints 14 and 16.

Electrical Connection

11.7.49 Significant visual effects are predicted at viewpoints 7 and 14.

11.7.50 During construction there will be significant adverse visual effects at Viewpoint 14 due to each of the three components.

On Completion

Power Generation Plant:

11.7.51 Significant visual effects are predicted at Viewpoints 14 and 15. The new development will be most prominent at Viewpoint 14. Views will be filtered by intervening woodland and maturing new vegetation.

Gas Connection:

11.7.52 Significant visual effects are predicted at Viewpoint 16.

Electrical Connection

11.7.53 Significant visual effects are predicted at Viewpoints 7 and 14.

11.7.54 On Completion, there will be significant adverse visual effects at Viewpoint 14 due to both the Power Generation Plant and the Electrical Connection.

<u>15 Years after planting</u>

Power Generation Plant:

11.7.55 Significant visual effects are predicted to remain at Viewpoint 14.

<u>Decommissioning</u>

Power Generation Plant:

11.7.56 Significant visual effects are predicted at Viewpoints 5 and 14.

Gas Connection:

11.7.57 Significant visual effects are predicted at Viewpoint 16.

Electrical Connection:

11.7.58 Significant visual effects are predicted at Viewpoint 14.

11.7.59 During the decommissioning phase, there will be significant adverse visual effects at Viewpoint 14 due to both the Power Generation Plant and the Electrical Connection.

11.7.60 A summary of the significant visual effects is shown in Table 11.13.

Table 11.13: Summary of Significant Visual Effects

Viewpoint		During Construction	On Completion	15 Years After Planting	Decommissioning at 25 years
VP3	**PGP**	✓			
VP5	**PGP**	✓			✓
VP6	**PGP**	✓			
VP7	**Electrical**	✓			
VP14	**PGP** **Gas** **Electrical**	✓ ✓ ✓	✓ ✓	✓	✓ ✓
VP15	**PGP**	✓	✓		
VP16	**Gas**	✓	✓		✓

PGP = Power Generation plant
Gas = Gas connection
Electrical = electrical connection

Summary of Significant Landscape Effects

11.7.61 The Landscape Effects Table at Appendix 11.1 sets out details of the assessed landscape effects of the Project on national, county, district and local character areas and on landform, woodland, trees and hedgerows, Public Rights of Way (PRoW) and watercourses.

11.7.62 Landscape effects are assessed for each of the components of the Project, comprising the Power Generation Plant, the Gas Connection and the Electrical Connection. In accordance with guidance in GLVIA3, the interaction of components is taken into account in assessing the overall significant effects, as summarised below for each assessment period.

11.7.63 The assessment shows no overall significant effects in EIA terms for any Landscape Character Area. Landscape features likely to experience overall significant effects are summarised as follows:

Construction

Power Generation Plant

11.7.64 Significant adverse landscape effects are predicted for woodland, trees and hedgerows due to the loss of vegetation along the Access Road and entrance to the Project Site, as described in 11.7.6-11.7.7.

Electrical Connection

11.7.65 Significant adverse landscape effects are predicted for woodland, trees and hedgerows due to the loss of vegetation, and Public Rights of Way as one footpath (FP14) will be temporarily diverted.

Gas Connection

11.7.66 Significant adverse landscape effects are predicted for Public Rights of Way as two footpaths (FP7 and FP14) will be temporarily diverted.

11.7.67 During construction there will be significant adverse landscape effects on woodland, trees and hedgerows due to both the Power Generation Plant and the Electrical Connection; and on Public Rights of Way due to both the Electrical and Gas Connections.

<u>On Completion</u>

11.7.68 The Power Generation Plant: Significant adverse landscape effects are predicted to remain for woodland, trees and hedgerows as the new planting will not have matured.

<u>15 Years after planting</u>

Power Generation Plant:

11.7.69 Significant beneficial landscape effects are predicted for woodland, trees and hedgerows as the new planting will have become established.

Electrical Connection

11.7.70 Significant beneficial landscape effects are predicted for woodland, trees and hedgerows and also for Public Rights of Way which will have been improved by the addition of new woodland belts and hedgerows.

Gas Connection:

11.7.71 Significant beneficial landscape effects are predicted for Public Rights of Way as above.

11.7.72 15 years after planting, significant beneficial landscape effects are predicted for woodland, trees and hedgerows due to both the Power Generation Plant and the Electrical Connection; and for Public Rights of Way due to both the Electrical and Gas Connections.

Decommissioning

Power Generation Plant:

11.7.73 Significant beneficial landscape effects are predicted for woodland, trees and hedgerows.

Electrical Connection:

11.7.74 Significant beneficial landscape effects are predicted for woodland, trees and hedgerows and Public Rights of Way.

Gas Connection:

11.7.75 Significant beneficial landscape effects are predicted to remain for Public Rights of Way.

11.7.76 During the decommissioning phase, significant beneficial landscape effects are predicted for woodland, trees and hedgerows due to both the Power Generation Plant and the Electrical Connection; and for Public Rights of Way due to both the Electrical and Gas Connections.

11.7.77 A summary of the significant landscape effects is shown in the Table 11.14 below:

Table 11.14: Summary of Significant Landscape Effects

Landscape Feature		During Construction	On Completion	15 Years After Planting	Decommissioning at 25 years
Woodland Trees and Hedges	**PGP** **Electrical**	✓ ✓	✓	✓Benefit	✓ Benefit ✓ Benefit
Public Rights of Way	**Gas** **Electrical**	✓ ✓		✓ Benefit ✓ Benefit	✓ Benefit ✓ Benefit

PGP = POWER GENERATION PLANT
GAS = GAS CONNECTION
ELECTRICAL = ELECTRICAL CONNECTION

11.8 Night Time Lighting

11.8.1 An Outline Lighting Strategy has been prepared for the Project (Appendix 11.2) and submitted alongside the ES to support the DCO Application. However, the overarching philosophy is, as far as possible, to maintain a dark site.

11.8.2 Other design parameters are, in summary:

- For the Power Generation Plant Site, a curfew will be implemented for all non-critical lighting from 23.00 to 05.00 hrs to reduce the impact of the development on the local environment.
- External lighting for the Substation and Above Ground Installation (AGI) will only be required for infrequent routine and unplanned maintenance activity.
- For internal lighting, appropriate measures will be included for reducing light spill.
- The level of lighting within open compounds will be sufficient to allow the safe movement of pedestrians and vehicles (using their headlights) about the compound in areas that they might reasonably be expected to negotiate at night.
- All luminaires will completely omit direct upward light emission and peak light intensities from any fitting will not unintentionally illuminate any building or structure.

Landscape and Visual Effects of Night Time Lighting

11.8.3 The potential visual and landscape effects of lighting will be limited as the lighting is designed to avoid upward light spillage and most lighting will only be used when required, such as when unplanned maintenance is required at night. The scale of the lighting and its infrequent use will not be sufficient to have any significant landscape effects.

11.8.4 Most views towards the Project Site are from recreational receptors, some with high sensitivity, such as Houghton House and Ampthill Park. Very few people are likely to be using those receptors at night, additionally, there are sources of lighting from settlement and development in the context of the site, such as Lidlington, Cranfield, Stewartby and Marston Moretaine as well as from road junctions such as the junction at Marston Moretaine and along the Bedford Road parallel to the A421, and at railway stations. As a result, the landscape and visual effects of the lighting of the scheme, given the distance from receptors and likely lack of recreational users, will not be significant.

11.8.5 Of the representative viewpoints considered in the LVIA, most are from recreational facilities which are unlikely to be used at night, such as Ampthill Park, or that are closed at night such as the Millennium Country Park and Houghton House.

11.8.6 Representative viewpoints that would be unlikely to have use at night by sensitive receptors are as follows:

11.8.7 Viewpoints 3 (Ampthill Park), 4 (Houghton House), 6 (Greensand Ridge Walk/B530),8 (footpaths at Marston Moretaine), 9 (Marston Vale Trail near Lidlington), 12 (Green Lane), 13 (Hill Farm/Bridleway – although Hill Farm is a potential residential receptor, views are screened from it by existing vegetation), 14 (footpath near Vehicle Proving Ground), 15 (public footpath on the edge of Millennium Country Park) and 16 (public footpath north of the AGI).

11.8.8 Representative viewpoints that would be expected to be used at night are all residential, and are:

11.8.9 Viewpoints 2, (opposite the Chequers pub with patrons as the receptors), 5 (cottages near Houghton House) and 7 (near to Ampthill Park House and representative of a residential receptor). However, in Viewpoint 2 much of the Power Generation Plant is obscured by the railway embankment and only the stack is visible so that on the rare occasions that the site is lit, the directional nature of the lighting will mean that it is unlikely to be visible. In viewpoint 5, there will be clear views to the Project in the Rookery South Pit, but it will be approximately 1.8 km away, and in the context of lighting at Marston Moretaine beyond. In viewpoint 7, where views occur from Ampthill Park House, the use of lighting will be fleeting and in the context of lighting at Stewartby and Marston Moretaine.

11.8.10 The AGI is separate from the other parts of the Project and 120m from the front elevation of Lower Farm. Given that the lighting will only be operated when required and that views to the AGI will be filtered by existing vegetation, no significant effects will be experienced.

11.9 Cumulative Landscape and Visual Effects Assessment (CLVEA)

Introduction

11.9.1 Cumulative landscape and visual effects are the additional landscape and visual changes caused by a proposed development in conjunction with other similar (cumulative) developments.

11.9.2 Definition of cumulative landscape and visual effects was first set out in the 2002 edition of the Guidelines for Landscape and Visual Impact Assessment, and since then has been further refined, in terms of windfarm development, by guidance produced in Scotland, which is used widely and not only in Scotland. The current definitions, as set out in 'Assessing the Cumulative Impact of Onshore Wind Energy Developments', Scottish Natural Heritage (SNH), 2012, are referred to in paragraph 7.3 of the Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013 (Landscape Institute and IEMA), (GLVIA3) and comprise:

- **Cumulative effects** - 'the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together';
- **Cumulative visual effects** - effects caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different developments'; and

- **Cumulative landscape effects -** effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it'.

11.9.3 In accordance with the emphasis in EIA, the assessment is required to focus on the cumulative landscape and visual effects which are *likely to be significant*, rather than providing a comprehensive listing of every cumulative landscape and visual effect that might occur. The approach must be reasonable and proportional to the proposed development.

11.9.4 Paragraph 7.18 of GLVIA3 refers to different focuses of a cumulative effects assessment: '…the additional effects of the main project under consideration, or on the combined effects of all the past, present and future proposals together with the new project.' GLVIA3 recognises some of the limitations of assessing combined cumulative effects, noting that '…the assessor will not have assessed the other schemes and cannot make a fully informed judgement.'

11.9.5 PINS Advice Note 17: Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure (PINS Advice Note 17), sets out an overview of a process for cumulative effects assessment (CEA) which '*…applicants may wish to adopt for NSIPs*.'. Paragraph 1.4 of PINS17 makes reference to the Overarching NPS for Energy (EN-1) paragraph 4.2.5, which states: '*When considering cumulative effects, the ES should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development…*'

11.9.6 PINS Advice Note 17 sets out suggested stages for a CEA process. Stage 4 Assessment, (PINS Advice Note 17 pages 8 and 9) acknowledges there may be limitations or uncertainty to the CEA; and, in paragraph 3.4.5, reminds applicants that '*…the CEA should be proportionate and not be any longer than is necessary to identify and assess any likely significant cumulative effects that are material to the decision making process, rather than cataloguing every conceivable effect.*'.

11.9.7 Taking into account GLVIA3 and PINS Advice Note 17, the Cumulative Landscape and Visual Effects Assessment (CLVEA) of this ES seeks to provide an understanding of cumulative landscape and visual effects in terms of how the Project would both interact and combine with effects of other development (hereafter referred to as the "cumulative developments"). Accordingly, the CLVEA is formed by two parts:

- **Incremental cumulative effects**; that is, the additional effects of the Project in the context of all the cumulative developments being taken into account. So this assessment essentially looks at the contribution of the Project to the overall effect of the cumulative developments. For example, Project X results in 0.25ha of woodland removed, and Project Y results in 9ha of woodland removed – whilst the combined cumulative effects (see below) would be 9.25ha of woodland removed and therefore potentially quite significant, the incremental cumulative effect of Project X is 0.25ha of woodland; and

- **Combined cumulative effects**: the effects resulting from the combination of the Project and cumulative developments. These may be further identified as **additive effects** (a total effect produced by the Project and cumulative developments in combination; being the sum of the parts or the overall consequence). For example, in simplest terms, Project X results in 1ha of woodland removed, Project Y results in 2ha of woodland removed, resulting in a combined additive cumulative effect of 3ha of woodland removed); or **synergistic effects** (where the combined effect is greater than the sum of the separate effects of the cumulative developments, and which wouldn't have occurred from the Project or any of the cumulative developments in isolation. For example, the losses of woodland from Project X and Project Y combine to have a new effect on a species that is not affected by the loss of woodland from either Project X or Project Y in isolation).

11.9.8 It is acknowledged that there are limitations to the assessment of combined cumulative effects in this ES, such as:

- Limited information that is available;
- PBA did not prepare the LVIAs for the cumulative developments. A different assessor may have a different professional judgement of landscape and visual effects, and use different assessment methodologies in LVIAs;
- Different baseline dates between the cumulative developments' original LVIA assessments (not prepared by PBA) and the Project's LVIA (prepared by PBA), resulting in a different assessment basis. For example, the Covanta LVIA baseline was 2010. Since then the Marston Vale wind turbine has been constructed and there will have been growth or removal of vegetation. The Covanta 2010 LVIA will have assessed effects upon people's views which did not include the wind turbine in the view composition, as it did not exist at that time. Whilst the Project LVIA in 2017, assesses visual effects from the same location, which now has the wind turbine present within the view. This change of view composition between the baselines means that there will inevitably be a degree of difference between assessment of changes to the view; and
- Assessments of different receptors, that are not comparable. For example, in the Covanta LVIA, no effects were assessed on landscape features, only landscape character – an approach which differs from the Project LVIA. Another example of this limitation, is when there is no Covanta LVIA equivalent viewpoint location for the assessment of visual effects. Where there is no equivalent receptor, it is noted as such in the combined cumulative assessment tables and our judgement of effects is informed by the information which is available, our understanding of the Project site and its context and, for visual effects, the Project's cumulative development photomontages where they are available.

11.9.9 Section 4.10 of this ES sets out the criteria and list of projects used for the cumulative assessment.

11.9.10 In regard to the Covanta RRF Project, it is considered that a pragmatic and proportionate approach to assessing combined cumulative effects would be to take the Covanta RRF Project LVIA findings, which were prepared by LDA Design, as a starting point for the combined cumulative assessment; on the basis that they have been agreed with key consultees and tested through the DCO process.

11.9.11 There is little detail known about the 'Integrated Waste Management Facilities' proposed for the Rookery South Pit. At the time of writing this ES, a request for a scoping opinion has been submitted by the promoter, although no details are provided regarding potential landscape or visual impacts. Should it go ahead, then the Integrated Waste Management Facilities scheme will need to consider cumulative landscape and visual effects, and therefore the development has been scoped out of this assessment, due to insufficient information at this stage.

11.9.12 Land at Warren Farm on Flitwick Road in Ampthill has also been scoped out as the intervening Greensand Ridge, which rises up to 110m AOD will prevent any intervisibility and there are unlikely to be any viewpoints in which the Project and the Warren Farm schemes will both be visible.

Incremental Cumulative Visual Effects

11.9.13 The following is an assessment of the worst-case scenario of cumulative visual effects on people's views during construction and on completion from each of the representative assessment viewpoints. The baseline description for each is set out in Table 11.11.

11.9.14 The assessment is informed by the cumulative photomontages in Document Reference 7.1, which should be referred to, to aid understanding of this assessment.

Viewpoint 1

11.9.15 Viewpoint 1 is approximately 1.5km north-east of the Project.

11.9.16 Owing to intervening vegetation and landform, the only part of the Project that would be visible is part of the proposed transmission tower, roughly in the same position as the existing tower. Most of the stack of the Covanta scheme will be visible. None of the other cumulative developments would be visible.

11.9.17 The addition of the Project would result in an incremental cumulative visual effect that has a negligible magnitude of change during the construction period and on completion.

11.9.18 Incremental cumulative visual effects upon views from this viewpoint location during the construction period and on completion of the Project, will be not significant.

Viewpoint 2

11.9.19 The stack is the only part of the Generating Equipment visible; and owing to separation distance from, and the relative scale compared to the Covanta stack, the addition of the Project would result in an incremental cumulative visual effect that has a negligible magnitude of change during the construction period and on completion.

11.9.20 Other committed developments are not anticipated to be seen in combination with the Project from this viewpoint location, as a result of intervening vegetation and landform.

11.9.21 Incremental cumulative visual effects upon views from this viewpoint location during the construction period and on completion of the Project, will be not significant.

Viewpoint 3

11.9.22 The Project appears in front of, and is viewed as part of but below, Covanta in this view. Covanta dominates the Project and Covanta's stack breaks the skyline. As a result, the addition of the Project would result in incremental cumulative visual effect that has a negligible magnitude of change during the construction period and on completion.

11.9.23 Other committed developments are not anticipated to be seen in combination with the Project from this viewpoint location, as a result of distance, intervening vegetation and landform.

11.9.24 Incremental cumulative visual effect s upon views from this viewpoint location during the construction period and on completion of the Project, will be not significant.

Viewpoint 4

11.9.25 Views of the Project will be filtered by intervening vegetation and it will sit below the skyline. Covanta's stack will break the skyline and Covanta will be a large scale built form which is the focus of the view drawing the eye. The addition of the Project would result in an incremental cumulative visual effect that has a negligible magnitude of change during the construction period and on completion.

11.9.26 The committed development on land at Moreteyne Farm would be barely discernible in the distance in the view and seen in association with existing development at Marston Moretaine. As a result, it is anticipated that there would be very little combined visibility with the Project.

11.9.27 Therefore, incremental cumulative visual effects upon views from this viewpoint location will be not significant during the construction period or on completion of the Project.

Viewpoint 5

11.9.28 The Covanta scheme will be seen on the valley floor, with its stack breaking the skyline; and will be large scale built form which is the focus of the view. The Project will be seen in the context of the much larger Covanta scheme and the addition of the Project would result in an incremental cumulative visual effect that has a slight magnitude of change during the construction period and on completion.

11.9.29 The committed developments on land at Moreteyne Farm and Broadmead Road will be barely discernible in the far distance of the view.

11.9.30 Incremental cumulative visual effects on views from this viewpoint location during the construction period and on completion of the Project will therefore be not significant.

Viewpoint 6

11.9.31 The Covanta scheme includes a very large mass of structure within the pit, seen against the rising landscape in the background and its stack breaks the skyline. Covanta is seen as a large scale built form, which draws the eye and is the focus of the view. The Project will be seen as additional built form adjacent to, and left of, Covanta; but it will be below the skyline and of a much smaller scale and mass. Although the Stack of the Generating Equipment is an additional vertical feature in the landscape, it does not break the skyline and sits below the height of the main mass of the Covanta structure. As a result, the addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during the construction period and on completion.

11.9.32 The developments at Moreteyne Farm and Stewartby are anticipated to not be perceptible in this view.

11.9.33 Therefore, incremental cumulative visual effects upon views from this viewpoint location will not be significant during the construction period or on completion of the Project.

Viewpoint 6a

11.9.34 Covanta appears as a very large mass of structure, seen through winter trees, and its tall vertical stack extends into the skyline. In this view, the upper-most part of the stack of the Generating Equipment will be barely perceptible, with the rest of the Stack and the Project being filtered by vegetation. As a result, the addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during the construction period and on completion.

11.9.35 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.36 Therefore, incremental cumulative visual effects upon views from this viewpoint location will be not significant during construction or on completion of the Project.

Viewpoint 6b

11.9.37 Covanta appears as a large and bulky structure which, together with its tall vertical stack, rises above vegetation and breaks the skyline. The upper-most part of cranes during construction and the stack of the Generating Equipment on completion, will be barely discernible, filtered by vegetation. As a result, the addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during the construction period and on completion.

11.9.38 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.39 Incremental cumulative visual effects upon views from this viewpoint location during construction and on completion of the Project will be not significant.

Viewpoint 7

11.9.40 Partial views of the upper-most parts of cranes during construction and the stack of the Generating Equipment on completion are anticipated to be just visible above the intervening woodland; whilst Covanta will appear as an a large and bulky structure which, together with its tall vertical stack, will break the skyline. The addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during the construction period and on completion.

11.9.41 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.42 Therefore, incremental cumulative visual effects upon views from this viewpoint location will be not significant during the construction period and on completion of the Project.

Viewpoint 8

11.9.43 Covanta will appear as a large structure and mass, seen above vegetation. Its stack is a vertical feature punctuating the skyline, to a similar height as pylons in the view.

11.9.44 Construction activities associated with the upper elements of the transmission tower will be seen above the rooflines of intervening dwellings. On completion, the transmission tower will be seen on the skyline, but lower than the Covanta stack and other pylons. The addition of the transmission tower & SECs therefore will have an incremental cumulative visual effect during the construction period and on completion which has a negligible magnitude of change.

11.9.45 The Generating Plant will not be visible from this viewpoint; therefore, will not contribute to an incremental cumulative visual effect on completion.

11.9.46 Other cumulative developments will not be visible as a result of intervening vegetation and landform.

11.9.47 Incremental cumulative visual effects upon views from this viewpoint location, during construction and on completion of the Project, will be not significant.

Viewpoint 9

11.9.48 Covanta will appear as a large structure, partially filtered by vegetation. Its stack forms a vertical feature on the skyline.

11.9.49 Some construction activities arising from both the Generating Plant and the transmission tower are anticipated to be visible above woodland. On completion, the transmission tower will be seen on the skyline, but lower than the Covanta stack and the Marston Vale wind turbine. As a result, the addition of the Project and transmission tower would result in an incremental cumulative visual effect during the construction period which has a magnitude of change that is negligible.

11.9.50 Other cumulative developments are not likely to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.51 Therefore, incremental cumulative visual effects upon views from this viewpoint location during construction and on completion will be not significant.

Viewpoint 10

11.9.52 The upper parts of the stack of the Generating Equipment will be barely perceptible on the floor of the valley, some 5.5km away and seen against the wide sweep of the landscape of the valley. Covanta is seen as a large scale built form in the valley and its stack breaks the skyline in the distant view. The transmission tower is barely perceptible in the landscape and sits below the skyline. The addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during construction and on completion.

11.9.53 Other cumulative developments are not likely to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.54 The incremental cumulative visual effects will be not significant during construction and on completion of the Project.

Viewpoint 11

11.9.55 Some construction activities arising from both the Generating Plant and the transmission tower are anticipated to be visible 3km away and above intervening vegetation. Covanta is clearly seen as a large scale built form and its stack breaks the skyline. The addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during the construction period and on completion.

11.9.56 Other cumulative developments are not likely to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.57 Therefore, incremental cumulative visual effects will be not significant during construction and on completion of the Project.

Viewpoint 12

11.9.58 An access road will have been constructed for the Covanta scheme and which will be used for the construction and operation of the Project. The stack of the Generating Equipment will visible to the left of Covanta but will sit below the skyline of the Greensand Ridge. Although an additional vertical element in the view, the stack appears as a smaller element in comparison to the Covanta form, mass and stack height. Covanta will be a large scale structure and mass which is the focus of and in the centre of the view, with the stack seen partly against the Greensand Ridge and extending into the skyline. The addition of the Project would result in an incremental cumulative visual effect which has a negligible magnitude of change during the construction period and on completion.

11.9.59 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.60 Therefore, incremental cumulative visual effects will be not significant during construction and on completion of the Project.

Viewpoint 13

11.9.61 Covanta is not perceptible in this view as a result of the intervening landform.

11.9.62 Other cumulative developments are not anticipated to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.63 Therefore, there are no incremental cumulative visual effects upon views from this viewpoint location. The effects of the Project upon views from this location are those as previously reported in the LVIA.

Viewpoint 14

11.9.64 Covanta is seen as a large mass and scale of built form in the landscape, in the centre of the view; breaking the skyline and forming the focus of the view.

11.9.65 The Project, the transmission tower and SECs are in the foreground of the view, seen in front of Covanta. Construction activities will be clearly seen taking place in the middle ground.

11.9.66 On completion, the Project structures, transmission tower and SECs will be seen in context with Covanta. The Generating Equipment and stack are of a smaller scale than Covanta; the stack however does not extend into the skyline. The addition of the Project, transmission tower and SECs creates additional visual complexity in the view, due to contrasts in the scale, mass and variety of structures; amplifies visual effects; and results cumulatively in a large proportion of the middle ground being occupied by development.

11.9.67 The incremental cumulative visual effects would therefore result in moderate magnitudes of change during construction and also on completion.

11.9.68 The visual receptor at this viewpoint location is judged to have an overall sensitivity of Medium. Therefore, the incremental cumulative visual effects during the construction period and on completion will be significant.

11.9.69 Other cumulative developments are not anticipated to be perceptible owing to distance, intervening development, vegetation and landform.

Viewpoint 15

11.9.70 Covanta dominates the view, its scale, mass and bulky form clearly visible through winter trees. Covanta's stack extends into the skyline.

11.9.71 The Project is clearly visible in the middle ground, to the right of Covanta. Much of the Project sits against the backdrop of rising land; however, the stack of the Generating Equipment breaks the skyline but is seen as a lower height than the pylons on the skyline. The Project forms additional development in the view, but appears dwarfed by Covanta which draws the eye and forms the main focus of the view.

11.9.72 The incremental cumulative visual effects would result in slight magnitudes of change during construction and also on completion.

11.9.73 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.74 Therefore, the incremental cumulative visual effects during the construction period and on completion will be not significant.

Viewpoint 16

11.9.75 Other cumulative developments will not be visible owing to the direction of view and intervening vegetation and landform.

11.9.76 Therefore, there are no cumulative visual effects upon views from this viewpoint location. The effects of the Project upon views from this location are those as previously reported in the LVIA.

Incremental Cumulative Landscape Effects

11.9.77 The following is an assessment of the worst-case scenario of incremental cumulative landscape visual effects during construction and on completion for each Landscape Character Area (LCA) and Landscape Feature.

National LCA 88: Bedfordshire and Cambridgeshire Claylands; and LCA 90: Bedfordshire Greensand Ridge.

11.9.78 Due to the changes being in a limited area contained within a much larger character area, the magnitude of change of incremental cumulative landscape effects is anticipated to be negligible. No significant incremental cumulative landscape effects are anticipated for this NCA.

County LCA 5D: North Marston Clay Vale

11.9.79 Due to the changes being in a limited area contained within a much larger character area, the magnitude of change of incremental cumulative landscape effects is anticipated to be negligible. No significant incremental cumulative landscape effects are anticipated for these LCAs.

11.9.80 District LCA Forest of Marston Vale Landscape Zones: Greensand Ridge and East Vale; Brickfields.

11.9.81 Due to the changes being in a limited area contained within much larger character areas, the magnitude of change of incremental cumulative landscape effects is anticipated to be negligible. No significant incremental cumulative landscape effects are anticipated for these LCAs.

Local Landscape Character of Site and Surrounding Area

11.9.82 Owing to its size and form, the Covanta scheme fundamentally changes the character of the local landscape of the area surrounding the Project Site. The addition of the Project would result in an incremental cumulative effect on local landscape character which has a slight magnitude of change, and the incremental cumulative landscape effect would be not significant.

11.9.83 The other cumulative developments are remote from the site and can therefore have no direct effect.

Landform

11.9.84 The addition of the Project to Covanta would result in incremental cumulative effects on landform which are of a negligible magnitude of change. The incremental cumulative landscape effect therefore would be not significant.

Woodland, Trees and Hedgerows

11.9.85 The effects on woodland, trees and hedgerows resulting from the Project largely arise from the construction of the access road, and the gas and electrical connections. With the Covanta scheme in place, a large access road will already have been constructed to serve it; which would be utilised by the Project. The addition of the Project will, however, require some further clearance of vegetation in relation to the access road, as well as for the Gas and Electrical Connections. Incremental cumulative landscape effects on woodland, trees and hedgerows will result in effects that are of a moderate magnitude of change, which would be adverse during construction and on completion; changing to beneficial effects 15yrs after planting. These effects would be significant.

Public Rights of Way

11.9.86 The Covanta scheme does not result in effects on public rights of way within the Project Site. Therefore there are no incremental cumulative landscape effects on public rights of way. The effects of the Project upon public rights of way are those as previously reported in the LVIA

Watercourses

11.9.87 The Covanta scheme does not result in effects on watercourses within the Project Site. Therefore there is no incremental cumulative landscape effect on watercourses. The effects of the Project upon watercourses are those as previously reported in the LVIA.

Combined Cumulative Visual Effects

11.9.88 The assessment of combined cumulative visual effects is set out in detail, including the assessment of levels of significance, in Table 11.1C of Appendix 11.1 to this ES. Combined Cumulative Visual Effects Table (note that the baseline descriptions of views and assessment of sensitivity are as those set out in Table 11.1A of Appendix 11.1 to this ES). The assessment is made of the Project in combination with the cumulative developments, assessed against the 2017 baseline year (i.e. all developments, combined, assessed against baseline) and has been informed by the Project cumulative photomontages.

11.9.89 Figure 11.5: Cumulative ZTV Plan has been prepared to demonstrate the combined ZTV of both the Project and the Covanta scheme, formed by the (worst case) zone of theoretical visibility of the Project (orange hatch) overlaid onto a (worst case) zone of theoretical visibility of the RFF Covanta Project (pink solid shading). Both ZTVs have been prepared using the same software and parameters, to enable as clear a comparison as possible. Figure 11.5 illustrates that the Project ZTV sits within the much larger ZTV of Covanta. In reality, the extent of the ZTV of each scheme is likely to be less than indicated on the plan, as a result of additional visual barriers on the ground such as buildings or trees and hedgerows.

11.9.90 The assessment of the worst-case scenario of combined cumulative visual effects is made in accordance with the methodology used for the Project LVIA, previously described, and therefore is consistent with the Project's LVIA in the assessment and definitions of sensitivity, magnitude of impact and level of significance. A summary of the combined cumulative visual effects is set out below, which should be read together with the Project cumulative photomontages in Document Reference 7.1.

Viewpoint 1

11.9.91 Owing to intervening vegetation and landform, the only part of the Project that would be visible is part of the proposed transmission tower, roughly in the same position as the existing tower. Most of the stack of the Covanta scheme will be visible. None of the other cumulative developments would be visible.

11.9.92 The combination of the Project and Covanta would result in combined cumulative visual effects of a slight to moderate magnitude of change during the construction period, and of a moderate magnitude of change on completion and at 15yrs after planting. The combined cumulative visual effects upon views from this viewpoint location are adverse, additive and significant for all assessment periods.

Viewpoint 2

11.9.93 The stack is the only part of the Generating Equipment visible; and owing to separation distance from, and the relative scale compared to the Covanta stack, the Project and cumulative developments would result in combined cumulative visual effects that have a moderate magnitude of change which is adverse, during the construction period. On completion and at 15yrs after planting, there would be a combined cumulative visual effect that has a slight to moderate magnitude of change which is adverse.

11.9.94 These combined cumulative visual effects arise from the combination of the Project and Covanta, as other committed developments are not anticipated to be seen from this viewpoint location, due to intervening vegetation and landform.

11.9.95 Combined cumulative visual effects upon views from this viewpoint location at all assessment periods, are additive effects and will be significant.

Viewpoint 3

11.9.96 The Project appears in front of, and is viewed as part of, but below, Covanta in this view. Covanta dominates the Project and Covanta's stack breaks the skyline. Other committed developments are not anticipated to be seen in combination with the Project from this viewpoint location, due to distance, intervening vegetation and landform.

11.9.97 As a result, the combination of the Project and Covanta would result in combined cumulative visual effects that have a moderate magnitude of change that is adverse, during all assessment periods.

11.9.98 The combined cumulative visual effects upon views from this viewpoint location at all assessment periods, are additive effects and will be significant.

Viewpoint 4

11.9.99 Views of the Project will be filtered by intervening vegetation and it will sit below the skyline. Covanta's stack will break the skyline and Covanta will be a large scale built form which is the focus of the view drawing the eye. The committed development on land at Moreteyne Farm would be barely discernible in the distance in the view and seen in association with existing development at Marston Moretaine. As a result, it is anticipated that there would be very little combined visibility of that cumulative development scheme with the Project.

11.9.100 The combination of the Project and cumulative developments would result in combined cumulative visual effects that are of a moderate magnitude of change at all periods of assessment.

11.9.101 The combined cumulative visual effects upon views from this viewpoint location at all assessment periods, are additive effects and will be significant.

Viewpoint 5

11.9.102 The Covanta scheme will be seen on the valley floor, with its stack breaking the skyline; and will be large scale built form which is the focus of the view. The Project will be seen in the context of the much larger Covanta scheme. The committed developments on land at Moreteyne Farm and Broadmead Road will be barely discernible in the far distance of the view.

11.9.103 The combination of the Project and cumulative developments would result in combined cumulative visual effects that are of a moderate magnitude of change during all assessment periods.

11.9.104 The combined cumulative visual effects on views from this viewpoint location at all assessment periods will be additive and significant.

Viewpoint 6

11.9.105 The Covanta scheme includes a very large mass of structure within the pit, seen against the rising landscape in the background and its stack breaks the skyline. Covanta is seen as a large scale built form, which draws the eye and is the focus of the view. The Project will be seen as built form adjacent to, and left of, Covanta; but it will be below the skyline and of a much smaller scale and mass. Although the Stack of the Generating Equipment is a vertical feature in the landscape, it does not break the skyline and sits below the height of the main mass of the Covanta structure.

11.9.106 The developments at Moreteyne Farm and Stewartby are anticipated to not be perceptible in this view.

11.9.107 Therefore, the combination of the Project and Covanta would result in combined cumulative visual effects that are adverse, additive and of a moderate magnitude of change during construction and on completion; and a slight to moderate magnitude of change at 15yrs after planting.

11.9.108 The combined cumulative visual effects upon views from this viewpoint location will be therefore be significant for all assessment periods.

Viewpoint 6a

11.9.109 Covanta appears as a very large mass of structure, seen through winter trees, and its tall vertical stack extends into the skyline. In this view, the upper-most part of the stack of the Generating Equipment will be barely perceptible, with the rest of the Project's stack and extent being well filtered by vegetation. Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.110 Therefore, the combination of the Project and Covanta would result in combined cumulative visual effects which are adverse and additive, of a slight to moderate magnitude of change during the construction period and a moderate magnitude of change on completion and at 15yrs after planting.

11.9.111 The combined cumulative visual effects upon views from this viewpoint location will therefore be significant for all assessment periods.

Viewpoint 6b

11.9.112 Covanta appears as a large and bulky structure which, together with its tall vertical stack, rises above vegetation and breaks the skyline. The upper-most part of cranes during construction and the stack of the Generating Equipment on completion, will be barely discernible, filtered by vegetation.

11.9.113 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.114 Therefore, the combination of the Project and Covanta would result in combined cumulative visual effects that have a major magnitude of change that is adverse during construction and on completion; and a moderate magnitude of change that is adverse at 15yrs after planting.

11.9.115 The combined cumulative visual effects upon views from this viewpoint location will be additive and significant for all assessment periods.

Viewpoint 7

11.9.116 Partial views of the upper-most parts of cranes during construction and the stack of the Generating Equipment on completion are anticipated to be just visible above the intervening woodland; whilst Covanta will appear as an a large and bulky structure which, together with its tall vertical stack, will break the skyline. Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.117 The combination of the Project and Covanta would result in combined cumulative visual effects which are of a moderate magnitude of change that are adverse and additive, during the construction period and on completion. At 15yrs after planting, the magnitude of change would reduce to slight to moderate, and remain as adverse and additive.

11.9.118 Therefore, combined cumulative visual effects upon views from this viewpoint location will be significant at all assessment periods.

Viewpoint 8

11.9.119 Covanta will appear as a large structure and mass, seen above vegetation. Its stack is a vertical feature punctuating the skyline, to a similar height as pylons in the view. Other cumulative developments will not be visible as a result of intervening vegetation and landform.

11.9.120 Construction activities associated with the upper elements of the Project's transmission tower will be seen above the rooflines of intervening dwellings. On completion, the transmission tower will be seen on the skyline, but it will be lower than the Covanta stack and other pylons.

11.9.121 The combination of the Project's transmission tower & SECs with Covanta therefore will have a combined cumulative visual effect which is adverse and additive. During the construction period and on completion the combined cumulative visual effects will be of a moderate magnitude of change; and at 15yrs after planting the magnitude of change will reduce to slight to moderate.

11.9.122 The Project's Generating Plant will not be visible from this viewpoint; therefore, it will not contribute to the combined cumulative visual effects.

11.9.123 The combined cumulative visual effects upon views from this viewpoint location, at all assessment periods, will be significant.

Viewpoint 9

11.9.124 Covanta will appear as a large structure, partially filtered by vegetation. Its stack forms a vertical feature on the skyline. Other cumulative developments are not likely to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.125 Some construction activities arising from both the Project's Generating Plant and the transmission tower are anticipated to be visible above woodland. On completion, the transmission tower will be seen on the skyline, but it will be lower than the Covanta stack and the Marston Vale wind turbine.

11.9.126 Therefore, the combination of the Project and Covanta would result in combined cumulative visual effects that are adverse, additive and of a slight magnitude of change during all assessment periods.

11.9.127 These combined cumulative visual effects upon views from this viewpoint location, during all assessment periods, will be significant, due to the overall high sensitivity of the visual receptor.

Viewpoint 10

11.9.128 The upper parts of the stack of the Project's Generating Equipment will be barely perceptible on the floor of the valley, some 5.5km away and seen against the wide sweep of the landscape of the valley. The transmission tower is barely perceptible in the landscape and sits below the skyline.

11.9.129 Covanta is seen as a large scale built form in the valley and its stack breaks the skyline in the distant view. Other cumulative developments are not likely to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.130 Therefore, the combination of the Project and Covanta would result in combined cumulative visual effects which are adverse, additive and of a slight magnitude of change for all assessment periods.

11.9.131 These combined cumulative visual effects upon views from this viewpoint location, during all assessment periods, will be significant, due to the high sensitivity of the visual receptor.

Viewpoint 11

11.9.132 Some construction activities arising from the Project's Generating Plant and the transmission tower are anticipated to be visible 3km away and above intervening vegetation.

11.9.133 Covanta is clearly seen as a large scale built form and its stack breaks the skyline. Other cumulative developments are not likely to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.134 Therefore, the combination of the Project and Covanta would result in combined cumulative visual effects that are adverse, additive. These would have a slight to moderate magnitude of change during construction and at 15yrs after planting, and a moderate magnitude of change on completion.

11.9.135 As a result, the combined cumulative visual effects will be significant during all assessment periods.

Viewpoint 12

11.9.136 An access road will have been constructed for the Covanta scheme, which will be used for the construction and operation of the Project. The stack of the

Generating Equipment will visible to the left of Covanta but will sit below the skyline of the Greensand Ridge. Although a vertical element in the view, the Project’s stack appears as a smaller element in comparison to the Covanta form, mass and stack height. Covanta will be a large scale structure and mass which is the focus of, and in the centre of, the view; with the Covanta stack seen partly against the Greensand Ridge and extending into the skyline.

11.9.137 Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.138 The combination of the Project and Covanta would result in combined cumulative visual effects which are adverse, additive and are of a major magnitude of change during the construction period, and moderate magnitudes of change on completion and at 15yrs after planting.

11.9.139 The combined cumulative visual effects will be significant during all periods of assessment.

<u>Viewpoint 13</u>

11.9.140 Covanta is not perceptible in this view as a result of the intervening landform. Other cumulative developments are not anticipated to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.141 Therefore, there are no combined cumulative visual effects upon views from this viewpoint location. The effects of the Project upon views from this location are those as previously reported in the LVIA.

<u>Viewpoint 14</u>

11.9.142 Covanta is seen as a large mass and scale of built form in the landscape, in the centre of the view; breaking the skyline and forming the focus of the view. Other cumulative developments are not anticipated to be perceptible owing to distance, intervening development, vegetation and landform.

11.9.143 The Project and the transmission tower and SECs is in the foreground of the view, seen in front of Covanta. Construction activities will be clearly seen taking place in the middle ground.

11.9.144 On completion, the Project structures, transmission tower and SECs will be seen in context with Covanta. The Generating Equipment and stack are of a smaller scale than Covanta; the stack however does not extend into the skyline. The Project, transmission tower and SECs create visual complexity in the view, due to contrasts in the scale, mass and variety of structures with Covanta; amplifying visual effects; and resulting cumulatively in a large proportion of the middle ground being occupied by development.

11.9.145 The combined cumulative visual effects would therefore be adverse and additive, and result in major magnitudes of change during construction and on completion, and a moderate to major magnitude of change at 15yrs after planting.

11.9.146 The combination of the Project and Covanta will result in combined cumulative visual effects that are considered significant for all assessment periods.

Viewpoint 15

11.9.147 Covanta dominates the view; its scale, mass and bulky form clearly visible through winter trees. Covanta's stack extends into the skyline. Other cumulative developments will not be visible owing to intervening vegetation and landform.

11.9.148 The Project is clearly visible in the middle ground, to the right of Covanta. Much of the Project sits against the backdrop of rising land; and although, the stack of the Generating Equipment breaks the skyline, it is seen to be a lower height than the pylons on the skyline. In the view, the Project appears dwarfed by Covanta. It is Covanta which draws the eye and forms the main focus of the view.

11.9.149 The combined cumulative visual effects would be adverse, additive and result in major magnitudes of change during construction and on completion, and a moderate to major magnitude of change at 15yrs after planting.

11.9.150 The combined cumulative visual effects at all assessment periods are therefore significant.

Viewpoint 16

11.9.151 Other cumulative developments will not be visible owing to the direction of view and intervening vegetation and landform.

11.9.152 Therefore, there are no cumulative visual effects upon views from this viewpoint location. The effects of the Project upon views from this location are those as previously reported in the LVIA.

Combined Cumulative Landscape Effects

11.9.153 The assessment of the worst-case scenario of combined cumulative landscape effects is made in accordance with the methodology used for the Project LVIA, previously described, and therefore is consistent with the Project's LVIA in the assessment and definitions of sensitivity, magnitude of impact and level of significance. The detailed combined cumulative landscape assessment is set out in Table 11.1D of Appendix 11.1 of this ES. Baseline descriptions of landscape receptors are at Table 11.11.

11.9.154 The following is a summary of the assessment of combined cumulative landscape effects, for each Landscape Character Area (LCA) and Landscape Feature, which arise as a result of the Project in combination with the cumulative developments.

National LCA 88: Bedfordshire and Cambridgeshire Claylands; and LCA 90: Bedfordshire Greensand Ridge.

11.9.155 The changes will occur in a limited area contained within these much larger character areas. The combined cumulative landscape effects are anticipated to be adverse and additive, but of a magnitude of change that is negligible. There are therefore no significant combined cumulative landscape effects anticipated for this NCA.

County LCA 5D: North Marston Clay Vale

11.9.156 The changes would be in a limited area contained within a much larger character area. The combined cumulative landscape effects would be adverse and additive, and of a moderate magnitude of change during construction and on completion, reducing to slight 15yrs after planting. The overall sensitivity of the LCA is assessed as low; therefore, combined cumulative landscape effects upon this LCA will be not significant.

District LCA Forest of Marston Vale Landscape Zones: Greensand Ridge and East Vale; Brickfields.

11.9.157 The changes would occur in a limited area contained within this larger character area. The combined cumulative landscape effects would be adverse and additive, having a magnitude of change that is slight. Therefore, these effects will be not significant.

Local Landscape Character of Project Site and Surrounding Area

11.9.158 Owing to its size and form, the Covanta scheme fundamentally changes the character of the local landscape character of the Project Site's surrounding area. The combination of the Project and Covanta will directly affect the local landscape character of the Project Site and immediate surrounding area. Other cumulative developments are remote from the Project Site and will have no direct effect.

11.9.159 The combined cumulative landscape effects on the local landscape character of the Project Site and surrounding area will be adverse and additive. These will be of a major magnitude of change during construction and on completion, and have a moderate magnitude of change at 15yrs after planting. These effects would not be significant, however, as a result of the receptor's low overall sensitivity.

Landform

11.9.160 The combination of the Project with Covanta would result in combined cumulative landscape effects on landform that are adverse, additive and of a negligible magnitude of change for all assessment periods. The combined cumulative landscape effect on landform will therefore be not significant.

Woodland, Trees and Hedgerows

11.9.161 Adverse effects on woodland, trees and hedgerows resulting from the Project in combination with Covanta, largely relate to losses as a result of the construction of a new access road, which would also be utilised by the Project and Covanta. There will also be losses associated with electrical and gas connections for the Project. Therefore, there will be adverse, additive combined cumulative landscape effects upon woodland, trees and hedgerows which are of a moderate magnitude of change during construction and on completion, which are significant.

11.9.162 Mitigation and new planting is proposed which, at 15 years after planting, will result in beneficial and additive combined cumulative landscape effects that have a moderate magnitude of change, and are therefore significant.

Public Rights of Way

11.9.163 The Covanta scheme and other cumulative developments do not have direct effects on public rights of way within the Project Site area; therefore, there are no direct combined cumulative landscape effects on public rights of way. The effects of the Project upon public rights of way are those as previously reported in the LVIA.

Watercourses

11.9.164 The Covanta scheme and other cumulative developments do not have direct effects on watercourses within the Project Site area; therefore, there are no direct combined cumulative landscape effects on watercourses. The effects of the Project upon watercourses are those as previously reported in the LVIA

11.10 Effect Interactions

11.10.1 In terms of LVIA, the component of the Project most likely to have significant effects is the stack of the Generating Equipment. The height of the stack has been set by air quality stack height sensitivity analysis, as described in Chapter 6. The air quality modelling has determined the most appropriate stack height based on the need to meet air quality legislative limits. The air quality modelling has ensured that that stack height will meet legislative limits, but the stack height has not been increased any more, in order to strike an appropriate balance with potential effects on landscape and visual receptors.

11.10.2 It is recognised that there is also a cross-over between LVIA and effects on cultural heritage assets, and Chapter 13 deals with potential effects on cultural heritage assets and any potential interactions. Photomontages have been produced which cover views from cultural heritage assets as well as sensitive landscape and visual receptors.

11.10.3 The Landscape and Ecology Mitigation and Management Strategy (Appendix 11.3) has considered mitigation and management measures which are complementary to both landscape screening and enhancement and ecological management.

11.11 Mitigation and Assessment of Residual Effects

11.11.1 Additional mitigation is that which is additional to the embedded design mitigation measures described in section 3.6 of Chapter 3. Additional mitigation is described in the Landscape and Visual Effects Tables (Appendix 11.1) and below.

11.11.2 Specific embedded mitigation for the Power Generation Plant includes the following:

- The location of the generating plant within the Rookery South Pit which reduces the potential height of the development by the depth of the pit, which is 15m. As a result, the potential adverse visual effects will be reduced such that the magnitude of change leads to there being very few significant visual effects;
- The design of the development such as the selection of materials and colours to minimise reflective finishes and maximise recessive colours, reducing visibility against the background of the landscape;
- The Project Site being amongst existing woodland and hedges, including more recent planting undertaken for clay extraction and restoration, such as on the ridge between the Rookery North and Rookery South Pits, as well as woodland along Marston Road to the west;
- Taking advantage of the planting undertaken for the LLRS to provide further integration into the landscape especially from the north; and
- The adoption of a Construction Environmental Management Plan (CEMP) (Appendix 3.2) that controls the construction process to minimise impacts on the environment, and which to protect landscape and visual aspects would, for instance, include procedures to protect existing trees and manage soil as a valuable resource and as a result ensure that existing features aid in mitigating the potential effects.

11.11.3 Specific additional mitigation includes the following:

- Woodland and hedge planting along the southern boundary to reinforce existing vegetation pattern and provide screening and filtering of views;
- Hedge planting to the Green Lane frontage on new lines to replace planting lost to the Access Road;
- New planting along the access track to replace that lost to highway improvements to the track; and
- Landscape and Ecological Management Plan to ensure the long term management of the landscape and ecological strategy (Appendix 11.3).

11.11.4 The Landscape Strategy associated with the Covanta RRF has been taken into account when designing the Landscape and Ecology Mitigation and Management Strategy (LEMMS) in Appendix 11.3 of the ES. All areas of planting and habitat creation proposed associated with the Covanta Scheme has been taken into account in the context of the Strategy and will not be disturbed by the Project. This will ensure that the biodiversity enhancements proposed associated with the Covanta Scheme can still be delivered.

11.11.5 Embedded mitigation for the gas connection is as follows:

- Having the gas supply largely underground to reduce its potential effects; and
- Application of the CEMP.

11.11.6 Embedded mitigation for the electrical connection is as follows:

- Putting much of the connection underground to reduce both visual and landscape effects;
- Locating the replacement transmission tower close to the original tower to ensure that it is the same broad corridor as the existing, which reduces the geographical extent of effects;
- Placing the SECs within a wooded setting so that it is only clearly visible in the immediate vicinity, largely to the south and south-east from the footpath network; and
- Application of the CEMP.

11.11.7 Residual landscape and visual effects, including cumulative landscape and visual effects, considering the mitigation set out above are outlined in the landscape and visual impact assessment tables in Appendix 11.1 and at Sections 11.7 and 11.9 above.

11.11.8 The cumulative landscape and visual effects assessment has not identified a requirement, as a result of incremental or combined cumulative effects, for the Project to provide further additional mitigation, over and above that which has been outlined for the Project in terms of proposed landscape planting which is set out in the outline LEMMS (Appendix 11.3). The planting scheme for the Project has taken account of the planting scheme for the Covanta RFF Project, so that both mitigation planting schemes can co-exist. The purpose of this is to provide an appropriate level of mitigation for the Project, whilst not detrimentally affecting the delivery of the original level of mitigation intended by the Covanta RFF planting scheme. It is therefore considered that the mitigation proposed for the Project provides a sufficient proportion of mitigation of effects.

11.12 Conclusions

11.12.1 The Landscape and Visual Assessment has shown that for most Landscape and Visual Receptors the Project will not result in likely significant effects as a standalone project.

11.12.2 In terms of Visual Effects, out of 18 viewpoints, only 3, 5, 6, 7, 14, 15 and 16 show significant effects during construction and only viewpoints 14, 15 and 16 show significant effects on completion and Viewpoint 14 shows significant effects 15 years after planting. Viewpoints 14, 15 and 16 show significant effects on decommissioning, but as a result of the short term dismantling process and not any long term effects.

11.12.3 In terms of Landscape Effects, there are significant effects on some of the features of the Project Site and its setting, which are Woodland, Trees and Hedgerows; and Public Rights of Way. During construction, significant adverse effects arise from the Generating Plant and the Electrical Connection on Woodland, Trees and Hedgerows; and arise from the Gas and Electrical Connections on the Public Rights of Way. On completion, the significant adverse effect on Woodland, Trees and Hedgerows remains from the Generating Plant. However, owing to the effective establishment and maturing of the mitigation planting, significant benefits arise from year 15 onwards.

11.12.4 The Cumulative Landscape and Visual Effects Assessment has demonstrated that the incremental cumulative visual effects of the Project are not significant, with the exception of those upon views from Viewpoint 14. For incremental cumulative landscape effects, the only significant effect would be upon woodland, trees and hedgerows.

11.12.5 The Cumulative Landscape and Visual Effects Assessment also determined that that the combined cumulative visual effects (those which arise from the combination of the Project and cumulative developments) are adverse and significant. The detailed assessment has found that the combined cumulative visual effects are additive effects as a result of the Project and Covanta; that is, the total effect of both projects. However, the detailed assessment indicates that the greatest proportions of the combined cumulative visual effects are generated as a result of Covanta.

11.12.6 Combined cumulative landscape effects have been identified as not significant, with the exception of significant effects upon woodland, trees and hedgerows. These would be adverse and additive as a result of the combination of the Project and Covanta. At 15yrs after planting, however, the significant and additive effect will become beneficial, due to the maturing mitigation planting associated with the Project.

11.12.7 The cumulative landscape and visual effects assessment has not identified a requirement, as a result of incremental or combined cumulative effects, for the Project to provide further additional mitigation, over and above that which has been outlined for the Project in terms of proposed landscape planting which is set out in the outline LEMMS (Appendix 11.3).

12 Traffic and Transport

12.1 Introduction

12.1.1 This Chapter presents the assessment of likely significant traffic and transport effects arising from the construction, operation, maintenance and decommissioning of the Project. It also describes the routes to be used to access the Project during construction, operation, maintenance and decommissioning.

12.1.2 The Project has the potential to affect traffic and transport due to effects on road safety, increased congestion and pedestrian delay during the construction, operational and decommissioning phases.

12.2 Legislation and Policy Context

12.2.1 The legislation and policy context in relation to traffic and transport is described in detail in Appendix 2.12. However, in summary, the following items of policy, legislation and guidance have been considered in preparing the assessment:

- National Policy Statements (NPS EN-1, EN-2, EN-4 and EN-5);
- National Planning Policy Framework;
- National Planning Policy Guidance;
- Central Bedfordshire Council's Local Transport Plan (LTP) 3 (2011- 2026);
- Bedford Borough Council's LTP3 (2011-2026);
- Central Bedfordshire Council Local Plan 2015 - 2035 – 2017 Consultation Paper;
- Bedford Borough Council Local Plan 2035 – 2017 Consultation;
- Circular 02/13 - 'The Strategic Road Network and the Delivery of Sustainable Development – 2007'; and
- The Highways Agency and the Planning Application process: a protocol for dealing with Planning Applications (June 2014).

12.3 Consultation

12.3.1 A list of key consultation responses received from statutory consultees during the EIA process relating to traffic and transport in 2014 and 2017 are presented in Table 12.1 below, along with how these have been responded to.

Table 12.1 - Summary of key consultation and responses

Reference 2014 consultation	Comment	Response
Planning Inspectorate (PINs) (Scoping Response)		
2.59	The SoS considers that information regarding site access routes for construction traffic and any vehicles carrying abnormal indivisible loads (AIL) should be clearly identified and assessed within the ES; including any alterations required to the existing road network to accommodate any AIL. The ES should also identify whether any alterations to the existing road network would be retained or reinstated, and assess the potential effects arising.	Information relating to construction access is summarised in section 5.2 of the TA (Appendix 12.1) and is referred to in Section 3.6 (Embedded Mitigation) and within the following documents that would be finalised upon the appointment of the contractor: i) the CEMP, contained in TA Appendix 5.1; ii) the Construction Traffic Management Plan (CTMP), an outline of which is included in TA Appendix 5.2, 5.3 and 5.4. iii) the framework of a route management plan included in TA section 5.2; iv) the construction routes are referred to in section 12.6 and shown on Figure 12.2 for the three component parts of the Project (the Power Generation Plant, the Gas Connection, and the Electrical Connection); v) an abnormal load delivery strategy; vi) construction movements are reported in section 12.7; and vii) the construction vehicle parking strategy defined in TA section 5.2.
2.60	The SoS considers that information on construction including: …number, movements and parking of construction vehicles (both HGVs and staff) should be clearly indicated in the ES.	
2.61	Information on the operation and maintenance of the proposed development should be included in the ES and should cover but not be limited to such matters as: … the number and types of vehicle movements generated during the operational stage.	

Reference 2014 consultation	Comment	Response
3.80	The ES should include information relating to transport for all phases of the proposed development such as estimates of traffic movements, and vehicle types, including relating to abnormal loads, and access and delivery routes.	Details of the operation and maintenance of the proposed development is considered in section 12.7.
	The applicant is referred to the comments of Luton Borough Council … in relation to traffic movements during the operational phase, and to comments made by Network Rail with regard to the level crossing on Stewartby Green Lane.	These comments are responded to below in the following sections with references to Paragraphs 8 to 10 of Luton Borough Councils consultation response. A traffic management scheme developed to respond to Network Rail's concerns is summarised in TA section 5.2 and included in TA Appendix 5.2, and referred to in the CTMP (TA Appendix 5.3 and 5.4). Details of the operation and maintenance movements from the proposed development are considered in section 12.7.
3.81	The removal of waste from the site for all phases of the proposed Project should be considered and assessed in terms of the likely transport routes, the number of journeys, and the type of vehicles required. Consideration must be given to an assessment of potential cumulative effects with other projects in the area - e.g., the LLRS which also has potential for a high number of HGV movements.	This information is contained within the framework CEMP, summarised in TA section 5.2, and contained in the CTMP (TA Appendix 5.2, 5.3 and 5.4). The LLRS will be completed in advance of the Project. As such, there will be no vehicle movements relating to the construction of the LLRS, albeit there will be occasional maintenance movements. Information on cumulative effects is referred to within section 12.8.

Reference 2014 consultation	Comment	Response
3.82	The ES should include a plan on which access routes are clearly identifiable, which the Scoping Report refers to in Figure 1 and 2.	The framework of a route management plan has been developed and reported within TA section 5.2, and would be finalised upon the appointment of the Contractor. The construction access routes for the three component elements of the Project are referred to in section 12.6 and shown on Figure 12.2.
3.83	The SoS would expect on-going discussion and agreement with the local highways authorities and the Highways Agency where possible.	A series of meetings were held during 2014 to scope the TA in accordance with current guidance, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. Further meetings will be held as part of the ongoing EIA work.
3.84	The SoS notes that opportunities for traffic movements will be investigated, and suggests mitigation measures such as a travel plan and sourcing materials so as to minimise transport.	The travel demand management measure elements are summarised in the response to PINS reference 2.59 referred to above.
3.85	The SoS recommends that the ES should take account of the location of footpaths and PROWs in the area, including bridleways and byways, and clearly set out potential impacts as a result of access routes and traffic movements.	Information regarding pedestrian and cyclist facilities has been included within the TA section 3.2 and section 12.6. An assessment of the environmental impacts is contained within section 12.7. A footpath management plan will be implemented in accordance

Reference 2014 consultation	Comment	Response
		with the CTMP (TA Appendix 5.3 and 5.4). This would be finalised upon the confirmation of the programme and appointment of contractor.
3.86	The Applicant is referred to the comments of the Highways Agency in relation to assessment of potential access routes, and abnormal loads, and construction management and travel plans.	Details of the operation and maintenance movements from the proposed development are considered in section 12.7. The travel demand management measure elements, including the assessment of abnormal loads, construction management and travel plans, are summarised in the response to PINS reference 2.59 referred to above.
3.87	This topic (transport) should be cross referred to the air quality topic chapter in the ES, particularly in relation to traffic emissions.	The traffic data used in the TA and this chapter has been used in, and is consistent with that used in the Air Quality (Chapter 6) and Noise and Vibration (Chapter 7) assessments.
Highways Agency (HA) - now Highways England (HE)		
1.	Both proposed access routes need to be assessed in line with current guidance- DfT Circular 02/13 and Highways Agency Planning Protocols. The Transport Assessment would be expected to assess the impact on the Strategic and Local Road Network throughout construction, operation and decommissioning periods.	A series of meetings were held during 2014 to scope the TA in accordance with current guidance, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. Details of the operation and maintenance movements from the proposed development are considered in section 12.7.
2.	Any abnormal loads will need to be discussed and their route agreed either at the planning stage or shortly after to ensure	These travel demand management measure elements are summarised in the response

Reference 2014 consultation	Comment	Response
	that the impact on road network is minimised.	to PINS reference 2.59 referred to above.
3.	A Construction Environmental Management Plan ("CEMP") should be put in place to ensure that the impact on the road network is minimised and deliveries to the site should be outside of peak periods.	This is contained in TA Appendix 5.1.
4.	HE expects to see a Travel Plan for staff working at the site to be implemented to reduce the number of trips associated with the development.	A Travel Plan has been prepared to minimise the number of car-based trips associated with the operation of the development. This is contained in TA Appendix 5.5
Luton Borough Council		
Paragraph 8	There is no indication of the number of people wanting to access the site during its operational phase. I would therefore expect the Transport Assessment to cover this in more detail.	A series of Joint Highway Authority Meetings were held in August 2014 to scope the TA in accordance with current guidance, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. This information has been included within TA section 7 and section 12.7.
Paragraph 9	As part of proposal for the western section of the East West Rail scheme, Network Rail and Department for Transport are looking at alternative alignments for the Bedford to	Further details of this proposal were requested from Network Rail – this relates to an option for consideration by Network

Reference 2014 consultation	Comment	Response
	Bletchley section, one of which involves a proposal known as the Stewartby Chord that runs between the Marston Vale line and the Midland main line south of Stewartby via the higher ground between Rookery North and South pits; this will cross the access track near the bend. It is worth consulting with Network Rail at an early stage regarding this.	Rail only at this stage and there are no firm proposals. Meetings have been held with Network Rail to enable this issue to be discussed. Relevant meeting notes are contained within TA Appendix 2.2. Further details are provided in section 12.5.
Paragraph 10	The scoping report should take into consideration a growing network of routes used by cyclists, walkers and equestrians around the area.	Information regarding pedestrian and cyclist facilities has been included within the TA section 3.2 and section 12.6. An assessment of the environmental impacts is contained within section 12.7. A footpath management plan will be implemented in accordance with the CTMP (TA Appendix 5.3 and 5.4). This would be finalised upon the confirmation of the programme, and the protection details are subject to agreement, but would include: i) publication of the construction dates when the route would have been affected; ii) safeguarding of the footpath route users by providing conspicuous fencing; iii) keeping a route of a suitable standard open during the works; and

Reference 2014 consultation	Comment	Response
		iv) minimising the time that the route is affected.
Central Bedfordshire Council (CBC)		
Development Control - Highways Officer	The CBC Highways Officer notes from information supplied, that the highway issues will be considered and addressed within the Transport Assessment and Travel Plan which will form part of any future submission. This is considered acceptable.	A series of meetings were held during 2014 to scope the TA in accordance with current guidance, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. The Travel Plan is contained in TA Appendix 5.5.
Bedford Borough Council (BBC)		
Transport Paragraph 1	The main issue will be the traffic and travel resulting from the development and the environmental, operational and safety impacts of this on the local communities and transport networks.	A series of meetings were held during 2014 to scope the TA in accordance with current guidance, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. The Travel Plan is contained in TA Appendix 5.5. Details of the operation and maintenance movements from the proposed development are considered in section 12.7
Transport Paragraph 2	The Transport Assessment and Construction Management Plan will have to carefully consider the suitability of the vehicular access points and routes. The	The travel demand management measure elements are summarised in the response to PINS reference 2.59 referred to above.

Reference 2014 consultation	Comment	Response
	A507 (South) and B530 (East) have both weight and width restrictions on them and will need to be assessed for their suitability for HGV or significant additional traffic.	
Network Rail		
Paragraph 4	It is likely that the development will significantly impact Railway Infrastructure, in particular the proposals on the level crossing on Green Lane. A risk assessment considering the increase in traffic over the level crossing will be required.	A series of discussions and meetings were held with Network Rail during 2014 to scope the Transport Assessment in, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. Details of the operation and maintenance movements from the proposed development are considered in section 12.7 A traffic management scheme - developed to respond to Network Rail's concerns regarding the construction movements - is summarised in TA section 5.2 and included in the CTMP (TA Appendix 5.3 and 5.4). This would be finalised upon the confirmation of the programme. Network Rail has agreed that there are unlikely to be any concerns during normal operation, it has been agreed that a temporary traffic signal controlled arrangement would be implemented during the construction period. This is reported in section 5.2 of the TA and section 3.6.

12.3.2

Reference 2017 consultation	Comment	Response
Network Rail Infrastructure		
S42-017	It is highly likely that the proposed new access roads off Green Lane in Stewartby and Station Lane in Millbrook will have an impact on the 2 Level Crossings located on both these roads. The report submitted to Network Rail for this consultation (the 2017 PEIR) does not discuss or mention the potential impact on the level crossings of the proposal.	As detailed above, a series of discussions and meetings were held with Network Rail during 2014 to scope the Transport Assessment, to discuss all outstanding issues, and resolve all matters. This process is detailed in TA section 2.4, copies of the notes of meetings are contained in TA Appendix 2.2. Details of the operation and maintenance movements from the Project are considered in ES section 12.7. A traffic management scheme - developed in 2014 to respond to Network Rail's concerns regarding the construction movements - is summarised in TA section 5.2 and included in TA Appendix 5.2, and referred to in section 3.6. Network Rail has agreed that there are unlikely to be any concerns during normal operation, it has been agreed that a temporary traffic signal controlled arrangement would be implemented during the construction period. This is reported in section 5.2 of the TA and section 3.6. Network Rail has advised it has no objection to the proposal.
S42-018	In 2015, the Network Rail Level Crossings Manager for the area, was consulted on initial proposals and raised concerns that the entrance to the development was approximately 150 metres from Stewartby Green Lane Level Crossing. There was concern that the construction traffic could cause blocking back at the level crossing and discussions included traffic management control to mitigate any impacts from the construction phase. There was also a proposal to re-model a section of Green Lane where the new access road would join it.	
S42-019	The developer should continue to liaise with Network Rail's Level Crossing Manager to ensure that the construction works on site do not impact upon the safe operation and integrity of the Stewartby	

Reference 2017 consultation	Comment	Response
	Green Lane Level Crossing and Millbrook Level Crossing.	
S42-020	A good traffic management control scheme must be included within the construction works phase to remove any issues of blocking back due to the additional traffic and construction traffic generated by the proposal.	
S42-021	The developer should also consider the potential impacts of the proposal not only during construction but also once the proposal is up and running (should it be granted planning consent).	
S42-022	As the proposal progresses the impact of construction works on site and impacts from the proposal once in operation on Network Rail's level crossings should be considered within the Transport Assessment. Any mitigation measures required at the level crossings would need to be fully funded by the developer and agreed with Network Rail.	
S42-023	Network Rail's Asset Protection Engineer has already informed the developer that they have reviewed the new access road within the site, which runs adjacent to the railway boundary. The developer has been advised that there must be no disturbance to the operational railway infrastructure and that the developer will need to provide: suitable trespass	The works are at least 70m from the operating rail boundary. The offset dimensions and fence / barriers are acceptable against vehicle incursion.

Reference 2017 consultation	Comment	Response
	proof fence of at least 1.8m in height; directional column lighting; adequate anti incursion barriers – especially in view of the increase in HGVs; and, surface water drainage away from the railway boundary.	
S42-024	Network Rail has been advised that the developer may want to install an Under Track Crossing (UTX) – this would need to be agreed with Network Rail including any wayleaves etc.	No UTX is being proposed with the development.
S42-025	As the proposal includes works which may impact the existing operational railway and in order to facilitate the above, a BAPA (Basic Asset Protection Agreement) will need to be agreed between the developer and Network Rail. The developer will be liable for all costs incurred by Network Rail in facilitating this proposal, including any railway site safety costs, possession costs, asset protection costs / presence, site visits, review and agreement of proposal documents and any buried services searches. The BAPA will be in addition to any planning consent.	Having received confirmation from Asset Protection, Network Rail has no objection to the proposal.
Buckinghamshire County Council		
S42-065	In consideration of the content of the Preliminary	The Applicant has noted the response.

Reference 2017 consultation	Comment	Response
	Environmental Information Report (PEIR) it is concluded that an increase in traffic flow within Buckinghamshire as a result of the proposals would not be considered a severe residual impact of the Millbrook Power development and could be attributed to natural fluctuation.	
	Royal Mail Group	
S42-066	Royal Mail requests that the ES includes information on the needs of major road users (such as Royal Mail) and acknowledges the requirement to ensure that major road users are not disrupted though full advance consultation by the applicant at the appropriate time in the DCO and development process. Royal Mail is able to supply the applicant with information on its road usage/ trips if required.	The assessment of effects presented in Section 12.7 has included an assessment on major road users in terms of e.g. severance and delay.
S42-067	The ES should include detailed information on the construction traffic mitigation measures that are proposed to be implemented, including a draft Construction Traffic Management Plan (CTMP) in addition to the CEMP and Contractor's Route Management Plan.	Information relating to construction access is summarised in section 5.2 of the TA (TA Appendix 51), and is referred to in Section 3.6 (Embedded Mitigation) and also within the following documents that would be finalised upon the appointment of the contractor: a. the CEMP (an outline of which is included in TA Appendix 5.1);

Reference 2017 consultation	Comment	Response
		b. the CTMP (an outline of which is included in TA Appendices 5.3 and 5.4); c. the framework of a route management plan included in TA section 5.2; d. the construction routes referred to in section 12.6 and shown on Figure 12.2 for the three component parts of the Project (the Power Generation Plant, the Gas Connection, and the Electrical Connection); e. an abnormal load delivery strategy (see section 5.2 of the TA); f. construction movements, reported in section 12.7; and g. the construction vehicle parking strategy, defined in TA section 5.2. Details of the operation and maintenance of the proposed development is considered in section 12.7.
S42-068	Royal Mail requests that it is fully pre-consulted by Millbrook Power on any proposed road closures/ diversions/ alternative access arrangements, hours of working and the content of the CEMP, CTMP and the Contractor's Route Management Plan.	Noted – Royal Mail will be consulted moving forward on any proposed road closures/ diversions/ alternative access arrangements and hours of working.

<table>
<tr><th>Reference 2017 consultation</th><th>Comment</th><th>Response</th></tr>
<tr><td colspan="3">BBC</td></tr>
<tr><td>S42-073</td><td>It appears from the information provided that the greatest traffic impacts will occur in the construction and decommissioning periods, as in the interim operational period once the equipment is in place there will be very little staff or commercial vehicle activity, but this will need to be evidenced.</td><td>This is discussed in detail in TA section 6.5</td></tr>
<tr><td>S42-074</td><td>For a development of this size and type a Transport Assessment (TA) that considers access impacts by all modes, on existing and future traffic levels along with a Construction Management Plan (CPM) that uses information from this.</td><td rowspan="3">Information relating to construction access is summarised in section 5.2 of the TA (Appendix 12.1), and is referred to in Section 3.6 (Embedded Mitigation) and also within the following documents that would be finalised upon the appointment of the contractor:
h. the CEMP (an outline of which is included in TA Appendix 5.1);
i. the CTMP (an outline of which is included in TA Appendices 5.3 and 5.4);
j. the framework of a route management plan included in TA section 5.2;
k. the construction routes are referred to in section 12.6 and shown on Figure 12.2 for the three component parts of the Project (the Power Generation Plant, the Gas Connection, and the Electrical Connection);</td></tr>
<tr><td>S42-075</td><td>The TA and CPM will have to carefully consider the suitability of the vehicular access points and routes. The A507 (south) and B530 (east) have both weight and width restrictions on them and will need to be assessed for their suitability for HGV or significant additional traffic. We would however not expect to see anything routing through the local villages.</td></tr>
<tr><td>S42-076</td><td>The Council would highlight due to the clay nature of the ground that on site wheel wash</td></tr>
</table>

Reference 2017 consultation	Comment	Response
	facilities will be required during the full construction phase and details of these measures should be included in the CMP to ensure the public highway remains clear of mud.	l. an abnormal load delivery strategy (see paragraphs 5.2.26 – 28 of the TA); m. construction movements are reported in section 12.7; and n. the construction vehicle parking strategy defined in TA section 5.2. Details of the operation and maintenance of the Project is considered in section 12.7.
CBC		
S42-103	If the EfW [Covanta Project] development does not go ahead or this development started first then a new access will need to be submitted as part of any DCO (Development Consent Order) application, though it should be pointed out that a ghost right turn access has already been approved through the EfW development which itself was subject to being granted through the DCO process.	A new access drawing will be submitted with the DCO for this development; see PBA DWG 31116/2001/008A in TA section 2.3 and TA Appendix 2.1
S42-104	Details on construction vehicles including abnormal loads and full details of a construction traffic route would be required. I would not wish to see any routing from the A507 through Lidlington, Millbrook or Marston Moretaine.	The travel demand management measure elements are summarised in the response to BBC reference S42-075 referred to above.

Reference 2017 consultation	Comment	Response
S42-105	I have a concern over the access shown on drg 31116/2001/007 as works traffic is shown entering/exiting on both sides of Houghton Lane and regular access to the AGI site off an existing track access, whilst I agree in the short term some mitigation can be provided I have a concern over the longer term if those access point were to remain and become permanent.	Noted – The access points will only be temporary and not used as permanent access points, therefore the short-term mitigation measures are considered sufficient.
S42-106	Drg 31116/2001/006 shows the traffic management on Green Lane but I would question why the access itself would not be constructed prior to any commencement on site. We would of course need to see engineering layout for approval.	It is likely that the access would be constructed early in the construction programme to allow access for construction vehicles and to prevent compaction of earth and transfer of detritus from the Project Site to the surrounding road network.
S42-107	Notwithstanding this the wait here sign closest to the railway barriers for the proposed signals means that there could be concerns over traffic backing up and possibly onto the railway line. This is a matter for Network Rail to agree to and no doubt they will have been consulted on this matter as well.	Noted – Network Rail has been consulted on this application, and had no objection to the proposal.

12.4 Topic-specific Realistic Worst Case Scenario for Assessment

12.4.1 The range of proposed Project parameters (which are described in Chapters 3 and 5 of this ES) have no bearing on potential effects on traffic and transport because all options will generate the same number of traffic movements during construction, operation and decommissioning.

12.5 Assessment Methodology and Significance Criteria

Assessment Methodology

Study Area

12.5.1 The study area for this assessment has been defined by the extent of the Project Site, as well as the main access routes which will be used by the Project during construction, operation and decommissioning, as outlined in Chapter 3 of this ES. The study area, as agreed with the Highway Authorities, is shown on Figure 12.2

Supporting Documents

12.5.2 A full TA has been completed in accordance with the relevant policy and guidance in Appendix 2.12 and is presented in the ES.

12.5.3 The Applicant held initial consultations with the relevant highway authorities in order to agree the scope and methodology of the TA in 2014. These were followed up with additional consultations in 2017 which confirmed the earlier assessment scope was still valid. The findings of the TA are summarised within this Chapter.

12.5.4 The TA is supplemented by a Travel Plan which sets out a strategy for reducing operational traffic movements to the Project Site. The Travel Plan is included as Appendix 5.5 to the TA.

12.5.5 An outline CEMP and a CTMP have also been prepared and are included as Appendices 5.1-5.4 to the TA. These documents have been prepared to minimise all aspects construction impact, including a strategy for reducing construction traffic movements.

Environmental Effects

12.5.6 The transport-related environmental effects of the Project have been assessed in accordance with the Guidelines for the Environmental Assessment of Road Traffic published by IEMA in 1993 (the "IEMA Guidance"), and Volume 11 of the Design Manual for Roads and Bridges (DMRB) - Environmental Assessment.

12.5.7 Reflecting this guidance, the assessment includes a review of:

- severance;

- driver delay;
- pedestrian delay (also considering cyclist delay);
- pedestrian amenity (also considering cyclist amenity);
- fear and intimidation;
- accidents and safety; and
- hazardous loads.

12.5.8 Full definitions of these potential effects are set out in the IEMA Guidance and DMRB Volume 11. It has been assumed that construction effects are the same as decommissioning and have been treated as such.

Traffic Surveys

12.5.9 In order to inform the assessment in the TA and ES, data obtained from traffic and pedestrian / cycle surveys undertaken in October and November 2014 and May 2017 were used. These include:

- automatic traffic counts on the C94 Bedford Road (the old A421), and Green Lane adjacent the Proposed Site Access;
- an all-movement part classified turning count survey at the C94 Bedford Road / Green Lane priority junction;
- an automatic traffic count on Millbrook Road; and
- pedestrian and cycle counts on Green Lane.

Items Scoped out of the Assessment

12.5.10 No hazardous loads are associated with the construction, operation or decommissioning of the Project and therefore have been scoped out of the assessment.

12.5.11 There would be a minimal number of vehicle movements to the Gas Connection during the operational phase (possibly in the order of 1 trip per week). These movements would be intermittent, and would be limited to routine inspection and maintenance operations at the AGI.

12.5.12 As such, no assessment has been undertaken of any operational phase-generated traffic movement on Millbrook Road from the Gas Connection, as described in section 12.7.

12.5.13 There would be a minimal number of movements to the Electrical Connection during the operational phase (possibly in the order of 1 trip per week). These movements would be intermittent, and would be limited to routine inspection and maintenance operations.

12.5.14 As such, no assessment has been undertaken of any operational phase-generated traffic movement on Millbrook Road from the Electrical Connection, as described in section 12.7.

Assumptions and Limitations

12.5.15 The assumptions and limitations used in this assessment are as per section 4.8 – particularly that typical construction schedules and traffic movements have been taken from a design concept report, prepared specifically for the Project and based on experience of other, similar projects.

Significance Criteria

12.5.16 The significance criteria derived for this assessment reflect those contained within IEMA / DMRB Guidance, together with professional judgement.

12.5.17 The significance of effect is derived from a combination of the sensitivity (or importance) of the receptors affected and magnitude (or scale) of the change on the receptors.

Sensitivity

12.5.18 For the transport-related effects considered in this section of the ES, categories of receptor sensitivity have been defined from the principles set out in the IEMA Guidelines and therefore differ slightly from the example sensitivity of receptors table set out in Chapter 4.

Table 12.2 - Sensitivity of Receptors

Sensitivity	Receptors
High	Schools, colleges and other educational institutions; retirement / care homes for the elderly or infirm; roads used by pedestrians with no footways; and road safety black spots.
Medium	hospitals, surgeries and clinics; parks and recreation areas; shopping areas; and roads used by pedestrians with narrow footways.
Low	open space; tourist / visitor attractions; historical buildings; and churches.

12.5.19 In addition, although not specifically identified within the IEMA Guidelines as being sensitive, it has been assumed that residential areas (including rural communities) and employment areas have low sensitivity to these effects as they typically experience regular traffic movements on a day to day basis.

Magnitude of Impact

12.5.20 The magnitude of impact depends upon the category of traffic effects being assessed, and this has been based on the guidance relating to severance (as set out below) which suggests that 0%, 30%, 60% and 90% changes in traffic levels should be considered as "negligible", "minor", "moderate" and "major" impacts respectively.

12.5.21 IEMA's guidelines set out the broad principles of how to assess the magnitude of effect for each category of potential environmental impact. This is summarised below:

- **Severance** - The IEMA guidelines state that "severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery." Further, "Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively" (to maintain consistency with this assessment, these are referred to as "Minor", "Moderate" and "Major"). However, the guidance acknowledges that the measurement and prediction of severance is extremely difficult. The assessment of severance pays full regard to specific local conditions, in particular the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

Volume 11, Section 3, Part 8, Chapter 6 of the Design Manual for Roads and Bridges dated 2006 (the "DMRB") provides further guidance on this aspect of Severance in terms of the 2-way Annual Average Daily Traffic Flow (AADT) on a link. It states that new severance should be described in terms of "Slight", Moderate" or Severe" (to maintain consistency with this assessment, these are referred to as "Minor", "Moderate" and "Major") and that these categories " … should be coupled with an estimate of the numbers of people affected, their location and the community facilities from which they are severed". Therefore, for anything less than minor significance, no such estimate of the numbers of people affected need be made. (The potential effects as set out later in this section are based on an assessment which takes this into account). Table 12.3 summarises these thresholds:

Table 12.3 – Pedestrian Severance Threshold (DMRB)

Severance Level	Traffic Flow (AADT)
Major	> 16,000
Moderate	8,000 - 16,000
Minor	< 8,000

12.5.22 In addition (with specific reference to relief from existing severance), the DMRB Guidelines acknowledge that there is a traffic flow threshold below which changes in Severance are not considered significant where the existing AADT (daily) flow is below 8,000 vehicles.

- **Driver delay** – such delays "…are only likely to be significant when the traffic on the network surrounding the proposed development is already at, or close to, the capacity of the system";

- **Pedestrian delay** – "Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads." The guidance suggests that assessors "… use their judgement to determine whether pedestrian delay is a significant impact". For the purposes of this assessment, the pedestrian severance threshold levels identified in Table 12.3 above have been applied to pedestrian delay;

- **Pedestrian amenity** – this is broadly defined as the relative pleasantness of a journey, whether a journey is affected by traffic flow, traffic composition and pavement width / separation from traffic. The guidance suggests a tentative threshold for judging the significance of changes in pedestrian amenity of where traffic flow (or its lorry component) is halved or doubled;

- **Fear and intimidation** – the impact of this is dependent upon the volume of traffic, its heavy vehicle composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths. The IEMA guidelines state that there are no commonly agreed thresholds for estimating this from known traffic and physical conditions, but it does nevertheless suggest some thresholds which could be used, based on previous research, and these are shown in Table 12.4:

Table 12.4 - Fear and Intimidation Thresholds

Degree of Hazard	Average traffic flow over 18-hour day – vehicles / hour 2-way	Total 18-hour HGV flows	Average Vehicle Speed over 18-hour day - mph
Major	> 1,800	> 3,000	> 20
Moderate	1,200 - 1,800	2,000 - 3,000	15 - 20
Minor	600 - 1,200	1,000 - 2,000	10 - 15
Negligible	< 600	< 1,000	< 10

- **Accidents and safety** - the guidance suggests that "Professional judgement will be needed to assess the implications of local circumstances, or factors, which may elevate or lessen risks of accidents, e.g. junction conflicts".

- **Hazardous loads** - the guidance states that the Environmental Assessment needs clearly to outline the estimated number and composition of such loads, but that the analysis should reflect the nature of the load in question. The IEMA guidelines acknowledge that most developments will not result in increases in the number of movements or hazardous / dangerous loads.

Significance of Effect

12.5.23 The sensitivity of the receptor and the magnitude of impact are combined to give the overall significance of effect, as set out in Table 12.5. The criteria are based on guidance together with professional judgement.

Table 12.5 – Significance of Effect

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate	Large	Very Large
High	Neutral	Slight	Moderate	Large	Large
Medium	Neutral	Slight	Slight	Moderate	Large
Low	Neutral	Slight	Slight	Slight	Moderate
Negligible	Neutral	Neutral	Neutral	Neutral	Neutral

12.5.24 Effects of "moderate" or above are considered significant in terms of the EIA regulations.

12.6 Baseline Conditions and Receptors

Power Generation Plant

On-site access (Power Generation Plant)

12.6.1 Construction and operational access to the Generating Equipment Site is proposed from the north near Stewartby via Green Lane as shown on Figure 12.2. Green Lane links to C94 Bedford Road to the west, and Stewartby Way and the B530 to the east. There is a junction on Green Lane leading to an existing access track on the previously unexcavated land on the western side of Rookery North Pit which extends southwards into Rookery South Pit.

12.6.2 An unmetalled access track is already in existence at the Project Site, linking Green Lane to Rookery South Pit. However, this track is only currently suitable for use by off-road vehicles. The LLRS, as described in section 3.1 of this ES, includes work to build a new ramp into Rookery South Pit. This work will be carried out prior to construction of the Project.

12.6.3 There are two possible options for on-site access at the Generating Equipment Site, as described below.

With Covanta RRF Project: Short Access Road

12.6.4 The Covanta RRF Project includes provision to upgrade the existing agricultural track to a tarmac road suitable for the delivery of waste by HGV. Should this road be upgraded prior to the Project, it would be suitable to meet both the needs of the Project and the Covanta RRF Project - the typical capacity of this link, assessed in line with the DMRB TA 79/99 (of 1,590 vehicles per hour in the peak direction), is far higher than the daily traffic generation of both the Project and the Covanta RRF Project (as reported in the Covanta RRF Transport Assessment submitted in support of the Covanta RRF DCO) of approximately 600 vehicles per day.

12.6.5 In this instance, there would be a requirement for a short section of new Access Road ('Short Access Road') of up to 1.4 km in length, effectively extending the Covanta RRF road to the Generating Equipment Site within Rookery South Pit. The Short Access Road would be constructed from bituminous material bordered by a pre-cast concrete kerb and a footway. It would generally be 6m wide allowing for two-way traffic.

Without Covanta RRF Project: Access Road

12.6.6 As it is not certain as to when the Covanta RRF Project will be implemented, the Applicant has also included, within its Project, provision for a complete Access Road from Green Lane to the Generating Equipment Site (which includes both sections referred to above). If the Covanta RRF Project is not built before construction on the Project commences, the complete Access Road would be built. The Access Road would be up to 2.2 km long and would be constructed from bituminous material bordered by a concrete kerb. It would generally be 6m wide with appropriate widening on bends, allowing for two-way traffic. There would be a footway adjacent to part of the Access Road where there is no existing footpath.

12.6.7 The route of the Access Road from Green Lane would follow the alignment of the access road proposed within the LLRS and Covanta RRF Project, along the existing access track which borders Rookery North Pit. On reaching Rookery South Pit, the Access Road would use the access ramp (built standard as part of the LLRS as described above to enter into the pit and cross through the base of the pit until it reaches the Generating Equipment Site.

12.6.8 Should the Access Road for the Project be constructed first, it would not prevent the Covanta RRF Project or other developments from progressing at a later date, although it may require the Access Road to be upgraded as part of the other scheme(s), as necessary. The upgrade of the Access Road by

Covanta in the event that the permission for that scheme is implemented after any DCO for the Project is not considered further in this ES as this would be the responsibility of the Covanta RRF project and is addressed within the Covanta RRF ES. Potential cumulative effects arising from construction of the Covanta RRF Project and the Project are set out in Section 12.9.

Local and Strategic Highway Network

12.6.9 The road network in the vicinity of the Project Site is shown on Figures 12.1 and 12.2.

12.6.10 Green Lane is a rural single carriageway road, connecting Stewartby to Marston Moretaine on the C94 Bedford Road, at a ghost island priority junction 1.3km to the north-west of the proposed site access. A level crossing of the Marston Vale Rail line is located 70 m to the west of the proposed Access Road. The Kimberley College (a Science, Technology, Engineering and Mathematics Sixth Form College) is located to the north of Green Lane, 400m to the west of the proposed Access Road. The Green Lane carriageway is around 6.5 m wide, with lighting and/or footway to the south-east of the Kimberley College only. Green Lane is subject to the national speed limit of 60 mph from Bedford Road to 600 m west of the Access Road on the approach to the level crossing, where a 30mph speed limit is applied.

12.6.11 To the east of the Access Road, Green Lane is around 6.5m to 7.0m wide, with a footway in the northern verge. This is present all the way into Stewartby. A speed limit of 30 mph is applied on this stretch of road. Green Lane continues to the east forming Stewartby Way, before connecting with the B530.

12.6.12 The C94 Bedford Road, with which Green Lane connects, formed the A421 before the parallel dual carriageway scheme opened in 2010 between the M1 Junction 13 and Bedford. Access to the new A421 is provided at a series of grade-separated junctions, the closest to the Power Generation Plant Site being 3.2 km north and 2 km south of the Access Road.

12.6.13 The A421 is aligned on a south-west to north-east axis, connecting to M1 Junction 13 - around 8 km south-west of Green Lane - passing to the south of Bedford city centre, to end at the A1, 26 km to the north-east of Green Lane. Access is provided to Bedford by a series of five grade-separated junctions on the A421.

12.6.14 The M1, located 8 km to the south-west of the Access Road, forms one of the main strategic north-south highway routes through Great Britain, connecting some of the major conurbations of the north (Sheffield, Leeds), the Midlands (Nottingham, Northampton), Milton Keynes and London. A connection from the M1 to the M6 provides a link to Scotland, the major conurbations in the north-west (Liverpool, Manchester), and Birmingham.

Public Rights of Way

12.6.15 The Public Rights of Way (PROW) in the vicinity of the Generating Equipment Site are shown on the plan in Appendix 2.1 of the TA.

12.6.16 There are no Public Rights of Way within the Generating Equipment Site, although the LLRS is promoting further new permissive recreational footpaths in and around the Rookery Pit including:

- a footpath connection to Green Lane;
- a footpath circling the Rookery North Pit;
- a footpath surrounding the attenuation pond in the Rookery South Pit; and
- a footpath link to the existing public footpath FP4.

12.6.17 These are shown on Figure 8.7 of the LLRS Restoration Strategy, included in Appendix 2.1 of the TA.

12.6.18 Footpaths within close proximity to the Power Generation Plant Site are also shown in Appendix 2.1 of the TA, and are as follows:

- to the north-west of the Power Generation Plant Site FP72 provides a leisure footpath around the Stewartby Lake. In order to form an access between Stewartby and FP72, there is a footpath link to Green Lane 160m west of the railway crossing; and
- to the west of Stewartby Lake, there is a footpath link to C94 Bedford Road, via FP19. This joins C94 Bedford Road within a national speed limit zone, where no footway is present. The speed limit is reduced to 30 mph 90m south of the FP19 link: after a further 40m into this zone, a footway is formed.

Footways and Cycleways

12.6.19 There is a footway in the northern verge of Green Lane linking Stewartby village to the east and Kimberley College to the west. The footway commences in the centre of Stewartby and is between 1.5m and 2m in width. This footway link is 0.8km in length. Kimberley College has committed to providing a crossing patrol during the College opening hours to assist the movements of students across Green Lane to the FP72 recreational footpath also linking to Marston Moretaine (see below) and the Kimberley College Access. The footway in this section is illuminated by the street lighting system. As well as accommodating students walking to this facility, the footway would also accommodate pedestrians walking from Stewartby to the Stewartby Rail Station, and to the FP72 recreational footpath which runs alongside Stewartby Lake.

12.6.20 In the southern verge of Green Lane immediately adjacent to the railway level crossing, there is a short section of footway either side of the crossing to provide pedestrian access to the platforms. This footway terminates within 20m of the crossing.

12.6.21 On C94 Bedford Road, there is a footway on the eastern verge commencing 160m south of the junction with Green Lane linking to Marston Moretaine to the south. This footway has a width of between 1.5m and 2m, and is illuminated by the street lighting system.

12.6.22 There are no further pedestrian facilities along Green Lane to the north past this point.

12.6.23 On Bedford Road, a footway starts 160 m south of the Access Road, with a width between 1.5m and 2m. This section is illuminated by the street lighting system.

12.6.24 No cycleways are present on either Bedford Road, or Green Lane.

Equestrian

12.6.25 There are no bridleways or equestrian facilities on the Power Generation Plant Site.

12.6.26 As shown in Appendix 2.1 to the TA, BW84 is the closest bridleway to the Power Generation Plant Site, approximately 200m east, joining FP17 and FP72, towards the south and south-west of Stewartby Lake respectively.

Existing Bus Routes and Services

12.6.27 Existing bus services are summarised in Table 12.6 below

Table 12.6 – Existing Bus Services

Service Number	Nearest Bus Stop	Operator	Route	Frequency
68	Outside Stewartby Brickworks	Grant Palmer	Bedford - Kempston - Wootton-Stewartby	Every one and a half hours from 0705 to 1710 for departures and 0806 to 1825 for arrivals Mondays to Saturdays. No services on Sundays and on Public Holidays

12.6.28 The closest bus stop served by Service 68 is located outside Stewartby Village Hall - approximately 350m east of the existing Rookery Pit access on Green Lane. A further four stops are located within Stewartby.

12.6.29 Further services serve the area to the south of the Project site, but are infrequent and have not been considered in any further detail.

Existing Rail Routes and Services

12.6.30 As shown on Figure 12.1, the nearest rail station to the Power Generation Plant Site is Millbrook, approximately 700m south-west. However, practically (due to the quality of the access route), the closest station is Stewartby Rail Station to the northern side of Green Lane. This station is approximately 90m from the junction of Green Lane with the Access Road, and approximately 1.7 km north-west from the centre of the Generating Equipment Site.

12.6.31 Both the Stewartby and Millbrook Rail Stations are served by the Marston Vale Line that provides an hourly service operated by London Midland in each direction between Bedford and Bletchley from Mondays to Saturdays (16 trains per day in each direction).

12.6.32 There are links from Millbrook and Stewartby Rail Stations to Bedford, Bedford St Johns, Kempston Hardwick, Lidlington, Ridgmont, Aspley Guise, Woburn Sands, Bow Brickhill, Fenny Stratford and Bletchley.

12.6.33 The Midland Main Line runs to the east of the Project Site providing services from Bedford to London St Pancras, the Midlands and northern England. The nearest railway station to the Project Site served by the Midland Main Line is Bedford Railway Station also served by the adjacent Marston Vale Line, located approximately 9.3 km north-east from the centre of the Project Site. Bedford Railway Station is served by East Midlands Trains, London Midlands and First Capital Connect, providing direct rail connections northwards - to Wellingborough, Kettering, Market Harborough, Leicester, Loughborough and Nottingham - and southwards to Luton, St Albans City and London St Pancras.

12.6.34 There are proposals in the future to reconnect the Bedford Railway Station between Oxford and Cambridge through the East West Rail Link project. This is being promoted by the East-West Rail Consortium, a consortium of local authorities and interested bodies along the route. Phase 1 of the western section of the East West Rail Link project from Oxford to Bedford was approved by the Government in November 2011 (committing £270 million to the scheme) and has been constructed and is now operational. Discussions have taken place with Network Rail and relevant meeting notes are contained within Appendix 2.2 of the TA.

12.6.35 Phase 2 of the western section of the project will connect Bicester to Bedford via Bletchley and the Marston Vale branch line which runs along the west side of Rookery North Pit and Rookery South Pit. Statutory consultation was conducted between 30th June and 11th August 2017 on Phase 2 of the East West Rail Link and a member of the management team for the Project attended an event in Marston Moretaine. A meeting was also held with the East West Rail Stakeholder Manager on 10th May 2017. The Marston Vale branch line between the Millbrook level crossing and the Green Lane level crossing (including the level crossings themselves) are not subject to any upgrade works or alterations as part of the Phase 2 proposals.

12.6.36 Discussions have taken place with Network Rail regarding the scheme and relevant meeting notes are contained within Appendix 2.2 of the TA. Network Rail have not raised any objections to the Project.

Road Safety

12.6.37 Personal Injury Collision ((PIC) – formerly known as Personal Injury Accident – (PIA)) summary data was obtained from Central Bedfordshire Council for the most recent five-year period up to 31st December 2016.

12.6.38 The TA provides a detailed summary of the PICs (location and nature) for links and junctions in the study area, and also provides an estimate of the likely anticipated number of PICs for similar types of links and junctions using national data, to enable comparison. This is summarised below.

12.6.39 The assessment has identified that for all the links and junctions close to the Power Generation Plant Site, the number of observed PICs is low, and within the levels which would be expected based on the highway layout and traffic flows.

12.6.40 No trends appear to be apparent within the PIC data, nor any indication that there are any trends relating to vulnerable users.

12.6.41 As such, there appear to be no existing road safety issues in relation to the road links and junctions close to the Power Generation Plant Site.

Baseline Traffic Flow Information

12.6.42 Traffic surveys were undertaken as follows:

- a peak period turning count at the C94 Bedford Road / Green Lane junction – undertaken in May 2017: and
- automatic traffic counts on the C94 Bedford Road and Green Lane – undertaken in May 2017.

12.6.43 The Baseline traffic flows from these surveys are shown in Table 12.7 below:

Table 12.7 – 2017 Baseline Traffic flows (Total 2-way)

Link No	Link Description (Date)	18 hour All Vehs 5-day flows	24 hour All Vehs 7-day flows	18 hour >3.5t OGV 5-day flows	24 hour >3.5t OGV 7-day flows
1	C94 – North of Green Lane Junction (May 2017)	6,497	7,041	633	689
2	C94 – South of Green Lane Junction (May 2017)	7,866	8,524	766	834
3	Green Lane east of C94 Junction (May 2017)	3,513	3,808	267	309
4	Green Lane adjacent site access	1,937	2,129	147	173

12.6.44 As agreed with the highway authorities (see TA Appendix 2.2.2), a Future Year assessment has been undertaken for 2031. These 2031 flows have been assessed assuming:

- the growth in flows between 2017 to 2031;
- the flows from the Covanta RRF development; and
- the development at Broadmead Road, Stewartby.

12.6.45 The 2031 flows are synthesised by applying the following TEMPRO growth factors to the 2017 Observed Flows to generate the 2031 flows:

2017 – 2031 - AM: 1.063

- PM: 1.063

12.6.46 The flows from the Covanta RRF Development have been extracted from their Transport Assessment (dated August 2010).

12.6.47 The flows from the Broadmead Road development were taken from their TA (2002).

12.6.48 The 2031 Baseline flows are shown in Table 12.8 below:

Table 12.8 – 2031 Baseline Traffic flows (Total 2-way)

Link No	Link Description (Date)	18 hour All Vehs 5-day flows	24 hour All Vehs 7-day flows	18 hour >3.5t OGV 5-day flows	24 hour >3.5t OGV 7-day flows
1	C94 – North of Green Lane Junction	8,768	9,502	854	930
2	C94 – South of Green Lane Junction	10,485	11,363	1,021	1,112
3	Green Lane east of C94 Junction	6,640	7,196	505	585
4	Green Lane, adjacent to Access Road	4,427	4,867	337	395

12.6.49

12.6.50 A Pedestrian / Cyclist survey was also undertaken to provide up-to-date flow information for Green Lane. As agreed with the highway authorities, the pedestrian / cycle movements were observed on a Saturday, Sunday and Monday in May 2017, reflecting the typical weekend and weekday movements. As the Kimberley College was open on the Monday, it is assumed that this reflects typical conditions. These data are summarised below in Table 12.9.

Table 12.9 – Daily Baseline Pedestrian and Cyclist flows (Total 2-way)

Date	Pedestrian movements	Cyclist movements
Saturday 20/05/17	134	24
Sunday 21/05/17	81	71
Monday 22/05/17	177	73

12.6.51 The peak hour for pedestrian flows occurred between 0900 and 1000 on Saturday (51 pedestrians 2- way).

12.6.52 The peak hour for cycle flows occurred between 1800 - 1900 on Monday (22 cyclists 2-way).

Receptors

12.6.53 It is concluded that the only receptor with a high sensitivity likely to be affected by the Power Generation Plant is the Kimberley College on Green Lane. However, whilst the Kimberley College, an educational establishment, is a high sensitivity receptor, as the students attending are sixteen or older they are likely to be more risk-aware than primary or secondary school children.

12.6.54 Receptors with a medium sensitivity are considered to be:

- the Water Sports Club on Green Lane, but located 300m south of the road itself;
- the narrow footway / cycleway across the level crossing;
- cyclists on Green Lane; and
- users of the permissive recreational footpaths in the Rookery Pit area.

Gas Connection

12.6.55 As described in Chapter 3 of this ES, the Gas Connection is approximately 1.8 km in length, running roughly north – south towards Millbrook Road.

12.6.56 There are two construction access options for the Gas Connection Site: it is likely that both will be used to access different parts of the Gas Connection. These two access options are shown on Figure 12.2, and are as follows:

- through the Rookery South Pit, from the Power Generation Plant Site (having accessed the Site from Green Lane and C94 Bedford Road as per the Generating Equipment site) for the northern sections of the Gas Connection Site; or
- for the central and southern sections of the Gas Connection Site - from the A421, northwards along the A5141, westwards then southwards for approximately 7km along the B530 (referred to variously along its route as Ampthill Road / Hardwick Road / Bedford Road / Hazelwood Lane) to Millbrook Road then Houghton Lane.

12.6.57 Access will be obtained from the latter Millbrook Road / Houghton Lane option at two points:

- an existing field access to the east of Houghton Lane to an existing agricultural track will be used for both construction and operational access to the Above Ground Installation (AGI) and the southern end of the Gas Connection Site south of Millbrook Road / Houghton Lane. This track will be upgraded as part of the Project; and
- from Houghton Lane, to both the east and the west, to the central section of the Gas Connection Site north of Millbrook Road / Houghton Lane. This will also be used as a crossing point across Houghton Lane during construction for those crossing north and south of the Gas Connection.

Local and Strategic Highway Network

12.6.58 The road network in the vicinity of the Gas Connection is shown on Figures 12.1 and 12.2. In addition to the local and strategic highway network described for the Power Generation Plant are the following road links:

- Millbrook Road, which bisects the Gas Connection on a north-east - south-west axis, is a single carriageway with a speed limit of 60 mph. The width of the road ranges between 5 m to 5.5 m. To the south-west, Millbrook Road leads on to Houghton Lane, and on to Station Lane. To the north-east, Millbrook Road links to the B530 at a priority junction;
- Sandhill Close runs north-south, to the south of the Gas Connection, connecting Houghton Lane to the A507 via a roundabout. Sandhill Close has a weight restriction of 7.5 tonnes and a width restriction of 6' 6", making it suitable only for cars and light vehicles;
- the B530 runs on a north to south axis between Bedford to the north and Ampthill to the south. The B530 is a single carriageway with a speed limit of 60 mph. Stewartby Way also links to the B530, which in turn links to Green Lane through Stewartby. As there is a height restriction of 11'3" and a 7.5 tonne weight restriction through Stewartby, this route is only suitable for cars and light vehicles; and
- the A507 provides a single carriageway connection from the M1 Junction 13 to Ampthill and passes to the south of Millbrook.

Public Rights of Way

12.6.59 The Public Rights of Way (PROW) in the vicinity of the proposed Gas Connection are shown on the plan in Appendix 2.1 to the TA.

12.6.60 The northern part of the Gas Connection is bisected east-west by a continuous footpath route formed by three individual footpath sections FP14, FP65 and FP15, connecting Station Lane to Millbrook Road, crossing the Midland Main railway line. There is also a spur, FP4, from FP15 aligned north-south to the west of the rail line, crossing it towards FP16 and then via the FP3 towards the B530 and towards Stewartby.

12.6.61 The southern part of the Gas Connection is bisected by FP7 which runs between FP14 close to Station Lane, Millbrook Road and across the rail way line where it becomes FP13 towards Park Farm Cottage and beyond to the south east.

Footways and Cycleways

12.6.62 From Stewartby, whilst there is a footpath along Stewartby Way along the westbound carriageway, there are no footways on the B530, Millbrook Road or Houghton Lane.

12.6.63 From Millbrook, to the east of the Sandhill Close / Station Lane Junction, there is a footway along Sandhill Close in the southern verge of the carriageway up until its junction with Houghton Lane and Russell Grove where it ends. To the west of the Sandhill Close / Station Lane Junction, there are no footways along this derestricted section of Station Lane up until the Millbrook Rail Station.

12.6.64 From Marston Moretaine, there are footways along Beancroft Road and Station Road, then along Station Lane where it terminates at the Millbrook Rail Station. There is no footway along the section of Station Lane from the Millbrook Rail Station to Sandhill Close in Millbrook.

12.6.65 No cycle ways are present in the vicinity of the Gas Connection.

Equestrian

12.6.66 There are no bridleways in the area of the Gas Connection.

Existing Bus Routes and Services

12.6.67 To the north of the Project site, Service 68 operated by Grant Palmer is the most frequent operating service in Stewartby. This service runs between Bedford, Kempston, Wootton and Stewartby. The route from Bedford routes to Stewartby via Bedford Road and Broadmead Road.

12.6.68 Service 68 provides eight services per day, in each direction between Bedford town centre and Stewartby (Monday to Saturday). In the northbound direction, the first service of the day to Bedford is at 07:05, the final service of the day at 17:10. In the southbound direction, the first service from Bedford is at 07:35, the final service of the day at 17:50. No services operate on Sundays.

12.6.69 The closest bus stop to the Project served by this Service 68 is located outside Stewartby Village Hall – approximately 350m east of the existing Rookery Pit access on Green Lane. A further four stops are located within Stewartby further afield.

12.6.70 Further services serve the area to the south of the Project site (as summarised in Table 12.10), but are infrequent and have not been considered in any further detail.

12.6.71 Table 12.10 summarises the bus services in the area – details of the routes, stops, and timetables are contained in Appendix 3.2 of the TA:

Table 12.10 – Existing Bus Services

Service Number	Route	Frequency
68	Bedford – Kempston – Wootton – Stewartby Closest stop adjacent the post office in Stewartby	8 Services per day Monday to Saturday No services on Sunday
FL2	Haynes West End - Houghton Conquest - Lidlington - Milton Keynes 2nd Tuesday of each month Closest stop on Millbrook Lane, adjacent junction with Sandhill Close	2nd Tuesday of each month only Towards Milton Keynes in AM and towards Hayes West End in PM
FL6B	Lidlington - Millbrook - Ampthill - Silsoe - Flitwick - Steppingley Closest Stop at Millbrook Station or on Millbrook Lane adjacent Sandhill Close	Thursdays only 1 AM journey towards Lidlington and 1 AM journey towards Steppingley
42	Bedford - Ampthill – Flitwick Closest stop on B530 adjacent junction with Millbrook Road	Hourly Monday to Saturday

<u>Existing Rail Routes and Services</u>

12.6.72 As shown on Figure 12.1, Millbrook Rail Station is located 1 km to the west of the Gas Connection. This station is served by the Marston Vale Line services reported in paragraphs 12.6.30-33.

<u>Baseline Traffic Flows</u>

12.6.73 As part of previous traffic counts undertaken in 2014, an ATC was installed along Millbrook Road (50m west of the B530). These results are shown in Table 12.11. As the flows recorded in 2014 were so low, and as there has been no local development or infrastructure to affect flows on this link, no repeat ATC was commissioned in 2017.

12.6.74 The 2017 data has been calculated by applying growth factors extracted from the growth observed in the ATC results from 2014 and 2017 at Green Lane.:

2014 – 2017 -AM:1.179
- PM: 1.317

12.6.75 The 2017 AM and PM peak flows on Millbrook Road, derived from the observed Green Lane ATC surveys were then combined and factors of 3.88 and 4.24 were applied to convert into the 18hr and 24hr flows, respectively, that are summarised in Table 12.12.

Table 12.11 – 2014 Baseline Traffic Flows – Millbrook Road (total 2-way)

Link No	Link Description (Date)	18 hour All Vehs 5-day flows	24 hour All Vehs 7-day flows	18 hour >3.5t OGV 5-day flows	24 hour >3.5t OGV 7-day flows
5	Millbrook Road	1591	1615	108	110

Table 12.12 – 2017 Factored Baseline Traffic Flows – Millbrook Road (total 2-way)

Link No	Link Description (Date).	18 hour* All Vehs 5-day flows	24 hour* All Vehs 7-day flows	18 hour* >3.5t OGV 5-day flows	24 hour* >3.5t OGV 7-day flows
5	Millbrook Road	1636	1798	111	122

*These are derived from the (2014) AM and PM peaks, combined and factored to obtain equivalent values for 18-hr and 24-hr flows; with growth applied.

Receptors

12.6.76 Receptors with a high sensitivity potentially affected by the Gas Connection are:

- pedestrians and cyclists, due to the lack of footways on the B530; and
- pedestrians and cyclists, due to the lack of footways on Millbrook Road.

12.6.77 Whilst these receptors are of a high sensitivity, the numbers of pedestrians and cyclists are considered to be minimal.

12.6.78 Receptors with a medium sensitivity potentially affected briefly during the construction sequence only of the Gas Connection are:

- users of footpath FP65 where that pipeline crosses this public right of way; and
- similarly, users of footpath FP7.

The numbers of pedestrians using these routes are considered to be minimal.

12.6.79 The other receptor, with a medium sensitivity, are cyclists on the B530 and Millbrook Road – albeit the numbers of cyclists are also considered to be minimal given that this is not a formal cycle route and the traffic count data from 2014 recorded minimal numbers of cyclists.

Electrical Connection

12.6.80 Two access route options are available for the Electrical Connection. They are shown on Figure 12.2, and are as follows:

- through the Rookery South Pit, from the Power Generation Plant Site (having accessed the Power Generation Plant Site from Green Lane and C94 Bedford Road) for the northern section of the Electrical Connection; or
- for the southern section of the Electrical Connection - from the A421, northwards along the A5141, westwards then southwards for approximately 7km along the B530 (Ampthill Road / Hardwick Road / Bedford Road / Hazelwood Lane) to Millbrook Road, Houghton Lane and Station Lane.

12.6.81 The Substation would be accessed using the first route option through Rookery South Pit. The rest of the Electrical Connection would be accessed using a combination of both access options listed above. It is assumed that the operational access routes would be the same as those for the construction phase of the Electrical Connection.

Local and Strategic Highway Network

12.6.82 The road network in the vicinity of the Electrical Connection is shown on Figures 12.1 and 12.2. In addition to the local and strategic highway network described for the Power Generation Plant and the Gas Connection is the following road link:

- Station Lane runs from the junction of Houghton Lane / Sandhill Close junction to Marston Moretaine, crossing the Marston Vale Rail Line at a level crossing. It continues through Marston Moretaine to link towards the A421.

Existing Pedestrian, Cyclist and Equestrian Facilities

12.6.83 The Public Rights of Way (PROW) in the vicinity of the Electrical Connection are shown on the plan in Appendix 2.1 of the TA.

12.6.84 In addition to the Public Rights of Way described for the Power Generation Plant and the Gas Connection, the Electrical Connection is also crossed by:

- Footpath FP7 which is aligned from north-west to south-east through the Electrical Connection, connecting between Millbrook Road and Station Lane and;
- Footpath FP14, aligned west to east from Station Lane across the Midland Mainline Rail to Millbrook Road.

Existing Bus Routes and Services

12.6.85 As discussed earlier, the site is served by two regular bus services. Service 68 (Bedford – Kempston – Wootton – Stewartby) and Service 42 (Bedford – Ampthill – Flitwick).

Existing Rail Routes and Services

12.6.86 As shown on Figure 12.1, Millbrook Rail Station is located 0.5km to the west of the Electrical Connection. This station is served by the Marston Vale Line services reported in paragraphs 12.6.30-33.

Receptors

12.6.87 In addition to the receptors with a high sensitivity possibly affected by the Power Generation Plant and Gas Connection as referred to above, there is no footway on Station Lane. Whilst this may be considered to be of high sensitivity, the numbers of pedestrians and cyclists are from observation, minimal.

12.6.88 In addition, users of footpath FP7 and FP14 are medium sensitivity receptors briefly during the installation of the Electrical Connection as the access would cross these public rights of way during the construction. Once the Electrical Connection has been installed, there would be no further impacts.

12.7 Assessment of Effects

Power Generation Plant

Construction / Decommissioning

12.7.1 Section 6 within the TA looks at the typical average construction trip generation of the Power Generation Plant, with reference to the construction traffic flows identified for similar projects.

12.7.2 In addition, a worst case construction phase has also been tested as part of the TA process and considers the likely peak daily construction movements. These would typically occur over a short timescale of a day or two in the course of construction – and relates to the one major pour of the foundation only. It has been assumed that:

- this event would arise from deliveries of ready-mixed concrete for the casting of the main foundation. To avoid the need for construction joints (with the associated impact on long-term durability), it assumed that this base would be cast in one operation, during one day;
- a typical Generating Equipment plant foundation detail would require around 750m^3 of concrete;
- assuming the typical load is 6m^3 of concrete per HGV, this would require around 125 deliveries;

- due to the time that it takes to process the arriving concrete vehicle, to sample the batch, pump it to the correct area, then place and compact the concrete, it is likely that the delivery rate would be around one vehicle arriving every 5 minutes through the day for ten hours;
- this operation would need a total of 30 operatives on site. For the purposes of this worst case assessment, it has been assumed that all would have to be on site before the AM peak hour, and would work until after the PM peak hour had finished;
- because of the priority needed to be provided to the concrete delivery, that no other construction operation will be ongoing on the Generating Equipment site at the same time; and
- this work would form one of the earlier work tasks in the project – i.e., it is assumed that this would be in the first quarter.

12.7.3 The typical average daily and peak construction trip generation in relation to the construction and decommissioning of the Power Generation Plant is summarised below in Table 12.13:

Table 12.13 – Average Daily and Peak Hour Construction movements (Total Vehicles) for Power Generation Plant

Construction Period	Vehicles* / day		Peak Hour trips (0800-0900 and 1700-1800)	
	Car	HGV	Car	HGV
Average Daily Construction vehicles				
Q1	17	35	9	7
Q2	78	32	41	6
Q3	118	30	62	5
Q4	123	15	64	3
Q5	97	15	50	3
Q6	80	18	42	3
Q7	54	40	28	8
Q8	2	0	2	0
Peak Construction vehicles				
(for the 1 or 2 days, only in Q1)	19	125	0	12

*1 Vehicle = 1 In Movement and 1 Out Movement

12.7.4 As the peak construction flow generation is limited to one, possibly two, days during the construction sequence, limited further assessment will be reported of this scenario on Green Lane only. In terms of the average construction movements on the road links close to the Power Generation Plant Site, the highest flow occurs in Q3. These movements are shown in Table 12.14 below for total vehicles and HGVs, together with the percentage increase.

12.7.5 For the purposes of the assessment, we have assumed that there will a roughly equal split of vehicles coming from the north and south and from the east and west. However, far fewer vehicles are anticipated to come through Stewartby (limited to construction workers) as the routes have been planned to avoid Stewartby.

Table 12.14 – Daily Flow Increases – Average Construction (2-way Vehicle Movements) for Power Generation Plant

Route	All Vehicle movements (2-way movements)	% increase	HGVs	% increase
Average Construction movements				
C94 North of Green Lane	136 (i.e., 68 In and 68 Out)	1.9	30	4.4
C94 South of Green Lane	136	1.6	30	3.6
Green Lane east of C94	272	7.1	60	19.4
Green Lane West of Access Road	272	12.8	60	34.6
Green Lane East of Access Road	24	1.1	0	0
Millbrook Road west of B530	0	0	0	0
Station Lane adjacent to the Electrical Connection site	0	0	0	0

12.7.6 These average increases reported above occur during Q3 only – the average across all eight quarters of the construction period will be less than this – so this average construction movement assessment represents a realistic worst-case analysis of the average flows during the construction period.

12.7.7 For a short duration in Q1 (over a period of one or two days), there would be a peak of construction related movement as described in section 12.7.2 and shown in Table 12.13. The traffic flows and percentage increases for this peak are shown below in Table 12.15.

Table 12.15 – Daily Flow Increases – Peak Construction (2-way Vehicle Movements) for Power Generation Plant

Route	All Vehicle movements (2-way)	% increase	HGVs	% increase
C94 North of Green Lane	142 (i.e. 71 in and 71 out)	2.02	125	18.14
C94 South of Green Lane	142	1.67	125	14.99
Green Lane east of C94	284	7.46	250	80.91
Green Lane West of Access Road	284	13.34	250	144.51
Green Lane East of Access Road	2	0.1	0	0
Millbrook Road west of B530	0	0	0	0
Station Lane adjacent to the Electrical Connection	0	0	0	0

12.7.8 With respect to the minimum environmental impact thresholds identified in section 12.5 for Pedestrian Severance ('Minor' is below 8,000 additional vehicles AADT), Pedestrian Amenity and Fear and Intimidation ('Negligible' is less than 600 vehicles an hour over an 18 hour day) this assessment shows that all of these relatively limited-duration construction movements are generally well below the level at which changes can be perceived, and in accordance with Table 12.5, the significance of effect is therefore neutral and not significant. The exception is for the peak construction movements on Green Lane where HGVs are forecast to treble for this short period of time (1 to 2 days). The significance of these effects are summarised below.

12.7.9 In addition, the relatively minor traffic flows associated with construction movements forecast are all below the level at which changes in road user delay or accidents and safety can be perceived or measured, and in accordance with Table 12.5, the significance of effect is therefore neutral and not significant.

12.7.10 The results of the assessment of the likely significant environmental effects of the construction and decommissioning of the Power Generation Plant are summarised below, with reference to the identified specific sensitive receptors and the magnitude of likely impact, as defined in the Significance of Effects Matrix in Table 12.5.

12.7.11 For the average construction movements during Q3 (the quarter with the highest average construction movement flow):

- Kimberley College – the sensitivity of the receptor is high, and the magnitude of impact for the categories of effect considered (severance, fear and intimidation, pedestrian or cyclist amenity, road user or pedestrian delay, accidents and safety) is no change. In accordance with Table 12.5, the significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4 this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;
- Water Sports Club on Green Lane – the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4 this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;
- Narrow Footway/Cycleway over Green Lane Level Crossing – the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4 this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;
- Cyclists on Green Lane the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4 this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence; and
- Users of the permissive recreational footpath within the Rookery Pit where the path is aligned along the Access Road during the construction of this road. The sensitivity of the receptor is medium and the magnitude of impact for the categories of effect (severance, fear and intimidation, pedestrian or cyclist amenity) is considered to be negligible, so without mitigation this would give a significance of effect of Slight Adverse. However, this is fully mitigated by the embedded mitigation measures detailed in the footpath management plan. The mitigated significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4 this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence.

12.7.12 For the peak construction movements over a very short duration (1 to 2 days) HGV movements on Green Lane treble. Although total HGV volumes on Green Lane are well below the thresholds given in Section 12.5 (and the high percentage increase reflects very low baseline HGV flows on Green Lane) it is possible that a change in pedestrian amenity could be perceived. On that basis therefore, for Kimberley College, the sensitivity of the receptor is high, the magnitude of impact in terms of pedestrian amenity is negligible, and the significance of effect is therefore slight adverse for this short time period (1 to

2 days). As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence.

Operation

12.7.13 Within the TA, section 7 deals with the normal operation of the Power Generation Plant. Up to four members of staff would be working at the Power Generation Plant Site at any one time. Three shifts per day are assumed, to provide 24-hour coverage. As these shift changes would be timed to avoid the highway network peak hour, the highway impact of the operation would therefore be minimised. An assessment has been made of the likely mode share, based on the local Journey to Work data obtained from the 2011 Census - it is assumed that 20 of these daily 24 movements would be made by car. In addition, there would be infrequent HGV movements associated with maintenance and supply deliveries - to provide a worst case assessment, it has been assumed that one HGV movement would be made per day.

12.7.14 During the annual maintenance of the Generating Equipment, there may be up to 40 additional staff on site for a typical maintenance period of one month. It is assumed that all these trips would all be made by car, assuming 1.6 occupants per car, as per the average Journey to Work car occupancy within the National Travel Survey. Reflecting the typical working hours on construction sites, it is assumed that majority of these movements would be made outside of the network peak. However, to provide a robust assessment it has been assumed that 25 percent of the total vehicle movements would be during the peak hour. A further five HGV movements per day (none during the peak hour) are assumed during maintenance.

12.7.15 The likely worst case operational trip generation (during the periodic maintenance) in connection with the operation of the Power Generation Plant is summarised in Table 12.16 below.

Table 12.16 – Normal Operational and Maintenance Period Daily and Peak Hour vehicle movements (2-way) for Power Generation Plant

Period	Vehicle movements (2-way) / day		Peak Hour trips	
	Car	HGV	Car	HGV
Normal operation	20 (i.e., 10 In and 10 Out)	2	0	0
During Annual Maintenance (over one month only)	20 +50 70	2 +10 12	0 + 14 14	0 +0 0

12.7.16 In terms of the normal operation of the Power Generation Plant, the traffic flows and percentage increases are show in Table 12.17 below:

Table 12.17 – Daily Flow Increases – Normal Operation (2-Way Vehicle Movements) of Power Generation Plant

Route	All Vehicle movements(2-way)	% increase	HGVs	% increase
C94 North of Green Lane	10 (5 in and 5 out)	0.11	2	1.07
C94 South of Green Lane	10	0.09	0	0.00
Green Lane east of C94	20	0.28	2	0.34
Green Lane West of Access Road	20	0.41	2	0.51
Green Lane East of Access Road	2	0.04	0	0.00
Millbrook Road west of B530	0	0.00	0	0.00
Station Lane adjacent to the Electrical Connection	0	0.00	0	0.00

12.7.17 In terms of the operation of the Power Generation Plant when maintenance is occurring (during one month in the year) the traffic flows and percentage increases are shown in Table 12.18 below:

Table 12.18 – Daily Flow Increases - Maintenance Period (2-way Vehicle Movements) of Power Generation Plant operation

Route	All Vehicles	% increase	HGVs	% increase
C94 North of Green Lane	37	0.39	6	0.64
C94 South of Green Lane	37	0.32	6	0.53
Green Lane east of C94	74	1.03	12	2.05
Green Lane West of site access	74	1.52	12	3.04
Green Lane East of site access	8	0.16	0	0.00
Millbrook Road west of B530	0	0.00	0	0.00
Station Lane adjacent to the Electrical Connection site	0	0.00	0	0.00

12.7.18 With respect to the minimum environmental impact thresholds identified in section 12.5, it is clear that even during the higher traffic generating periods, all of these operational phase movements are so low that they are well below the level at which changes can be perceived, and that they are therefore not significant.

12.7.19 The results of the assessment of the potential environmental effects of the Power Generation Plant during operation are summarised below:

- Kimberley College – the sensitivity of the receptor is high, and the magnitude of impact for the categories of effect considered (severance, fear and intimidation, pedestrian or cyclist amenity, road user, or pedestrian delay, accidents and safety) is no change. The significance of effect is therefore neutral. The extent would be local, the duration short term and there would be a low likelihood of occurrence. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant;
- Water Sports Club on Green Lane – the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration long term and there would be a low likelihood of occurrence;
- Narrow Footway/Cycleway over Green Lane Level Crossing – the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The sensitivity of effect is

therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration long term and there would be a low likelihood of occurrence;

- Cyclists on Green Lane - the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The sensitivity of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration long term and there would be a low likelihood of occurrence;
- Users of the permissive recreational footpaths within the Rookery Pit where the path is aligned along the Access Road. The sensitivity of the receptor is medium and the magnitude of impact for the categories of effect considered is no change. The sensitivity of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration long term and there would be a low likelihood of occurrence.

Gas Connection

<u>Construction/Decommissioning</u>

12.7.20 Section 6 within the TA reports on the typical average construction and decommissioning trip generation of the Gas Connection works, with reference to the traffic flows identified for earlier, similar, projects. It is assumed that all trips made by car would have 1.6 occupants per car, as per the average Journey to Work car occupancy within the National Travel Survey.

12.7.21 The likely trip generation in relation to the construction and decommissioning of the Gas Connection is summarised in Table 12.19.

Table 12.19 – Average Construction Daily and Peak Hour (Total Vehicles) for Gas Connection

Construction Period	Vehicles* / day		Peak Hour trips	
	Car	HGV	Car	HGV
Q1	6	12	3	2
Q2	26	11	14	2
Q3	39	10	21	2
Q4	41	5	21	1
Q5	32	5	17	1

Q6	27	6	14	1
Q7	18	13	9	3
Q8	1	0	1	0

*1 Vehicle = 1 In Movement and 1 Out Movement

12.7.22 In terms of the Gas Connection, the traffic flows and percentage increases are shown in Table 12.20 below. As Q3 gives rise to the highest number of vehicle movements, this has been used as 'worst case' example:

Table 12.20 – Daily Flow Increases – Average Construction (2-way Vehicle Movements) for Gas Connection

Route	All Vehicles	% increase	HGVs	% increase
C94 North of Green Lane	21	0.29	5	0.94
C94 South of Green Lane	20	0.23	5	0.45
Green Lane east of C94	41	1.08	10	1.71
Green Lane West of Access Road	41	1.92	10	2.53
Green Lane East of Access Road	8	0.38	0	0.0
Millbrook Road west of B530	49	2.72	10	8.2

12.7.23 With respect to the minimum environmental impact thresholds for Pedestrian Severance, Pedestrian Amenity and Fear and Intimidation identified in section 12.5, this assessment has shown that all of these relatively limited construction movements are well below the level at which changes can be perceived, and are therefore not significant.

12.7.24 In addition, the relatively minor traffic flows associated with construction movements forecast are all below the level at which changes in road user delay or accidents and safety can be perceived/measured and are therefore not significant.

12.7.25 The results of the assessment of the potential environmental impact on the construction and decommissioning of the Gas Connection are summarised as follows:

- lack of footways on the B530 – the sensitivity of the receptor is high and the magnitude of impact for the categories of effect considered (severance, fear and intimidation, pedestrian or cyclist amenity, road user or pedestrian delay, accidents and safety) is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;

- lack of footways on Millbrook Road – the sensitivity of the receptor is high, and the magnitude of impact for the categories of effect considered (severance, fear and intimidation, pedestrian or cyclist amenity, road user or pedestrian delay, accidents and safety) is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;
- cyclists along Millbrook Road and the B530 – the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The sensitivity of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;
- users of footpath FP65 during the installation of the Gas Connection pipeline – the sensitivity of the receptor is medium and the magnitude of impact for the categories of effect (severance, fear and intimidation, pedestrian or cyclist amenity) is considered to be negligible, so without mitigation this would give a significance of effect of Slight Adverse. However, this is fully mitigated by the embedded mitigation measures of a footpath diversion implemented for the few days' duration of the works, and the measures detailed in the footpath management plan. The mitigated significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence; and
- users of footpath FP7 during the installation of the Gas Connection pipeline – the sensitivity of the receptor is medium and the magnitude of impact for the categories of effect (severance, fear and intimidation, pedestrian or cyclist amenity) is considered to be negligible, this would give a significance of effect of Slight Adverse. However, this is fully mitigated by a footpath diversion implemented for the few days' duration of the works, and the measures detailed in the footpath management plan. The mitigated significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence.

<u>Operation</u>

12.7.26 There would be a minimal number of vehicle movements to the Gas Connection during the Operational phase (less than 1 per week). These movements would be intermittent, and would be limited to routine inspection and maintenance operations at the AGI.

12.7.27 As such, no assessment has been undertaken of these movements, as they have been scoped out of the assessment as described in section 12.5.

Electrical Connection

Construction/Decommissioning

12.7.28 Section 6 within the TA will assess the typical average construction and decommissioning trip generation of the Electrical Connection construction works, with reference to the traffic flows identified for similar projects. It is assumed that all trips made by car would have 1.6 occupants per car, as per the average Journey to Work car occupancy within the National Travel Survey.

12.7.29 The likely construction trip generation for the construction and decommissioning of the Electrical Connection are summarised in Table 12.21 below.

Table 12.21 – Average Construction Daily and Peak Hour (Total Vehicles) for Electrical Connection

Construction Period	Vehicles* / day		Peak Hour trips	
	Car	HGV	Car	HGV
Q1	25	1	13	0
Q2	25	9	13	2
Q3	25	9	13	2
Q4	25	9	13	2
Q5	25	9	13	2
Q6	13	9	7	2
Q7	13	1	7	0
Q8	13	1	7	0

*1 Vehicle = 1 In Movement and 1 Out Movement

12.7.30 The traffic flows and percentage increases are shown below in Table 12.22 and use the highest construction related traffic experienced in Q2-Q5:

Table 12.22 – Daily Flow increases – Average Construction (2-way Vehicle Movements) for Electrical Connection

Route	Vehicle Movements (2-way)	% increase	HGVs	% increase
C94 North of Green Lane	15	0.21	5	0.72
C94 South of Green Lane	15	0.18	4	0.48
Green Lane east of C94	30	0.79	9	2.91
Green Lane West of Access Road	30	1.41	9	5.20
Green Lane East of Access Road	4	0.19	0	0.00
Millbrook Road west of B530	34	1.89	9	7.38
Station Lane adjacent to the Electrical Connection	34	1.9	9	7.4

12.7.31 With respect to the minimum environmental impact thresholds for Pedestrian Severance, Pedestrian Amenity and Fear and Intimidation identified in Section 12.5, this assessment has shown that all of these relatively limited construction movements are well below the level at which changes can be perceived, and are therefore not significant.

12.7.32 In addition, the relatively minor traffic flows associated with construction movements forecast for all Electrical Connection Options are all below the level at which changes in road user delay or accidents and safety can be perceived/measured and are therefore not significant.

12.7.33 The results of the assessment of the potential environmental impacts of the construction and decommissioning of the Electrical Connection are summarised as:

- lack of footways on Station Lane – the sensitivity of the receptor is high and the magnitude of impact for the categories of effect considered (severance, fear and intimidation, pedestrian or cyclist amenity, road user or pedestrian delay, accidents and safety) is no change. The significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;
- cyclists along Station Lane - the sensitivity of the receptor is medium, and the magnitude of impact for the categories of effect considered is no change. The significance of effect is therefore neutral. As this significance

of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence;

- users of footpath FP14 during the installation of the Electrical Connection – the sensitivity of the receptor is medium and the magnitude of impact for the categories of effect (severance, fear and intimidation, pedestrian or cyclist amenity) is considered to be negligible, so without mitigation this would give a significance of effect of Slight Adverse. However, this is fully mitigated by the embedded mitigation measures – the footpath diversion implemented for the few days' duration of the works, and the measures detailed in the footpath management plan. The mitigated significance of effect is therefore neutral. As this significance of effect is below moderate, with reference to paragraph 4.7.4, this is considered to be not significant. The extent would be local, the duration short term and there would be a low likelihood of occurrence.

Operation

12.7.34 There would be a minimal number of movements to the Electrical Connection during the operational phase. These movements would be intermittent, and would be limited to routine inspection and maintenance operations.

12.7.35 As any impact from the above would be ephemeral, these movements have been scoped out of the assessment as per section 12.5.

12.8 Cumulative and in Combination Effects

Cumulative Effects

12.8.1 Construction, operation (including maintenance) and decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site.

12.8.2 The projects which are considered to be of relevance to the cumulative assessment have been agreed with CBC and the traffic numbers generated by these developments have been built into their predicted future year growth forecasts for 2031 (as described above in section 12.6).

12.8.3 The requirement for any further Cumulative Effect assessment of the Project is considered in the context of

- the minimum environmental impact thresholds identified in section 12.5 for:
  - Pedestrian Severance (Minor is below 8,000 additional vehicles AADT);
  - Pedestrian Amenity and Fear and Intimidation (Negligible is less than 600 vehicles an hour over an 18-hour day); and

- the significance of effect of the Project being identified as being below moderate throughout Section 12.7 and therefore this is considered to be not significant.
- The level of Project-generated traffic is significantly below these thresholds.

12.8.4 It is concluded that there are no effects arising from Project-generated traffic with the exception of a very short duration peak in construction over 1 to 2 days.

12.8.5 The total cumulative traffic generation anticipated from projects included in the 2031 baseline assessment are compared in Table 12.23 to the likely traffic generation from the Project during construction, operation and decommissioning. Given that the Covanta RRF Project and Broadmead Road developments are adjacent to the Project Site, the construction and operational periods may overlap, the access routes used may be the same and the same roads on the local network may be affected, a direct comparison with only those projects is provided. Other projects listed in section 4.10 do not have the same localised impact on the local road network as the Project and are therefore not considered below in Table 12.23

Table 12.23 – Additional Traffic Flows from All Developments – Green Lane (Vehicle Movements)

Project (and stage)	18 hour All Vehs 5-day flows	24 hour All Vehs 7-day flows	18 hour >3.5t OGV 5-day flows	24 hour >3.5t OGV 7-day flows
Broadmead Road – Residential Development*	1,942	2,026	19	20
Covanta RRF - Nominal Throughput*	779	1,025	712	712
Total Non-Project Development traffic²	**2,721**	**3,051**	**731**	**732**
Project – Highest average construction movements (Q3)	231	231	49	49
Project – Worst Case construction movements (Q1) – over one or two days	288	288	250¹	250¹
Project – Operational Movements during Maintenance	82	82	12	12

*Covanta figures obtained from the Covanta DCO. Broadmead Road figures obtained from Planning Application.

¹These projected flows are in reality 125 HGV movements over a very limited 1-2 day period ² all cumulative projects including Covanta

12.8.6 As can be seen from Table 12.23, the trip generation from other developments is significantly greater than that from the Project.

12.8.7 Although the total cumulative traffic movements are above the thresholds for pedestrian amenity and fear and intimidation, the small increase in traffic movements generated by the Project, together with the relatively low sensitivity of the surrounding road network, mean that the addition of the Project makes no difference to the level of effect resulting from the "Total Non-Project Development (including Covanta)" and therefore the cumulative effect of the Project is not significant.

12.8.8 The likely worst case potential cumulative effects would arise from the operation of Covanta RRF Project (779 vehicles) with the peak in construction of the Project (288 vehicles). The CTMP, included within the TA (Appendix 12.1) provides for a traffic management scheme at the Green Lane level crossing taking into account Covanta RRF traffic which would limit any impacts so that they are not significant. Key to this traffic management scheme is timing of construction movements so they do not coincide with the busiest times of waste delivery for the Covanta RRF.

12.8.9 The Covanta RRF ES concluded that whilst an increase in vehicle movements along the A421 and Green Lane would result in a significant increase in terms of percentage change for HGVs, traffic levels would remain relatively low in absolute terms and as such the traffic levels were deemed to be at an acceptable level.

12.8.10 In terms of driver delay, the Covanta RRF concluded that that there would be only a slight increase in delay to drivers during the network peak periods which would not be perceivable against the daily fluctuation in vehicle movements. A review of the impact in proximity to the Green Lane level crossing has been undertaken for both the construction and operational phases demonstrating that there will be limited queuing at the access into the RRF site, with no impact to the operation of the level crossing.

12.8.11 The Covanta RRF ES also concluded that although the impact of traffic movements in absolute terms is considered low, measures are proposed to mitigate the impact to pedestrian and cycle amenity as a result of the increased HGV movements. The provisions include a continuous footway route along the southern side of Green Lane from Stewartby to Stewartby Lake and Marston Vale Millennium Country Park. Measures are also proposed to assist pedestrians across Green Lane through the provision of a centre island refuge both on the new RRF access road and on Green Lane.

12.8.12 The new Covanta RRF access arrangement will include widening Green Lane within the proximity of the existing access, to facilitate a ghost right turn lane arrangement.

12.8.13 All of the above measures will assist in improving accessibility for both existing residents and staff of the Covanta RRF and improve safety for pedestrians crossing Green Lane.

12.8.14 Further to this, the TA (Appendix 12.1) provides an assessment of potential impacts on junction capacity taking into consideration the Project cumulatively with other proposed projects in the vicinity, (included in CBC 2031 growth factor model). Junctions assessed were Green Lane / Project Access Road and Bedford Road / Green Lane. This assessment has concluded that the impact on the links is shown to be minimal and that the junctions both operate well within capacity with minimal queuing or delay.

12.8.15 Taking the above into consideration, the Project is not anticipated to give rise to any significant cumulative effects with other projects in the vicinity of the Project Site.

<u>Effect Interactions</u>

12.8.16 The Noise modelling (Chapter 7) has been based upon the traffic movements predicted as part of the transport assessment work.

12.8.17 The Air Quality modelling (Chapter 6) has also been based upon the traffic movements predicted as part of the transport assessment work. This has allowed an assessment to be made in relation to the pollution levels on roads used to access the site during both the construction and operational phases

12.9 Mitigation and Assessment of Residual Effects

12.9.1 No project-specific mitigation is required in addition to the embedded design mitigation described in section 3.6. This includes adherence to a CTMP (an outline of which is included in Appendices 5.2-5.4 of the TA) which includes for the implementation of a contractor's route management plan as well as a traffic management scheme at Station Lane and Houghton Lane.

12.10 Summary of Residual Effects

12.10.1 For a very short duration (one to two days) of peak construction activity associated with the Generating Equipment, there would be a slight negative significance of effect for Pedestrian Amenity on Green Lane which is not significant. Notwithstanding, any increase in vehicles as a consequence of the Project is still below the threshold identified in Section 12.5 for Pedestrian Amenity and Fear and Intimidation, where negligible is less than 600 vehicles an hour over an 18-hour day. As such, the Project will not result in any likely significant transport-related environmental effects.

12.10.2 Although some embedded mitigation is proposed to address this short duration effect, this may remain as a residual effect.

12.11 Summary

12.11.1 Table 12.24 below summarises the residual transport-related effects of the Project.

Table 12.24 – Summary of the likely transport-related effects of the Project

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Construction and Decommissioning Phase									
Power Generation Plant	Kimberley College:	High	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation; Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Water Sports Club	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant

	Narrow Footway / Cycleway over Green Lane Level Crossing	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Cyclists on Green Lane	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Users of the permissive recreational footpath	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian*	No change Local Short-term	Low	Embedded mitigation to include provision of route	Neutral. Not significant	None	Neutral. Not significant

	within the Rookery Pit		*Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*			management strategy.			
Gas connection	Lack of footways on B530	High	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Lack of footways on Millbrook Road	High	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant

	Cyclists along Millbrook Road and the B530	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Users of footpath FP65	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Users of footpath FP7	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant

			• *Accidents and Highway Safety*						
Electrical Connection	Lack of footways on Station Lane	High	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Cyclists along Station Lane	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant

	Users of footpath FP14	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	Negligible Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral Not significant	None	Neutral. Not significant
Cumulative effects	No cumulative effects expected						Neutral. Not significant		Neutral. Not significant
Operation and maintenance									
Power generation plant	Kimberley College:	High	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation ;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant

	Water Sports Club	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Narrow Footway / Cycleway over Green Lane Level Crossing	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
	Cyclists on Green Lane	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant

			• *Accidents and Highway Safety*						
	Users of the permissive recreational footpath within the Rookery Pit	Medium	• *Severance;* • *Pedestrian Delay;* • *Pedestrian Amenity;* • *Fear and Intimidation;* • *Accidents and Highway Safety*	No change Local Short-term	Low	Embedded mitigation to include provision of route management strategy.	Neutral. Not significant	None	Neutral. Not significant
Gas and Electrical connection	None affected						Neutral. Not significant		Neutral. Not significant
Cumulative effects	No cumulative effects anticipated.						Neutral. Not significant		Neutral. Not significant

12.12 Conclusions

12.12.1 This assessment has shown that, with the exception of a short duration (1 to 2 days) of peak construction activity for the Generating Equipment, the Project will not result in any likely significant environmental effects in relation to traffic. During this time, there would be a slight adverse significance of effect for pedestrian amenity associated with the high sensitivity receptors on Green Lane (Kimberley College) but this is considered to be not significant.

12.12.2 During normal operation of the Project, up to four members of staff would be working at the Generating Equipment Site at any one time. Three shifts per day are assumed, to provide 24 hour coverage. These shift changes would be timed to avoid the network peak hour i.e. morning and evening rush hours, hence the highway impact would be minimised. Additionally, there will be infrequent maintenance visits by one or two engineers.

12.12.3 During the annual maintenance of the Generating Equipment, there may be up to 40 additional staff on site for a typical maintenance period of one month. It is assumed that all these trips would all be made by car, assuming 1.6 occupants per car, as per the average Journey to Work car occupancy within the National Travel Survey. Reflecting the typical working hours on construction sites, it is assumed that majority of these movements would be made outside of the network peak. However, in order to provide a robust assessment, it has been assumed that up to 25% of these movements would occur at peak times and a further 12 HGV movements per day are assumed during maintenance.

12.12.4 Neither the Gas Connection, nor Electrical Connection will be manned. They will have very infrequent service and maintenance visits (less than 1 per week) and therefore consideration of the operation and maintenance of the Gas Connection and Electrical Connection were scoped out of the traffic assessment.

12.12.5 Even during the higher traffic generating periods in the short-term maintenance period, all of these operational phase movements are so low that they are well below the level at which changes can be perceived, and that they are therefore neutral and not significant.

12.12.6 Therefore, normal operation of the Project is not anticipated to have any likely significant effects on the local road network.

12.12.7 The Project would not result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site.

13 Historic Environment

13.1 Introduction

13.1.1 This Chapter presents the assessment of likely significant effects on the historic environment arising from the construction, operation, maintenance and decommissioning of the Project. The historic environment includes a wide range of features resulting from human intervention in the landscape, varying in scope from buried archaeological remains dating from the Palaeolithic (450,000 BC) up to late 20th century industrial structures. The historic environment can be divided into the following two categories:

- **Archaeology**
  - Scheduled Monuments (SMs)
  - Non-designated archaeological finds and sites
- **Built Heritage**
  - Listed Buildings (Grades I, II*, and II)
  - Registered Parks and Gardens (Grades I, II* and II)
  - Conservation Areas.
  - Historic Battlefields
  - Shipwrecks
  - World Heritage Sites

13.1.2 Designated heritage assets are defined in Annex 2 of the NPPF as comprising World Heritage Sites, scheduled monuments, listed buildings, conservation areas, protected wreck sites. Registered parks and gardens and registered battlefields. All other heritage assets (i.e. non-listed buildings, non-scheduled archaeological remains, and non-registered battlefields, parks and gardens and shipwrecks) are collectively referred to as non-designated heritage assets.

13.1.3 The Project has the potential to affect the historic environment due to direct (physical) impacts and indirect (visual, odour and/or noise) impacts on the setting of assets.

13.2 Legislation and Policy Context

13.2.1 The legislation and policy context in relation to archaeology and cultural heritage is described in detail in Appendix 2.13. However, in summary, the following items of policy, legislation and guidance have been considered in preparing this assessment:

- National Policy Statements (NPS) EN-1, 2, 4 and 5;
- National Planning Policy Framework 2012
- National Planning Policy Guidance;

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas) Act 1990;
- Planning and Compulsory Purchase Act 2004;
- Central Bedfordshire LDF Core Strategy and Development Management Policies (Adopted December 2009) POLICY CS15: HERITAGE;
- Bedford Borough Council Local Plan 2002, saved policies: Policy BE11 'Setting of Conservation Areas', BE21 'Setting of Listed Buildings' and BE23-25 'Archaeology';
- Bedford Borough Council Local Plan 2035 2017 Consultation Paper; and
- Bedford Borough Council Core Strategy and Rural Issues Plan Development Plan Document (adopted April 2008) POLICY CP23 – HERITAGE, POLICY CP24 – LANSDSCAPE PROTECTION AND ENHANCEMENT and POLICY CP21 – DESIGNING IN QUALITY.

13.3 Consultation

13.3.1 A list of key consultation responses received to date relating to historic environment are presented in Table 13.1 below, along with how these have been responded to.

Table 13.1 - Summary of key consultation and responses

Reference	Comment	Response
SoS Scoping Opinion		
3.88	The SoS would expect the potential impacts on conservation areas to be identified and assessed as part of the EIA.	The results of this assessment are provided in paragraph 13.6.9.
3.90	The SoS notes that the proposed development involves some working of previously unworked areas on the project site, and recommends that consideration is given to whether further assessment of the project site is required, in consultation with relevant Council officers.	The assessment throughout this Chapter has had regard to the unworked area of the Project Site. As agreed with CBC archaeological officer, topsoil stripping and recording of any finds would be undertaken on previously unworked areas of the project site prior to construction.
3.91	The SoS expects to see a comprehensive assessment in the ES of potential impacts of the proposed development on the setting of cultural heritage assets in the area.	The results of this assessment are provided in section 13.7 and Appendix 13.2.
Ampthill Town Council		
Scoping Response Letter	The plant will have an impact on the restoration project currently being undertaken at Ampthill Great Park.	An assessment of impacts on Ampthill Great Park (including restoration) has been described in Appendix 13.2 and summarised in this chapter.

Reference	Comment	Response
CBC		
Scoping Response Letter	The EIA should deal with the impact of the proposal on the remains of the Rookery Pit clay pit.	An assessment has been undertaken on the remains of the Rookery South Pit in section 13.7.
	It is proposed that the baseline information for the EIA should be collected by means of a desk-based assessment, using the relevant Institute for Archaeologists' standards and guidance document as the basis for the assessment.	The desk based assessment (DBA) forms an Appendix to the ES (Appendix 13.1) and is summarised in section 13.6. It has been prepared in accordance with the Chartered Institute for Archaeology (CIfA) guidelines and Historic England (2015) The Setting of Heritage Assets Historic Environment Advice in Planning 3.
	Given the potential for this area to contain as yet unidentified archaeological remains the CBC Archaeological Officer considers that the collection of baseline information on archaeology for the gas and electrical connections should include an archaeological field evaluation comprising geophysical survey and trial trenching of the selected connection routes.	Consultations have been undertaken with the CBC Archaeological Officer who has confirmed that instead of a programme geophysical survey and trial trenching of the Gas and electrical Connections, mitigation in the form of an archaeological strip, map and sample of the Gas and Electrical Connections can be undertaken as a pre-commencement Requirement of the DCO (Correspondence with the CBC Archaeological Officer regarding this is included as Appendix 13.3). This has been included in the draft DCO that has is submitted with the Application.
	The Environmental Statement should contain sufficient visual information to be able to assess the impact on the setting of assets including from the monuments and into them from a variety of locations, including view sites on the Greensand Ridge from the northern edge of the Marston Vale.	An assessment of the potential effects of the Project on the setting of cultural heritage assets is provided in section 13.7 and Appendix 13.2. Further assessment of visual amenity within the Zone of Theoretical Visibility (ZTV) is provided in Chapter 11.

Reference	Comment	Response
CBC (Response to 2014 PEIR)	The wider project area has the potential to contain so far unidentified archaeological sites and features dating from the prehistoric period. The proposed development site is also located within the setting of a number of Scheduled Monuments In relation to designated heritage assets, the need for photomontages taken from LVIA locations 3, 4, 5 and 9 was confirmed. Construction of the gas and electrical connections has the potential to affect as yet unrecorded archaeological. The Archaeology Team's earlier comments remains as was the requirement for archaeological field evaluation to provide information on the location, extent and character of any archaeological remains that will be affected. The details of proposed mitigation will need to be agreed with the Authority	The baseline conditions for non-designated heritage assets were assessed for a study area of extending 1 km in radius from the Project Site boundary and are reported in detail in an archaeological desk based assessment (see Appendix 13.1) The findings of the desk based assessment are summarised in section 13.6. Scheduled Monuments were assessed within a study area of 5 km radius from the Project Site (see section 13.5 and Appendix 13.2). Photomontages have been produced from viewpoints close or at these locations and are contained in Document Reference 7.2. Consultations have been undertaken with the CBC Archaeological Officer who has confirmed that instead of a programme of geophysical survey and trial trenching of the Gas and Electrical Connections, mitigation in the form of an archaeological strip, map and sample of the Gas and Electrical Connection can be undertaken as pre-commencement requirement of the DCO(Correspondence with the CBC Archaeological Officer regarding this is included as Appendix 13.3). This has been included in the draft DCO that has is submitted with the Application.

Reference	Comment	Response
CBC - Pre-application advice letter (October 2015)	In response to discussions regarding the scope of archaeological mitigation work, a summary of CBC's response stated that "strip map and sample of the selected pipeline routes ahead of construction may be the most effective way of dealing with the archaeological impact of the pipeline, and indeed the pylon bases".	In light of the consultation with the CBC Archaeological Officer who has confirmed that instead of a programme of geophysical survey and trial trenching of the Gas and Electrical Connections, mitigation in the form of an archaeological strip, map and sample of the Gas and Electrical Connection can be undertaken as a pre-commencement Requirement of the DCO. This has been included in the draft DCO that has is submitted with the Application.
CBC – Response to PEIR (2017)	The Archaeological Desk-Based Assessment update should be expanded to cover the impact on the designated heritage assets following the methods and principles described in Historic England (2015) The Setting of Heritage Assets Historic Environment Advice in Planning 3.	Noted. The updated DBA is presented in Appendix 13.1 and takes account of the impact on designated assets following the methods and principles described in Historic England (2015) The Setting of Heritage Assets Historic Environment Advice in Planning 3.
English Heritage / Historic England		

Reference	Comment	Response
English Heritage (Response to 2014 PEIR)	There is a need for a range of heritage specific photomontages, and that we would appreciate some additional views from those presented in the PIER report. Primarily it would be the views from Houghton House that are likely to be most important, but also Ampthill Park House which is Grade II* and the Scheduled Monument in Ampthill Park. There are also potentially some views from Millbrook Church, in particular from the graveyard at the base of the tower	An updated suite of photomontages have been prepared as part of the Landscape and Visual Impact assessment and are presented in the ES. They cover Houghton House (Viewpoints 4 and 5) and Ampthill Park and House (Viewpoints 3 and 7). These have been prepared in consultation between the heritage team and landscape team to ensure that effects can be understood from both an LVIA and historic setting perspective. They have been agreed with CBC. An assessment of photomontages undertaken has informed this assessment. They are presented in Document Reference 7.2. Millbrook Church was visited as part of the site assessment but it was concluded that there were no clear views of the Project Site to warrant a separate photomontage. The assessment of Millbrook Church is presented in Appendix 13.2.

Historic England Response to PEIR (2017)	HE have concerns over the PEIR method; the sensitivity matrix (table 4.1) categorises heritage assets as medium sensitivity however, HE consider the assessed heritage sites to be of high sensitivity	Table 4.1 is provided in the introductory sections of the ES to illustrate 'example' matrices, the type of which would be used in the technical ES chapters. However, Chapter 4 also states that these matrices would be refined accordingly in each topic chapter. Table 13.2 already categorises heritage assets accordingly (including those considered to be high sensitivity). Table 4.1 has also been amended to reflect this.
	HE do not agree that the grading of a building reflects the contribution of setting to its significance. The heritage impact conclusions should consider the effects on significance of heritage assets as opposed to the effects on the setting which makes a contribution to the significance of the Heritage asset	The assessment presented in Appendix 13.2 has been refined and it has now been made clearer that assessments are based on the specific factors and attributes of each asset and not on their grading alone.
	Effects on heritage assets need to be considered in terms of levels of harm in accordance with the NPPF.	Effects on heritage assets are and will be considered in terms of levels of harm in accordance with the NPPF.
	Efforts should be made to ensure that assets are properly assessed including securing private access to undertake the assessment if required.	MPL considers that following best practice guidance (e.g. GLVIA 3) and taking views from publicly accessible locations did not lead to any limitations to the assessment of the designated assets or their setting, as a full assessment of the significance and setting of the assets (including how setting contributes to the

		significance of the assets) was possible on this basis (Appendix 13.2). This is therefore considered to be a reasonable approach, and the views were sufficient for undertaking a robust assessment of the assets.
	it is considered that there is likely to be notable harm to the significance of Ampthill Park, Park House and Houghton House through a development within their setting.	A full assessment of these assets is provided in Appendix 13.2 and summarised in section 13.7. Taking into consideration the photomontages, and landscape, topography and intervening vegetation, we do not anticipate significant harm on these assets.
	The cumulative impact of both projects (RRF and MPL) on the significance of heritage assets, in particular Park House, Ampthill Park and Houghton House, is likely to be harmful.	A cumulative assessment is presented in section 13.8 and Appendix 13.2.
	Photomontages and visualisations are of insufficient quality and date from 2014.	A full suite of photomontages is presented in Document Reference 7.1 which date from 2017. A high resolution copy has been sent to HE.
	Three additional viewpoints are requested from Houghton House, Marston Moretaine Church and Ampthill Park House.	It is considered that Viewpoint 4 (Document Reference 7.1) provides a sufficient view to assess effects on Houghton House. Marston Moretaine Church is outside of the ZTV therefore there is no scope for intervisibility and

Reference	Comment	Response
		no effects on the church are anticipated. A view from the eastern edge of Marston Moretaine (VP 8 presented in Document Reference 7.1) shows that there is no intervisibility between the church and the Project Site. The view from Ampthill Park House is recognised and acknowledged in the assessment in Appendix 13.2; Viewpoint 7 is taken from the Public Right of Way at the front of the house and is considered to provide a sufficient view. Photomontages constitute tools to illustrate an assessment, they do not constitute the assessment. The assessor has been to site, considered the position from a number of locations and set out a full assessment in Appendix 13.2. The Photomontages are provided for context to the reader, they are not (in themselves) the assessment. The effects of the Project taken as a whole (including the stack and the SECs together) are described in in section 13.10.
	The cumulative effect of the stack and SEC should be considered.	
BBC		

Response to PEIR (2017)	The terminology used and therefore the conclusions drawn have not at any point been quantified in terms of NPPF terminology. The significance and any contribution which setting makes to significance of Stewartby Conservation Area and Sir Malcom Stewart Trust Homes, seven lamp standards and wrought-iron railings, listed in 2016, list no.: 1432692 and Sir Malcom Stewart Trust Common Room, Stewartby, listed 2016, list no.: 1433440. Have not been assessed.	This chapter now uses terminology which is consistent with the NPPF (Section 13.7). in relation to Wootton Cons Area, there is no intervisibility between the Project and the CA. Therefore, there will be no visible effect on the CA. The project does lie within 2km but the setting of the CA does not extend as far as the project in terms of providing a positive or negative contribution to the significance of the CA. There is likely to have been some historic socio-economic connection between the CA and the pits as some of the village's population may have worked there, but this is not affected by the project and also is an a very minor contributor to the CA's significance. In relation to Stewartby, as with Wootton, the CA is outside of the ZTV so there will be no visual change within the setting. The element of the scheme that could have some theoretical impact on the significance of the CA (i.e. the power generation plant, is relatively distant from the CA. As with Wootton, there will have been a historic socio-economic connection with the pits within which the generation plant is located but presence of the project will not affect this. Therefore,

Reference	Comment	Response
		there is no effect on the significance of the CA.
	It is also noted that the 12m width of stack proposed does not appear to have been taken into account in considering the impact of views on the Stewartby chimneys, the height appears to be the main consideration.	We consider that we have fully assessed the effect on the Stewartby chimneys and have taken into account the height and width differential in section 13.7 and Appendix 13.2. Additionally, text in the ES has been amended so that it no longer suggests that the stack would be a similar character to the chimneys.
	legislation and policy and the PEIR no reference to existing local plan policies relating to heritage is made, for example BE11 and BE21. Also core strategy policies CP23 and CP21 are also not consistently referred to in both these legislation sections.	This was an omission in the PEIR. The policies were used in the assessment and have been added in to section 13.2.

13.4 Topic-specific Realistic Worst Case Scenario for Assessment

13.4.1 In respect of the historic environment, the realistic worst case scenario from within the proposed Project parameters (which are described in Chapters 3 and 5 of this ES) is to assume that the Power Generation Plant will have a 35m high stack.

13.4.2 The reason that this represents the realistic worst case is that a larger stack height will increase the magnitude of visual (and therefore setting) effects as the Power Generation Plant will be more prominent and will be visible over a larger geographical area.

13.5 Assessment Methodology and Significance Criteria

Assessment Methodology

13.5.1 The following guidance documents have been used to inform the methodology used in this assessment:

- Scheduled Monuments & nationally important but non-scheduled monuments (DCMS 2013);
- Principles of Selection for Listing Buildings (DCMS 2010);
- Conservation Principles – Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage 2008);
- Historic Environment Good Practice Advice in Planning Note 2 Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015);
- Historic Environment Good Practice Advice in Planning Note 3 The Setting of Heritage Assets (Historic England 2015)
- Seeing the History in the View – A Method for Assessing Heritage Significance in Views (English Heritage 2011);
- Standard and Guidance for Historic Environment Desk-based Assessments (Institute for Archaeologists 2014).

13.5.2 The following study areas have been chosen for the heritage impact assessment. These study areas have been selected based on professional judgment and experience of potential likely significant direct and indirect effects likely to arise from the Project. They have been agreed as appropriate with CBC:

- The inner study area - A radius of 1 km from the boundary of the Project Site which has been used for assessing direct (physical) effects on non-designated archaeological heritage assets;
- The wider study area - A radius of 5 km from the boundary of the Project Site which has been used for assessing indirect (primarily visual) effects on Scheduled Monuments, Grade I and Grade II* Listed Buildings, Conservation Areas and Registered Parks and Gardens. The Zone of Theoretical Visibility defined in Chapter 11 was used to screen out designated assets that will have no intervisibility with the Project; and
- A radius of 2 km from the boundary of the Project Site which has been used for assessing indirect (visual) effects on Grade II Listed Buildings. The ZTV for the stack was used to screen out designated assets that will have no intervisibility with the Project.

13.5.3 The 1 km radius study area for non-designated heritage assets was used so as to enable the archaeological background of an area wider than just the Project Site to be established so as to better understand the potential for as yet unrecorded remains within the Project Site.

13.5.4 The majority of grade II listed buildings within the study area are situated within villages in the area surrounding the Project Site and, in general, have localised settings within the built up areas within which they are located, which do not have a strong interaction with the surrounding countryside. For the purposes of this assessment consideration of Grade II listed buildings, where their wider setting is generally a less sensitive part of their significance, has been limited to 2 km. Beyond this distance, given the nature of the surrounding landscape, it is not considered that the presence of the Project would affect the significance of these buildings.

13.5.5 Beyond a distance of 2 km these factors are considered to reduce the potential for impact of the Project on the settings of listed buildings. For the purposes of this assessment consideration of Grade II listed buildings, where setting is generally a less sensitive part of their significance, has been limited to 2 km. Beyond this distance, given the nature of the surrounding landscape, it is not considered that the presence of the Project would affect the significance of these buildings.

13.5.6 Therefore, only those Grade II listed buildings within 2 km have been considered in detail. The data for all Grade II listed buildings within 5 km has however been collected, plotted and reviewed to identify any buildings of this grade beyond 2 km that are considered to have a highly sensitive setting.

13.5.7 The wider (5km) study area is shown on Figure 13.1.

The following data sources have been used in this assessment:

- Central Bedfordshire Historic Environment Record (HER), to provide details on known archaeology in the inner study area;
- National Monuments Record to provide details on known archaeology in the inner study area;
- Historic cartographic and documentary sources at the Bedfordshire records office;
- British Library;
- Unpublished material from recent archaeological investigations in the wider study area; and
- National Heritage List for England.

13.5.8 A desk based assessment was undertaken in accordance with the Chartered Institute for Archaeologists (CIfA) guidelines (2017) The Setting of Heritage Assets Historic Environment Advice in Planning 3, along with site walkovers in 2014 and 2017. The desk based assessment is included as Appendix 13.1.

13.5.9 All designated assets within the study areas and also within the ZTV were visited in 2014 and 2017 in order to assess both the building/archaeological site/structure and also their setting. This has been supplemented by consultations with interested parties, expert advice and professional judgment.

13.5.10 In order to assess the indirect effects of the Project, the ZTV, together with fieldwork observations and professional judgment were used. The results of these assessments are presented in Appendix 13.2.

13.5.11 The factors taken into account in assessing the extent of the setting of each heritage asset and whether, how and to what degree the setting makes a contribution to the significance of each designated heritage asset are taken from Planning Note 3 - The Setting of Heritage Assets (Historic England 2015).

13.5.12 In all cases, the various levels of predicted effects have been defined in accordance with the scales of change provided in Tables 13.2 - 13.4 below.

Significance Criteria

Sensitivity

13.5.13 The sensitivity of each type of heritage asset and its setting is defined using the descriptions in Table 13.2, although it is recognised that occasionally sites can have a higher level of sensitivity in a local context, and vice versa. The categories have been devised using professional judgement and experience with similar Projects. The contribution that the setting of a heritage asset makes to its significance may vary within the setting and will also vary between heritage assets as laid out in Historic Environment Good Practice Advice in Planning Note 3 - The Setting of Heritage Assets (Historic England 2015).

Table 13.2: Definitions of Sensitivity for Heritage Assets

Sensitivity	Criteria
Very high	World Heritage Site.
High	Scheduled Monuments & Areas of Archaeological Importance Archaeological sites of schedulable quality & significance Listed buildings (all grades) Conservation Areas Registered Historic Parks and Gardens (all grades) Historic Battlefields Non-designated heritage assets of demonstrable equivalence designated heritage assets
Medium	Local Authority designated sites Non-designated sites of demonstrable regional importance
Low	Non-designated heritage assets with significance to local interest groups Non-designated heritage Non-designated heritage assets where the significance is limited by poor preservation and poor survival of contextual associations

13.5.14 The heritage assets that are within the very high and high categories are considered to be of national significance. Heritage assets that are within the medium category are considered to be of regional significance and those in the low category are considered to be of local significance.

Magnitude of impact

13.5.15 Magnitude of impact is a measure of the degree to which the significance of a heritage asset (e.g. national, regional or local significance) will be increased or diminished by a proposed development such as the Project. In determining the magnitude of impact, the asset's significance is first established. This allows the identification of the key features of the heritage asset and its setting, and provides the baseline against which the magnitude of change can be assessed with the magnitude of impact being proportional to the degree of change in the asset's baseline significance. The assessment of magnitude also takes into account the contribution that setting makes to the significance of the asset.

Table 13.3 Magnitude of Impact

Magnitude of Impact	Definition
Major	• Total or substantial loss of the significance of a heritage asset. • Substantial harm to a heritage asset's setting, such that the significance of the asset would be totally lost or substantially reduced (e.g. the significance of a designated heritage asset would be reduced to such a degree that its designation would be questionable or the significance of an undesignated heritage asset would be reduced to such a degree that its categorisation as a heritage asset would be questionable).
Moderate	• Partial loss or alteration of the significance of a heritage asset. • Harm to a heritage asset’s setting, such that the asset's significance would be materially affected, but not totally or substantially lost.
Minor	• Slight loss of the significance of a heritage asset. This could include the removal of fabric that forms part of the heritage asset, but that is not integral to its significance (e.g. the demolition of later extensions/additions of little intrinsic value). • Some harm to the heritage asset’s setting, but not to the degree that it would materially compromise the significance of the heritage asset. • Perceivable level of harm, but insubstantial relative to the overall interest of the heritage asset.
Negligible	• A very slight change to a heritage asset. This could include a change to a part of a heritage asset that does not materially contribute to its significance. • Very minor change to a heritage asset’s setting such that there is a slight impact not materially affecting the heritage asset’s significance.
No Change	• No change to a heritage asset or its setting.

Significance of Effect

13.5.16 The sensitivity of the receiving environment, together with the magnitude of impact, defines the significance of the effect (Table 13.4). Where there is scope for two levels of impact (e.g. major/moderate), professional judgement has been used in the assessment as to the level of impact arising.

Table 13.4: Significance of Effects

		Magnitude of Impact				
		No Change	Negligible	Minor	Moderate	Major
Receptor Sensitivity	Very High	Neutral	Slight	Moderate	Large	Very Large
	High	Neutral	Slight	Moderate	Large	Large
	Medium	Neutral	Slight	Slight	Moderate	Large
	Low	Neutral	Slight	Slight	Slight	Moderate
	Negligible	Neutral	Neutral	Neutral	Neutral	Neutral

13.5.17 Effects of moderate or above are considered significant in terms of the EIA Regulations unless otherwise stated. However, professional judgement is also used in judging the significance of effects.

13.5.18 The judgement of the significance of effects takes in to consideration the impact on the heritage asset's significance (as defined in Appendix 2 of the NPPF). For designated assets, it is the magnitude of impact on the heritage significance of the asset that is being considered. As part of this assessment, the impact on the contribution that the setting of a heritage asset makes to its significance is also considered. The nature of the contribution that the setting of an assets makes to its heritage significance varies from asset to asset (i.e. the setting of some assets have a greater contribution to the significance and vice versa). Consequently, where there are effects from the Project on the setting of an asset that has only a limited contribution to the significance of that asset, the effect on the significance of the asset itself may be very limited or even potentially non-existent. Where a heritage asset has a setting that has a large contribution to the significance of that asset, effects on the significance of the asset itself will be greater.

13.5.19 Timescales used in this report are as follows:

<u>Prehistoric</u>

- Palaeolithic – 450,000 – 12,000 BC
- Mesolithic – 12,000 – 4,000 BC
- Neolithic – 4,000 – 1,800 BC
- Bronze Age – 1,800 – 600 BC
- Iron Age – 600 BC – AD 43

Historic

- Roman – AD 43 - 410
- Saxon / Early Medieval – AD 410 - 1066
- Medieval – 1066 - 1485
- Post-Medieval – 1486 - 1799
- Modern – 1800 – Present

Items scoped out of assessment

Historic Landscape

13.5.20 The landscape in the vicinity of the Project Site has been substantially modified with the introduction of modern structures such as pylons, a substantial amount of new housing development and the Rookery North and South Pits. Introduction of the Project will not result in the loss of significant historical landscape features. Although partial removal of hedgerows will be required during construction of the Gas Connection and some trees will require removal during construction of the Electrical Connection, these are not classed as 'important' hedgerows and none of the trees are subject to tree preservation orders. The potential effects on historic landscapes has therefore not been considered further in this Assessment. However, the historic landscape setting of designated assets has been considered where appropriate in section 13.7 and Appendix 13.2.

13.6 Baseline Conditions and Receptors

13.6.1 The locations of designated assets considered in the assessment are presented on Figure 13.1. The locations of non-designated heritage assets within the 1km inner study area are presented on Figure 13.2.

13.6.2 The future baseline (prior to construction of the Project assumes that the LLRS works as outlined in section 3.1) have been implemented.

Power Generation Plant

13.6.3 A map regression exercise was undertaken as part of the archaeological desk based assessment, (included in Appendix 13.1). However, in summary, the Power Generation Plant is depicted on historic maps as being agricultural fields until the 1970s when the Rookery Pits are first shown. The remains of the former conveyor lines still survive in the north-west of Rookery North Pit, mainly evidenced by concrete plinths along the former route, but also as a conveyor bridge crossing over the railway line close to Green Lane in Rookery North Pit. By 1988-89 Rookery North and South Pits were both disused.

13.6.4 The descriptions below summarise the archaeological and built heritage assets within the inner and wider study areas in the vicinity of the Power Generation Plant.

Non-designated Heritage Assets

13.6.5 Crop marks of four circles and oblongs east of Pillinge Farm were noted within the Power Generation Plant Site in 1974. However, when re-examined in 2009, there were no traces of these features and they have been discounted as being of any archaeological interest. Furthermore, these features are recorded as being within Rookery South Pit and consequently, will have been destroyed during clay extraction operations. No other features or structures of archaeological or historic interest have been recorded on the Bedfordshire HER within the Power Generation Plant Site, representative of the fact that the majority of it is located within a former clay extraction pit. However, it is recognised that the Rookery South Pit which, although not recorded on the HER, could be considered as a non-designated heritage asset of local significance, and has been raised as such by statutory consultees due to its socio-economic interest related to the former clay extraction industry of the area.

13.6.6 The archaeological potential of the Power Generation Plant Site is summarised below.

- **Palaeolithic** – Low
- **Mesolithic** – Low
- **Neolithic** – Low
- **Bronze Age** – Low
- **Iron Age** – Low
- **Roman** – Low
- **Saxon / Early Medieval** – Low
- **Medieval** – Low
- **Post-Medieval** – Low
- **Modern** - Low

Designated Assets

13.6.7 A review of the National Heritage List for England confirmed that there are no designated heritage assets within the Power Generation Plant Site. Tables 13.5-13.9 list the designated assets within the wider (5km) study area. All designated heritage assets are considered to be of high sensitivity, although their settings may not necessarily be as sensitive to change (i.e. direct physical change) as the assets themselves.

13.6.8 Of the designated heritage assets in the wider study area, there is one Grade I listed building (1321465 Ruins of Houghton House), one grade II* listed building (1137595 Ampthill Park House), eight grade II listed buildings (1158024 South Pillinge Farmhouse; 1321648 Millbrook Station; 1392357 Two kilns and four chimneys at Stewartby Brickworks; 1113921 16 & 17 How End Road; 1114416 Statue of hound at Ampthill Park House; 1311682 Lower Roxhill Farmhouse; 1321647 Roxhill Manor House & 1249331 Wood Farmhouse), three scheduled monuments (1013522 Houghton House; 1009630 Ampthill Castle & 1012317 Long Barrow 350m SE of Bury Farm), one registered park and garden (1000378 Ampthill Park) and two Conservation Areas (Ampthill and Stewartby). These assets are all within the ZTV and there is therefore the potential for effects arising from the Project on the setting of these assets. Appendix 13.2 presents a detailed assessment of the significance and setting of each of these assets and effects of the Project upon the significance of the assets.

13.6.9 Figure 13.1 shows the designated assets within the study area that are outside of the ZTV. As these assets are outside of the ZTV, the Project can have no effect upon them, and therefore effects on these assets will not be assessed in this Chapter. One other scheduled monument, Ampthill Castle, is essentially outside of the ZTV with only its very northern edge being within the ZTV. This has been included in the assessment but will be considered as part of Ampthill Park within which it is located.

Table 13.5 Scheduled Monuments within 5km of the Power Generation Plant Site and within the ZTV

ID	Name	Distance (m)
SM 2	Ampthill Castle: a medieval magnate's residence	2276
SM 4	Houghton House: a 17th century mansion and associated courtyard and formal garden remains	2605
SM 7	Long barrow 350m south east of Bury Farm	3980

Table 13.6 Grade I and II* Listed Buildings within 5 km of the Power Generation Plant Site and within the ZTV

ID	Name	Grade	Distance (m)
LB 25	Ruins Of Houghton House, Houghton Park	I	2679
LB 10	Park House (Cheshire Home for The Disabled), Ampthill Park	II*	1885

13.6.10 As discussed in section 13.5 only those grade II listed buildings within 2 km of the Power Generation Plant Site and within the ZTV have been considered in detail. These are summarised in Table 13.7.

Table 13.7 Grade II Listed Buildings within 2 km of the Power Generation Plant Site and within the ZTV

ID	Name	Distance (m)
LB 1	South Pillinge Farmhouse	182
LB 2	Millbrook Station	437
LB 8	Statue of Hound at Ampthill Park	1860
LB 11	16 And 17, How End Road	1902
LB 13	Two Kilns and Four Chimneys at The Stewartby Brickworks	1956

13.6.11 There are five Conservation Areas within the wider study area:

- Three of these (Millbrook, Maulden & Wootton) are outside of the ZTV. Millbrook is located c. 1.8km to the south of the Project. The setting of the Conservation Area in the direction of the Project comprises agricultural fields. The way that views open up at the northern part of the Conservation Area is an important aspect of its setting. However, the Conservation Area and the area to the north of it are outside of the ZTV and so there would be no effects upon it. Maulden is located 4.7 km to the south east of the Power Generation Plant and the lack of intervisibility due to intervening topography and distance mean that no aspects of its setting and significance could be impacted upon. Furthermore, it is outside of the ZTV. Wootton Conservation Area lies c. 4.1 km to the north west of the Project. The setting of the Conservation Area is considered to extend over the surrounding fields and the modern housing to the east and north of the area. It is not considered to extend as far as the Power Generation Plant Site.

- Stewartby Conservation Area is located 1.4 km to the north east at its nearest point to the Power Generation Plant Site. It has no intervisibility with the Project except for a small sliver of the south eastern corner of the Conservation Area which is a small area of open space. It is also separated in the direction of the Power Generation Plant by Rookery North Pit and is located too far away from the Power Generation Plant for the non-visual aspects of its setting to be impacted upon

13.6.12 Consequently, these four assets have not been assessed in detail as there will be no potential for impacts or effects on their settings.

13.6.13 The majority of Ampthill Conservation Area to the south east is outside of the ZTV, with the north western edge that is within Ampthill Park being the only part within the ZTV.

Table 13.8 Conservation Areas within 5 km of the Power Generation Plant and within the ZTV

ID	Name	Distance (m)
CA 1	Stewartby	1384
CA 3	Ampthill	1771

13.6.14 There is only one Registered Park and Garden within the wider study area, Ampthill Park to the south east, part of which is outside the ZTV. The effects of the Project on the setting of Ampthill Park have been considered in Appendix 13.2.

Table 13.9 Registered Parks and Gardens within 5 km of the Power Generation Plant

ID	Name	Grade	Distance (m)
RPG 1	Ampthill Park	II	1370

Gas Connection

13.6.15 Land on which the majority of the Gas Connection is situated is agricultural, and has remained undeveloped according to the earliest historical mapping data.

Non-designated Heritage Assets

13.6.16 A pair of parallel linear crop marks which are crossed by a single linear crop mark have been recorded within the Gas Connection. Archaeological investigations (trial trenching) have been undertaken in the vicinity of the Gas Connection in relation to an unrelated previous proposed development. The archaeological evaluation did not reveal archaeological remains despite the results of the crop marks recorded within the area (see Appendix 13.1).

13.6.17 An archaeological assessment of the Gas Connection has been undertaken which considers heritage assets within the Gas Connection and the inner and wider study areas in detail. The archaeological potential of the Gas Connection is summarised below.

- **Palaeolithic** – Low
- **Mesolithic** – Low
- **Neolithic** – Low
- **Bronze Age** – Low
- **Iron Age** – Low

- **Roman** – Low
- **Saxon** / **Early Medieval** – Low
- **Medieval** – Moderate potential agricultural remains (i.e. former field systems and boundaries)
- **Post-Medieval** – Moderate potential agricultural remains (i.e. former field systems and boundaries); and
- **Modern** - Low

13.6.18 Should any as yet unrecorded archaeological features be present within the Gas Connection, based on the data contained in the Bedford and Central Bedfordshire Historic Environment Records and discussion with the Central Bedfordshire Archaeology team, any such remains are considered most likely to be of local significance.

Designated Heritage Assets

13.6.19 There are no designated heritage assets within the Gas Connection. Designated assets in the wider study area are set out in Tables 13.5 – 13.9.

Electrical Connection

Non-designated Heritage Assets

13.6.20 A number of crop marks of possible archaeological origin have been recorded within the Electrical Connection. Archaeological investigations have been undertaken in the northern part of the Electrical Connection in relation to the unrelated previous proposed development. This comprised the excavation of a number of trial trenches which revealed the remains of an enclosed late Iron Age/Roman settlement and a possible prehistoric settlement either side of a former stream channel (Appendix 13.1). The putative line of a Roman road crosses north west to south east across the south western part of the Electrical Connection.

13.6.21 A number of crop marks are identified from aerial photographs as representing prehistoric and Romano-British settlement sites on the HER within the study area (4469 & 9077). However, the recent archaeological evaluation in the Electrical Connection did not record any correlation between the plotted crop marks and excavated features, suggesting at least some of the crop marks in the area are non-archaeological in origin.

13.6.22 The crop mark of an isolated ring ditch on the top of a small hillock is recorded in the south-west edge of the Electrical Connection, adjacent to the Millbrook Proving Ground (MNN16566).

13.6.23 A late Iron Age/early Roman farmstead has been recorded recently at the Millennium Country Park, Marston Moretaine c. 1. km north-west of the Electrical Connection (17715).

13.6.24 A possible medieval moated site is recorded immediately north-west of the study site at Pillinge Farm South, represented by a square arrangement of ditches surrounding an orchard (3270).

13.6.25 In summary, the archaeological potential of the Electrical Connection is summarised below.

- **Later Upper Palaeolithic**; low;
- **Mesolithic**; low
- **Neolithic**; low
- **Bronze Age**; low
- **Iron Age** and **Romano-British**; known/high likelihood of presence. These remains are considered to be of local significance;
- **Early Medieval**; low
- **Medieval**; moderate likelihood of presence of agricultural remains (i.e. former field systems and boundaries);
- **Post-Medieval**; moderate likelihood of presence of agricultural remains (i.e. former field systems and boundaries); and
- **Modern** - Low

13.6.26 Should any as yet unrecorded archaeological features be present within the Electrical Connection, based on the data contained in the Bedford and Central Bedfordshire Historic Environment Records and discussion with the Central Bedfordshire Archaeology team, any such remains they are considered most likely to be of local significance. The draft DCO proposes a pre-commencement archaeological requirement.

Designated Heritage Assets

13.6.27 There are no designated heritage assets or assets of demonstrable equivalence with designated heritage assets within the Electrical Connection. Heritage assets in the wider study area are set out in Tables 13.5 – 13.9.

13.7 Assessment of Effects

Power Generation Plant

Construction / Decommissioning

13.7.1 The following assessment of effects takes into account the embedded mitigation as outlined in Chapter 3 section 3.6.

13.7.2 Due to the majority of the Power Generation Plant being located within a former clay extraction pit, there are no designated or non-designated archaeological heritage assets within the Power Generation Plant site. Therefore, the Power Generation Plant will have no direct physical impacts upon heritage assets as there are none present. The clay extraction processes would have removed any heritage assets that may have been located within the area of the Power Generation Plant and consequently it is considered that there is no scope for as yet undiscovered remains to be encountered.

13.7.3 The Generating Equipment, Laydown Area and part of the Access Road is located within Rookery South Pit which is a non-designated heritage asset of local significance as described in section 13.6. The Project's construction will have a direct impact on Rookery South Pit, although it is considered to be an asset of low heritage sensitivity. The majority of Rookery South Pit will be unaffected by the construction of the Project and consequently, there will be no change outside of the footprint of the Power Generation Plant. Therefore, there is judged to be a minor impact on the Rookery Pit overall resulting in a 'slight' significance of effect. The attribute importance of the Rookery Pit remaining essentially unaffected.

13.7.4 The impacts of the construction / decommissioning of the Power Generation Plant on built heritage assets will be of a comparable nature to those occurring at the operational and maintenance stage, albeit of a much shorter duration. That is, there will be the temporary presence of tall structures such as cranes both during construction and during decommissioning. Therefore, the predicted effects of construction activities are broadly similar to those assessed in operational impacts (see below) and have not been repeated here.

13.7.5 South Pillinge Farm Grade II listed building, which is the only designated heritage asset located in close proximity to the Project, is therefore, the only heritage asset that could theoretically be affected by noise or dust during construction. However, there will be no change resulting from noise and dust during construction due to the implementation of measures outlined in the CEMP (Appendix 3.2). This will result in a neutral effect.

<u>Operation (including maintenance)</u>

13.7.6 As any non-designated remains that may have been located within the area of the Pwer Generation Plant will have been destroyed by the former clay ectraction activities, there will be no operational and maintenance impacts on non-designated heritage assets.

13.7.7 The operation and maintenance of the Power Generation Plant will potentially have indirect impacts on the setting of designated assets within the wider study area. That is, the stack of the Generating Equipment may be experienced visually within the settings of designated assets and consequently may have an effect on the contribution that the settings have to the significance of those assets. The impacts on designated assets as outlined in paragraphs 13.6.8 to 13.6.12, are considered in detail in Appendix 13.2. However, in summary, the stack of the Generating Equipment is considered to have no more than a moderate adverse indirect effect on the setting of any of the assets, and for the majority of assets, there will be a neutral indirect effect. The designated heritage assets which the Power Generation Plant will have a moderate indirect effect upon are South Pillinge Farm (II), Park House (II*), Ampthill Park and Houghton House (SAM and Grade I). Although utilising the matrices in Tables 13.2 – 13.4, the effect of the scheme comes out as being moderate, the effect is not considered to be significant in EIA terms. The reason for this is that in each case the core of the significance of the assets is unaffected. The element of the assets that is affected is part of their setting which in each case does have a positive contribution to the significance. However, the Project will be at a relative distance from Houghton House and Ampthill Park House and only occupy a small section of the setting to the NW of both assets (i.e. a large part of the setting is unaffected in any way). Therefore, when the setting and its contribution to the significance of the assets are considered in the round, while there is an effect due to the change within the wider landscape setting of the assets, this change does not materially reduce the significance of the assets. Therefore, once professional judgement is taken into account, the effect on the significance of these assets is considered to be minor.

13.7.8 The stack is of a similar nature to existing structures in the vicinity (i.e. Marston Vale wind turbine, Stewartby chimneys and electricity pylons). That is, it would be a tall industrial structure visible from a distance. The stack will appear to be significantly lower in height and slightly wider than the other tall structures in the vicinity as it is located within Rookery South Pit, with only a maximum of 20 m visible above ground level. Consequently, its appearance will be subservient to the existing structures and also it will be in keeping both visually and in nature and function to the other existing structures in the vicinity.

13.7.9 Any effects will be experienced only during the lifetime of the Project and the decommissioning of the Power Generation Plant will remove any effects that the stack may have on the settings of designated heritage assets.

Gas Connection

Construction / Decommissioning

13.7.10 The construction / decommissioning of the Gas Connection will have no physical impacts on any designated heritage assets. The construction and decommissioning of the Gas Connection will be relatively short lived activity. Although machinery and construction activity may be possible from some of the designated assets, this activity will transitory and also at a distance and therefore will have an extremely limited visual effect which will disappear once the construction/decommissioning works cease. Therefore, there will also be no impacts on the settings or significance of any designated heritage assets.

13.7.11 In terms of non-designated assets, the Gas Connection lies in an area that is considered to have potential to contain the crop marks of a possible Romano-British settlement (HER4469) and other as yet unrecorded below-ground archaeological features that may be present. The recent archaeological evaluation in the vicinity of the Gas Connection referred to in section 13.6 did not record any correlation between the plotted crop marks and excavated features, suggesting the crop marks were non-archaeological in origin (Appendix 13.1). Consequently, it is considered that any archaeological features located within the Gas Connection will be isolated and fragmentary and no more than low sensitivity and local significance.

13.7.12 The excavation for the trench required to install the Pipeline and its easement will result in the removal of any archaeological features within the extent of the excavation area. Should archaeological features be present within the Gas Connection, they are considered likely to be of no more than low sensitivity and local significance and could be more extensive than the width of the excavation area required for the Pipeline and its easement. Therefore, as non-designated remains within the area will at the worst be only be partially affected, it is considered that at worst if archaeological features are present there will be a moderate magnitude of impact (i.e. partial loss of significance) resulting in a slight adverse effect.

13.7.13 The decommissioning of the Gas Connection is not anticipated to have any effects on designated and non-designated heritage assets as the Pipeline is expected to be left in situ and therefore, there will be no ground works that could impact on archaeological remains. If any of the structures associated with the AGI are removed, there will be no impacts on non-designated assets as the mitigation measures outlined below will have resulted in them being fully excavated and recorded before construction has begun. Consequently, there will be no archaeological features surviving that could be impacted by decommissioning resulting in a neutral effect.

Operation (including maintenance)

13.7.14 Operation of the Gas Connection will not impact on any buried non-designated heritage assets. Given that the Gas Connection will be mainly buried, it will not have any impacts on above ground heritage assets. The AGI will be a relatively small structure, screened by vegetation. The Gas Connection is not located within the setting of any designated heritage assets. Consequently, there will be no impacts on the significance of any designated or non-designated heritage assets resulting in neutral effects.

Electrical Connection

Construction / Decommissioning

13.7.15 The construction / decommissioning of the Electrical Connection will have no physical impacts on any designated heritage assets. The construction and decommissioning of the Electrical Connection will be relatively short lived activity. Although machinery and construction activity may be possible from some of the designated assets, this activity will transitory and also at a distance and therefore will have an extremely limited visual effect which will disappear once the construction/decommissioning works cease. Therefore, there will be no impacts on the settings or significance of any designated heritage assets.

13.7.16 The Electrical Connection is located in an area that is known to contain the remains of a Romano-British settlement at the northern end close to the Rookery South Pit (Appendix 13.1). It is also considered to have potential to contain as yet unrecorded non-designated assets. As any non-designated heritage assets will be of a nature that is relatively common within the area, these remains are considered to be of low sensitivity and of local significance.

13.7.17 The excavation for the trench required to install the Electrical Connection and its easement will result in the removal of any archaeological features within the extent of the excavation area. Where archaeological features are known or suspected to be present within the Electrical Connection, they are considered likely to be of no more than low sensitivity and could be more extensive than the width of the required excavation area. Therefore, as any non-designated remains within the area will at the worst be only be partially affected, it is considered that there will be a moderate magnitude of impact (i.e. partial loss of significance) which will result in a slight adverse effect.

13.7.18 The decommissioning of the Electrical Connection is not anticipated to have any effects on designated and non-designated heritage assets as the underground cables are expected to be left in situ and therefore, there will be no ground works that could impact on archaeological remains.

<u>Operation (including maintenance)</u>

13.7.19 Operation of the Electrical Connection will not impact on any buried non-designated heritage assets. Given that the Electrical Connection will be mainly buried or located within Rookery South Pit, there will not be any impacts on above ground heritage assets. Consequently, there will be no impacts on the significance of any designated or non-designated heritage assets.

13.8 Cumulative and in Combination Effects

Overview

13.8.1 Construction, operation or decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in section 4.10. However, the majority of these developments are distant from the Project Site (greater than 2 km).

13.8.2 These developments and any effects arising from them are outside the area for this topic within which significant effects could occur during construction (e.g. loss of or damage to designated or non-designated assets). As such it is considered that no cumulative or in combination effects are likely to arise on the historic environment during the construction or decommissioning phases of the Project.

13.8.3 Furthermore, each of these developments, which have or will have gone through the planning system, will be bound by its own CEMP and will apply best practice construction methods so as to minimise impacts on the historic environment.

Construction and Decommissioning

13.8.4 The projects considered to be of relevance to the cumulative effects assessment for this chapter (taken from section 4.10) are therefore:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, immediately north of the Generating Equipment Site).

13.8.5 The construction of both the Project and other projects at the same time represents the greatest potential for creating cumulative effects on non-designated heritage assets is therefore judged to be a realistic worst case scenario for cumulatively assessing construction impacts. Any other scenario (e.g. operation of one scheme and constriction of the other) would generate less direct ground disturbance and therefore lower impacts.

13.8.6 Little detail is known about the ‘Integrated Waste Management Facilities’ proposed for development in the Rookery South Pit. At present, a request for a scoping opinion has been submitted by the promoter of the project although no details are provided regarding potential impacts on the historic environment as a result of the project. However, it is likely that this development will be bound by its own CEMP and best practice construction methods so as to limit impacts on the historic environment during construction and decommissioning. Should it go ahead, then it will need to consider the Project to ensure that no significant cumulative effects will arise between it and the Project. Nevertheless, in order to minimise the possibility of cumulative effects arising, a CEMP will be followed during construction of the Project, which will ensure best practice construction methods are followed and limit, as far as practicable, the possibility of impacts occurring to the historic environment, including for example the stopping of work immediately if any heritage assets are found. Furthermore, a WSI will be submitted prior to construction of the Project so as to reveal and record any historic environment assets which may be impacted by the construction of the Gas Connection and Electrical Connection and preserve by recording. This is secured via a requirement in the draft DCO.

13.8.7 Furthermore, given the early stage of the Integrated Waste Management proposals and the likely time required to achieve planning consent, it is considered unlikely that there would be any overlap on the construction periods of these two projects, which further mitigates against any potential cumulative effects.

13.8.8 The ES for the Covanta RRF Project to the north of the Generating Equipment Site concluded that there was the potential for pre-mitigation impacts resulting from construction phase. Given the lack of assets within the Rookery South pit, these potential impacts were limited to excavation works required for the electrical cable connection and tree planting associated with the landscape mitigation proposals.

13.8.9 The potential impacts were limited to (as yet) unknown assets. However, the ES for the Covanta RRF stated that given the limited footprint of predicted disturbance (low adverse), and the likely asset sensitivity of moderate sensitivity (based on previous finds in the area) the predicted (pre-mitigation) effects were likely to be minor adverse.

13.8.10 Mitigation has been proposed as part of the Covanta RRF DCO which includes a programme of archaeological works to be undertaken in line with a written scheme of investigation (WSI). Following the implementation of the WSI there are not likely to be any residual construction / decommissioning effects on heritage assets as a result of the development of the Covanta RRF Project.

13.8.11 There are not anticipated to be any significant effects arising from the construction and de-commissioning of the Project. Additionally, the areas of undisturbed ground which the Covanta RRF Project would be developing would be largely different from those being disturbed by the Project. Therefore, there are not anticipated to be any cumulative or in combination effects with Covanta RRF during construction or decommissioning.

13.8.12 Following the grant of the Rookery South (Resource Recovery Facility) Order 2011 for the Covanta RRF project, Requirement 15 was set out relating to archaeology. Specifically, it states:

(1) "No part of the authorised development may commence until a written scheme of archaeological investigation has been submitted to and approved in writing by the relevant local planning authorities [and]
(2) The archaeological investigation must be carried out in accordance with the approved scheme unless otherwise agreed in writing by the relevant planning authorities".

13.8.13 In January 2017, Headland Archaeology, on behalf of Covanta and Veolia submitted a Written Scheme of Investigation (WSI) to CBC in order to discharge Requirement 15. The WSI sets out a scheme of archaeological investigation to be undertaken prior to construction of the Covanta Project, primarily through a watching brief of construction and groundworks.

Operation (including maintenance)

13.8.14 The operation of both the Project and other projects at the same time represents the greatest potential for creating cumulative effects on designated heritage assets as this has the greatest potential to introduce large structures to the landscape which could affect the setting of designated assets. Therefore this is judged to be a realistic worst case scenario for cumulatively assessing operational impacts. Any other scenario (e.g. operation of one scheme and constriction of the other) would generate less potential for impacts on setting of designated assets.

13.8.15 As above, the projects considered to be of relevance to the cumulative effects assessment for the operation of the Project (taken from section 4.10) are:

- The Integrated Waste Management Facilities at Rookery South Pit; and
- The Covanta RRF Project at Rookery South Pit, immediately north of the Generating Equipment Site).

13.8.16 Little detail is known about the 'Integrated Waste Management Facilities' proposed for development in the Rookery Pit. At present, only a high level scoping opinion has been submitted. No details are proposed regarding potential impacts on the historic environment as a result of the project. The assessment set out in this Chapter has shown no significant effects on the setting of designated assets are anticipated to arise from operation of the Project.

13.8.17 The ES for the Covanta RRF Project considered that there was the potential for significant adverse effects on a total of 16 designated assets, as follows:

- Ampthill Castle;
- Church and Tower of St Mary the Virgin, Marston Moretaine;
- Ampthill Park House
- Church of St. Michael, Millbrook;
- Katherine's Cross
- Stewartby Chimneys and Kilns;
- Stewartby;
- Millbrook;
- Ampthill Park;
- Houghton House;
- Church of All Saints, Houghton Conquest;
- Church of St. Mary the Virgin, Wootton;
- Cardington Sheds;
- Wrest Park; and
- Woburn Park.

13.8.18 However, following further assessment, there was deemed to be no potential impacts on Cardington Sheds, Church of All Saints, Church of St Mary, Church of St Michael, Stewartby, Wrest Park and Woburn Park.

13.8.19 There was deemed to be a 'negligible' magnitude of impact on the remainder of the assets, other than Ampthill Park House, where the magnitude of impact was deemed to be 'low'.

13.8.20 The conclusion reached by the Covanta RRF ES was that these impacts resulted in effects which were 'not significant'.

13.8.21 An assessment has been undertaken of the cumulative operational effects between the Project and the Covanta RRF project on designated heritage assets (including many of those listed above and assessed in the Covanta RRF ES). This is set out in Appendix 13.2 and has predicted only slight adverse effects which are not significant.

13.8.22 The assessment in Appendix 13.2 concludes that the cumulative and combined operational impacts with Covanta would largely be the same nature and magnitude as the Project on its ow.

Effect Interactions

13.8.23 Viewpoints and photomontages selected for the LVIA analysis presented in Chapter 11 have been used to inform the assessment of effects on setting of cultural heritage assets.

13.9 Mitigation and Assessment of Residual Effects

13.9.1 In accordance with national and local planning policies, any potential direct and indirect effects upon heritage assets have been considered from the outset of the Project. Accordingly, the proximity to and potential for direct and indirect effects upon designated and non-designated heritage assets were addressed during the development of the layout of the Project as part of the iterative design and assessment process. Therefore, mitigation is inherent within the final design proposals in order to prevent or reduce direct and indirect impacts and effects on heritage assets.

Power Generation Plant

13.9.2 Due to the lack of impacts and effects on non-designated heritage assets, no mitigation measures are proposed for the Power Generation Plant.

13.9.3 Apart from the iterative design process mentioned in paragraph 13.9.1, no mitigation measures are proposed in relation to the impact on the settings of designated heritage assets within the wider study area. The stack will be experienced from designated assets within the ZTV, as part of a landscape that already contains a number of significant tall industrial structures in the vicinity of the Power Generation Plant (Marston Vale wind turbine and Stewartby chimneys). The height of the stack will appear to be significantly lower than these structures and will not be out of keeping with the existing setting of the designated heritage assets.

Gas & Electrical Connections

13.9.4 A programme of archaeological mitigation will be undertaken on the Gas Connection and Electrical Connection outside of Rookery South Pit during construction, the principles of which have been agreed with the CBC Archaeological Officer during consultations (see Appendix 13.3) (secured via Requirement 9 of the draft DCO (Document Reference 3.1)). Should the DCO be made, a written scheme of investigation (WSI) will be produced and submitted to the CBC Archaeological Officer. This document will define the scope of works and the methods of excavation and recording that will be implemented. The mitigation will comprise of an archaeological strip, map and sample operation during the excavation of the trenches required to install the Pipeline and underground cables as well as the AGI and their associated construction easements. During this process any archaeological features exposed will be hand excavated and recorded according to a sampling strategy set out within the WSI and agreed with the CBC Archaeological Officer. Following completion of the fieldwork, the findings will be assessed, analysed and published in full in an appropriate academic journal. These works will be undertaken in accordance with the CIfA Standards and Guidance for Excavation and/or Standards and Guidance for an Archaeological Watching Brief (CIfA 2014).

13.10 Summary of Residual Effects

13.10.1 Table 13.10 sets out a summary of the significant effects arising from the Project during construction, operation and de-commissioning.

13.10.2 The following elements are reported:

- the affected group or receptor;
- the sensitivity of the affected group/receptor;
- potential effect;
- the likely magnitude and duration of the effect;
- the likelihood of occurrence;
- proposed mitigation or response to ameliorate the effect; and
- the significance of the residual effect following the incorporation of mitigation.

13.10.3 Also reported are any potential effects from the Project as a whole arising on a receptor during each phase, as well as any cumulative effects.

13.10.4 The assessment of the significant effects has used the significance criteria matrices laid out above (Tables 13.2-13.4). This has identified that for a number of designated heritage assets, the effects on their setting are moderate and therefore are significant effects. The detail contained in the assessment in Appendix 13.2 demonstrates that this effect is based on the contribution that the settings make to the significance of the asset in question, rather than the asset's significance itself. In all cases, the significance of the assets themselves are not reduced but there is a minor magnitude of impact (as defined in Table 13.3) to the contribution that the setting makes to the significance. Consequently, the professional judgement of this effect is that as the significance of the assets themselves is largely unaffected, the impact is not significant. Therefore, the significance of effects reported in below in Table 13.10 reports what the assessor considers is a 'true' reflection of the significance of effects taking into consideration professional judgement, rather than strictly following a matrix based approach which would often result in an overestimate of the true significance of effect.

Table 13.10 - Summary of Residual Effects

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Construction phase									
Power Generation Plant	Rookery South Pit	Low	Direct development in the pit	Negligible Local long-term	High	The design of the Project means only a small portion of Rookery South Pit will be used for the Power Generation Plant. .	Slight adverse – not significant	None required	Slight adverse – not significant
Power Generation Plant	Designated Assets (see Appendix 13.2 for more detail)	High	Visual effect on setting	Negligible / Minor District long-term	Medium	Siting Generating Equipment below ground level within Rookery South Pit.	Slight adverse for the majority of designated assets	None specifically required in addition to the proposed landscaping proposal	Slight adverse for the majority of designated assets
Gas Connection	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	Moderate Local Long term	High	.	Slight adverse – not significant	Programme of archaeological evaluation through archaeological strip, map and	Slight adverse – not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
								sample of areas to be excavated outside of Rookery South Pit (secured by DCO Requirement).	
Gas Connection	Designated Assets (see Appendix 13.2 for more detail)	High	None	None	Low	None	None		None
Electrical connection	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	Moderate Local Long term	High		Slight adverse – not significant	Programme of archaeological evaluation through archaeological strip, map and sample of areas to be excavated outside of Rookery South Pit.	Slight adverse – not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Electrical Connection -	designated assets (see Appendix 13.2 for more detail)	High	Direct physical construction impact	None	Low	None	None		None
Project (in combination and synergistic)	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Negligible / Minor District long-term	Medium	None	Slight adverse for the majority of designated assets - not significant	None required	Slight adverse for the majority of designated assets – not significant
Project (in combination and synergistic)	Non-Designated Assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	Moderate Local Long term	High		Slight adverse - not significant	Programme of archaeological evaluation through archaeological strip, map and sample of areas to be excavated outside of Rookery South Pit.	Slight adverse - not significant
Cumulative effects	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Moderate District long-term	Medium	None	Slight adverse for the majority of designated	None required	Slight adverse for the majority of designated

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
							assets - not significant		assets – not significant
Cumulative	Non-Designated Assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	Moderate Local Long term	High	.	Slight adverse – not significant	Programme of archaeological evaluation through archaeological strip, map and sample of areas to be excavated outside of Rookery South Pit.	Slight adverse – not significant
Operation and maintenance									
Power Generation Plant	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Negligible District long-term	Medium	Siting Generating Equipment within Rookery South Pit.	Slight adverse – not significant	None required	Slight adverse – not significant
Power Generation Plant	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
Gas connection	Designated Assets (see Appendix 13.2 for more detail)	High	None	None	Low	None	None	None required	No Impact
Gas Connection	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Electrical Connection	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	None	Low	None	None	None required	No Impact
Electrical connection	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Whole Project in combination	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Negligible District long-term	Medium	Siting Generating Equipment within Rookery South Pit.	Slight adverse – not significant	None required	Slight adverse – not significant
Project	Non-designated assets (see Appendix	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
	13.2 for more detail)								
Cumulative effects	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Moderate District long-term	Medium	Siting Generating Equipment within Rookery South Pit.	Slight adverse for the majority of designated assets – not significant	None required	Slight adverse for the majority of designated assets – not significant
Cumulative	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Decommissioning									
Power generation plant	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Negligible District long-term	Medium	None	Slight beneficial – not significant	None required	Slight beneficial – not significant
Power generation plant	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Gas connection	Designated Assets (see Appendix	High	Effect on setting	Negligible Districtlong-term	Low	None	No impact	None required	No impact

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
	13.2 for more detail)								
Gas connection	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Electrical connection	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Negligible District long-term	Low	None	No impact	None required	No impact
Electrical connection	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Project	Designated Assets (see Appendix 13.2 for more detail)	High	Effect on setting	Negligible District long-term	Low	None	No impact	None required	No impact
Project	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact
Cumulative effects	Designated Assets(see	High	Effect on setting	Moderate	Low	None	No impact	None required	No impact

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor	Effect	Magnitude/ spatial extent Duration	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect
	Appendix 13.2 for more detail)			District long-term					
Cumulative effects	Non-designated assets (see Appendix 13.2 for more detail)	Low	Direct physical construction impact	None	Low	None	None	None required	No Impact

13.11 Conclusions

13.11.1 The potential construction, operational, maintenance and decommissioning impacts of the Project on historic environment have been assessed.

13.11.2 The construction of the Gas and Electrical Connections have the potential to impact on non-designated archaeological heritage assets. These known and potential remains are considered to be of low sensitivity and of local significance. Consultations with the CBC Archaeologist have concluded with an agreement that no-predetermination archaeological evaluation works are necessary and that mitigation strategy that the line of both connections should be stripped archaeologically and that all remains exposed will be excavated and recorded in full. The CBC Archaeologist has confirmed that these works can be undertaken after the DCO has been made provided a pre-commencement requirement is imposed on the DCO. The Applicant is content with this. The decommissioning of the Gas and Electrical Connections will have neutral effects on non-designated heritage assets as any effects would have been mitigated by pre-construction assessments. Additionally, it is likely that large parts of the Gas and Electrical Connections would remain in-situ following decommissioning to limit any environmental effects associated with their removal.

13.11.3 The assessment has shown that the construction and operational stages of the Power Generation Plant will result in no more than a minor adverse impact (once professional judgement is taken into consideration) on the significance of designated heritage assets within the study areas. Due to the elevated positions of many of the designated assets that are affected by the presence of the stack, mitigation measures to reduce this impact, such as landscaping and tree planting beyond that included in the LEMMS (Appendix 11.3), are not feasible as a way of reducing the impact. Furthermore, due to the both the distance from and the presence of a significant number of tall industrial structures in proximity to the Project, the potential effects will be experienced within a context where industrial structures such as Marston Vale wind turbine and the Stewartby Chimneys are already present in the same area. The decommissioning of the Power Generation Plant will remove any slight adverse effects that the earlier stages will have had.

13.11.4 The assessment has established that there will be no cumulative or combined effects on non-designated heritage assets as the known and potential assets that the Project may impact upon will not be impacted upon by any of the other projects in the vicinity of the Project Site.

13.11.5 The assessment has established that there will be no more than a minor cumulative or combined effect on the significance of designated heritage assets.

13.11.6 The assessment in Appendix 13.2 concludes that the cumulative and combined operational impacts with Covanta are the same nature and magnitude as the Project on its own.

13.11.7 The conclusions of this Chapter on Historic Environment are that the construction, operation and maintenance and decommissioning of the Project does not result in any likely significant effects on the historic environment, either when considered alone or cumulatively with other developments

13.12 Assessment of Effects on Historic Features (APFP Regulations 2009)

13.12.1 In addition to the assessment of significant effects, it is also necessary to consider all potential effects on historic features, not just those effects which are significant in EIA terms. This accords with the requirements of Regulation 5(2)(m) of the APFP Regulations (2009).

13.12.2 The Historic Environment Impact Assessment process has determined that there will be neutral to moderate/slight adverse residual effects on the setting of heritage assets within the Study Areas resulting from the construction or operation of the Project. However, applying professional judgement, none of these effects are considered significant. The assets relating to the assessment are presented in Figure 13.1

13.12.3 There is the potential for residual effects on the buried historic assets within the Study Areas. Following a programme of archaeological mitigation prior to construction (secured through DCO Requirement 9), there will be no residual effects on the buried historic assets within the Study Areas.

14 Socio-economics

14.1 Introduction

14.1.1 This Chapter presents the assessment of likely significant effects on the labour market, tourism economy and community infrastructure arising from the construction, operation maintenance and decommissioning of the Project.

14.1.2 The Project has the potential to create socio-economic effects from increased investment in the local economy, increased demand for labour and potentially increased pressure on the area's community infrastructure. The area's tourism economy and recreational assets could also be potentially affected during the construction, operational (including maintenance) and decommissioning phases of the Project. This Chapter also includes an assessment of absorption capacity and accommodation capacity.

14.1.3 This ES Chapter provides an update to the PEIR. A more detailed assessment has resulted in some minor updates throughout this chapter.

14.2 Legislation and Policy Context

14.2.1 The legislation and policy context in relation to socio-economics is described in detail in Appendix 2.14. However, in summary, the following items of policy, legislation and guidance have been considered in preparing this assessment:

- National Policy Statements (NPS) EN1, EN2, EN4 and EN5;
- National Planning Policy Framework, 2012;
- Planning Policy Guidance;
- HM Government's 2012 Gas Generation Strategy, prepared by the Department of Energy & Climate Change (DECC, 2010-2015 Coalition Government) and subsequent announcements from the UK Energy and Climate Change Secretary from 2015[32];
- HM Government's UK Low Carbon Transition Plan: National Strategy for Climate and Energy;
- The Central Bedfordshire Economic Development Plan (November 2011);
- The Central Bedfordshire Core Strategy and Development Management Policies (Adopted November 2009);
- Central Bedfordshire North Local Development Framework (2011);

[32] Also see Business, Energy & Industrial Strategy Committee Report on Leaving the EU: Negotiation Priorities for Energy and Climate Change Policy (2017)

- Central Bedfordshire Council Local Plan 2015 - 2035 – Draft Plan – July 2017;
- Bedford Borough Council Local Plan 2035 – 2017 Consultation;
- Bedford Growth Plan (2014) – Stimulating Economic Growth; and
- Bedford Borough Economic Development Strategy - Shaping Bedford Borough's Economy 2011-2014 (Approved March 2011).

14.3 Consultation

14.3.1 A list of consultation responses received to date relating to the socio-economics Chapter are presented in Table 14.1.

Table 14.1 - Summary of consultation and responses

Reference	Comment	Response
Secretary of State (SoS) Scoping Opinion		
3.93	The SoS recommends that the types of jobs generated should be considered in the context of the available workforce in the area. This applies equally to the construction and operational stages.	Noted. The types of jobs and typical workforce of the area are described in section 14.6
3.94	The SoS recommends that the assessment criteria should be locationally-specific, and consider the potential significance of the impacts of the proposed development within the local and regional context.	The study area is described in section 14.6 and the assessment presented in this chapter (Section 14.7) includes the local and regional context.
Ampthill Town Council		
Scoping Response Letter	Respondent is not convinced that the proposed facility will enhance the local economy as only 15 full time jobs have been identified.	We consider that this will have minor benefits to the local economy, as will the number of construction jobs, as reported in Section 14.7.
	Respondent suggests there will be a detrimental effect on existing property prices, depressing economic activity and undermine the ambition of local communities to develop as tourist destinations.	We do not agree that siting the Project in this location would detrimentally impact the area such that tourists would be put off. In addition, the situation of the Project should not have a detrimental effect on property prices. The Project is sited largely within a former clay pit in order to minimise landscape and visual effects. An assessment of potential tourist related impacts in included in section 14.7 of this Chapter.
Central Bedfordshire Economic Development		

Reference	Comment	Response
Email response to non-statutory consultation on methodology carried out in 2014	The proposed methodology is sound. However, it would be beneficial to ensure that ward data for the affected and neighbouring wards is included to ensure that the local considerations are taken into account. I am particularly keen that you include the impact on tourism business and would support the survey. The use of the business survey is supported. There is a need to liaise with Experience Bedfordshire (our destination management organisation). I would also note that the Council has produced a range of economic information which should be used as a baseline, or at least to allow for consistent comparison.	The socio-economic baseline uses 30, 45 and 60-minute drive-time from the site and therefore takes into account the local area (section 14.6). The business survey addresses the perceived impact on tourism businesses. The survey population was compiled using a range of local tourism websites including the Experience Bedfordshire website The chapter refers to relevant economic information from the website such as policy documents. A range of socio- economic baseline information is included on a drive-time basis (sections 14.6 and 14.7).
Bedford Economic Development		
Email response to non-statutory consultation on methodology carried out in 2014	Generally in agreement with proposals, but felt that the following should also be included: . 1. A statement about the key role that peak-power plants play in energy supply for the country (and therefore locally too); 2. Information about the potential economic role (attracting inward investment – e.g. data centres) of the significant out-of-peak-power generation capacity of the plant.	A statement about the role of the Power Generation Plant is provided in Chapter 1. Peaking plants are required to operate when there is a 'stress event' on the grid. The Generating Equipment will be limited to running 2250 hours in any given year, provided that the 5 year rolling average does not exceed 1,500 hours - so in the majority of instances, it will be running to service peak demand and stress events due to a drop in supply for example, a power plant outage or sudden drop in wind power output.
Bedford Outdoor Access		
Email response to non-statutory consultation on methodology carried out in 2014	We have no comments to add to your assessment and we are happy for you to continue as you have set out.	No action required
Sport England		

Reference	Comment	Response
Email response to non-statutory consultation on methodology carried out in 2014	Sport England does not have any published guidance for undertaking such assessments in relation to assessing sports facilities. The focus of the assessment would be expected to be on what, if any, affects there would be on existing sports facilities in the local area. The assessment should identify existing sports facilities and identify the nature and magnitude of any potential impact on the use of these facilities (e.g. traffic, noise, air quality etc.). in a similar way to other community infrastructure. .	The Project Site does not contain any sporting facilities and it will not generate a need for sports facilities. The chapter identifies any outdoor sports facilities within 5 km of the Power Generation Plant in section 14.6.

14.4 Topic-specific Realistic Worst Case Scenario for Assessment

14.4.1 In respect of socio-economics, the proposed Project parameters (which are described in Chapters 3 and 5) have little bearing on the impact to socio-economics as they will all require the same number of construction, operational (including maintenance) and decommissioning staff and will give rise to the same impacts in terms of LVIA, noise and other amenities.

14.5 Assessment Methodology and Significance Criteria

Assessment Methodology

14.5.1 The assessment follows UK Government guidelines and best practice guidance. The methodology used to estimate impacts follows guidance set out in the HM Treasury's Green Book[33] and Homes and Communities Agency (HCA) Additionality Guide,[34] as well as taking account of the Department for Business Innovation and Skills research on additionality.

14.5.2 The proposed socio-economic and tourism study areas[35] formed part of the consultation on methodology[36]. The study areas are as follows:

- Socio economic study area - The socio-economic assessment is based on drive time catchment areas from the Project.[37] The 'local area' is defined within a 30-minute drive time, 'wider area' within a 45-minute drive time, and 'wider region' within a 60-minute drive time (see Figure 14.1). The 60 minute drive time catchment is the principle study area for labour market

[33] http://www.hm-treasury.gov.uk/d/green_book_complete.pdf
[34] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf
[35] Please note there is no specific socio-economic guidance on methodology. The Methodology used has been developed by PBA over a 10-year period and tested at a number of Public Inquiries for Nationally Significant Infrastructure Projects.
[36] Methodology consultations were separate from the Scoping process consultations
[37] A drive time catchment shows the geographic area that can be accessed by car within a given drive time.

effects. This reflects the outer boundary that a typical workforce is willing to commute within on a daily basis;

- Tourism study area - The tourism/business study area is limited to a 10 km radius of the Project Site (see Figure 14.2) which was based on professional judgement and agreed with consultees (CBC and BBC Economic Development - See Table 14.1). However, some tourism receptors within this radius have been excluded as they are either screened by roads and/or situated in an urban area where visual impacts (which would have one of the largest effects on tourism) are unlikely to be experienced. In particular tourism receptors within the settlements of Milton Keynes and Bedford have been excluded for the following reasons:

  — Milton Keynes: The presence of the M1 to the south-west of the Project Site omits Milton Keynes and settlements such as Aspley Heath as valid areas likely to be affected.

  — Bedford: Bedford is an urbanised environment with significant built infrastructure. Bedford is also severed from the Project Site by the A421 and A6.

- Community Infrastructure study area – As proximity is likely to be the main determinant of impacts and their scale, the status (or catchment) of community facility receptors in an area determines the scale and significance of any effect. The community infrastructure assessment is focussed on the area defined within an approximate 5 km radius from the Project.

Defining the Baseline

14.5.3 Data and information from national, regional and local databases have been reviewed, identifying information gaps and requirements for data gathering e.g. business, accommodation and other surveys.

14.5.4 The study area's socio-economic position has been described using standard indicators. This provides a baseline from which potential impacts and effects can be assessed:

- Socio-economic/ labour market: the area has been defined using a combination of: standard sources[38] and indicators[39]; research available at study area level; and research into the business and labour market structure of the local economy (details of the indicators are provided in section 14.6);
- Tourism economy: the area's visitor attraction has been profiled[40] including:

[38] Census 2001 and 2011 data
[39] Population, economic activity, skills, education, availability of relevant workforce
[40] Visit England

visitor attractions; visitor accommodation; tourism volume and value; and the local tourism economy (see Figure 14.3);

- Community Infrastructure: An audit of community infrastructure including GP facilities, education facilities, recreation facilities, pharmacies and dentists has been prepared[41] (see Figures 14.4-14.7); and
- Policy Context: planning, economic development and other relevant policy has been reviewed to identify related economic, social and regeneration objectives which the Project may affect (whether contributing to their realisation or otherwise).

Assessment of Socio-economic Effects

Employment and Gross Value Added

14.5.5 A detailed assessment of likely significant effects on the local, regional and national economy during construction, operation and decommissioning of the Project has been prepared. This assesses the scale of:

- Direct economic impacts: jobs and Gross Value Added (GVA)[42] that are wholly or largely related to construction, operation and decommissioning of the Project;
- Indirect economic impacts (beneficial and adverse): jobs and GVA generated in the study area in the chain of suppliers of goods and services to the direct activities;
- Induced economic impacts: jobs and GVA created by direct and indirect employees' spending in the study area or in the wider economy; and
- Wider economic (catalytic) impacts (beneficial and adverse): employment and income generated in the economy related to the wider role of the Project in influencing economic activities (including wider socio-economic effects).

14.5.6 For economic impacts and effects (including employment), the availability of labour and skills is critical in accommodating the demands, needs and requirements of the Project. Adequate capacity results in a low sensitivity while a shortfall or constrained capacity results in a high sensitivity.

14.5.7 The key socio-economic indicators for the study area include:

- The proportion of skilled workforce in the study area relative to national averages;
- Educational attainment levels compared with national averages;

[41] Community Infrastructure facilities and capacity were identified using: http://www.nhs.uk/Pages/HomePage.aspx

[42] Gross value added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy

- The proportion of employment in relevant sectors (i.e. manufacturing and construction workers) in the study area;
- The availability of labour (including the unemployed workforce); and
- Relevant education and training provision, including existing and proposed programmes provided by institutions serving the study area.

Absorption and Accommodation Capacity

14.5.8 An assessment has been undertaken of accommodation capacity and absorption capacity; the methodology differs from the approach taken for the above as it does not use sensitivity and magnitude criteria, and therefore cannot be categorised in terms of likely significant effects as has been done for other aspects of the assessment.

14.5.9 The assessment of accommodation capacity and absorption capacity is an important indicator of the availability of bedrooms and labour, used to inform potential effects. The assessment approach therefore relies upon demonstrating adequate capacity as opposed to assessing significant effects. This is considered to be an appropriate method[43] and is consistent with the approach used for other consented nationally significant infrastructure projects. There is no Guidance for assessing accommodation and absorption capacity effects. PBA has developed this approach as part of our standard assessment methodology for DCO projects. Many of which have been successfully tested at public inquires and hearings.

14.5.10 The assessment of accommodation capacity and absorption capacity is presented in section 14.8 alongside the assessment of effects on employment and GVA.

<u>Assessment of Tourism and Recreation</u>

14.5.11 Tourism and recreational behaviour will only be detrimentally affected where the effects of the Project either change the visitor/user pattern in terms of numbers, and/or their patterns of expenditure for the worse. As such, opportunities for tourist and visitor expenditure, any potential variation in expenditure or visitor numbers, and consequent effects on turnover or employment are of key importance.

14.5.12 A business survey was carried out in late 2014 to gain a more detailed understanding of the local tourism economy, its current performance and views on the Project's perceived impact on their business and the wider tourism economy. The business survey forms part of a suite of information that provides baseline information and provides potential explanations for

[43] Demonstrating adequate capacity (or otherwise) provides a proportionate and comprehensible assessment of these factors.

'perceived' business impacts (i.e. visual, noise, traffic, air quality). The validity of these perceived impacts are then investigated using the findings of the relevant ES Chapters to determine the assessed effect.

14.5.13 The baseline assessment undertaken as part of this ES (e.g. review of population, age structure, qualifications (see section 14.6)) demonstrates the socio-economic and tourism profile are broadly comparable to the conditions in 2014. Therefore, the findings and results of the business survey are still considered to be relevant to the assessment of the Project and have been included in this ES to provide further evidence on local tourism dynamics, performance and the perceived impact of the Project.

14.5.14 Businesses contacted include key visitor accommodation providers, leisure activity providers and other relevant tourism businesses.

14.5.15 The survey sought respondents' perceptions of the likely potential impacts of the Project on their business performance (turnover/customer base) and on tourism in the wider Bedfordshire area. Impacts were categorised as follows:

- Low Impact = <10 %;
- Medium Impact = 10-15 %; and
- High Impact =>15 %.

14.5.16 The definitions of perceived impact (both beneficial and adverse) are based on market experience. In tourism related business surveys across the UK, respondents have generally stated that reductions in turnover of in excess of 15% are critical to business sustainability/survival, while reductions of 10%-15% represent a moderate impact which can be recouped through marketing, cost saving and similar market responses. Reductions of less than 10% are seen as being within the parameters of general changes in trading conditions.

14.5.17 Visitor and recreational facilities in the study area have been identified. Based on the Project's anticipated visibility, the assessment reports on the likelihood of the Project influencing visitor and tourist attitudes and behaviour towards them.

14.5.18 The significance of effects on tourism is assessed by reference to the sensitivity of the receptor and the anticipated magnitude of impact. The criteria for sensitivity and magnitude of impact are defined in the Significance Criteria section below (Tables 14.2 – 14.8).

14.5.19 In considering the level of tourism sensitivity, the standing of the receptor or resource is the defining factor. This is established against:

- Tourism business' relative attraction to customers from outside the study area and the Project's potential to influence broader perceptions of the area. Where a majority of trade is non-local this is more likely to be the case; and
- The relative importance of tourism as a business sector. Where tourism is more important relative to other sectors, impacts may have the potential to

generate broader impacts. Similarly, where it is of relatively low significance, impacts on tourism and related sectors are unlikely to generate a high level of adverse impact across the broader economy.

Assessment of Community Infrastructure Effects

14.5.20 An assessment of the likely significant effects on local, regional and national community receptors during construction, operation and decommissioning of the Project have been carried out. This assessment includes an audit of community infrastructure facilities/receptors within the local area and its associated effects

14.5.21 When considering the level of sensitivity of community infrastructure, the standing / status of the community receptor is the defining factor. Facilities with a national or international status have the ability to draw in more people from outside the study area and hence are more sensitive to impact. Conversely, where the receptor is of relatively low significance i.e. local facilities, the impacts are unlikely to generate a high level of adverse impact across the study area.

Significance Criteria

14.5.22 The significance of effect is defined by the combination of the sensitivity of receptors and the magnitude of impacts upon them. The criteria set out below are specific to socio-economic factors and have been adopted to assess receptor sensitivity and impact magnitude. They therefore differ from those listed in Tables 4.1 to 4.3 of this ES.

Socio-economic significance criteria

14.5.23 The following criteria have been set to assess the effects on socio-economic receptors in relation to employment and GVA. As noted in paragraph 14.5.9 these criteria have not been used in assessing absorption capacity or accommodation capacity as the methodology is not applicable to those aspects.

14.5.24 Table 14.2 identifies the sensitivity of socio-economic receptors.

Table 14.2 Socio-Economic Sensitivity Criteria

Sensitivity	Example
Very High	The area has a shortfall of appropriate labour and skills. The Project would lead to excessive labour market pressure and distortions (i.e. skills and capacity shortages, import of labour, wage inflation).
High	The area has constrained supply of labour and skills. The Project would lead to labour market pressure and distortions (i.e. skills and capacity shortages, import of labour, wage inflation).
Medium	The area has a low/ limited supply of labour and skills. The Project could lead to labour market pressure or distortions.
Low	The receptor has a readily available labour force. The Project is unlikely to lead to labour market pressure or distortions.
Negligible	The area has a surplus of readily available labour with directly relevant and transferable skills. The Project will not lead to labour market pressure or distortions.

14.5.25 The magnitude of the impact of likely socio-economic impacts is assessed against the thresholds shown in Table 14.3.

Table 14.3 Socio-Economics Magnitude Criteria

Magnitude	Adverse/ Beneficial	Example
Major	Adverse	Effects would be observed on an international, national or regional scale; where the number of jobs lost in the Study Area would be greater than 250 (based upon the EU definition of small and medium enterprises[44]). and/or Effects would be of long-term duration (i.e. greater than five years).
	Beneficial	Effects would be observed on an international, national or regional scale; where the number of jobs created in the Study Area would be greater than 250 (based upon EU definition of small and medium enterprises). and/or Effects would be of long-term duration (i.e. greater than five years).
Moderate	Adverse	Noticeable effects would arise that may be judged to be important at a local scale, either because there are large effects on few receptors or smaller effects on a larger proportion of receptors; where the number of jobs lost in the Study Area would be greater than 50, but fewer than 250. and/or Effects would be medium-term (i.e. 3-5 years).
	Beneficial	Noticeable effects would arise that may be judged to be important at a local scale, either because there are large effects on few receptors or smaller effects on a larger proportion of receptors; where the number of jobs created in the Study Area would be greater than 50, but fewer than 250. and/or Effects would be medium-term (i.e. 3-5 years).

[44] http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

Magnitude	Adverse/ Beneficial	Example
Minor	Adverse	Small scale effects would arise, with a limited number of affected receptors; and/or where the number of jobs lost in the Study Area would be greater than 10, but fewer than 50. and/or Effects would be short-term (i.e. 1-2 years).
	Beneficial	Small scale effects would arise, with a limited number of affected receptors; and/or where the number of jobs created in the Study Area would be greater than 10, but fewer than 50. and/or Effects would be short-term (i.e. 1-2 years).
Negligible	Adverse	Very minor loss (e.g. less than 10 jobs lost) or very short term (less than 6 months)
	Beneficial	Very minor benefit (e.g. less than 10 jobs created) (less than 6 months)
No Change		No change would be perceptible, either beneficial or adverse.

<u>Tourism significance criteria</u>

14.5.26 The main factors relevant to determining tourism sensitivity are outlined below in Table 14.4 and are based on professional judgement and experience assessing other similar projects.

Table 14.4 Tourism Receptor Sensitivity Criteria

Sensitivity	Example
Very High	International status and/or high visitor numbers.
High	National status and/or high visitor numbers.
Medium	Regional status and/or medium visitor numbers.
Low	Local status and/or few visitor numbers.
Negligible	Sub local and/or minimal numbers.

14.5.27 The magnitude of impact is gauged by using professional judgement to estimate the amount of change to the receptor arising from the Project. It is evaluated in line with the criteria set out below in Table 14.5.

Table 14.5 Tourism Magnitude of Impact Criteria

Magnitude	Adverse/ Beneficial	Example
Major	Adverse	A permanent or long term adverse impact on the value of receptor.
	Beneficial	Large scale or major improvement of the facilities quality; extensive restoration or enhancement; major improvement of receptor quality.
Moderate	Adverse	An adverse impact on the value of receptor, but recovery is possible in the medium term and no permanent impacts are predicted.
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements or improvement of receptors quality.
Minor	Adverse	An adverse impact on the value of receptor, but recovery is expected in the short- term and there would be no impact on its integrity.
	Beneficial	Minor benefit to, or addition of key characteristics, features or elements; some beneficial impact on receptor.
Negligible	Adverse	Very minor loss
	Beneficial	Very minor benefit
No Change		No change would be perceptible, either beneficial or adverse

Community Infrastructure significance criteria

14.5.28 In considering the level of community infrastructure sensitivity, the area served by the facility or that from which people travel to access it is the defining factor (Table 14.6).

Table 14.6 Community Infrastructure Receptor Sensitivity Criteria

Sensitivity	Example
Very High	Facility is of international importance e.g. Major research or academic centre
High	Facility is of national importance e.g. University, Centre of Excellence for health care
Medium	Facility is of regional importance e.g. hospital.
Low (or lower)/Negligible	Facility is of local importance e.g. GP facility, local schools, community centre

14.5.29 The magnitude of impact on community infrastructure is gauged by estimating the amount of change on the receptor arising from the Project. The magnitude of change is evaluated in line with the criteria below (Table 14.7).

Table 14.7 Community Infrastructure Magnitude of Impact Criteria

Magnitude		Example
Major	Adverse	A permanent or long term adverse impact on the integrity and value of a facility
	Beneficial	Large scale or major improvement of the facilities quality; extensive restoration or enhancement; major improvement of facilities quality.
Moderate	Adverse	An adverse impact on the value of a facility, but recovery is possible in the medium term and no permanent impacts are predicted.
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements or improvement of a facilities quality.
Minor	Adverse	An adverse impact on the value of a facility, but recovery is expected in the short- term and there would be no impact on its integrity.
	Beneficial	Minor benefit to, or addition of key characteristics, features or elements; some beneficial impact on attribute or a reduction in the risk of a negative impact occurring.
Negligible	Adverse	Very minor loss
	Beneficial	Very minor benefit
No Change		No change would be perceptible, either beneficial or adverse.

Significance of Effect

14.5.30 In line with standard EIA practice, the sensitivity of receptors as defined in the tables above (Table 14.2, Table 14.4 and Table 14.6) are considered against the magnitude of impact (Table 14.3, Table 14.5 and Table 14.7) to determine the significance of effect (Table 14.8).

Table 14.8 Significance of Effect

<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="5">Magnitude of Impact</th></tr>
<tr><th>No Change</th><th>Negligible</th><th>Minor</th><th>Moderate</th><th>Major</th></tr>
<tr><th rowspan="5">Receptor Sensitivity</th><th>Very High</th><td>Neutral</td><td>Slight</td><td>Moderate</td><td>Large</td><td>Very Large</td></tr>
<tr><th>High</th><td>Neutral</td><td>Slight</td><td>Moderate</td><td>Large</td><td>Large</td></tr>
<tr><th>Medium</th><td>Neutral</td><td>Slight</td><td>Slight</td><td>Moderate</td><td>Large</td></tr>
<tr><th>Low</th><td>Neutral</td><td>Slight</td><td>Slight</td><td>Slight</td><td>Moderate</td></tr>
<tr><th>Negligible</th><td>Neutral</td><td>Neutral</td><td>Neutral</td><td>Neutral</td><td>Neutral</td></tr>
</table>

14.5.31 Effects which are moderate, large or very large are considered to be significant.

14.6 Baseline Conditions and Receptors

Socio-economic Baseline

14.6.1 This socio-economic profile examines the key indicators and measures of socio-economic activity in the Study Area which is divided into the following tiers:

- ‘Local area’ defined within a 30-minute drive time;
- ‘Wider area’ defined within a 45-minute drive time; and
- ‘Wider region’ defined within a 60-minute drive time (Main Labour Market Study Area).

14.6.2 A 60-minute drive time catchment is considered to be a reasonably accurate reflection of the areas labour market based on the distance that commuters are typically willing to travel on a daily basis. It is likely the majority of operational and construction employment will be sourced from this ‘wider region 60-minute drive time catchment.’

14.6.3 Smaller local and wider area catchments are provided to ensure more localised issues are reflected in the baseline. These smaller study areas are also used in the impact assessment to model the effects of sourcing the projects labour supply from smaller labour market areas.

Population

14.6.4 The local area, wider area and wider region has experienced relatively significant population increases since 2001, a trend which is expected to continue over the coming years to 2035. Over the same period the population of the UK has increased and is also projected to increase but at a lesser rate.

14.6.5 Table 14.9 below sets out the population statistics in the vicinity of the Project Site.

Table 14.9 Population

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Population (2001)	517,198	1,454,451	3,004,065	59,113,045
Population (2017)	614,428	1,724,187	3,527,588	66,118,137
Population (2035)	727,696	2,018,988	4,109,762	73,152,330
% change				
2001-2017	18.8%	18.5%	17.4%	11.9%
2017-2035	18.4%	17.1%	16.5%	10.6%

Source: Experian 2017

Age Structure

14.6.6 The local area has a declining proportion of working age people and an increasing dependency ratio[45] which is likely to put additional pressure on services in the area. By 2035 over a fifth of the local area's population is expected to be of retirement age. This is greater than the projected UK averages.

14.6.7 Table 14.10 below sets out the age structure in the vicinity of the Project Site.

Table 14.10 Age Structure

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
2001				
Children (0-15)	44%	42%	41%	20%

[45] The dependency ratio (or proportion of working age people) is significant as it measures the relationship between the productive element of a population and the economically dependent

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Working age (16-64)	45%	46%	46%	64%
Retirement age (65+)	11%	12%	13%	16%
2017				
Children (0-15)	21%	20%	20%	19%
Working age (16-64)	64%	64%	64%	64%
Retirement age (65+)	15%	16%	16%	18%
2035				
Children (0-15)	34%	33%	33%	19%
Working age (16-64)	45%	45%	45%	62%
Retirement age (65+)	22%	22%	23%	19%

Source: Experian 2017

Economic Activity

14.6.8 The economic activity rate is a useful measure of the labour market opportunities available in the area[46]. The local area's level of economic activity is considerably higher than the national average and is summarised below in Table 14.11.

Table 14.11 Economic Activity

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Total people (16-74)	413,190	1,163,199	2,398,089	46,410,512
Economically Active	73.84%	74.03%	73.25%	69.53%
Economically Inactive	26.16%	25.97%	26.75%	30.47%

Source: Experian 2017

14.6.9 The local area is characterised by marginally higher levels of unemployment compared to the wider area and region. The level of unemployment is however broadly comparable to the UK average. The local area, wider area and wider region have slightly higher proportions of self-employed people which may indicate a more dynamic entrepreneurial workforce. This is summarised in Table 14.12.

[46] The economic activity rate measures the percentage of the population, both in employment and unemployed that represent the labour supply regardless of their labour status. The figure represents the degree of success of the area in engaging people in productive activity.

Table 14.12 Economic Activity by Type

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Economically Active				
Employee	18%	18%	18%	20%
Self-employed with employees	10%	11%	11%	12%
Self-employed w/out employees	6%	6%	5%	5%
Unemployed	4%	5%	5%	4%
Economically Inactive				
Retired	18%	17%	21%	19%
Student (economically inactive)	17%	18%	17%	14%
Looking after home/family	12%	11%	11%	14%
Permanently sick/disabled	8%	7%	7%	7%
Other economically inactive	10%	11%	11%	12%

Source: Experian 2017

Employment Structure

14.6.10 Retail related occupations are the main employment category in the local area, with a higher proportion than the UK average. Employment in health and social work is lower than the UK average. Employment in construction and manufacturing is at the same level as the UK average. This is summarised in Table 14.13.

Table 14.13 Employment Structure

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Agriculture, forestry and fishing	0%	0%	0%	1%
Mining and quarrying	0%	0%	0%	0%
Manufacturing	9%	9%	8%	9%
Electricity, gas, steam and air conditioning supply	0%	0%	0%	1%
Water supply; sewerage, waste mgt. and remediation	1%	1%	1%	1%
Construction	8%	8%	8%	8%
Wholesale and retail; repair of motor cycles and vehicles	18%	18%	17%	16%
Transport and storage	6%	6%	5%	5%
Accommodation and food service activities	4%	4%	4%	6%

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Information and communication	5%	5%	5%	4%
Financial and insurance activities	4%	4%	4%	4%
Real estate activities	1%	1%	2%	1%
Professional, scientific and technical activities	6%	7%	8%	6%
Administrative and support service activities	5%	5%	5%	5%
Public administration, defence, compulsory social security	6%	5%	5%	6%
Education	11%	10%	11%	10%
Human health and social work activities	11%	11%	11%	13%
Industry: Other	5%	5%	5%	5%

Source: Experian 2017

Social Grade/ Skills

14.6.11 National Readership Survey (NRS) social grades are a system of demographic classification widely used in market research[47]. Compared to the UK average the local area has a higher proportion of people in the highest social grades (AB) and second highest (C1) grade. It also has a lower proportion of people in lowest social grades (DE) compared to the national average. The wider area and wider region have higher proportions of people in the highest social grade (AB), than that of the local area and UK average. This is summarised in Table 14.14.

Table 14.14 National Readership Survey (NRS) Social Grade

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
AB - High/intermediate manager/admin/professional	25%	26%	27%	22%
C1 - Supervisor/clerical/junior manager/admin/professional	32%	32%	32%	31%
C2 - Skilled manual	20%	20%	20%	21%

[47] Originally developed by the National Readership Survey (NRS). Now used by many other organisations for wider applications and a standard for market research.

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
DE - Semi-skilled/unskilled manual/State benefit / unemployed/ lowest grade	23%	22%	21%	26%

Source: Experian 2017

Qualifications

14.6.12 The local area's educational attainment rate is generally comparable to UK levels, with a lower proportion of people achieving no qualifications and a higher proportion achieving level 1 and 2 qualifications. This is summarised in Table 14.15.

Table 14.15 Qualifications[48]

	Study Area			Comparator
	Local Area	Wider Area	Wider Region	United Kingdom
Level 4 qualifications and above	27%	28%	30%	27%
Level 3 qualifications	12%	12%	12%	12%
Apprenticeship	4%	4%	3%	3%
Level 2 qualifications	16%	16%	15%	15%
Level 1 qualifications	15%	15%	14%	14%
Other qualifications	6%	6%	6%	5%
No qualifications	20%	20%	19%	23%

Source: Experian 2017, Census 2011

Summary

14.6.13 The socio-economic study area[49] surrounding the Project is characterised by:

[48] Level 1: qualifications cover: 1+'O' level passes; 1+ CSE/GCSE any grades; NVQ level 1; or Foundation level GNVQ.
Level 2: qualifications cover: 5+'O' level passes; 5+ CSE (grade 1's); 5+GCSEs (grades A-C); School Certificate; 1+'A' levels/'AS' levels; NVQ level 2; or Intermediate GNVQ.
Level 3: qualifications cover: 2+ 'A' levels; 4+ 'AS' levels; Higher School Certificate; NVQ level 3; or Advanced GNVQ.
Level 4: Qualifications cover: First Degree, Higher Degree, NVQ levels 4 and 5; HNC; HND; Qualified Teacher Status; Qualified Medical Doctor; Qualified Dentist; Qualified Nurse; Midwife; or Health Visitor.
[49] Defined as the area with a 60-minute drive time

- An increasing population between 2001 and 2017 which is c.7.1% higher than the UK average;
- An increasing population between 2017 and 2035 which is c. 8.2% higher than the UK average;
- A rapidly growing retirement age population;
- An economic activity rate higher than the UK average;
- Slightly higher levels of unemployment comparable to the UK average;
- A comparable proportion of people working in the manufacturing and construction sector;
- Higher than UK average proportion of people in highly skilled jobs and lower proportion of people employed in semi-skilled/unskilled jobs;
- Low proportion of people with no qualifications; and
- High proportion of people achieving the highest qualifications comparable to the UK average.

14.6.14 The socio-economic study area exhibits some characteristics consistent with a low sensitivity labour market (i.e. readily available skilled labour, increasing population, above average economic activity, high educational attainment). This suggests that the Project will not lead to any undue labour market pressure or distortions (i.e. wage inflation, skills and capacity shortages, import of labour).

14.6.15 The overall sensitivity of the labour market is assessed as low.[50]

Tourism Baseline

Tourism

14.6.16 Tourism volume and value indicators such as domestic tourist trips, bed-nights and spending in Central Bedfordshire have generally mirrored regional and national trends since 2006. Central Bedfordshire has however experienced much greater variation between periods.

14.6.17 Tourism volume and value in Central Bedfordshire recovered strongly during the period 2011-13 but has decreased slightly to 2013-2015. It now accounts for approximately one third of Bedfordshire's tourism economy. Previously Central Bedfordshire accounted for approximately a quarter of Bedfordshire's tourism volume and value. Tourist trips and bed-nights are now just above 2006 levels.

[50] The socio-economic study area exhibits some characteristics consistent with a low sensitivity labour market (i.e. readily available skilled labour, increasing population, above average economic activity, high educational attainment)

14.6.18 On average 194,000 trips were taken to Central Bedfordshire between 2013-15 which equated to 500,000 bed -nights. The annual value of these trips was £29 million. This is summarised in Table 14.16.

Table 14.16 Tourism Volume and Value in Central Bedfordshire, Bedfordshire and England 2006-2008 to 2013-2015

	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015
Trips (Thousands)								
Central Bedfordshire	171	147	141	134	204	217	214	194
Bedfordshire Total	675	591	517	575	649	697	640	649
England	98,265	98,724	97,516	100,682	101,418	103,500	99,604	99,028
C. Bed. As % of Bed. total	25%	25%	27%	23%	31%	31%	33%	30%
Nights (Thousands)								
Central Bedfordshire	507	704	544	358	507	506	500	500
Bedfordshire Total	1735	1734	1518	1350	1501	1607	1493	1512
England	301,044	302,767	296,377	300,915	300,922	304,912	293,391	289,850
C. Bed. As % of Bed. Total	29%	41%	36%	27%	34%	31%	33%	33%
Spend (£million)								
Central Bedfordshire	13	13	12	18	29	32	31	29
Bedfordshire Total	67	65	56	65	81	94	98	99
England	16,044	16,414	16,314	16,924	17,751	18,707	18,763	18,788
C. Bed. As % of Bed. Total	19%	20%	21%	28%	36%	34%	32%	29%

Source: VisitBritain Destination Specific Statistics, 2015 (most recent available data as at August 2017)

14.6.19 Visitor numbers to Bedfordshire and Central Bedfordshire visitor attractions have generally increased in recent years. Central Bedfordshire has two attractions in the top 20 free attractions – being the Marston Vale Millennium Country Park and RSPB The Lodge Nature Reserve - and one attraction in the top 20 paid tourist attractions in the East of England. Top attractions in Central Bedfordshire include the Chicksands Priory, Wrest Park, and RSPB The Lodge Nature Reserve.[51] ZSL Whipsnade Zoo located in Central

Bedfordshire was listed as most second most popular paid visitor attraction in the East of England[52].

Table 14.17 Top Paid and Unpaid Tourists Attractions in Bedfordshire

Source: Visit England 2017 (most recent available data as at August 2017)

Attraction	Type	2011	2012	2013	2014	2015	2016
Free							
The Marston Vale Millennium Country Park (Central Bedfordshire)	Nature Reserve/ Wetlands/ Wildlife Trips	n/a	n/a	160,223	n/a	n/a	n/a
RSPB The Lodge Nature Reserve (Central Bedfordshire)	Nature Reserve/ Wetlands/ Wildlife Trips	46,000	46,000	49,000	50,000	60,000	62,000
Wardown Park Museum (Luton)	Museum and/ or Art Gallery	61,611	41,730	42,407	n/a	n/a	n/a
Paid							
ZSL Whipsnade Zoo (Central Bedfordshire)	Safari Park/ Zoo/ Aquarium/ Aviary	502,785	544,236	620,762	696,750	663,424	672,851
Woburn Abbey and Park (Central Bedfordshire)	Other Historic Property	70,075	67,160	68,920	55,647	n/a	n/a
Summerfields Miniature Railway (Bedford)	Other	3,000	2,500	2,500	n/a	n/a	n/a
Go Ape! Tree Top Adventure - Woburn Safari Park (Central Bedfordshire)	Safari Park/Zoo/ Aquarium/ Aviary	15,177	12,879	13,476	16,075	17,181	17,016
Wrest Park (Central Bedfordshire)	Historic House/ Palace	89,648	96,247	108,904	107,256	108,761	124,305

14.6.20 Visitor trips, bed-nights, spending and visitor numbers to key attractions are increasing. The Marston Vale Millennium Country Park is located within close proximity of the Project Site and was the top free attraction in Bedfordshire in 2013 (see Table 14.17 above). In addition, another visitor attraction - Houghton House (operated by English Heritage) is located approximately 1 km from the Project Site which is also included in the business survey. National Cycle Route 51 runs to the east of the Project Site. It is a long distance route (214 miles) which connects major cities in the south of England. The tourist attractions below are also shown on Figure 14.8.

14.6.21 Tourism and recreation receptors have been identified in the study area. Source: Visit England 2017 (most recent available data as at August 2017)

14.6.22 The sensitivity of key tourism/recreation receptors is shown in Table 14.18 below shows the assessed sensitivity of each tourism/recreation receptor. A map showing the location of each receptor is also provided in Figure 14.3. We do not anticipate that the results of the assessment will differ significantly, given the lack of change to baseline conditions (according to the updated baseline assessment presented above).

Table 14.18 Tourism Sensitivity

Receptor	Sensitivity	Reason
Visitor Attractions		
The Forest Centre and Millennium Country Park	Medium	The attraction is of regional significance.
Houghton House	Low	The attraction is of local significance
Wrest Park	Medium	The attraction is of regional significance
Bird of Prey Centre	Low	The attraction is of local significance
De Grey Mausoleum	Low	The attraction is of local significance
Summerfields Miniature Railway	Low	The attraction is of local significance
Cycle Route/Promoted Paths		
National Cycle Route 51	High	The route is of national significance.
Forest Centre to Bedford via Shocott Spring	Low	The path is of local significance
The Clay Way: Forest Centre to Bromham Mill	Low	The path is of local significance

Receptor	Sensitivity	Reason
Forest Centre to Centre Parcs via Lidlington and Millbrook	Low	The path is of local significance
Forest Centre to Cranfield	Low	The path is of local significance
Optional Loop via Bourne End, Wootton	Low	The path is of local significance
Forest Centre to Lidlington & Folly Wood	Low	The path is of local significance
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low	The path is of local significance
Forest Centre to Gateway Woods	Low	The path is of local significance
The John Bunyan Trail	Medium	The path is of local regional significance
The Marston Jubilee Walk	Low	The path is of local significance
Timberland Trail	Low	The path is of local significance
Cranfield Hulcote Salford Circular Walk	Low	The path is of local significance
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Low	The path is of local significance

Findings of the Business Survey

14.6.23 This following analysis summarises the key findings from the local tourism business survey carried out during November and December 2014 to identify baseline information and the perceived impact of the project. The baseline assessment above indicates little change in the areas socio-economic and tourism and economy since 2014. The business survey results are therefore considered to remain relevant to include within this ES.

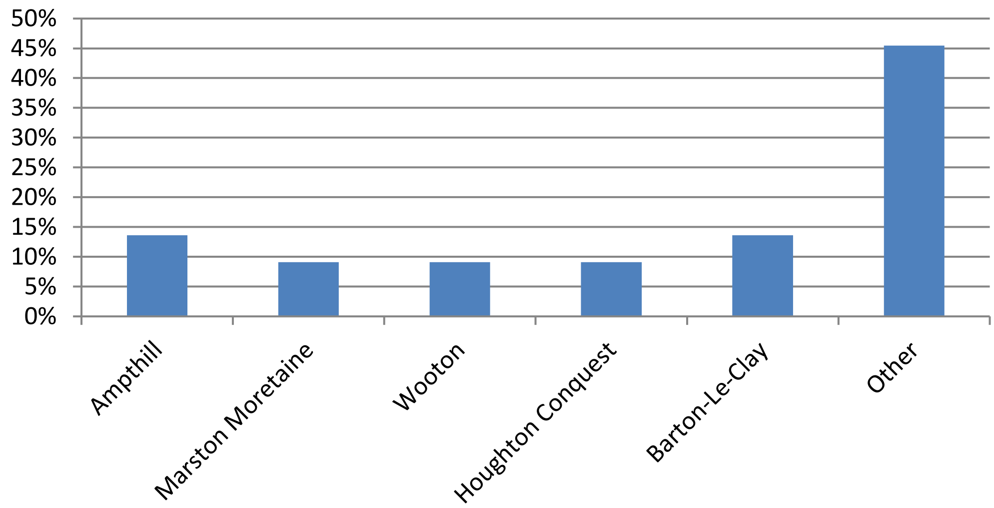
14.6.24 The survey population included all businesses which could be considered to derive a large part or all of their trade from tourism within the defined study area[53]. This primarily included businesses in accommodation & food services and leisure activities. The study area was selected as it was considered unlikely that tourism businesses located outside this would experience either beneficial or adverse impacts. The analysis provides a detailed understanding of the likely potential impacts perceived by businesses as a result of the Project. Businesses were identified through internet searches of local business listings, council websites and destination management organisations.

14.6.25 The survey had a response rate of 26%.[54]

Location of respondents

14.6.26 There was a wide geographical range of respondents throughout the Study Area as shown in Insert 14.1. Around 30% of respondents were from either Ampthill or Barton-Le-Clay.

Insert 14.1 Geographic Breakdown of Respondents (2014)



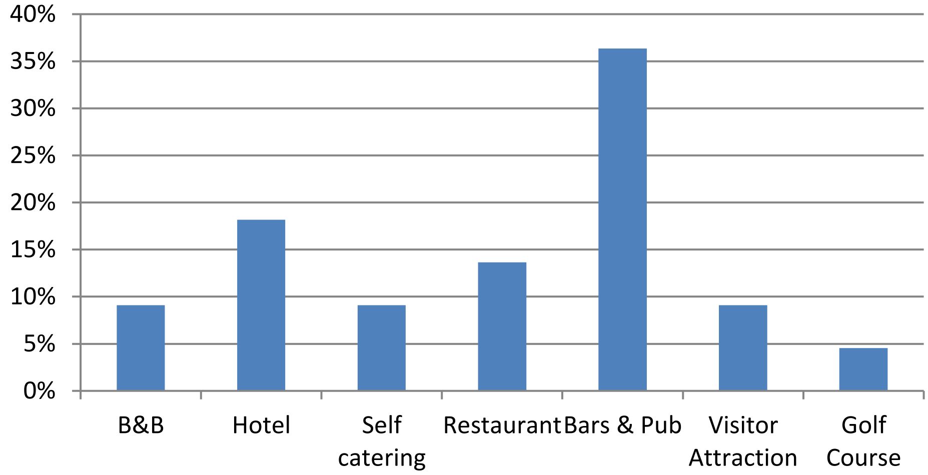
Type of business

14.6.27 The highest proportion of respondents were from bar and pub owners as shown in Insert 14.2. Accommodation providers accounted for over a third of responses.

[53] Business types include: Accommodation providers, visitor attractions, recreational businesses. Pubs/bars and restaurants. Please see Figure 14.2

[54] 22 responses from 84 businesses. Some respondents were unwilling or too time constrained to answer all the survey questions. All respondents answered the question on perceived impact.

Insert 14.2 Type of Business



Number of bed spaces

14.6.28 Seven of the accommodation providers gave details of the number of bed spaces, with over half of respondents having between 10-35 bed spaces. This indicates that a number of accommodation respondents are small/medium scale accommodation providers.

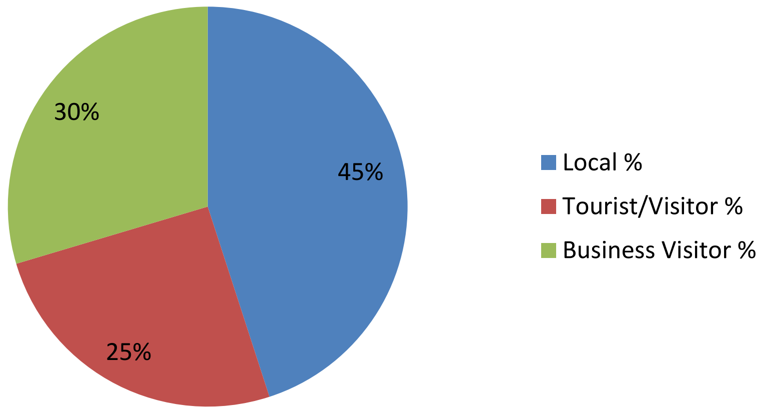
Number of Employees

14.6.29 Of the eight businesses that responded to this question five had 20 employees or more. The average number of employees was 28, indicating the majority of businesses are small/medium scale.

Customer base

14.6.30 Nearly half of the respondents' trade comes from local customers. A high proportion of trade (30%) is from business visitors. The smallest proportion of trade comes from tourists and leisure visitors. This is summarised in Insert 14.3. This suggests that businesses are less reliant on tourist/visitor trade within the study area.

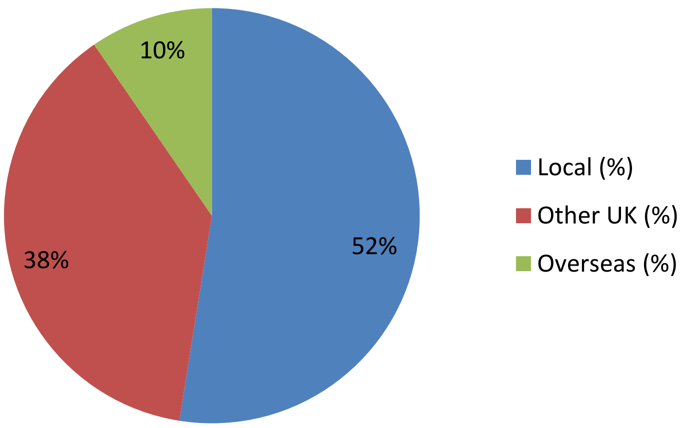
Insert 14.3 Type of customer



Visitor Origin – Aggregated locations of each Businesses' Customer Case

14.6.31 Over half of customers to respondent businesses are from the local area. Over a third are from other parts of the UK and the remaining 10% are from overseas visitors as shown in Insert 14.4.

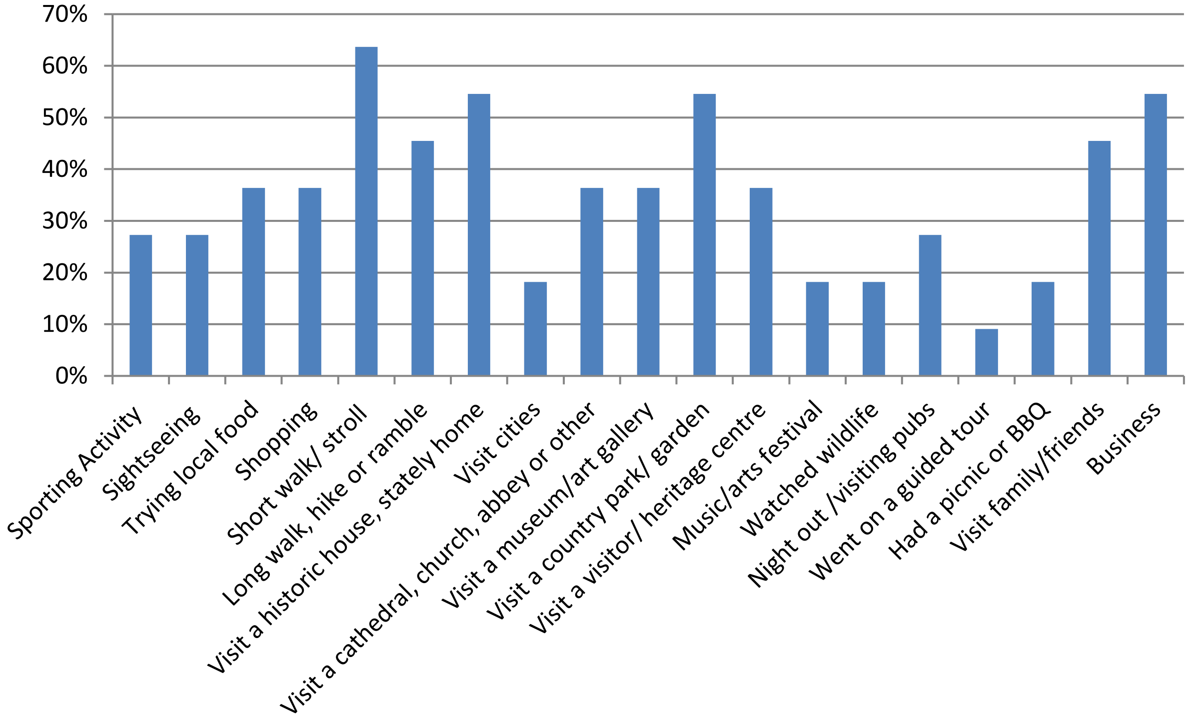
Insert 14.4 Customer place of origin



Visitor activities

14.6.32 The respondents stated their customers were involved in a wide variety of activities but the most popular were short walks, visiting a historic house, stately home, country park/garden and coming for business. Another popular activity was visiting friends and family and going on long walks. This is summarised in Insert 14.5.

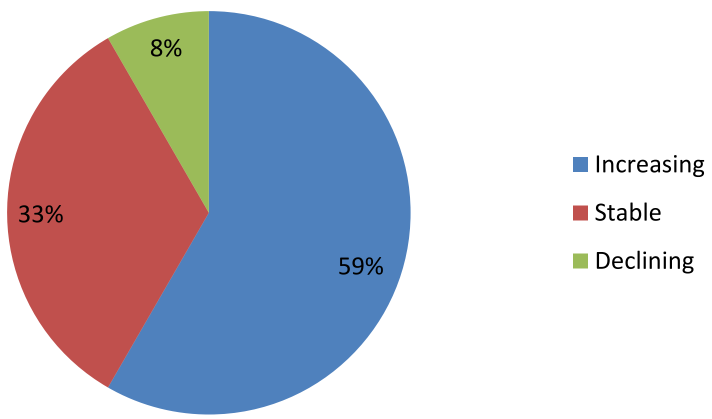
Insert 14.5 Main activities undertaken by customers



Business performance

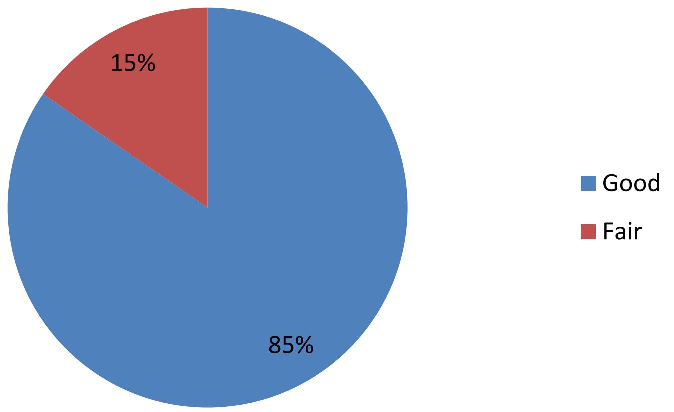
14.6.33 Most businesses stated that their business performance had been increasing over the last three years. A third reported that business performance had remained stable over the last three years with the only a small proportion (8%) experiencing a decline. This is summarised in Insert 14.6.

Insert 14.6 Business performance: Last 3 years

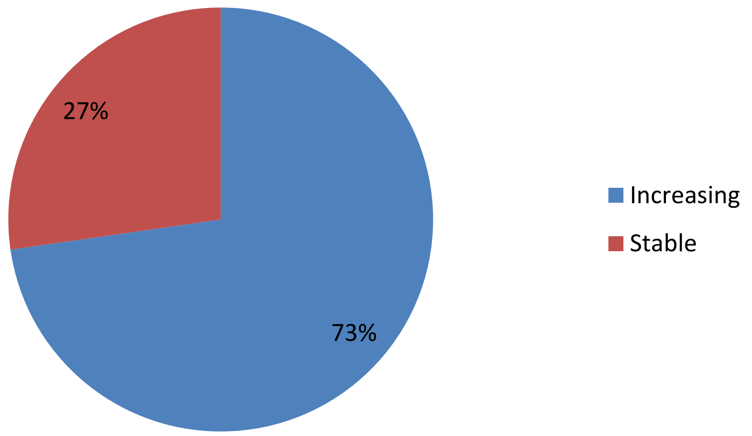


14.6.34 The vast majority reported that business was 'good' at the moment with only a small proportion reporting business as 'fair'. None of the respondents reported that business was 'poor'. This is summarised in Insert 14.7.

Insert 14.7 Business performance: Current



Insert 14.8 Business performance: Future



14.6.35 Tourism related operators have an optimistic outlook of future prospects in the study area with all respondents predicting either stable or increased performance. No business reported that it felt that its business would decline.

Business performance

14.6.36 Respondents were asked to comment on the factors influencing business trends. The most frequently mentioned were reputation, product and price and value for money. Other important factors mentioned included: promotion/marketing; new attractions or development; and business and economic cycles.

Occupancy rate

14.6.37 Accommodation business respondents were asked about their occupancy rate during the peak and off peak season. The average peak season occupancy rate was 85% and the average off-peak was 72%. This is higher than the English peak (76%) and off-peak average (63%)[55].

Business Survey: Baseline conclusion

14.6.38 Of the 84 businesses surveyed, 22 responded to the tourism business survey questionnaire, giving a 26% response rate.[56]

14.6.39 A high proportion of responses were from businesses located in Ampthill or Barton-Le-Clay. A number of the businesses were small/medium in size.

14.6.40 The highest proportion of responses were from bars and pubs as shown at 14.2 above. The survey identified that a high proportion of trade were from local customers. The origins tourist/visitor customers were mainly from the UK.

14.6.41 The main activities customers participated in when visiting the area were going on long and short walks, as well as visiting country parks and stately homes.

14.6.42 The majority of businesses considered that their business performance had been increasing over the last three years. Current levels of satisfaction were high, with a number of respondents reporting trade as being fair or good. Respondents were also optimistic that their future business performance will improve and level of business increase.

14.6.43 Reputation, product and price and value for money were deemed to be the most influential factors impacting upon business trends.

14.6.44 Occupancy rates reported by respondents were higher than the English average.

Community Infrastructure Audit

14.6.45 Demand for community infrastructure facilities could arise from the in-migration of construction workers and their families during the temporary construction phase. However, based the number of construction workers and professional

[55] England Occupancy Survey - September 2014 produced by VisitEngland
[56] Please note some of the businesses were unwilling or too time constrained to answer all of the questions. All respondents answered the question on perceived impact

judgement and experience of other projects, this requirement is likely to be minimal. An audit of community facilities also shows there is sufficient capacity to accommodate additional demand.

14.6.46 The community infrastructure audit has identified:

- 17 schools within approximately 5km of the Project Site (capacity for 1,027 pupils);
- Six GP surgeries (all accepting new patients);
- One hospital (7.5 km northeast in Bedford);
- Five pharmacies; and
- One library (4km southwest in Ampthill).

14.6.47 An audit of outdoor recreation facilities has identified:

- 2 public parks, including Marston Vale Millennium Country Park (<100m west) and Ampthill Park;
- 1 water sports club (c.1km north);
- 1 activity centre (Centre Parcs) (c. 2 km south) and
- 1 golf club (3km south west).

14.6.48 The overall sensitivity of the local area's community infrastructure is assessed as low as most of the facilities identified above are of local importance. The exception to this is Centre Parcs which is assessed as medium sensitivity due to its regional significance.

14.7 Assessment of Effects: Socio-economics

Construction

Employment and GVA

14.7.1 A detailed schedule of the level of employment and skills required to build the Project was provided to PBA by WSP, based on relevant project experience.[57]

14.7.2 The construction period is estimated to last 22 months from 2020-2022. The number of construction workers onsite per month ranges from 25 to 122 during the peak construction period[58].

14.7.3 Table 14.20 below shows the average number of construction workers and full time equivalent permanent construction jobs on site for years 1 to 2. Project

[57] WSP Construction Schedule based on 299 MW
[58] Lasting one month in an off peak period. Second highest is 118 (also in off peak)

construction would support 92 temporary construction job years, equivalent to nine permanent construction jobs.[59]

Table 14.19 Workers month, person year and permanent job equivalents

	Year 1	Year 2	Total
Worker months on site	213	891	1,104
Person year equivalent	17.8	74.3	92
Permanent jobs equivalent	1.8	7.4	9.2

Table 14.20 Peak and median workers on site

	Year 1 - 2
Peak workers on site (monthly)	122
Median workers on site (monthly)	69.5
Permanent jobs equivalent (over year 1&2)	9.2

14.7.4 Gross value added (GVA) is a measure of the value of goods and services produced in an area, industry or sector of an economy. Annual construction GVA per head in the East of England is £69,625. The construction phase could therefore deliver up to £6.4 million GVA[60] to the wider economy.

Significance of Construction Effect

14.7.5 The study area for the labour market is assessed to be of low sensitivity in accordance with the criteria provided in Table 14.2. The Project as a whole would provide a minor beneficial construction employment magnitude of impact in accordance with the criteria provided in Table 14.7.

14.7.6 The low sensitivity and minor beneficial impact results in a likely slight beneficial effect on employment, in accordance with the criteria provided in Table 14.8, and therefore construction effects on employment and GVA are considered to be not significant.

Accommodation Capacity

14.7.7 The study area accommodation capacity assessment is based on hotel and bed & breakfast accommodation i.e. it assumes that construction based

[59] It is generally accepted in economic appraisals that 10 years of continuous employment is equivalent to 1 FTE
[60] £69,625x 92 person years= £6.4m (note this is the same as 9.2 FTEs x 10 years continuous employment x £69,625 = £6.4m)

demand will be directed towards these sectors rather than other types of accommodation[61].

14.7.8 Average occupancy rates identified in the business survey have been used to estimate the number of available bedrooms.[62] The Project programme indicates the estimated number of construction staff on site on a monthly basis during the construction programme. The Project construction programme indicates that 122 workers would be on site at the peak of the construction period.

14.7.9 The extent to which construction workers use accommodation in the study area is influenced by: site proximity or ease of access to it; availability, quality and price of accommodation; the range of leisure and other services in the immediate area; and other factors.

14.7.10 There are 631 bedrooms available in hotel or bed and breakfast accommodation within a 10 km radius of the Project Site.[63] Table 14.21 demonstrates 100% of construction workers could be accommodated each month within a 10 km radius of the Project. The figures in the table assume that existing sources of trade are maintained at their current levels (as reflected in occupancy rates). Critically, it then shows the effect of construction-related accommodation demand on the residual capacity. The impact of construction labour on accommodation is assessed against the likely capacity during peak seasons when demand is high. This tests the sensitivity of labour market requirements and constrained availability.

14.7.11 In reality a large proportion of unspecialised jobs will be provided locally and will not require accommodation. However, Table 14.21 demonstrates that a worst case scenario involving 100% of workers requiring accommodation could be accommodated without causing any shortages or pressures.

[61] i.e. caravans and self-catering accommodation

[62] Average occupancy rates in the study area are 85% in peak season and 72% in off peak season

[63] Audit of hotels and bed and breakfasts prepared using online directories such as Yell.com. This reflects the process typically followed by visitors seeking accommodation in an area.

Table 14.21 Accommodation Capacity

Peak/ Off Peak	Month	Demand Construction workers (Assume 100% require room each)	Supply Typically available	Rooms Remaining (Supply - Demand)	% of Available rooms
Off Peak	March	50	177	127	28%
Peak	April	51	95	44	54%
Peak	May	53	95	42	56%
Peak	June	54	95	41	57%
Peak	July	55	95	40	58%
Peak	August	56	95	39	59%
Peak	September	65	95	30	69%
Off Peak	October	70	177	107	40%
Off Peak	November	80	177	97	45%
Off Peak	December	79	177	98	45%
Off Peak	January	88	177	89	50%
Off Peak	February	113	177	64	64%
Off Peak	March	122	177	55	69%
Peak	April	86	95	9	91%
Peak	May	81	95	14	86%
Peak	June	78	95	17	82%
Peak	July	85	95	10	90%
Peak	August	74	95	21	78%
Peak	September	69	95	26	73%
Off Peak	October	40	177	137	23%
Off Peak	November	30	177	147	17%
Off Peak	December	25	177	152	14%

Source: Construction Schedule by Month, 2014 Business Survey Occupancy Statistics & 2014 Accommodation Audit

Absorption Capacity

14.7.12 The labour market data from the baseline is used to show the extent to which the study area can supply relevant skills and labour for the construction and operation of the Project.

14.7.13 As set out above, labour market data is expressed at drive time level i.e. a catchment reflecting travel to work patterns. The 'local area' is defined within a 30-minute drive time; the 'wider area' within a 45-minute drive time and the 'wider region' within a 60-minute drive time.

14.7.14 Table 14.22 shows that the required construction labour force would also account for 0.6% of the employed construction workforce or 0.5% of manufacturing workers within a 30-minute drive time.

14.7.15 If the demand for construction labour were fully sourced from the 'potentially available labour pool' (i.e. unemployed) it would account for 0.7% of unemployed workers within a 30-minute drive time.

14.7.16 The demand for construction labour arising from the Project's development would not therefore result in any pressure on labour market capacity (i.e. requiring more than 15% [64] of existing capacity).

Table 14.22 Labour Market Absorption Capacity (30; 45 and 60-minute drive times)

	30 mins	45 mins	60 mins	UK
No. of workers				
Economically Active	305,113	861,116	1,756,525	32,268,551
Economically active: Unemployed	18,039	47,901	92,531	2,054,147
Highly Skilled	43,038	127,829	274,032	4,336,150
Skilled	56,236	158,105	318,991	6,032,985
Semi-skilled & Unskilled	76,272	210,754	409,474	9,191,042
Manufacturing	24,817	70,981	136,107	2,641,107
Construction	21,360	62,944	126,668	2,308,632
Electricity & gas	1,018	2,731	5,298	174,744
Peak Construction workers as % of:				
Economically Active	0.0%	0.0%	0.0%	0.0%
Economically active: Unemployed	0.7%	0.3%	0.1%	0.0%
Highly Skilled	0.3%	0.1%	0.0%	0.0%
Skilled	0.2%	0.1%	0.0%	0.0%
Semi-skilled & Unskilled	0.2%	0.1%	0.0%	0.0%
Manufacturing	0.5%	0.2%	0.1%	0.0%
Construction	0.6%	0.2%	0.1%	0.0%

[64] 15% threshold based on professional judgement

Operation

Employment and GVA

14.7.17 Best practice principles outlined in HM Treasury Green Book Appraisal Guidance[65] have been applied to assess the effect of permanent operational employment.

14.7.18 An Economic Impact Model was developed to measure net additional employment and GVA. The Guidance has been used along with professional judgment to estimate values for:

- Deadweight - what would happen in the absence of the Project;
- Leakage - the proportion of employment opportunities accessed by people living outside the study area;
- Displacement – the proportion of Project benefit accounted for by a reduction in benefit elsewhere;
- Substitution - when a firm substitutes one activity for another to take advantage of public sector assistances; and
- Multipliers –to estimate further economic activity associated with additional income and supplier purchases.

14.7.19 Table 14.23 shows the values used in the model. Explanatory comments are given for each value.

Table 14.23 Assumptions

	Value used in Economic Impact Model	Level	Comments
Regional (within 60-minute drive time)			
Deadweight	0%	None	Operational jobs for the Project depend solely on the Project being built
Leakage	20%	Low	The majority of operational jobs will be sourced by residents within a 60-minute drive time area
Displacement	20%	Low	Small proportion of highly skilled senior staff may be displaced from similar employment elsewhere in the region. The majority of

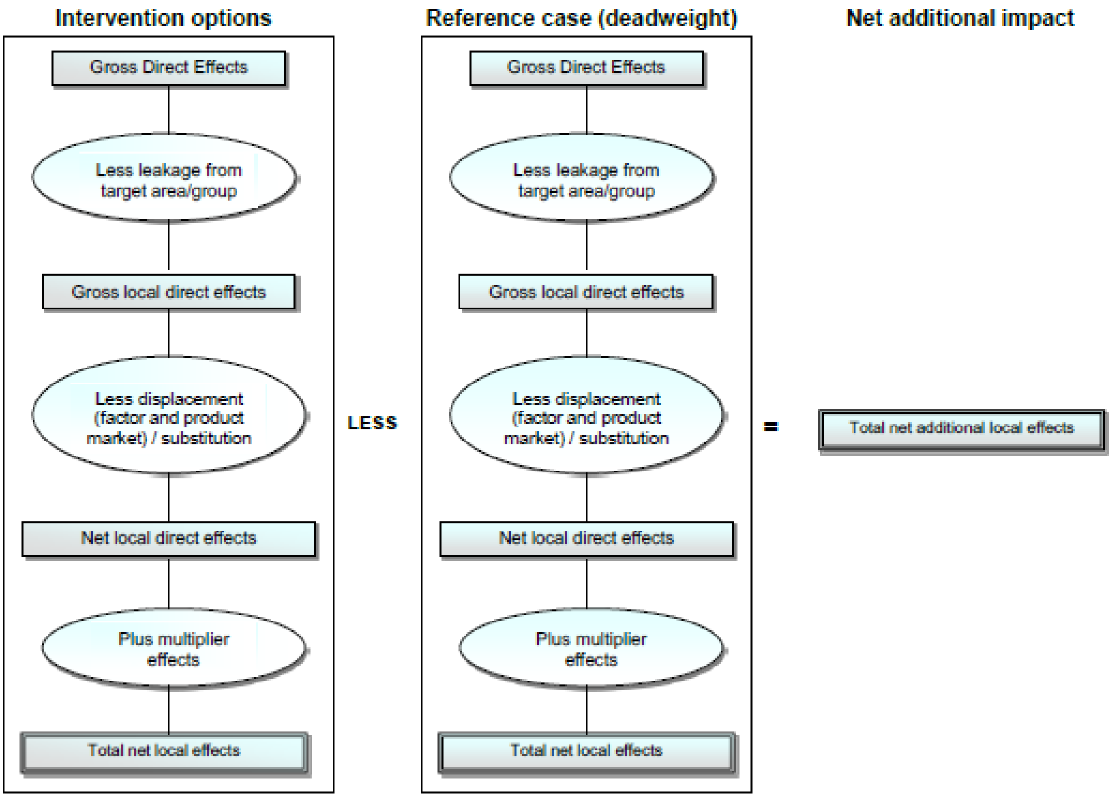
[65] https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

	Value used in Economic Impact Model	Level	Comments
			staff will be sourced from within a 60-minute drive time area and be specifically trained for the Project
Substitution	0%	None	Assumed no incentives to influence substitution behaviour
Multiplier	1.47	-	Assumed 60% of national Gas and Electricity multiplier[66]. This assumes 60% of benefit from the Project supply chain and the Project's employee's household spending occurs within the 60-minute drive time area
National			
Deadweight	75%	High	Gas Power stations will be built elsewhere in the UK. Employment benefits will therefore derive to other parts of the UK
Leakage	0%	None	All jobs will be taken up by UK residents
Displacement	10%	Low	A small proportion of highly skilled senior staff may be displaced from similar employment elsewhere in the UK. The majority of staff will be sourced from the regional area and specifically trained for the Project.
Substitution	0%	None	Assumed no incentives to influence substitution behaviour
Multiplier	2.46	-	Composite of Gas and Electricity multipliers (2016)

14.7.20 Homes and Communities Agency (HCA) has provided a methodology for calculating additionality through a 'net additionality framework'. This is represented in Insert 14.9 and can be described as: *'Impact of intervention option' less 'impact of reference case' (deadweight) equals 'net additional impact'*

[66] The Electricity and Gas multiplier estimates the additional employment impact that will arise through the Projects supply chain linkages and from direct employees spending

Insert 14.9: Calculating additionality through HCA 'net additionality framework'



Source: Homes and Communities Agency, 2014

14.7.21 The operational phase of the Project would provide an estimated 10 FTE direct jobs. The net effect, taking account of the leakage, displacement and multiplier effects shown above, would be 9.4 additional regional FTE jobs and 5.5 national FTE jobs. [67] Average GVA per utility employee in East of England is £90,071. Assuming Project related employment generated average levels of GVA, the Project's operation would provide approximately £0.85m GVA[68] and £0.50m GVA[69] per annum to the local and national economy respectively.

Significance of Operational Effect

14.7.22 The study area for the labour market is assessed to be of low sensitivity in accordance with the criteria provided in Table 14.2. The Project as a whole would provide a minor beneficial operation employment magnitude of impact in accordance with the criteria provided in Table 14.3.

[67] The assumptions in Table 14.23 are applied to the 10 Gross FTE Operational jobs created by the Project. This is done in an Excel Economic Impact Model created using HM Treasury Green Book Appraisal Guidance.
[68] 9.4 net additional local jobs x £90,071= £849,319
[69] 8.3 net additional national jobs x £90,071= £746,472

14.7.23 The low sensitivity and minor beneficial impact results in a likely slight beneficial effect on employment, in accordance with the criteria provided in Table 14.8, and is therefore operational effects on employment and GVA are considered to be not significant.

Absorption Capacity

14.7.24 The labour market data from the baseline is used to show the extent to which the study area can supply relevant skills and labour for the construction and operation of the Project.

14.7.25 Labour market data is expressed at drive time level i.e. a catchment reflecting travel to work patterns.

14.7.26 Operational impacts have been assessed against the current labour market. The operational workforce requirement accounts for less than 2% of the electricity and gas workers and less than 1% of the working age, economically active and highly skilled, skilled and unskilled labour force.

14.7.27 Demand for operational employment would not therefore result in any noticeable labour market pressure on the 30, 45 or 60-minute drive time areas and would not exert negative pressure through labour shortages and wage increases.

14.7.28 The labour requirement during the operational phase would provide a benefit and in reality would be sourced from a number of economically active categories including workers in directly relevant industries, workers with transferable skills and unemployed workers.

Table 14.24 Labour Market Absorption Capacity (30; 45 and 60-minute drive times)

	30 mins	45 mins	60 mins	UK
No. of workers				
Economically Active	305,113	861,116	1,756,525	32,268,551
Economically active: Unemployed	18,039	47,901	92,531	2,054,147
Highly Skilled	43,038	127,829	274,032	4,336,150
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Construction	21,360	62,944	126,668	2,308,632
Electricity & gas	1,018	2,731	5,298	174,744
Operational FTE jobs as % of:				
Economically Active	0.0%	0.0%	0.0%	0.0%
Economically active: Unemployed	0.1%	0.0%	0.0%	0.0%

	30 mins	45 mins	60 mins	UK
Highly Skilled	0.0%	0.0%	0.0%	0.0%
Skilled	0.0%	0.0%	0.0%	0.0%
Semi-skilled & Unskilled	0.0%	0.0%	0.0%	0.0%
Electricity & gas	1.0%	0.4%	0.2%	0.0%

Decommissioning

14.7.29 As noted in Chapter 3, this assessment has (in order to carry out an assessment of decommissioning effects) made an assumption regarding a possible date for decommissioning based on the operational lifespan of similar projects (25 years). However, it is possible that the Project will continue to operate for longer than the assumed period. The labour requirement for the decommissioning programme is unknown but is not expected to exceed that of the construction phase.

14.7.30 Decommissioning effects are therefore considered to be likely to be similar to the construction impacts. The Project's decommissioning phase will therefore provide an overall 'slight' beneficial employment impact (in accordance with criteria in Table 14.8), which is considered to be not significant.

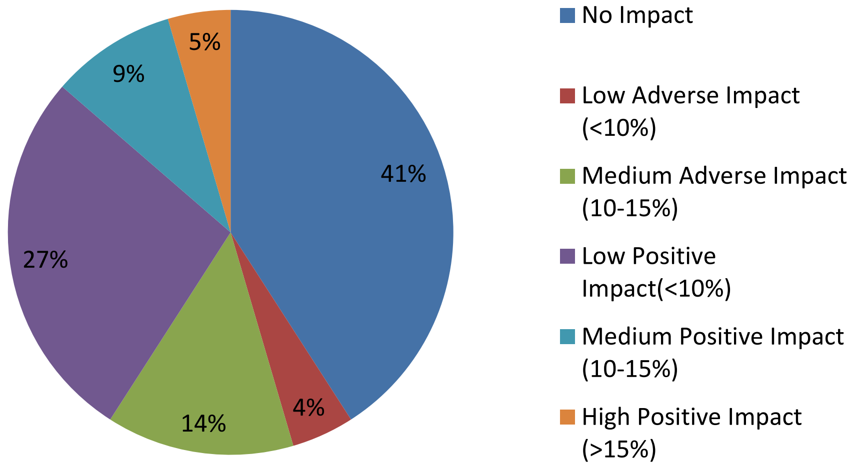
14.8 Assessment of Effects: Tourism and Recreation

Tourism Business Survey – Perceived Impact Analysis

14.8.1 The survey sought respondents' perceptions of the potential impacts of the Project on their business performance and on tourism in the wider Bedfordshire area.

14.8.2 All 22 respondents provided an answer as to what impact they felt the Project would have on their business. 41% of respondents considered that it would have no impact on their business as they considered that the Project was either too far away from their business to affect them directly or that they wouldn't be able to see the Project. Results are summarised in Insert 14.10.

Insert 14.10 Perceived Impacts of Project on business performance

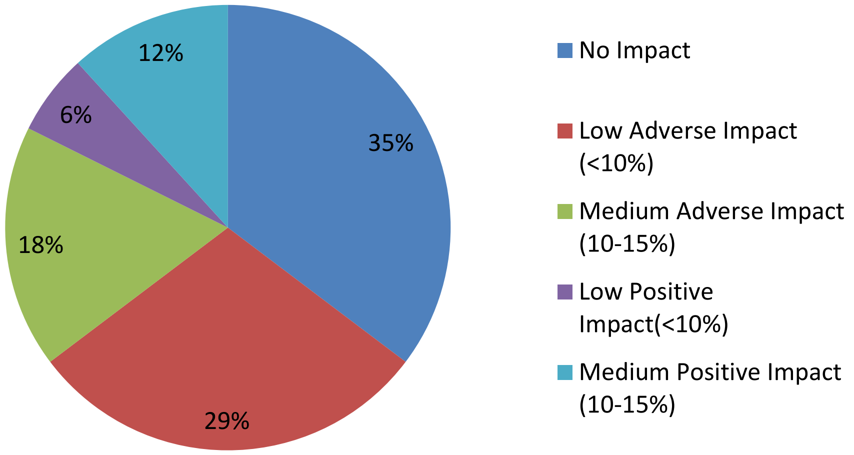


14.8.3 41% of respondents suggested that the Project could have varying degrees of beneficial impact on trading and the local economy. The main reason cited was the potential for the Project to attract workers to the area during the construction period. Businesses felt they may benefit from providing services such as accommodation, and food and drink.

14.8.4 18% of respondents (four respondents) considered the Project would have either a low or medium adverse impact on their business. Three businesses identified the likelihood of medium adverse impacts on their business while another identified a possible low adverse impact. The main reason given for potential adverse impacts were visual impacts. Several of the businesses rely on the countryside views for their business to operate successfully. In addition, one respondent stated that they had concerns over the environmental impact of a gas fired power station. Further detailed assessment of landscape and visual impacts is provided in Chapter 11.

14.8.5 Businesses were also asked to indicate what they expected the impact might be on Bedfordshire tourism in general. The results are summarised in Insert 14.11.

Insert 14.1 Perceived Impacts of Project on Bedfordshire Tourism



14.8.6 Over a third of respondents considered that it would have no impact on tourism and visitor numbers, with a further 30% considering any adverse impact to be low or minimal. 18% of respondents considered there to be a medium adverse impact on Bedfordshire tourism.

14.8.7 Three respondents perceived there to be medium adverse impacts. The reasons were again primarily related to visual impacts.

Duration of Adverse Impacts

14.8.8 Of those respondents who considered there to be adverse impacts over half felt the impacts would last for the life of the Project. Nearly a third of respondents felt that adverse impacts would be experienced during both the construction and operation of the Project.

Duration of Beneficial Impacts

14.8.9 Of those respondents who considered there to be beneficial impacts the majority felt the impacts would be during the construction phase only. A quarter of respondents felt that beneficial impacts would be for the life of the Project.

Potential Benefits

14.8.10 Respondents were asked to consider how the Project could benefit their business. The majority of these responses related to provision of accommodation, and food and drink, particularly during the construction phase.

Conclusion

14.8.11 In terms of impact, the vast majority of respondents felt that the Project would have either no or beneficial impacts on business performance. Some businesses felt that they would be able to capitalise on construction workers coming to area by providing services such as accommodation and food and drink.

14.8.12 Only a small proportion of respondents predicted a medium adverse impact on business performance based mainly on perceived adverse visual impact.

14.8.13 The majority of respondents felt that the Project would have either no or low adverse impact on tourism in Bedfordshire. Less than a fifth of respondents expected the impact to be moderately adverse, with visual impact again being cited as the main factor.

14.8.14 Overall, the business survey analysis has shown that a number of tourism/recreation related businesses within the study area are not reliant on tourism trade and are reporting high/increasing business confidence. A fifth of trade is said to come from tourists and the majority from locals and business visitors. The majority of respondents do not predict any significantly adverse impacts on either their own business performance or the wider Bedfordshire tourism offer.

Tourism and Recreation Receptors – Magnitude of Impact Analysis

<u>Factors influencing impact</u>

14.8.15 Tourism and recreation receptors within the study area may experience the following impacts:

- Visual;
- Noise;
- Traffic/accessibility; and
- Air quality.

Structure of Assessment

14.8.16 The tourism and recreation assessment assesses the potential impacts on four distinct components during three distinct phases.

14.8.17 The four distinct components include the:

- Power Generator Plant only;
- Gas Connection;
- Electrical Connection; and

- The Project as a whole (above components combined)[70]

14.8.18 The three district phases of the Project include the:

- Construction phase;
- Operational; and
- Decommissioning phase.

14.8.19 The structure of this section ensures potential visual, noise, traffic and air quality impacts on each component during each phase are individually assessed.

14.8.20 The magnitude of impact is then combined with assessed sensitivity and embedded mitigation to derive overall residual effect in Section 14.12[71].

Power Generation Plant

Construction – Visual

14.8.21 The ZTV shows that the stack is likely to be visible over a proportion of the study area. The ZTV analysis used to determine visual impact is based on the topography of the land and does not take into account physical or natural aspects such as buildings and trees. Visual impact is likely to be reduced due to the screening effect of buildings and woodland. The Landscape and Visual chapter (Chapter 11) notes that ZTV mapping tends to over-estimate the extent of visibility. The photomontages from key viewpoints produced to support Chapter 11 (Appendix 11.2) reinforce this assertion.

14.8.22 The likelihood of significant impact reduces with distance. Chapter 11 assumes that the visual effects of the Project will reduce as viewing distance increases. There is already industrialisation in nearby countryside in the form of two former clay pits (Rookery North and Rookery South) and the remaining former brickworks buildings and chimneys of the Stewartby Brickworks to the north of the Project.

14.8.23 Any operational impacts on walking routes during the construction phase will be short term and footpath diversions will be put in place.

Construction – Noise

14.8.24 Section 3.6, Chapter 3, lists a series of embedded mitigation measures to minimise noise impacts including the implementation of a CEMP during the construction period. As a result, the assessment of noise effects states that

[70] Please note the Project as a whole is summarised in Section 14.10 (along with socio-economics and community infrastructure).

[71] Table 14.34: Summary of Residual Effect - Tourism

there will be no significant adverse noise impacts during the construction/decommissioning phases of the Project.

Construction – Traffic/ accessibility

14.8.25 Section 3.6 provides some embedded mitigation measures including the implementation of a CTMP. The implementation of a CTMP during the construction phase should ensure that no tourism or recreational related businesses/receptors are affected significantly by traffic.

Construction – Air quality

14.8.26 Any air quality impacts are expected to be primarily restricted to the immediate local area around the Project Site.

14.8.27 Section 3.6 provides some embedded mitigation measures including adherence to a CEMP which will limit dust emissions during construction.

14.8.28 The adherence to these measures should ensure that no tourism or recreational related businesses or receptors are affected significantly during construction or operation.

Construction - Summary

14.8.29 A summary of the assessed magnitude of impact of the Power Generation Plant during construction on tourism and recreation receptors is provided below in Table 14.25. Taking into consideration the magnitude of change identified below, together with the sensitivity of receptor (as defined in Table 14.18) the significance of effect on all tourism and recreational receptors would be no greater than ‘slight’ in all cases and therefore not significant.

Table 14.25 Power Generation Plant: Construction

Receptor	Magnitude
Visitor Attractions	
The Forest Centre and Millennium Country Park	Minor adverse
Houghton House	Minor adverse
Wrest Park	No Change
Bird of Prey Centre	No Change
De Grey Mausoleum	No Change
Summerfields Miniature Railway	No Change
Cycle Route/Promoted Paths	
National Cycle Route 51	Negligible adverse
Forest Centre to Bedford via Shocott Spring	Minor adverse
The Clay Way: Forest Centre to Bromham Mill	Minor adverse
Forest Centre to Centre Parcs via Lidlington and Millbrook	Minor adverse
Forest Centre to Cranfield	Minor adverse
Optional Loop via Bourne End, Wootton	Minor adverse
Forest Centre to Lidlington & Folly Wood	Minor adverse
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Moderate adverse
Forest Centre to Gateway Woods	Negligible adverse
The John Bunyan Trail	Minor adverse
The Marston Jubilee Walk	Minor adverse
Timberland Trail—Forest Centre circular via Lidlington, Ampthill and Stewartby	Moderate adverse
Cranfield Hulcote Salford Circular Walk	Negligible
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Minor adverse

<u>Operation – Visual</u>

14.8.30 Chapter 11 Landscape and Visual Impact Assessment confirmed that the Power Generation Plant would sit within a context where industrialisation of the countryside has already taken place. Examples include the existing wind farm at the Millennium Country Park, existing railways with gantries and embankments, pylons associated with the existing 400 kV Sundon to Grendon line and the four remaining chimneys at the former brickworks at Stewartby.

<u>Operation – Noise</u>

14.8.31 The noise impacts of the Project will be localised and will not affect tourism/recreation receptors within the Study Area.

Operation – Traffic/ accessibility

14.8.32 The assessment of traffic impacts presented in Chapter 12 anticipates there will be negligible effects on the surrounding transport network during the operational phase as traffic to the Power Generation Plant would be limited to occasional maintenance vehicles, deliveries and visitor access to the Power Generation Plant.

Operation – Air quality

14.8.33 The assessment of air quality effects in Chapter 6 concludes that there are not anticipated to be any likely significant effects on air quality receptors.

Operation - Summary

14.8.34 A summary of the assessed magnitude of impact of the Power Generation Plant on tourism and recreation receptors is provided below in Table 14.26. Taking into consideration the magnitude of change identified below, together with the sensitivity of receptor (as defined in Table 14.18) the significance of effect on all tourism and recreational receptors would be no greater than 'slight' in all cases and therefore not significant.

Table 14.26 Power Generation Plant: Operation

Receptor	Magnitude
Visitor Attractions	
The Forest Centre and Millennium Country Park	Minor adverse
Houghton House	Minor adverse
Wrest Park	No Change
Bird of Prey Centre	No Change
De Grey Mausoleum	No Change
Summerfields Miniature Railway	No Change
Cycle Route/Promoted Paths	
National Cycle Route 51	Negligible Adverse
Forest Centre to Bedford via Shocott Spring	Minor adverse
The Clay Way: Forest Centre to Bromham Mill	Minor adverse
Forest Centre to Centre Parcs via Lidlington and Millbrook	Minor adverse
Forest Centre to Cranfield	Minor adverse
Optional Loop via Bourne End, Wootton	Minor adverse
Forest Centre to Lidlington & Folly Wood	Minor adverse

Receptor	Magnitude
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Moderate adverse
Forest Centre to Gateway Woods	Negligible adverse
The John Bunyan Trail	Minor adverse
The Marston Jubilee Walk	Minor adverse
Timberland Trail—Forest Centre circular via Lidlington, Ampthill and Stewartby	Moderate adverse
Cranfield Hulcote Salford Circular Walk	Negligible adverse
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Minor adverse

Decommissioning

14.8.35 The magnitude of impact noted in the construction sections above for the Power Generation Plant are anticipated to be the same for the decommissioning phase.

Gas Connection

Construction – Visual

14.8.36 Any visual impacts would be predominately restricted to the construction phase of the connection. Any impacts on walkers during the construction phase will be short term. These would be temporary and through the adoption of the mitigation measures mentioned in Chapter 11 (e.g. a landscape and ecology mitigation and management strategy) there should be no significant adverse visual effects on tourism and recreation receptors within the study area.

Construction – Noise

14.8.37 As noise impacts assessed in Chapter 7 will be primarily limited to the construction phase, they would be temporary. The mitigation measures noted in Section 3.6 should ensure that no tourism or recreational related businesses or receptors are affected significantly during construction or operation.

Construction – Traffic/ accessibility

14.8.38 Chapter 12 confirms that construction vehicle movements will not lead to significant impacts. Therefore, no tourism or recreational related businesses/receptors will be affected significantly.

Construction – Air quality

14.8.39 Any air quality impacts are expected to be primarily restricted to the immediate local area around the proposed Project Site. As stated above there are two tourist attractions and one promoted path in close proximity to the Project Site.

The adoption of the mitigation measures mentioned in Section 3.6 should ensure that no tourism or recreational related businesses or receptors are affected significantly during construction.

Construction - Summary

14.8.40 A summary of the assessed magnitude of impact of the Gas Connection during construction on tourism and recreation receptors is provided below in Table 14.27. Taking into consideration the magnitude of change identified below, together with the sensitivity of receptor (as defined in Table 14.18) the significance of effect on all tourism and recreational receptors would be no greater than 'slight' in all cases and therefore not significant.

Table 14.27 Gas Connection: Construction

Receptor	Magnitude
Visitor Attractions	
The Forest Centre and Millennium Country Park	Minor adverse
Houghton House	Minor adverse
Wrest Park	No Change
Bird of Prey Centre	No Change
De Grey Mausoleum	No Change
Summerfields Miniature Railway	No Change
Cycle Route/Promoted Paths	
National Cycle Route 51	Negligible adverse
Forest Centre to Bedford via Shocott Spring	Minor adverse
The Clay Way: Forest Centre to Bromham Mill	Minor adverse
Forest Centre to Centre Parcs via Lidlington and Millbrook	Minor adverse
Forest Centre to Cranfield	Minor adverse
Optional Loop via Bourne End, Wootton	Minor adverse
Forest Centre to Lidlington & Folly Wood	Minor adverse
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Moderate adverse
Forest Centre to Gateway Woods	Negligible adverse
The John Bunyan Trail	Minor adverse
The Marston Jubilee Walk	Minor adverse
Timberland Trail—Forest Centre circular via Lidlington, Ampthill and Stewartby	Moderate adverse
Cranfield Hulcote Salford Circular Walk	Negligible adverse
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Minor adverse

Operation – Visual

14.8.41 The assessment of landscape and visual effects (Chapter 11) has suggested that there are not considered to be any impacts arising from visual amenity as a result of operation of the Gas Connection.

Operation – Noise

14.8.42 The assessment of noise effects (Chapter 7) confirmed that the operational noise and vibration effects of the Gas Connection will be negligible adverse.

Operation – Traffic

14.8.43 The assessment of traffic effects (Chapter 12) has confirmed a minimal number of movements to the Gas Connection during the Operational phase (less than 1 per week). Therefore, there are not anticipated to be any effects on tourism and recreational receptors.

Operation – Air quality

14.8.44 The assessment of air quality effects (Chapter 6) confirmed that the Gas Connection is unlikely to result in impacts on air quality and was has therefore been scoped out of the assessment.

Operation - Summary

14.8.45 A Summary of the assessed magnitude of impact of the Gas Connection during operation on tourism and recreation receptors is provided below in Table 14.28 which confirms no significant effects. Taking into consideration the magnitude of change identified below, together with the sensitivity of receptor (as defined in Table 14.18) the significance of effect on all tourism and recreational receptors would be no greater than ‘slight’ in all cases and therefore not significant.

Table 14.28 Gas Connection: Operation

Receptor	Magnitude
Visitor Attractions	
The Forest Centre and Millennium Country Park	Negligible adverse
Houghton House	Negligible adverse
Wrest Park	No Change
Bird of Prey Centre	No Change
De Grey Mausoleum	No Change
Summerfields Miniature Railway	No Change
Cycle Route/Promoted Paths	
National Cycle Route 51	Negligible adverse
Forest Centre to Bedford via Shocott Spring	Negligible adverse
The Clay Way: Forest Centre to Bromham Mill	Negligible adverse

Receptor	Magnitude
Forest Centre to Centre Parcs via Lidlington and Millbrook	Negligible adverse
Forest Centre to Cranfield	Negligible adverse
Optional Loop via Bourne End, Wootton	Negligible adverse
Forest Centre to Lidlington & Folly Wood	Negligible adverse
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Negligible adverse
Forest Centre to Gateway Woods	Negligible adverse
The John Bunyan Trail	Negligible adverse
The Marston Jubilee Walk	Negligible adverse
Timberland Trail—Forest Centre circular via Lidlington, Ampthill and Stewartby	Negligible adverse
Cranfield Hulcote Salford Circular Walk	Negligible adverse
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Negligible adverse

Electrical Connection

Construction – Visual

14.8.46 The Electrical Connection is not in the immediate proximity of any visitor attractions. Any impacts on walkers during the construction phase will be short term. Through the adoption of the mitigation measures mentioned in Chapter 11 (e.g. landscape and ecology mitigation and management strategy) there should be no significant adverse visual effects on tourism and recreation receptors within the Study Area.

Construction – Noise

14.8.47 Any noise impacts associated with the construction phase would be temporary. The mitigation measures noted in Section 3.6 should ensure that no tourism or recreational related businesses or receptors are affected significantly during construction or operation.

Construction – Traffic/ accessibility

14.8.48 Users of the road network may be affected by additional construction work/workers travelling to the area. However, the construction phase of the Gas Connection is not anticipated to generate an amount of traffic movements which would have a likely significant detrimental effect on tourism or recreational related businesses/receptors.

Construction – Air quality

14.8.49 Any air quality impacts are expected to be restricted to the immediate local area around the proposed Project Site. The adoption of the embedded mitigation measures mentioned in Section 3.6 should ensure that no tourism or recreational related businesses or receptors are affected significantly during construction.

Construction - Summary

14.8.50 A Summary of the assessed magnitude of impact of the Electrical Connection during construction on tourism and recreation receptors is provided below in Table 14.29. Taking into consideration the magnitude of change identified below, together with the sensitivity of receptor (as defined in Table 14.18) the significance of effect on all tourism and recreational receptors would be no greater than 'slight' in all cases and therefore not significant.

Table 14.29 Electrical Connection: Construction

Receptor	Magnitude
Visitor Attractions	
The Forest Centre and Millennium Country Park	Minor adverse
Houghton House	Minor adverse
Wrest Park	No Change
Bird of Prey Centre	No Change
De Grey Mausoleum	No Change
Summerfields Miniature Railway	No Change
Cycle Route/Promoted Paths	
National Cycle Route 51	Negligible adverse
Forest Centre to Bedford via Shocott Spring	Minor adverse
The Clay Way: Forest Centre to Bromham Mill	Minor adverse
Forest Centre to Centre Parcs via Lidlington and Millbrook	Minor adverse
Forest Centre to Cranfield	Minor adverse
Optional Loop via Bourne End, Wootton	Minor adverse
Forest Centre to Lidlington & Folly Wood	Minor adverse
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Moderate adverse
Forest Centre to Gateway Woods	Negligible adverse
The John Bunyan Trail	Minor adverse
The Marston Jubilee Walk	Minor adverse
Timberland Trail—Forest Centre circular via Lidlington, Ampthill and Stewartby	Moderate adverse
Cranfield Hulcote Salford Circular Walk	Negligible adverse

Receptor	Magnitude
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Minor adverse

Operation – Visual

14.8.51 The assessment of landscape and visual impacts (Chapter 11) states that views of the Electrical Connection will be generally not significant given that the majority of it will be underground. It will be seen within a context of existing industrialisation of countryside and existing hedges and belts of woodland will also provide some screening.

Operation – Noise

14.8.52 The assessment of noise (Chapter 7) confirm that the residual noise and vibration effects of the Electrical Connection are not anticipated to be significant.

Operation – Traffic

14.8.53 The assessment of traffic movements during the operational phase of the Electrical Connection are not anticipated to be significant (of the order of 1 per week) and therefore no likely significant effects are anticipated on tourism or recreational receptors.

Operation – Air quality

14.8.54 The assessment of air quality effects (Chapter 6) confirm that the Electrical Connection is unlikely to result in impacts on air quality and was has therefore been scoped out of the assessment.

Operation - Summary

14.8.55 A Summary of the assessed magnitude of impact of the Electrical Connection during construction on tourism and recreation receptors is provided below in Table 14.30. Taking into consideration the magnitude of change identified below, together with the sensitivity of receptor (as defined in Table 14.18) the significance of effect on all tourism and recreational receptors would be no greater than ‘slight’ in all cases and therefore not significant.

Table 14.30 Electrical Connection: Operation

Receptor	Magnitude
Visitor Attractions	
The Forest Centre and Millennium Country Park	Minor adverse
Houghton House	Minor adverse
Wrest Park	No Change
Bird of Prey Centre	No Change

Receptor	Magnitude
De Grey Mausoleum	No Change
Summerfields Miniature Railway	No Change
Cycle Route/Promoted Paths	
National Cycle Route 51	Negligible adverse
Forest Centre to Bedford via Shocott Spring	Minor adverse
The Clay Way: Forest Centre to Bromham Mill	Minor adverse
Forest Centre to Centre Parcs via Lidlington and Millbrook	Minor adverse
Forest Centre to Cranfield	Minor adverse
Optional Loop via Bourne End, Wootton	Minor adverse
Forest Centre to Lidlington & Folly Wood	Minor adverse
Forest Centre & Millennium Country Park to Millbrook & Ampthill	Moderate adverse
Forest Centre to Gateway Woods	Negligible adverse
The John Bunyan Trail	Minor adverse
The Marston Jubilee Walk	Minor adverse
Timberland Trail—Forest Centre circular via Lidlington, Ampthill and Stewartby	Moderate adverse
Cranfield Hulcote Salford Circular Walk	Negligible adverse
Greenwood Cycle Trail- Forest Centre via Upper Shelton, Cranfield, Aston, Wood End, Wootton	Minor adverse

Decommissioning

14.8.56 The effects noted in the construction sections above for the Electrical Connection will be the same for the decommissioning phase.

14.9 Assessment of Effects: Community Infrastructure Receptors

Power Generation Plant

14.9.1 Community Infrastructure receptors within the study area may experience the following effects:

- Visual;
- Noise;
- Traffic/accessibility; and
- Air quality

Construction/Decommissioning – Visual

14.9.2 It is considered unlikely that the operation or effectiveness of community facilities would be affected by the appearance of the Power Generation Plant during construction. Patronage of community facilities and recreational facilities is primarily driven by demand for the activity they host. As long as services or facilities can be provided from the receptor the visual appearance of the development should not affect levels of patronage or its operation.

14.9.3 The ZTV analysis used to determine visual impact is based on the topography of the land and does not take into account physical or natural aspects such as buildings and trees. Visual impact is likely to be reduced due to the screening effect of buildings and woodland. The Landscape and visual chapter (Chapter 11) notes that a ZTV map does not account for views such as buildings, trees and hedgerows. This means that ZTV mapping tends to over-estimate the extent of visibility.

14.9.4 The anticipated magnitude of visual impact on community infrastructure is anticipated to be in the worst case minor adverse. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Noise

14.9.5 Any noise impacts during construction are expected to be restricted to the immediate area of the Power Generation Plant. As there are no community facilities in the immediate vicinity of the Project, noise is not therefore expected to be a significant issue for community infrastructure. The magnitude of the impact is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Traffic/ accessibility

14.9.6 Whilst there may be some occasional, temporary and short term delays on the local road network during the construction phase as a result of additional construction traffic, the implementation of an appropriate CTMP during the construction phase should ensure that no community facilities are significantly affected.

14.9.7 The magnitude of the impact is considered minor adverse. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Air quality

14.9.8 Any air quality impacts are expected to be restricted to the immediate local area around the proposed Project Site. As stated above there are no community facilities situated within the Project Site or within close proximity.

14.9.9 There will be no permanent residual risks associated with the construction of the Project as confirmed in Chapter 6 (air quality). Therefore, air quality is not expected to be a significant issue for community facilities in the area.

14.9.10 The magnitude of the impact is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Visual

14.9.11 The assessment of landscape and visual effects (Chapter 11) states that the Power Generation Plant would sit within a context where industrialisation of countryside has already taken place. Examples include the existing wind farm at the Millennium Country Park, existing railways with gantries and embankments, pylons associated with the existing 400 kV Sundon to Grendon line and the four remaining chimneys at the former brickworks at Stewartby.

14.9.12 The magnitude of impact is considered to be minor adverse on community infrastructure. Taking into consideration the low/medium sensitivity and the minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation –Noise

14.9.13 The assessment of noise effects (Chapter 7) anticipates that any operational noise effects are predominately localised to the immediate area and given that there are no community infrastructure receptors within close proximity of the Project, the overall magnitude of impact is considered minor adverse. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation –Traffic/ accessibility

14.9.14 The assessment of traffic and transport related effects (Chapter 12) assesses that there will be negligible effects on the surrounding transport network during the operational phase as traffic to the Power Generation Plant would be limited to occasional maintenance vehicles, deliveries and visitor access. Therefore, the magnitude of the impact on community infrastructure receptors is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation –Air quality

14.9.15 The assessment of air quality effects (Chapter 6) concludes that the effects of operational air quality are not anticipated to be significant. Therefore, the magnitude of the impact on community infrastructure receptors is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Gas Connection

Construction/ Decommissioning – Visual

14.9.16 Any visual effects during the construction phase of the Gas Connection would be temporary. The Gas Connection is not in the immediate proximity of any community infrastructure receptors. Through the adoption of the embedded mitigation measures outlined in Section 3.6 (e.g. planting around the AGI) there should be no significant adverse visual effects on community infrastructure receptors within the Study Area.

14.9.17 The magnitude of the impact is considered minor adverse. Taking into consideration the low/medium sensitivity of community infrastructure receptors and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Noise

14.9.18 Any noise impacts associated with the construction phase would be temporary. There are no community facilities sufficiently close to experience noise impacts. The mitigation measures noted in Section 3.6 should ensure that no community infrastructure receptors are affected significantly during construction or operation.

14.9.19 The magnitude of the impact is considered negligible. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning –Traffic/ accessibility

14.9.20 Users of the road network may also be affected by additional construction work/workers travelling to the area. However, the implementation of the mitigation measures stated in Section 3.6 during the construction phase should ensure that no community infrastructure receptors are affected significantly.

14.9.21 The magnitude of the impact is considered minor adverse. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning –Air quality

14.9.22 The adherence to the mitigation measures set out in Section 3.6 should ensure that no community infrastructure receptors are affected significantly during construction or operation.

14.9.23 The magnitude of the impact is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Visual

14.9.24 The assessment of landscape and visual impacts (Chapter 11) anticipates no significant impacts arising as a result of operation of the Gas Connection. The magnitude of the impact on community infrastructure receptors is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Noise

14.9.25 The assessment of noise effects (Chapter 7) anticipates that the noise and vibration effects from operation of the Gas Connection will be negligible. Accordingly, the magnitude of the impact is considered negligible adverse for community infrastructure receptors. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Traffic/ accessibility

14.9.26 The assessment of traffic and transport effects (Chapter 12) anticipates a minimal number of movements to the Gas Connection during the operational phase (less than 1 per week). The magnitude of impact on community infrastructure receptors therefore is negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Air quality

14.9.27 The assessment of air quality effects (Chapter 6) confirm that the operation of the Gas Connection is unlikely to result in impacts on air quality and was therefore scoped out of the assessment. The impact on community infrastructure receptors therefore is negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Electrical Connection

Construction/ Decommissioning – Visual

14.9.28 The Electrical Connection is not in the immediate proximity of any community infrastructure receptors. Through the adoption of the embedded mitigation measures outlined in Section 3.6 there should be no significant adverse visual effects on community infrastructure receptors within the Study Area, particularly as the majority of the Electrical Connection will be underground.

14.9.29 The magnitude of the impact is considered minor adverse. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Noise

14.9.30 Any noise impacts during the construction phase would be temporary and not considered significant. As stated above there are no community infrastructure receptors sufficiently close to experience noise impacts. The embedded mitigation measures outlined in Section 3.6 should ensure that no community infrastructure receptors are affected significantly during construction or operation.

14.9.31 The magnitude of the impact is considered negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Traffic/ accessibility

14.9.32 Users of the road network may be affected by additional construction work/workers travelling to the area. However, the implementation of the embedded mitigation measures stated in Section 3.6 during the construction phase should ensure that no community infrastructure receptors are affected significantly.

14.9.33 The magnitude of the impact is considered minor adverse. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Construction/ Decommissioning – Air quality

14.9.34 Any air quality impacts are expected to be restricted to the immediate local area around the Project Site. As stated above there is not a significant cluster of community facilities around the Project Site. Therefore, air quality is not expected to be a significant issue for community infrastructure receptors in the area.

14.9.35 The adoption of the mitigation measures mentioned in Chapter 6 should ensure that no community infrastructure receptors are affected significantly during construction or operation.

14.9.36 The magnitude of the impact is considered negligible. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Visual

14.9.37 The assessment of landscape and visual effects (Chapter 11) anticipates that views of the Electrical Connection will be generally not significant particularly as the majority of the Electrical Connection will be underground. It will be seen within a context of existing industrialisation of countryside and existing hedges and belts of woodland will also provide some screening. Accordingly, the magnitude of the impact is considered minor adverse for community infrastructure receptors. Taking into consideration the low/medium sensitivity and minor adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Noise

14.9.38 The assessment of noise effects (Chapter 7) anticipates that the residual noise and vibration effects of the Electrical Connection are likely to be of minor significance. Accordingly, the magnitude of the impact is considered minor adverse for community infrastructure receptors. Taking into consideration the low/medium sensitivity and minor impact, the likely effect would be slight adverse and therefore not significant.

Operation – Traffic/ accessibility

14.9.39 The assessment of traffic effects (Chapter 12) anticipates that there would be a minimal number of movements to the Electrical Connection during the operational phase. The impact on community infrastructure receptors therefore is negligible adverse. Taking into consideration the low/medium sensitivity and negligible adverse impact, the likely effect would be slight adverse and therefore not significant.

Operation – Air quality

14.9.40 The assessment of air quality effects (Chapter 6) confirms that there are unlikely to be any air quality effects arising from operation of the Electrical Connection and was therefore scoped out of the assessment. The impact on community infrastructure receptors therefore is negligible adverse. Taking into consideration the low/medium sensitivity and negligible impact, the likely effect would be slight adverse and therefore not significant.

14.10 Project as a Whole

Socio-economics

14.10.1 The Project as a whole in the context of employment and labour market pressure is considered in section 14.76.[72]

Tourism and Recreation

Construction – Visual

14.10.2 During construction, some visual effects will be created. However, given the lack of tourism/recreation receptors within close proximity of the Project, the overall impact is not significant on tourism. The siting of the Project and the adoption of the mitigation measures noted in Chapter 11 (e.g. landscape and ecology mitigation strategy) will reduce the visual affect further. There are also

[72] The socio-economic employment and GVA effects are considered for the Project as a whole in section 14.6. Construction information is only available for the Project as a whole.

examples of other energy infrastructure in the area which will lessen the visual effect further.

14.10.3 The anticipated magnitude of visual impact is anticipated to be minor adverse. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Construction – Noise

14.10.4 Any noise impacts are expected to be predominately restricted to the immediate area of the Project. There is not a significant cluster of tourism-related activity in this area. Noise is not therefore expected to be a significant issue for tourism activity.

14.10.5 Adherence to the mitigation measures noted in Section 3.6 will ensure that there will be no significant adverse noise effects.

14.10.6 The magnitude of the impact is considered negligible adverse. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Construction – Traffic/ accessibility

14.10.7 There will be some disruption on the road network as a result of construction traffic coming and going from the Project Site. However, the implementation of the embedded mitigation measures outlined in Section 3.6 should ensure that no tourism or recreational related businesses/receptors are affected significantly.

14.10.8 The magnitude of the impact is considered minor adverse. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Construction – Air quality

14.10.9 Any air quality impacts are expected to be primarily restricted to the immediate local area around the proposed Project Site. As stated above there is not a significant cluster of tourism-related activity around the proposed Project Site. Therefore, air quality is not expected to be a significant issue for tourism in the area.

14.10.10 Adoption of the embedded mitigation measures noted in Section 3.6 should ensure that no tourism or recreational related businesses or receptors are affected significantly during construction or operation.

14.10.11 The magnitude of the impact is considered negligible. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Visual

14.10.12 Views will be restricted to receptors with distant partial views. As stated above, the Project will sit within a context where industrialisation of the countryside has already taken place.

14.10.13 The impact on tourism and recreational receptors therefore is minor adverse. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Noise

14.10.14 The noise impacts of the Project will be predominately localised and will not affect tourism/recreation receptors within the Study Area. The magnitude of the impact is therefore considered minor adverse for tourism and recreational receptors. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Traffic

14.10.15 An assessment of traffic and transport related effects (Chapter 12) anticipates that traffic to the Project Site will be infrequent during the operational phase. The magnitude of impact on tourism and recreational receptors therefore is negligible adverse. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Air quality

14.10.16 The assessment of air quality effects (Chapter 6) anticipates that the Project as a whole is unlikely to result in impacts on air quality during the operational phase. The impact on tourism and recreational receptors therefore is negligible adverse. Taking into consideration the medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Decommissioning

14.10.17 The effects noted in the construction sections above for the Project as a whole are anticipated to be the same for the decommissioning phase.

Community Infrastructure

Construction – Visual

14.10.18 During construction, some visual effects will be created. However, given the lack of community infrastructure receptors within close proximity of the Project, the overall impact is not significant. The siting of the Project and the adoption of the embedded mitigation measures outlined in Section 3.6 will reduce the visual affect further. There are also examples of other energy infrastructure in the area which will lessen the visual effect further.

14.10.19 The anticipated magnitude of visual impact is anticipated to be minor adverse. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Construction – Noise

14.10.20 Any noise impacts are expected to be primarily restricted to the immediate area of the Project. There is not a significant cluster of community facilities in this area. Noise is not therefore expected to be a significant issue for community infrastructure receptors.

14.10.21 Adherence to the mitigation measures noted in Section 3.6 will ensure that there will be no significantly adverse noise impacts.

14.10.22 The magnitude of the impact is considered negligible. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Construction – Traffic/ accessibility

14.10.23 There will be some disruption on the road network as a result of construction traffic coming and going from the Project Site. However, the implementation of the embedded mitigation measures outlined in Section 3.6 should ensure that no community infrastructure receptors are affected significantly.

14.10.24 The magnitude of the impact is considered minor adverse. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Construction – Air quality

14.10.25 Any air quality impacts are expected to be predominately restricted to the immediate local area around the Project Site. As stated above there is not a significant cluster of community infrastructure receptors around the Project Site. Therefore, air quality is not expected to be a significant issue in the area.

14.10.26 Adoption of the mitigation measures noted in Section 3.6 should ensure that no community infrastructure receptors are affected significantly during construction or operation.

14.10.27 The magnitude of the impact is considered negligible. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Visual

14.10.28 As previously discussed there are no community infrastructure receptors within immediate proximity of the Project. Views will therefore be restricted to receptors with distant partial views. As stated in the Construction section, any visual impact should be reduced if the mitigation measures mentioned in Chapter 11 (landscape and visual assessment) are adopted. Moreover, the Project will sit within a context where industrialisation of the countryside has already taken place.

14.10.29 The impact on community infrastructure receptors therefore is minor adverse. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Noise

14.10.30 The noise impacts of the Project will be primarily localised and will not affect community infrastructure receptors within the Study Area. The magnitude of the impact is therefore considered negligible for community infrastructure receptors. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Traffic/ accessibility

14.10.31 The assessment of traffic and transport related effects (Chapter 12) anticipates that traffic to the Project Site will be infrequent during the operational phase. The impact on community infrastructure receptors therefore is negligible. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Operation – Air quality

14.10.32 The Air Quality Chapter confirmed that the Project as a whole is unlikely to result in impacts on air quality during the operational phase. The impact on community infrastructure receptors therefore is negligible adverse. Taking into consideration the low/medium sensitivity, the likely effect would be slight adverse and therefore not significant.

Decommissioning

14.10.33 The effects noted in the construction sections above for the Project as a whole are anticipated to be the same for the decommissioning phase.

14.11 Cumulative and in-combination effects

Cumulative effects: Socio-economics

14.11.1 Section 4.10 of this ES includes an initial schedule of projects to be included in the cumulative assessment.

14.11.2 Table 14.31 shows the construction job requirement for each project included in the cumulative assessment. Estimates have been based on construction costs using Building Cost Information Service data (2017).[73]

[73] Commercial database subscription held by PBA

14.11.3 A total of 6,734 temporary construction jobs would be required to build nearby projects, or 6,826 when including the Project.

Table 14.31 Cumulative Projects and Construction Job Requirement

Ref	Description	Cost (£m)	Person years
EN100011	Covanta RRF Project to the north of the Generating Equipment Site - immediately adjacent to Generating Equipment Site;	N/A	347*
CB/14/02453/OAC	Integrated Waste Management Operations at Rookery South, Bedfordshire – immediately adjacent to Generating Equipment Site;	N/A	320
CB/14/00925	Brogborough Wind Energy Project	£25.3	20
14/03135/MAR	Land East of Broadmead Road, Stewartby	£42.9	411
CB/16/04277/RM	Land at Moreteyne Farm at Wood End in Marston Moretaine proposed for residential properties – approximately 2km west of the Project Site;	£48.7	466
CB/11/04445/OUT	Outline Application: mixed use development on 14.5ha comprising up to 125 new dwellings including affordable housing on 4.15ha, employment uses (class B1 and B8) on 7.01ha, allotments, landscaping, balancing ponds and amenity space on 3.34ha.	£43.4	416
CB/16/02697/RM	Land at Warren Farm on Flitwick Road in Ampthill proposed for residential properties – approximately 3.5km south of Gas Connection AGI;	£ 54.1	519
CB/16/00919/RM	Reserved Matters: 259 Dwellings to include Appearance, Landscaping, Layout and Scale (all Matters Reserved except Access) Pursuant to Outline Permission CB/12/01496/OUT	£34.2	328
CB/15/02258/FULL	Land off Marston Road, Lidlington – proposed residential development of 31 dwellings - approximately 2km west of Electrical Connection;	£ 4.1	39
CB/16/05887/OUT	Land opposite The Lane & Lombard Street, East of Marston Road, Lidlington – proposed residential development of 40 dwellings approximately 2km west of Electrical Connection;	£ 5.3	51
CB/16/05797/OUT	Lower Shelton Road, Marston Moretaine - proposed residential development of 15 dwellings approximately 4km north of Access Road;	£ 2.0	19
CB/17/02575/OUT	Land East of Ampthill Road and North of Bedford Road, Houghton Conquest - proposed mixed use development including 650 dwellings approximately 4km north-east of Power Generation Plant;	£85.8	822
CB/17/01389/RM	Land off Chapel End Road, Houghton Conquest – proposed residential development of 125 dwellings approximately 4km north-east of Power Generation Plant; and	£16.5	158

Ref	Description	Cost (£m)	Person years
15/02060/MAF	Land South of Fields Road and East of Cranfield Road, Wootton – proposed residential development of 600 dwellings – approximately 5km north of Access Road.	£79.2	759
17/00284/MAO	Land east of Duck End Lane, Wilstead	£33.0	316
N/A	Land East of Anglia Way, Great Denham – 48 dwellings and associated infrastructure	£ 6.3	61
N/A	The new settlement at Wixams	£ 490.7**	470
CB/17/02601/MW	Four Winds Industrial Estate, West End, Haynes, Bedford, MK45 3QT - Redevelopment and expansion of waste transfer station and materials recycling facility (c6k south-east)	£ 1.1	10
CB/17/02719/OUT	Bayley Gate Farm, College Road, Cranfield – up to 300 dwellings, school and local service centre (c.7k west)	£13.2	126
CB/17/03375/MW	Cranfield University Sewage Treatment Works, Handley Page Close, Wharley End – clean pilot hall and welfare facility (c.7k west)	£ 0.2	2
17/02141/MAO	Cemetery Road, Kempston	£ 7.3	70
17/02015/MAF	Chantry Avenue, Kempston	£ 6.3	61
CB/14/05007/OUT	Land to the West of Mill Road, Cranfield	£30.4	291
16/02538/EIASCR	Marston Vale Business Park, land south of Fields Road, Wootton	£ 61.6	590
CB/16/05127/OUT	Land at the former Fullers Earth Quarry, Ampthill Road, Clophill	£ 6.6	63
	Total	**£1,098.2**	**6,734**
	Total with Millbrook		**6,826**
* NIP Socio-Economics Report (2010)– Assumed over 3 years of construction. **Assumed construction over 10 years			

14.11.4 The Absorption Capacity Table 14.32 below demonstrates sufficient labour in within the wider area & region drive time of the Project to build all of the cumulative projects (i.e. the total requirement does not exceed 15% for any category). The wider area (45- minute drive time) and region (60-minute drive time) have been considered for construction employment impacts since construction labour is more likely to come from these areas than from the local labour market[74].The cumulative projects could therefore be built using labour from the Project labour market area without creating any minor labour market distortions. In reality the labour market for the cumulative projects will be much wider than the Project labour market area providing access to a wider labour pool.

Table 14.32 Cumulative Projects Absorption Capacity (30; 45 and 60-minute drive times)

	30 mins	45 mins	60 mins
No. of workers			
Economically Active	305,113	861,116	1,756,525
Economically active: Unemployed	18,039	47,901	92,531
Highly Skilled	118,254	344,893	733,538
Skilled	88,792	251,846	509,072
Semi-skilled & Unskilled	76,965	207,544	403,729
Manufacturing	24,817	70,981	136,107
Construction	21,360	62944	126,668
Electricity & gas	1,018	2,731	5,298
Average Construction workers per year (6,826) as % of:			
Economically Active	2%	1%	0%
Economically active: Unemployed	38%	14%	7%
Highly Skilled	16%	5%	2%
Skilled	12%	4%	2%
Semi-skilled & Unskilled	9%	3%	2%
Manufacturing	28%	10%	5%
Construction	32%	11%	5%

14.11.5 The Absorption Capacity analysis assumes a worst case scenario (i.e. all cumulative projects will be constructed at the same time.) In practice this is unlikely to occur for a number of reasons:

- Some of the projects may not be consented or developed;
- The construction of the noted schemes is unlikely to take place concurrently. Some involve construction over a more extended period than the Project (further diluting absorption effects);

[74] The Construction Industry Training Board research document (2015) suggests that about 50% of construction workers in the East of England regularly travel more than 50 miles to their place of work.

- The labour market catchments for a number of the noted projects will differ from that of the Project;
- A number of the projects are likely to require more specialist construction skills. It is unlikely that the construction needs for all of the projects noted can be met from within localised catchments;
- Construction labour is highly mobile and flexible. Should capacity bottlenecks emerge, labour can generally be brought in from further afield; and
- A proportion of specialist labour would be sourced from across the UK.

14.11.6 It is therefore considered based on this assessment that there will be no cumulative impact on the wider labour market area, as the total projects are anticipated to constitute below 15% of total construction labour in the wider area. Combined, the cumulative projects will provide a positive stimulus to the study area economy through the provision of construction related training and employment opportunities, supply chain linkages and demand for accommodation, food and drink services.

Cumulative effects: Tourism and Recreation and Community Infrastructure

14.11.7 Construction and decommissioning of the Project could occur simultaneously with other projects located in the vicinity of the Project Site. The Air Quality, Noise, LVIA and Traffic Chapters all conclude that there would be no significant adverse cumulative effects. Therefore, it can be assumed that cumulative impacts on tourism and recreation receptors and community infrastructure receptors would also be not significant during the construction/decommissioning process given the distance of these receptors from the Project Site (all further away than the closest sensitive receptors assessed in those respective chapters).

14.11.8 As with the construction/decommissioning phases, the Air Quality, Noise and Traffic Chapters all confirm that during operation there will not be significant cumulative effects. As a result, it is not envisaged that there will be adverse impacts on tourism and recreation receptors and community infrastructure receptors during the operation phase given the distance of these receptors from the Project Site (all further away than the closest sensitive receptors assessed in those respective chapters).

14.12 Mitigation and Assessment of Residual Effects

Socio economics

14.12.1 Mitigation is not required for slight adverse impacts. Therefore, no additional mitigation is provided.

Tourism

14.12.2 The tourism receptors will not be significantly affected and mitigation will not be required for these slight adverse impacts.

Community Infrastructure

14.12.3 The community infrastructure assessment shows that there are a limited number of community facilities in close proximity to the Project.

14.12.4 Therefore no mitigation is required because no significant effects are identified.

14.13 Summary of Residual Effects

14.13.1 Table 14.33, Table 14.34 and Table 14.35 set out a summary of the significant effects arising from the Project during construction, operation and de-commissioning for socio-economics, tourism and recreation and community infrastructure assessments.

14.13.2 The assessment uses the receptor sensitivity and magnitude of impact criteria in Tables 14.2 -14.7 and the Significance of effect criteria in Table 14.8.

Table 14.33 Summary of Residual Effects – Socio-economics

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.2)*	Effect	Magnitude/ spatial extent Duration *(Table 14.3)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
Construction phase									
Power generation plant	Labour market	Low	Beneficial employment effect	Slight beneficial 60-minute drive time Short-term (22 months)	High	No mitigation required	Slight beneficial– not significant	None	Slight beneficial– not significant
Project (in combination and synergistic)	Labour market	Low	Beneficial employment effect	Slight beneficial	Medium	No mitigation required	Slight beneficial– not significant	None	Slight beneficial employment effect
Cumulative effects	Labour market	Low	Beneficial employment effect	Slight beneficial/ Cumulative projects are likely to be built over a c.5-year period	Medium	No mitigation required	Slight beneficial – not significant	None	Slight beneficial – not significant
Operational phase									
Power generation plant	Labour market	Low	Beneficial employment effect	Slight beneficial/ 60-minute drive time Long-term (25 years +)	High	No mitigation required	Slight beneficial – not significant	None	Slight beneficial – not significant
Project (in combination and synergistic)	Labour market	Low	Beneficial employment effect	Slight beneficial/ 60-minute drive time Long-term (25 years +)	High	No mitigation required	Slight beneficial – not significant	None	Slight beneficial – not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.2)*	Effect	Magnitude/ spatial extent Duration *(Table 14.3)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
Cumulative effects	Labour market	Low	Beneficial employment effect	Slight beneficial/ 60-minute drive time Long-term (25 years +)	High	No mitigation required	Slight beneficial – not significant	None	Slight beneficial – not significant
Decommissioning *(Precise information unknown. Effects and Impacts assumed to be no greater than construction)*									
Power generation plant	Labour market	Low	Beneficial employment effect	Slight beneficial/	High	No mitigation required	Slight beneficial employment effect	None	Slight beneficial employment effect
Project (in combination and synergistic)	Labour market	Low	Beneficial employment effect	Slight beneficial/	Medium	No mitigation required	Slight beneficial employment effect	None	Slight beneficial employment effect
Cumulative effects	Labour market	Low	Beneficial employment effect	Slight beneficial/	Medium	No mitigation required	Slight beneficial employment effect	None	Slight beneficial employment effect

Table 14.34 Summary of Residual Effects – Tourism/Recreation

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
Construction & Decommissioning phases									
Power generation plant *(1/4 components)*	The Forest Centre and Millennium Country Park	Medium	**Visual Noise Transport Air Quality**	Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral– not significant	None	Neutral – not significant
	Bird of Prey Centre	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	De Grey Mausoleum	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	Summerfields Miniature Railway	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	National Cycle Route 51	High		Local Short term Negligible adverse	High		Slight adverse – not significant	None	Slight adverse– not significant
	Forest Centre to Bedford via	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	Shocott Spring								
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
	Forest Centre to Cranfield	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
	Optional Loop via Bourne End, Wootton	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
	Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
	Forest Centre to	Low		Local Short term	High	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
	Gateway Woods			Negligible adverse					
	The John Bunyan Trail	Medium		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Cranfield Hulcote Salford Circular Walk	Low		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Gas Connection ***(2/4 components)***	The Forest Centre and Millennium Country Park	Medium	**Visual** **Noise** **Transport** **Air Quality**	Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
	Bird of Prey Centre	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	De Grey Mausoleum	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	Summerfields Miniature Railway	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	National Cycle Route 51	High		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Bedford via Shocott Spring	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	Forest Centre to Cranfield	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Gateway Woods	Low		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The John Bunyan Trail	Medium		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
	Cranfield Hulcote Salford Circular Walk	Low		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Electrical connection ***(3/4 components)***	The Forest Centre and Millennium Country Park	Medium	Visual Noise Transport Air Quality	Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Bird of Prey Centre	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	De Grey Mausoleum	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Summerfield s Miniature Railway	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	National Cycle Route 51	High		Local Short term	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
				Negligible adverse					
	Forest Centre to Bedford via Shocott Spring	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Cranfield	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre & Millennium Country Park	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
	to Millbrook & Ampthill								
	Forest Centre to Gateway Woods	Low		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The John Bunyan Trail	Medium		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Cranfield Hulcote Salford Circular Walk	Low		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Project (in combination and synergistic) ***(4/4 components)***	The Forest Centre and Millennium Country Park	Medium	Visual Noise Transport Air Quality	Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	Wrest Park	Medium		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral– not significant	None	Neutral – not significant
	Bird of Prey Centre	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral– not significant	None	Neutral – not significant
	De Grey Mausoleum	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Summerfields Miniature Railway	Low		Local Short term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	National Cycle Route 51	High		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Bedford via Shocott Spring	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Centre Parcs via Lidlington	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	and Millbrook								
	Forest Centre to Cranfield	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low		Local Short term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Gateway Woods	Low		Local Short term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The John Bunyan Trail	Medium		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Short term	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
				Moderate adverse					
	Cranfield Hulcote Salford Circular Walk	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Short term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Cumulative effects				**Not Significant**					
Operation Phase									
Power Generation Plant ***(1/4 components)***	The Forest Centre and Millennium Country Park	Medium	Visual Noise Transport Air Quality	Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Bird of Prey Centre	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant
	De Grey Mausoleum	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Summerfields Miniature Railway	Low		Local Long term	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
				No Change					
	National Cycle Route 51	High		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Bedford via Shocott Spring	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Cranfield	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low		Local Long term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Gateway Woods	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The John Bunyan Trail	Medium		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Long term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Cranfield Hulcote Salford Circular Walk	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Gas connection ***(2/4 components)***	The Forest Centre and Millennium Country Park	Medium	Visual Noise Transport	Local Long term	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
			Air Quality	Negligible adverse					
	Houghton House	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Bird of Prey Centre	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral– not significant	None	Neutral – not significant
	De Grey Mausoleum	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Summerfields Miniature Railway	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	National Cycle Route 51	High		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Bedford via Shocott Spring	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to	Low		Local Long term	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	Bromham Mill			Negligible adverse					
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Cranfield	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Gateway Woods	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** ***(Table 14.4)***	**Effect**	**Magnitude / spatial extent Duration** ***(Table 14.5)***	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** ***(Table 14.8)***
	The John Bunyan Trail	Medium		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Cranfield Hulcote Salford Circular Walk	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Electrical connection ***(3/4 components)***	The Forest Centre and Millennium Country Park	Medium	Visual Noise Transport Air Quality	Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Long term	High	Embedded: Refer to Chapter 3	Neutral– not significant	None	Neutral– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
				No Change					
	Bird of Prey Centre	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	De Grey Mausoleum	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Summerfields Miniature Railway	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	National Cycle Route 51	High		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Bedford via Shocott Spring	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
	Forest Centre to Cranfield	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre & Millennium Country Park to Millbrook & Ampthill	Low		Local Long term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Gateway Woods	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The John Bunyan Trail	Medium		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Long term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	Cranfield Hulcote Salford Circular Walk	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Project (in combination and synergistic) ***(4/4 components)***	The Forest Centre and Millennium Country Park	Medium	Visual Noise Transport Air Quality	Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Houghton House	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Wrest Park	Medium		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Bird of Prey Centre	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	De Grey Mausoleum	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	Summerfields Miniature Railway	Low		Local Long term No Change	High	Embedded: Refer to Chapter 3	Neutral – not significant	None	Neutral – not significant
	National Cycle Route 51	High		Local Long term	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.4)*	Effect	Magnitude / spatial extent Duration *(Table 14.5)*	Likelihood of occurrence	Mitigation/ response (embedded and additional mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
				Negligible adverse					
	Forest Centre to Bedford via Shocott Spring	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Clay Way: Forest Centre to Bromham Mill	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Centre Parcs via Lidlington and Millbrook	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Cranfield	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Optional Loop via Bourne End, Wootton	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre to Lidlington & Folly Wood	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Forest Centre & Millennium Country Park	Low		Local Long term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor** *(Table 14.4)*	**Effect**	**Magnitude / spatial extent Duration** *(Table 14.5)*	**Likelihood of occurrence**	**Mitigation/ response (embedded and additional mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect** *(Table 14.8)*
	to Millbrook & Ampthill								
	Forest Centre to Gateway Woods	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The John Bunyan Trail	Medium		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	The Marston Jubilee Walk	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Timberland Trail	Low		Local Long term Moderate adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Cranfield Hulcote Salford Circular Walk	Low		Local Long term Negligible adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
	Greenwood Cycle Trail	Low		Local Long term Minor adverse	High	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Cumulative effects				**Not significant**					

Table 14.35 Summary of Residual Effects – Community Infrastructure

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.6)*	Effect	Magnitude/ spatial extent Duration *(Table 14.7)*	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
Construction & Decommissioning phases									
Power generation plant	Community infrastructure receptors	Low/Medium	Visual	Local Short term Minor adverse	Medium	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
			Noise	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
			Transport	Local Short term Minor adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
			Air Quality	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Gas connection	Community infrastructure receptors	Low/Medium	Visual	Local Short term Minor adverse	Medium	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
			Noise	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
			Transport	Local Short term Minor Adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
			Air Quality	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor *(Table 14.6)***	**Effect**	**Magnitude/ spatial extent Duration *(Table 14.7)***	**Likelihood of occurrence**	**Mitigation/ response (embedded mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect *(Table 14.8)***
Electrical connection	Community infrastructure receptors	Low/Medium	Visual	Local Short term Minor adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
			Noise	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
			Transport	Local Short term Minor adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
			Air Quality	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
Project (in combination and synergistic)	Community infrastructure receptors	Low/Medium	Visual	Local Short term Minor adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
			Noise	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
			Transport	Local Short term Minor adverse	Medium	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
			Air Quality	Local Short term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
Cumulative effects				**Not Significant**					
Operation Phase									
		Low/Medium	Visual	Local Long term	Medium	None	Slight adverse–not significant	None	Slight adverse–not significant

Project component/ Effect types	**Receptor/ Affected group**	**Sensitivity of receptor *(Table 14.6)***	**Effect**	**Magnitude/ spatial extent Duration *(Table 14.7)***	**Likelihood of occurrence**	**Mitigation/ response (embedded mitigation)**	**Significance of effect (with embedded mitigation)**	**Additional mitigation (if required)**	**Significance of Residual Effect *(Table 14.8)***
Power generation plant	Community infrastructure receptors			Minor adverse					
			Noise	Local Long term Minor adverse	Low	Refer to Chapter 6	Slight adverse–not significant	None	Slight adverse–not significant
			Transport	Local Long term Negligible adverse	Low	None	Slight adverse–not significant	None	Slight adverse–not significant
			Air Quality	Local Long term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
Gas connection	Community infrastructure receptors	Low/Medium	Visual	Local Long term Negligible adverse	Low	None	Slight adverse–not significant	None	Slight adverse–not significant
			Noise	Local Long term Negligible adverse	Low	None	Slight adverse–not significant	None	Slight adverse–not significant
			Transport	Local Long term Negligible adverse	Low	None	Slight adverse–not significant	None	Slight adverse–not significant
			Air Quality	Local Long term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse–not significant	None	Slight adverse–not significant
Electrical connection	Community infrastructure receptors	Low/Medium	Visual	Local Long term Minor adverse	Medium	None	Slight adverse–not significant	None	Slight adverse–not significant
			Noise	Local Long term	Low	None	Slight adverse–not significant	None	Slight adverse–not significant

Project component/ Effect types	Receptor/ Affected group	Sensitivity of receptor *(Table 14.6)*	Effect	Magnitude/ spatial extent Duration *(Table 14.7)*	Likelihood of occurrence	Mitigation/ response (embedded mitigation)	Significance of effect (with embedded mitigation)	Additional mitigation (if required)	Significance of Residual Effect *(Table 14.8)*
				Minor adverse					
			Transport	Local Long term Negligible adverse	Low	None	Slight adverse– not significant	None	Slight adverse– not significant
			Air Quality	Local Long term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Project (in combination and synergistic)	Community infrastructure receptors	Low/Medium	Visual	Local Long term Minor adverse	Medium	None	Slight adverse– not significant	None	Slight adverse– not significant
			Noise	Local Long term Minor adverse	Low	None	Slight adverse– not significant	None	Slight adverse– not significant
			Transport	Local Long term Negligible adverse	Low	None	Slight adverse– not significant	None	Slight adverse– not significant
			Air Quality	Local Long term Negligible adverse	Low	Embedded: Refer to Chapter 3	Slight adverse– not significant	None	Slight adverse– not significant
Cumulative effects				**Not Significant**					

14.14 Conclusions

14.14.1 This chapter assessed the Project's potential to create socio-economic effects from increased investment in the local economy, increased demand for labour and increased pressure on the areas community infrastructure. Effects on the area's tourism economy and recreational assets were also assessed. Potential effects were considered for during the construction, operational and decommissioning phases.

Baseline

14.14.2 The study area's socio-economic position has been described using standard indicators. This provides a baseline from which potential impacts and effects can be assessed.

14.14.3 The baseline socio-economic status of the local area surrounding the Project is characterised by a pattern of population increase which is expected to continue until 2021. The area has a declining work age population with more than one fifth of the population expected to be at retirement age by 2021. This is also coupled with high economic activity which is higher than the UK average. Retail work is the main employment category in the local area, and is above the national average. Tourism volume and value in Central Bedfordshire recovered strongly during the period 2011-13 but has decreased slightly to 2013-2015. It now accounts for approximately one third of Bedfordshire's tourism economy. Previously Central Bedfordshire accounted for approximately a quarter of Bedfordshire's tourism volume and value. Tourist trips and bed-nights are now just above 2006 levels.

14.14.4 The tourism audit and community infrastructure audit have identified receptors within the study areas. This has allowed potential impacts and effects to be assessed.

Construction Phase

14.14.5 The Project will have slight positive effects on the socio-economic status of the area through both employment creation and capital expenditure and worker spending in the local economy. It is anticipated that up to 122 construction workers would be required at the Project Site during peak periods at any one time. Project construction would support up to nine permanent full time equivalent construction jobs and deliver £6.4 million GVA to the wider economy.

14.14.6 These workers would not only benefit the economy directly, but would also have knock on effects on other businesses (e.g. slight positive impact to accommodation providers in providing accommodation for temporary workers).

14.14.7 No likely significant impacts are predicted on tourism and community infrastructure as a result of the Project from visual, noise, traffic and accessibility and air quality impacts, given that assessments in Chapters 11, 7, 12 and 6 respectively have concluded that there will be no likely significant effects arising from these areas.

14.14.8 A total of 6,826 temporary construction jobs would be required to build nearby projects. The assessment shows that there is sufficient labour in a 60-minute drive time of the Project to build all of the cumulative projects. The cumulative projects could therefore be built using labour from the Project labour market area without creating any minor labour market distortions. The projects would therefore contribute to an overall slight benefit in terms of job creation.

Operational Phase

14.14.9 During operation, there will be 10 FTE jobs created at the Project Site. This is anticipated to bring minor beneficial effects to the area in the vicinity of the Project Site through the generation of jobs, supply chain linkages and employee spending. The Project's operation would provide approximately £0.85m GVA and £0.50m GVA per annum to the local and national economy respectively.

14.14.10 No likely significant impacts are predicted on tourism and community infrastructure as a result of operation of the Project from visual, noise, traffic and accessibility and air quality impacts, given that assessments in Chapters 7, 12 and 6 respectively have concluded that there will be no likely significant effects arising from these areas on tourism or community assets.

Decommissioning Phase

14.14.11 The labour requirement for the decommissioning programme is unknown but is not expected to exceed that of the construction phase. Decommissioning effects are therefore considered to be likely to be similar to the construction impacts. The Project's decommissioning phase will therefore provide an overall 'slight' beneficial employment impact.

14.14.12 The conclusions of this socio-economic assessment are that the construction, operation and maintenance and decommissioning of the Project does not result in any likely significant effects on socio-economic matters, either when considered alone or cumulatively with other developments.

15 Other Issues Considered

15.1 Introduction

15.1.1 It is recognised that during the EIA process, some of the statutory consultees have raised concerns that the Project may give rise to likely significant environmental effects over and above those described in Chapters 6-14 of this ES. Specifically, the Scoping Opinion (Appendix 1.2) requests that the ES describes the likely significant environmental impacts of the types of waste generated by the Project at all stages and the method/s of removing it, including identifying potential transport routes, as well as the impact of the Project on human health with specific focus on the Electromagnetic Fields (EMF) arising from operation of the Electrical Connection.

15.1.2 This chapter presents an assessment of the likely significant environmental effects of waste generated by the Project and the likely significant effects of the Project on human health (including focussing on EMF). It also considers residential amenity, together with the mitigation measures envisaged in order to avoid, reduce and, if possible, offset significant adverse effects.

15.2 Waste

Construction and Decommissioning

15.2.1 As part of the construction works for the Project, there is likely to be limited potential for the generation of waste associated with the Power Generation Plant. This is mainly due to the fact that the LLRS will ensure that a level platform is created in the base of the Rookery South Pit suitable for siting the Generating Equipment. There are therefore not anticipated to be large quantities of earth moving required for site levelling which can sometimes be required for this type of construction project.

15.2.2 There may however be small amounts of waste spoil produced from excavations for foundations of the Generating Equipment and for levelling of the Access Road.

15.2.3 There may also be small amounts of waste spoil produced from excavations for the Gas Connection (e.g. pipeline trench and ground preparation works) for the AGI and for the cable trench and SECs associated with the Electrical Connection.

15.2.4 The construction and decommissioning phases of the Project will operate in full accordance with the Waste Framework Directive and the Waste (England and Wales) Regulations 2011 (where relevant). The Applicant, at all phases of the Project, will seek to apply the waste hierarchy as part of their waste prevention and management policy as part of the CEMP – an outline of which is presented in Appendix 3.2.

15.2.5 The waste hierarchy consists, in order of preference, of:

- Prevention;
- Re-use;
- Recycling;
- Other recovery (e.g. energy recovery); and
- Disposal.

15.2.6 Therefore, in the first instance, waste will be minimised as far as reasonably practical. It is envisaged that where possible the small amounts of waste spoil, detailed above, will be re-used on the Project Site for e.g. landscaping. This is likely to be a practical use of waste spoil as an assessment of the ground conditions at the Project Site, presented in Chapter 10 of the ES, has suggested that there is a low risk of contaminated materials being present.

15.2.7 An Outline CEMP has been prepared and is presented in Appendix 3.2. This forms the framework upon which the final CEMP will be produced by the principal construction contractor. The Outline CEMP provides for the submission of construction method statements for approval by the local authority prior to commencement of construction as well as provision for a site waste management strategy.

15.2.8 Measures would include, amongst others, the stockpiling of excavated spoil and testing for Waste Acceptance Criteria[75], to determine whether it can be re-used on- or off-site, and the testing and removal, as appropriate, of any water from de-watering activities which will be handled by a suitably licensed waste contractor.

15.2.9 In order to facilitate the implementation of the Waste Framework Directive during decommissioning, much of the structures and equipment for the Project will be made of materials suitable for recycling as far as is practicable. For example, of the use of pre-fabricated steel which would be of interest to scrap metal merchants.

15.2.10 It is likely that some underground structures, including the cables associated with the Electrical Connection and Pipeline associated with the Gas Connection, may be left in situ to avoid any adverse environmental impacts associated with their removal. Due regard would be paid to all best practice guidelines on the decommissioning of projects which are relevant at the time. Where possible, items of plant would be re-cycled or re-used.

15.2.11 The CEMP would ensure that all types of waste generated during the construction stage of the Project will be dealt with in a manner that complies

[75] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296422/geho1110btew-e-e.pdf

with relevant legislation and (upon leaving the Project Site) waste will be treated and disposed of by suitably licensed contractors.

15.2.12 The routes used for construction traffic entering and leaving the Project Site are described in section 12.6. These routes would also be used during construction and decommissioning for the removal of any waste materials.

Operation

15.2.13 During operation a feature of the Gas Turbine Generator technology to be incorporated in the Project (as described in Chapters 3 and 5) is that waste generated should be minimal and will be restricted to the following:

- General office waste;
- Used air intake filters (typically replaced annually);
- Separated oil / sludge from oil / water separators; and
- Used oil, chemicals or chemical containers.

15.2.14 Only small quantities of potentially hazardous waste will be stored on the Project Site at any time, comprising e.g. lubricating oils for continued maintenance of the Generating Equipment. Any such substances will be held in secured containers to prevent contaminant migration (e.g. bunded to 110% of the capacity of any tank). These substances will be used up during operation of the Generating Equipment, and so large quantities of waste substances are not anticipated. Closed storage facilities or suitable dampening techniques will be utilised within the Project where emissions of dust etc. from waste are possible.

15.2.15 Where waste does require removal from site during maintenance (e.g. substances set out above) this will be via a dedicated contractor licensed to handle and treat, recycle or dispose of such wastes. Routes for waste removal would be as per operational access requirements described in section 12.6.

15.2.16 Based on the above, it can be concluded that that the Project will not result in any likely significant environmental effects with respect to waste.

15.3 Human Health

Introduction

15.3.1 The potential for likely significant effects of the Project on human health relate primarily, to exposure to excessive levels of noise, pollutants released during construction or operation of the Project (to the air, water or land) as well as effects relating to EMFs.

15.3.2 An assessment of the likely significant environmental effects from noise and pollution are described in more detail in Chapters 6 (Air Quality), 7 (Noise and Vibration), 9 (Water Quality and Resources) and 10 (Ground Conditions) of this ES and effects on Socio-economics (e.g. wellbeing) have been covered in

Chapter 14. It is therefore not the aim of this section to repeat these assessments, but rather to highlight the conclusions of these Chapters relating specifically to human health as well as to outline the findings of a separate EMF report.

Electromagnetic Fields (EMF)

15.3.3 EMF can be generated from high voltage electrical equipment under certain weather conditions. The resultant impact may be a crackle or loud hum noise. The potential effects relate only to the operational phase of the Electrical Connection for the Project as EMF is only generated through electrical infrastructure which is live and operational.

15.3.4 An EMF report has been prepared for the Project and is presented in Appendix 15.1 A summary of this report is presented below:

15.3.5 UK power developers (such as the Applicant) rely on national guidelines in accordance with Government advice to ensure that new installations consider health risks based on current knowledge. The UK's Health Protection Agency, previously the National Radiological Protection Board (NRPB), provides independent recommendations to the Government based on reviews of international study results.

15.3.6 In the absence of statutory regulations to limit the exposure of people to power-frequency electric or magnetic fields, guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) are adopted in the UK as recommended by the NRPB.

15.3.7 The electric fields due to the Substation would be inherently compliant with the public exposure limits as discussed above. The proposed Substation would be surrounded by an earthed metal fence and consequently the electric field outside of this fence due to the substation equipment it encloses would comply with ICNIRP exposure guidelines for the public.

15.3.8 There are no external electric fields associated with underground cables. Electric fields associated with underground cables are contained by the sheath of the cable itself. The public would thus not be exposed to electric fields from the proposed underground cables.

15.3.9 Some equipment within the Substation would produce magnetic fields, but these fields tend to diminish rapidly with increasing distance from the equipment. Magnetic fields outside the Substation due to these items of equipment are inherently compliant with public exposure limits, as discussed above.

15.3.10 The prospective magnetic field strength due to the proposed underground cables is calculated to remain below the public exposure basic restriction levels.

15.3.11 There will be a magnetic field due to the underground cables from the SECs beside the existing overhead line to the proposed Substation. However, this will be a relatively short length of cable and given the conclusions above, there will be no impacts arising from this which could give rise to public health issues.

Air Quality

Construction and Decommissioning

15.3.12 The results of the air quality assessment are set out in Chapter 6 of this ES.

15.3.13 The likely significant effects on human health regarding air quality from construction and decommissioning of the Project relate to dust generated from construction activities (e.g. excavation for new foundations associated with the Substation and Generating Equipment, excavation of the Pipeline route and excavation for the Electrical Connection) and exhaust emissions from construction traffic.

15.3.14 However, it is considered unlikely that levels of atmospheric dust would be generated which would constitute a health hazard or nuisance to local people in the vicinity of the Project Site (Chapter 6, section 6.7). The limited numbers of vehicle movements associated with the Project means that significant effects on human health from exhaust emissions are not anticipated.

15.3.15 Any significant adverse effects on human health arising from the dust generated during construction and decommissioning would be remedied through implementation of a CEMP, which would incorporate appropriate dust mitigation measures for low risk sites from IAQM guidance such as damping down or covering of stock piles and excavations during dry and windy weather. Additionally, the majority of particulates from construction and decommissioning activities settle within a very short distance of any construction site (approximately 200m). Therefore, effects on receptors further afield from the Project Site will be negligible and not significant.

Operation

15.3.16 The main likely significant effects on human health in relation to air quality arising from operation of the Project are associated with the stack emissions from combustion of natural gas in the Generating Equipment releasing emissions of NOx.

15.3.17 However, modern gas fired power plant are inherently clean and produce far fewer emissions than other fossil fuel power plants (e.g. coal) when compared on an energy output basis. Emissions of NOx are strictly limited under national and international guidelines such as the IED. Operation of the Generating Equipment will also be regulated by the EA under an Environmental Permit, which will limit emissions in line with national guidelines.

15.3.18 Air quality modelling has shown that the stack height selected for the Project of 32.5 – 35 m will achieve adequate dispersion of NOx to meet legislative limits and prevent any impacts to identified receptors. It is concluded, therefore, that there will not be any likely significant effects on human health as a result of NOx emissions during the operational phase of the Project.

15.3.19 During the operational phase of the Gas Connection, there may be some emissions from vehicles accessing the AGI for maintenance reasons. However, these will be so insignificant that they will not have a significant impact on human health.

15.3.20 In terms of the Electrical Connection, very infrequent maintenance visits will also take place (up to two days a week for routine maintenance, and four weeks per year for annual maintenance). In light of the above, there will not be any likely significant effects on human health as a result of maintenance vehicle emissions.

Noise and Vibration

Construction and Decommissioning

15.3.21 Excavation for foundations for buildings across the Project Site, delivery of plant and excavation for laying the Gas Connection and Electrical Connection during construction and decommissioning could lead to increases in noise in the surrounding area. This will however be a temporary source of noise. The noise assessment is presented in Chapter 7. A numerical model has been created which assesses likely construction related noise in comparison to measured background levels of noise at the Project Site. Based on a conservative, realistic worst case assessment, where numerous large construction plant items are operating simultaneously, the likely significance of the overall effect of construction and decommissioning noise from the Power Generation Plant is predicted to be neutral at all receptor locations and therefore not significant following the implementation of embedded mitigation measures which include:

- A 10 dB reduction in construction noise due to use of an appropriately placed acoustic screen, which is typical of this type of construction / decommissioning activity;
- Implementation of a CEMP; and
- Use of appropriately maintained plant and equipment during construction and decommissioning.

15.3.22 Additionally, further noise mitigation is available in the form of programming of the noisiest construction activities not to occur simultaneously, utilising a temporary noise bund and using quieter equipment. Such mitigation measures will be set out in the outline CEMP which will accompany the ES and be submitted with the DCO Application.

15.3.23 The above mitigation means that there are not anticipated to be any likely significant effects on human health in relation to noise levels during construction and decommissioning.

Operation

15.3.24 During operation, noise could occur from the rotating components of the Generating Equipment (e.g. the Gas Turbine Generator), stack and Fin-Fan coolers when operational. There may also be a limited amount of noise from the Access Road from the small number of vehicles accessing the Generating Equipment Site, although the likely impact of this on human health will not be significant when compared to the existing traffic noise.

15.3.25 In order to predict operational noise, background noise measurements taken at nearest noise sensitive receptors were modelled alongside noise levels predicted for typical Generating Equipment similar to that expected for the Project.

15.3.26 This assessment has shown that at South Pillinge Farm (the nearest residential receptor), the predicted noise impact is 38 dB.

15.3.27 The predicted noise levels are therefore below the proposed significant observed adverse effect level (SOAEL). This is defined as the level at which significant health effects on receptors is likely to occur or when noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time; avoiding certain activities during periods of intrusion; potential for sleep disturbance resulting in difficulty in getting back to sleep; or quality of life diminished due to change in acoustic character of the area.

15.3.28 The predicted noise levels from the Generating Equipment fall within the proposed lowest observed adverse effect level (LOAEL) and SOAEL for a 24 hour operation as shown below:

- Proposed LOAEL – 44 dB $L_{Aeq,T}$,
- Predicted noise impact at Pillinge Cottages - 38 dB $L_{Aeq,T}$,
- Predicted noise impact at South Pillinge Farm - 38 dB $L_{Aeq,T}$,
- Proposed SOAEL – 49 dB $L_{Aeq,T}$

15.3.29 The levels above for LOAEL and SOAEL are based on professional judgement and are specific to the Project, taking into consideration a number of factors such as the likely operating regime of the Generating Equipment and background noise sources. They also represent external noise levels, rather than inside the property of the nearest sensitive receptors.

15.3.30 Therefore, there are not predicted to be any significant noise effects on human health at the nearest noise sensitive receptors.

15.3.31 During operation, there will be small amounts of noise generated by the AGI. This may be a low ‘hum’ noise or ‘hiss’ type of noise as the AGI regulates the flow of gas from the NTS to the Power Generation Plant.

15.3.32 This noise is rarely perceptible except when in very close proximity to the AGI. Given that there are no residential properties in close proximity to the current preferred location for the AGI, it is considered that the operational noise from the Gas Connection is not likely to have a significant effect on human health.

15.3.33 No significant effects on human health are considered likely from operation of the Electrical Connection, given that the underground connection will not generate any audible noise during operation.

Pollution and Contamination

15.3.34 A desk based assessment, together with targeted ground water sampling has been carried out to assess the baseline geology and ground conditions underlying the Project Site. The assessment studied information regarding previous land uses of the Project Site and the surrounding area, the soils and geology present at the Project Site, and any potential contamination issues resulting from former site uses.

Construction and Decommissioning

15.3.35 During construction of the Project, the main potential impacts to human health are from;

- Disturbance of any existing contamination and therefore causing effects to receptors through the creation of pollution pathways; and
- Creation of pollution incidents from e.g. spillages or mobilisation of existing contamination.

15.3.36 However, mitigation measures such as working within and adhering to a detailed CEMP will be employed to prevent any contamination or pollution incidents impacting on ground conditions. This will include having an appropriate spill response plan, correct re-fuelling of vehicles and plant on hardstanding and the correct storage of potentially hazardous substances in bunded storage tanks. These mitigation measures will ensure that there will be no likely significant effects from pollution and contamination on human health.

Operation

15.3.37 During the operational phase, there is the potential for the contamination of surface water resulting from the flushing of silts and hydrocarbons from areas of hardstanding within the Project Site. However, such impacts would be controlled by the embedded mitigation measures implicit within the Project, comprising industry standard/best practice and measures required to ensure legislative compliance, contained within an operational environmental management plan secured through the EP. On this basis, the impact is considered to be Negligible and is therefore not significant.

15.4 Cumulative Effects on Human Health

15.4.1 The section below presents an assessment of the likely significant cumulative effects on human health as a result of construction, decommissioning and operation of the Project together with other projects. Cumulative assessments are also provided in Chapters 6-14.

15.4.2 Construction or decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in Chapter 4, section 4.10. However, the majority of these developments are all a significant distance from the Project Site and outside of the study areas of the topics listed above so as not to cause any cumulative impacts. Furthermore, none of these developments have predicted any likely significant impacts on human health and will be bound by their own CEMP and best practice construction methods so as to limit the potential for impacts on human health.

15.4.3 The assessment set out in this Chapter has shown no likely significant effects are anticipated to arise from construction of the Project on human health.

15.4.4 Little detail is known about the 'Integrated Waste Management Facilities' proposed for development in the Rookery Pit. At present, only a high level scoping opinion has been submitted. No details are proposed regarding potential impacts on human health as a result of the project. However, it is likely that this development will be bound by its own CEMP and best practice construction methods so as to limit impacts on human health. The assessment set out in this Chapter has shown no significant effects on human health are anticipated to arise from construction of the Project. Accordingly, given that the Project alone is anticipated to have no significant effects it is anticipated that no cumulative impacts will occur with these developments during construction.

15.4.5 The DCO for the Covanta RRF Project to the north of the Generating Equipment Site included a health impact assessment (HIA). The HIA concluded that although there were potential impacts arising from construction and decommissioning of the project on human health from air quality, noise, socio-economics, traffic and visual effects, the implementation of mitigation measures precluded any impacts from the construction of the Rookery RRF. A summary of the possible cumulative effects is provided below by topic:

Air Quality (including traffic)

15.4.6 The construction, decommissioning and operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site, as listed in section 4.10. However, most of the proposed developments are greater than 5 km from the Project Site and outside of the study area for this topic within which potentially significant effects could occur. As such it is considered that no cumulative effects are likely to arise in relation to these projects in respect of air quality.

15.4.7 The only projects listed in 4.10 which are considered relevant to the cumulative effects assessment for air quality are the Integrated Waste Management Facilities proposed at Rookery South Pit and the Covanta RRF Project at Rookery South Pit.

15.4.8 The proposed Integrated Waste Management Facilities development is at an early stage and very little information is available regarding potential impacts on air quality as a result of this project. Should it go ahead it will have to consider the Project to ensure that no significant cumulative impacts will arise between it and the Project. As such, any mitigation that is needed in future in relation to cumulative effects as between this scheme and the Project would be assessed as part of (and could be secured through) the permission process for the proposed Integrated Waste Management Facilities development.

15.4.9 The ES for the Covanta RRF Project concluded that although there were potential impacts arising from air quality during construction or decommissioning, the implementation of embedded mitigation measures such as adhering to a CEMP for both projects will negate any effects on air quality.

15.4.10 The proposed Covanta RRF project to the north of the Generating Equipment Site will release both oxides of nitrogen and carbon monoxide from the combustion process. However, the exhaust stack for the Covanta RRF will be much higher than the stack for the Project (105 m compared to 35 m) and therefore the location of maximum ground level concentrations will be different from those associated with the Project.

15.4.11 Modelling has been undertaken of the emissions from the Covanta RRF and the Generating Equipment together and the results are contained in Appendix 6.1. There are no predicted exceedances of the assessment levels for human health impacts for the two plants operating together and therefore the cumulative effect will be negligible and not significant.

15.4.12 It is considered that, based on professional judgement, with the implementation of the embedded mitigation along with the embedded mitigation in the Covanta RRF Project, no likely significant cumulative effects will arise between the Project, the Covanta RRF Project and the other developments referred to in 4.10.

<u>Noise and Vibration</u>

15.4.13 As for air quality, the only projects listed in 4.10 which are considered relevant to the cumulative effects assessment for noise and vibration are the Integrated Waste Management Facilities proposed at Rookery South Pit and the Covanta RRF Project at Rookery South Pit.

15.4.14 The proposed Integrated Waste Management Facilities development is at an early stage and very little information is available regarding potential impacts on air quality as a result of this project. Should it go ahead it will have to consider the Project to ensure that no significant cumulative impacts will arise between it and the Project. As such, any mitigation that is needed in future in relation to cumulative effects as between this scheme and the Project would be assessed as part of (and could be secured through) the permission process for the proposed Integrated Waste Management Facilities development.

15.4.15 Cumulative noise modelling has been undertaken with the Project and the Covanta RRF project for construction and operation, assuming that the construction and operational phases of the projects would occur simultaneously. The results of the modelling are presented in Chapter 7. The modelling has predicted no likely significant effects arising from simultaneous construction and or operation of the two projects and therefore no likely significant cumulative effects.

Pollution and Contamination

15.4.16 As for air quality, the only projects listed in 4.10 which are considered relevant to the cumulative effects assessment for ground conditions are the Integrated Waste Management Facilities proposed at Rookery South Pit and the Covanta RRF Project at Rookery South Pit.

15.4.17 The proposed Integrated Waste Management Facilities development is at an early stage and very little information is available regarding potential impacts on ground conditions as a result of this project. Should it go ahead it will have to consider the Project to ensure that no significant cumulative impacts will arise between it and the Project. As such, any mitigation that is needed in future in relation to cumulative effects as between this scheme and the Project would be assessed as part of (and could be secured through) the permission process for the proposed Integrated Waste Management Facilities development.

15.4.18 The ES for the Covanta RRF Project concluded that there were no potential impacts arising from construction, operation or decommissioning of the project on ground conditions.

15.4.19 It is considered that, based on professional judgement, with the implementation of the embedded mitigation described in the ES along with the embedded mitigation in the Covanta RRF Project, no likely significant cumulative effects will arise as between the Project, the Covanta RRF Project and the other developments referred to in 4.10 in respect of ground conditions.

15.5 Residential Amenity

15.5.1 The amenity of a property can be affected by various factors including local changes in views from the property, external noise and changes in local air quality.

15.5.2 A consideration of these potential impacts on amenity at each property lying within 0.75 km of the Project was made from the nearest public vantage point. In the case of visual effects, this included a review of aerial photography to understand the orientation of windows and gardens towards the Project Site and the degree of screening from intervening vegetation that could be taken into account when assessing the magnitude and degree of visual effect.

15.5.3 Although there is no published guidance that sets out the criteria for establishing whether or not the visual presence of a development impacts unacceptably on living conditions, the distance of 0.75 km for the consideration of potential effects has been examined at several public inquiries.

15.5.4 The visual element of the assessment identified temporary significant visual impacts would occur during construction at six viewpoints. Of these, four viewpoints (VP5, VP6, VP7 and VP15) are considered representative of residential receptors. However, only one of these were from properties within 0.75 km of the Project Site (VP15 on a publicly accessible footpath near to South Pillinge Farm). No other residential receptors lie sufficiently close to the Project Site to experience potentially overbearing visual amenity impacts.

15.5.5 In the longer term, visual effects would be mitigated by screen planting which would take approximately 15 years.

15.5.6 For properties where a significant visual impact would be likely to occur (in EIA terms), it was concluded that the potential impact on living conditions from views would be acceptable without the benefits of mitigation planting, and would not be overbearing or oppressive. The conclusion was based on the intervening distance, the extent of screening from existing vegetation, and the orientation of views from the properties.

15.5.7 Visual impacts would be further mitigated by the proposed screen planting which would have a noticeable affect approximately five years after planting and achieve its full effect after around 15 years.

15.5.8 In order to predict operational noise, background noise measurements taken at nearest noise sensitive receptors were modelled alongside noise levels predicted for typical Generating Equipment similar to that expected for the Project.

15.5.9 This assessment has shown that at South Pillinge Farm (the nearest residential receptor), the predicted noise impact is 38 dBA.

15.5.10 The predicted noise levels are therefore below the proposed significant observed adverse effect level (SOAEL). This is defined as the level at which significant health effects on receptors is likely to occur or when noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area).

15.5.11 The predicted noise levels from the Generating Equipment fall within the proposed LOAEL and SOAEL for a 24hour operation as shown below:

- Proposed LOAEL – 39 dB $L_{Aeq,T}$,
- Predicted noise impact at Pillinge Cottages - 38 dB $L_{Aeq,T}$,
- Predicted noise impact at South Pillinge Farm - 38 dB $L_{Aeq,T}$,
- Proposed SOAEL – 49 dB $L_{Aeq,T}$

15.5.12 The levels above for LOAEL and SOAEL are based on professional judgement and are specific to the Project, taken into consideration a number of factors such as the likely operating regime of the Generating Equipment and background noise sources. They also represent external noise levels, rather than inside the property of the nearest sensitive receptors.

15.5.13 As such, predicted noise levels from the Project to external amenity areas of residential dwellings are considered unlikely to cause annoyance.

15.5.14 Finally, in terms of Air Quality, the risk of a loss of amenity during construction at residential properties will be low due to the embedded site mitigation measures inbuilt into the Project, and the distance from residential areas. In most cases, significant impacts are generally only seen within 20 – 50 m of construction activities.

15.5.15 During operation of the Project, the impacts of the emissions will be imperceptible. Gas combustion does not produce any odorous compounds or particulate matter that would be visible, and will thus have no impact on local amenity.

15.6 Conclusions

15.6.1 The conclusions of this Chapter are that the construction, operation and maintenance and decommissioning of the Project does not result in any likely significant effects on human health (including focussing on EMF) or as a result of waste generated by the Project, either when considered alone or cumulatively with other developments.