Millbrook Power Project

Preliminary Environmental Information Report

On behalf of **Millbrook Power Limited.**

Millbrook Power

Project Ref: 31116 | Rev: 1.0 | Date: October 2014

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Contents

1 Introduction

1.1 Overview

1.1.1 This document sets out preliminary environmental information relating to the Millbrook Power Project (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 is proposed at the former clay extraction pit at Rookery South, near Stewartby, Bedfordshire with the approximate centre of the Project Site at grid reference 501373, 240734. The boundary of the Project Site falls within both Central Bedfordshire Council (CBC) and Bedford Borough Council (BBC) areas. The Project constitutes a Nationally Significant Infrastructure Project (NSIP) pursuant to the Planning Act 2008 and therefore requires development consent under that Act. The Applicant intends to apply for a development consent order ("DCO") for the Project in Q1 2015. The DCO process is described further in Section 1.3 of this PEIR.

1.1.3 The location of the Project Site is shown in Figure 1.1.

1.1.4 Terms referred to below using capital letters are defined in the Project glossary set out in Appendix 1 of this document.

1.1.5 The Project would comprise:

- A new Power Generation Plant in the form of a Simple Cycle Gas Turbine (SCGT) peaking power generating station, fuelled by natural gas with a rated electrical output of up to 299 Megawatts (MW). The Power Generation Plant comprises:

— generating equipment including up to five gas turbine generators, up to five exhaust gas flue stacks and balance of plant, which are located within the Generating Equipment Site (together the "Generating Equipment");

— A new purpose built access road from Green Lane to the Generating Equipment Site (the "Access Road");

— A temporary construction compound required during construction only (the "Laydown Area");

- A new gas connection to bring natural gas to the Generating Equipment from the National Transmission System (NTS) (the "Gas Connection"); and

- A new electrical connection to export power from the Generating Equipment to the National Grid Electricity Transmission System (NETS) (the "Electrical Connection").

1.1.6 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

1.1.7 The Power Generation Plant, Gas Connection, and Electrical Connection, together with all access requirements are referred to as the 'Project' and are all integral to the generation of electricity and subsequent export of that electricity to the NETS. 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 is described in more detail in Section 2, including the options currently under consideration for the Gas Connection and Electrical Connection.

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 Gas and Electrical Connections extending from The Rookery into adjacent agricultural land.

1.1.10 The Rookery, which comprises the Rookery North and Rookery South Pits, is currently the subject of an ongoing Low Level Restoration Scheme (LLRS) by the landowner which includes works to re-profile and level the base of the pit together with drainage and attenuation works and structural planting. Once the works have been completed, Rookery South Pit will be approximately 15 m below the surrounding ground level. Details of the works are described in section 2.1.

1.2 Purpose and Structure of the PEIR

1.2.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations) require an EIA to be carried out in respect of any development listed in Schedule 1 to the EIA Regulations ("Schedule 1 development"). 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.

1.2.2 The definition of a Schedule 1 development includes thermal generating stations with a heat output of 300 MW or more (Schedule 1, paragraph 2(a)).

1.2.3 The thermal output of the Project will be greater than 300 MW and therefore an EIA for the Project will be required under the EIA regulations.

1.2.4 Under Regulation 10(b) of the EIA Regulations, the Applicant is required to set out how it intends to publicise and consult on preliminary environmental information relating to the Project. Regulation 2 of the EIA Regulations then defines preliminary environmental information as being the environmental information that has been compiled by the Applicant and which is reasonably required to assess the environmental effects of the development.

1.2.5 In the case of the Project, information has been compiled into this document (the "PEIR") which presents the environmental information collected to date and an assessment, on a preliminary basis, of the likely significant environmental effects of the Project.

1.2.6 This PEIR has been prepared in discrete sections 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 preliminary findings of the Environmental Impact Assessment (EIA).

1.2.7 The PEIR is set out as follows:

- Section 1 comprises a brief description of the Project, an introduction to the consenting regime, a description of the Applicant and the need for and benefits of the Project;
- Section 2 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;
- Section 3 provides a brief description of the planning policy background and regulatory framework in which the PEIR has been prepared;
- Section 4 provides a description of the methodologies employed in undertaking the EIA for the Project;
- Section 5 provides a description of alternatives which have been considered; and
- Sections 6 to 15 provide a description of the environmental information which has been gathered to date under specific environmental topics, the preliminary findings of the assessment as well as details of the next steps required to complete the EIA.

1.3 Application for Development Consent

1.3.1 In England and Wales, an onshore electricity generating station is considered to be a nationally significant infrastructure project (NSIP) under the Planning Act 2008 (PA 2008) if it has a capacity of more than 50 MW. As the Project would have a rated electrical output of at least 50 MW, and up to 299 MW, it would be classified as an NSIP under Section 14(1)(a) and Section 15(2) of the PA 2008. Under Section 31 of the PA 2008, consent is required for development that is or forms part of an NSIP and therefore a Development Consent Order (DCO) application must be made to the Secretary of State (SoS) for the Project.

1.3.2 Development consent for an NSIP may only be granted by an application made under Section 37 of the PA 2008 to the SoS. Section 37 of the PA 2008 (and associated legislation) also governs the content of a DCO Application, including requirements for certain accompanying documents.

1.3.3 These requirements are specified, in particular, in the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (the "APFP Regulations"). The APFP Regulations require that a DCO Application, where applicable, includes an environmental statement (ES). As such, an ES for the Project will be submitted as part of the suite of documents that will accompany the DCO Application for the Project in Q1 2015.

1.4 Consultation Strategy

1.4.1 This PEIR has been compiled in order to assist the Applicant to consult upon its DCO Application for the Project by providing preliminary environmental information about the Project. Pre-application consultation is a requirement under s42, s47 and s48 of the PA 2008. This PEIR has been published in the manner described in the Applicant's Statement of Community Consultation (SoCC), which explains how the Applicant proposes to consult people living in the vicinity of the Project, as required by s47 of the PA 2008. The SoCC also explains how feedback can be given about the Project and the content of this PEIR.

1.4.2 This PEIR is intended to provide an assessment, on a preliminary basis, of the likely significant environmental effects of the Project. The DCO Application for the Project is still being developed and refined. In particular, decisions are still to be made on the Route Corridor Options for the Gas Connection and Electrical Connection. Feedback received during the consultation process will help inform the development of the Project and the decisions on its design still to be made. The ES that is submitted with the DCO Application in Q1 2015 will assess the refined Project, following consultation, that is the subject of the DCO Application. As such, details about the Project may alter between the publication of the PEIR and the ES. An assessment of the likely significant environmental effects of the Project as at the point of submission of the DCO Application will be provided via the ES.

1.4.3 All representations made during the consultation process will be considered carefully and the Applicant will have regard to all relevant responses prior to submission of the DCO Application. The outputs generated from statutory and non-statutory consultation will be summarised in a consultation report, submitted alongside the DCO Application. This document will also demonstrate how the Applicant has had regard to relevant consultation responses received.

1.4.4 At the start of the EIA process, the Applicant requested a Scoping Opinion from the SoS. This request was made on the 20th June 2014, and was supported by a Scoping Report (available on both the Applicant's website www.millbrookpower.co.uk and the Planning Inspectorate's website http://infrastructure.planningportal.gov.uk/projects/eastern/millbrook-power/).

1.4.5 A Scoping Opinion was subsequently issued by the SoS and this is also available on the Applicant's website and the Planning Inspectorate's website. The EIA process and this PEIR take the Scoping Opinion and the consultation responses provided by the SoS into account.

1.5 The Applicant

1.5.1 MPL is an energy development company established for the Project by Watt Power Limited (WPL).

1.5.2 WPL has been established to develop flexible gas fired generation assets to support the UK Government's drive to a low carbon economy. Stag Energy provides resources to WPL through a management services agreement with WPL. 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.

1.5.3 WPL currently has three other projects up to 299 MW 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). Progress Power Ltd and Hirwaun Power Ltd's projects are now both in the examination phase following acceptance of the applications for these two NSIPs by the Planning Inspectorate in Spring 2014. Abergelli Power Ltd will submit an application for its NSIP to the Planning Inspectorate for examination in Q1 2015.

1.5.4 Similarly, Stag Energy provides resources to the Gateway Storage Company Ltd, which is developing an offshore salt cavern gas storage facility in the East Irish Sea. The project has been consented by the UK Government, the Marine Management Organisation and the local planning authority (Barrow-in-Furness Borough Council, Cumbria). Further information on the project is available at www.gatewaystorage.co.uk.

1.5.5 WPL 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 will be designed and developed to high quality safety and environmental standards.

1.5.6 Further information on the companies referred to above is provided at http://www.millbrookpower.co.uk or http://www.wattpowerltd.co.uk.

1.6 Needs and Benefits of the Project

1.6.1 There is considerable national need for this type of development, acknowledged at all levels of Government policy. National planning policy supports the need for new electricity infrastructure due to the current ageing and inevitable closure of older fossil fuel and nuclear power plants and the likely increase in demand for electricity over the coming decades.

1.6.2 The overarching National Policy Statement (NPS) for Energy (NPS EN-1) re-affirms the transitional role of new gas generation, confirms that a diverse

energy mix is required and that there is a significant need for new energy generation infrastructure to replace capacity that will be lost through the closure of existing fossil fuel and nuclear plant. Indeed it states that the decision-maker 'should start with a presumption in favour of granting consent to applications for energy NSIPs' (paragraph 4.1.2).

1.6.3 NPS EN-1 also states that 'gas will continue to play an important role in the electricity sector – providing vital flexibility to support an increasing amount of low-carbon generation and to maintain security of supply' (paragraph 3.6.2).

1.6.4 Gas is a reliable fuel source. It is acknowledged by Government as being essential to a low-carbon economy and to underpin the country's energy security. In addition, gas peaking plants such as the Project provide back-up to power generation from renewable sources, particularly wind power, which is an increasingly prevalent but intermittent energy source. Modern gas-fired power plants are among the most efficient and cleanest forms of electricity power generation.

1.6.5 At present, thermal peaking capacity in the UK is relatively small due to the nature of the electricity generation mix on the NETS. There is therefore a clear and significant requirement for further capacity to meet the projected need for reactive/flexible generation. A dedicated gas fired peaking plant such as the Project could allow for the rapid provision of reserve capacity to the NETS, thus playing a role in meeting the energy requirements of the UK going forward.

1.6.6 Section 3.7 of NPS EN-1 sets out the need case for new electricity network infrastructure.

1.6.7 Paragraph 3.7.10 states that 'there is an urgent need for new electricity transmission and distribution infrastructure (and in particular for new lines of 132 kV and above) to be provided. The [SoS] should consider that the need for any given proposed new connection or reinforcement has been demonstrated if it represents an efficient and economical means of connecting a new generating station to the transmission or distribution network, or reinforcing the network to ensure that it is sufficiently resilient and has sufficient capacity (in the light of any performance standards set by Ofgem) to supply current or anticipated future levels of demand'.

1.6.8 In the second Annual Energy Statement (AES) (November, 2011), the Department of Energy and Climate Change (DECC) noted the need to build new power generation infrastructure. In line with this need, DECC acknowledged the need for gas to continue to feature strongly in the energy mix, and also stated that while it is important that businesses play their part in the transition to a low-carbon economy, it is also important to remain competitive.

1.6.9 This position is also supported by the more recent Gas Generation Strategy, released by DECC in December 2012. It states that "Gas currently forms an integral part of the UK's generation mix and is a reliable, flexible source of

electricity. Using gas as a fuel in our power stations currently provides a significant proportion of our electricity generation (around 40% in 2011)".

2 Project and Site Description

2.1 Site Description

The Rookery

2.1.1 The Power Generation Plant Site and part of the Gas and Electrical Connections would be situated on land within former clay pits known as 'The Rookery', covering an area of some 210 ha, and situated in the Marston Vale between Milton Keynes and Bedford, approximately 3 km north-west of Ampthill, and 7 km south west of Bedford.

2.1.2 The Rookery is situated within a post-industrial landscape, which is presently undergoing significant change. It comprises two large former clay pits, Rookery North and Rookery South Pits, separated by an east-west spine of unexcavated clay. The Generating Equipment Site, Laydown Area and parts of the Access Road and Gas and Electrical Connections would be located within Rookery South Pit which is approximately 95 ha and is bound by steep clay banks that are varied in nature and substrate. The pit base, which is the subject of the LLRS, currently includes open water, reed beds, pools and bare inundated 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 cleared of vegetation. Part of the Access Road would lie within Rookery North Pit.

2.1.3 The Gas and Electrical Connections would extend from Rookery South Pit into farmland to the south and/or east as shown on Figure 1.2.

Low Level Restoration Scheme (LLRS)

2.1.4 The Rookery is the subject of an ongoing LLRS being undertaken by the landowner. This was the subject of a separate planning permission and would be taking place regardless of the Applicant's proposals for the Project. The objective of the LLRS is to restore the former clay workings to low grade agriculture. This would be achieved through the restoration of The Rookery at a low level (i.e. below pre-excavation ground levels), with measures included in the restoration to enhance biodiversity and landscape.

2.1.5 The LLRS works for Rookery South Pit 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 regrading of the base of the pit;
- 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 site boundary 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 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 with Station Lane, nr Millbrook Station.

2.1.6 To facilitate the proposed LLRS works, extraction of clay from a currently un-worked area situated directly to the south of the Generating Equipment Site, 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.

2.1.7 The LLRS works are independent from the Project proposals and will be completed prior to the commencement of construction works, with the possible exception of buttressing and re-profiling to the eastern side of the pit.

2.1.8 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 and Laydown Area.

2.1.9 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 above and in Section 2.6 of this PEIR will be completed prior to the development of the Project. The completion of these works has been factored in to the Applicant's preliminary assessment as presented in Sections 6-14.

Site and Surroundings

2.1.10 Road access to the Power Generation Plant Site is currently from the north near Stewartby via the A421, Bedford Road 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 either be primarily accessed from Junction 13 of the M1 via the A507, Sandhill Close, Houghton Lane, Millbrook Road and the B530 Ampthill Road, from Bedford Road, via

Woburn Road, Manor Road, B530 Ampthill Road and Millbrook Road or 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. This road network is shown on Figure 12.1 and 12.2.

2.1.11 There are overhead power lines that run west to east 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. However, there is limited public access to Rookery South Pit itself.

2.1.12 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 Section 9 and shown on Figure 9.1.

2.1.13 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. To the north of The Rookery there remain some buildings associated with the former Stewartby Brickworks, including four chimneys which are now listed structures. Following clay extraction, these former clay working sites have been restored (to varying levels of completion) by different means (including the disposal of waste) and to different uses, including water based recreation and commercial uses.

2.1.14 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 substantial residential and employment development such as in the nearby settlements of Marston Moretaine and Stewartby.

2.1.15 The Gas and Electrical Connection would be located largely outside of Rookery South Pit, are located in a less dynamic landscape set within a mostly undeveloped agricultural landscape which includes areas of woodland, native hedgerows and a number of water-bodies such as ditches.

2.1.16 Nearby roads include the A421 which is approximately 2 km to the west and the B530 which lies to the east of the Project Site, as shown on Figure 12.2 The A421 connects directly to Junction 13 of the M1 Motorway which is approximately 5.6 km to the south east of the Project Site. Furthermore the Midland Mainline Railway and Marston Vale Line border the Power Generation Plant Site to the east and west respectively.

2.1.17 The closest residential dwelling to the Power Generation Plant Site is South Pillinge Farm, located approximately 90 m to the west of the Project Site boundary. South Pillinge Farm is separated from the Project Site by a small deciduous woodland. To the north of Green Lane and The Rookery, lies Stewartby. Other neighbouring 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.

2.1.18 To the west of the Project Site is Marston Vale Millennium Country Park, as shown on Figure 1.2, which provides habitat conservation opportunities, indoor and outdoor community amenities and a wind turbine. There is also a Forest Centre within the Marston Vale Millennium Country Park located just to the south of Stewartby Lake which provides the focal point for the indoor and outdoor community amenities. Millbrook Proving Ground, a vehicle testing ground, is located to the west of the Electrical Connection.

2.1.19 It is noted here that the red line boundary of the Project Site has changed from that which was submitted with the Project Scoping Report and following from the non-statutory consultation events. Specifically it has increased to the west and south, in order to allow for more flexibility over easements for infrastructure associated with the Gas and Connection AGI. It has also increased in the north to allow for traffic calming measures which would be necessary during the construction phase. However, the Project Site has also decreased substantially in size in the south east as more work has been done to develop the likely route of Gas Connection. The assessments which have been carried out to date have all included this extended area and the change does not impact on the methodologies for environmental studies as proposed in the Project Scoping Report.

2.2 Relevant Planning History

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

2.2.2 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 the Callow deposits and pumped, as sludge, into the south eastern quarter of the Rookery North Pit and the north eastern quarter of Rookery South Pit.

2.2.3 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.

2.2.4 Covanta Rookery South Limited obtained DCO consent pursuant to the PA 2008 for a Resource Recovery Facility (RRF) NSIP in autumn 2011 (the "Covanta RRF Project"). This has since been the subject of legal challenge.

2.3 Power Generation Plant Description

Generating Equipment

2.3.1 The Generating Equipment would be designed as a peaking plant fired by natural gas. It would have a rated electrical output of between 50 and 299 MW.

2.3.2 As a peaking plant, the Generating Equipment would operate for up to 1,500 hours per year. 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 boil kettles 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.

2.3.3 Given these parameters, it has been determined that a SCGT plant is the preferred and most appropriate technology choice for the Generating Equipment.

2.3.4 This PEIR has been prepared with relevance to PINS Advice Note 9 (AN9) – 'Using the Rochdale Envelope'. AN9 states that:

2.3.5 "The Planning Inspectorate understands that in the early stages of preparing a DCO application it may not be possible for a developer to have resolved all the details of a project". And 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".

2.3.6 The DCO Application will be flexible enough using the 'Rochdale Envelope' approach to allow the Applicant to achieve an up to 299 MW project by building between one to five Gas Turbine Generators, with up to five exhaust gas flue stacks.

2.3.7 Despite this, it is also noted 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".

2.3.8 To this end, where flexibility in parameters for the Project (such as the number of gas turbines) has been provided, the Applicant has assessed the realistic worst case and has been clear in each topic section what this constitutes.

2.3.9 There are several options of SCGT plant available to generate up to 299 MW. SCGT plants often use aero-derivative gas turbines (i.e. turbines derived from

aeronautical applications), primarily because of their suitability for frequent start-ups, flexibility, high efficiency and high-availability maintenance techniques. For the aero-derivative case, the Applicant envisages using three, four or five individual aero-derivative gas turbine generators to achieve up to 299 MW.

2.3.10 However, 'industrial' type gas turbines can also be used which are typically larger and often more suited to longer operational hours. They offer similar efficiency but less fast loading flexibility. Industrial gas turbines differ from aeronautical designs in that the casings, rotors and blading are of heavier construction. For the industrial gas turbine case, it is anticipated that one or two individual industrial gas turbine generators would be used to achieve up to 299 MW.

2.3.11 The main equipment in a SCGT is a Gas Turbine Generator, comprising the following components:

- Inlet air filter;
- Air compressor;
- Combustion chamber;
- Stack;
- Power turbine(s); and
- Exhaust silencer.

2.3.12 Air, on entering the gas turbines, would be compressed and natural gas injected into the air. The natural gas 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 electrical generators to produce electricity.

2.3.13 The waste gases and heat produced from this process would then be released to the atmosphere via between one or two stacks if industrial gas turbines were used and three to five stacks if aero derivative turbines were used. The stack(s) will contain equipment which will reduce emissions released to the atmosphere, including filters and a silencer.

2.3.14 A stack height sensitivity study has been undertaken for the Project to determine the minimum stack height for the Gas Turbine Generators, required for adequate dispersion of emissions and to meet legislative air quality targets. The height is set out in Table 2.1 and would apply to all technology choices, as discussed above, and would not be dependent on the number of units present at the Generating Equipment Site.

2.3.15 Stack emissions will be continuously recorded to ensure correct and efficient operation of the plant. Any significant deviations will be alarmed and corrections carried out on occurrence. Records of performance and deviation

will be maintained. Full facilities for interfacing information, control and alarm systems will be installed so that the plant can be operated from the central control room via the distributed control system (DCS). In the event of a fault in the Gas Turbine Generator(s) or other major plant items, the Generating Equipment will shut down automatically in a controlled manner.

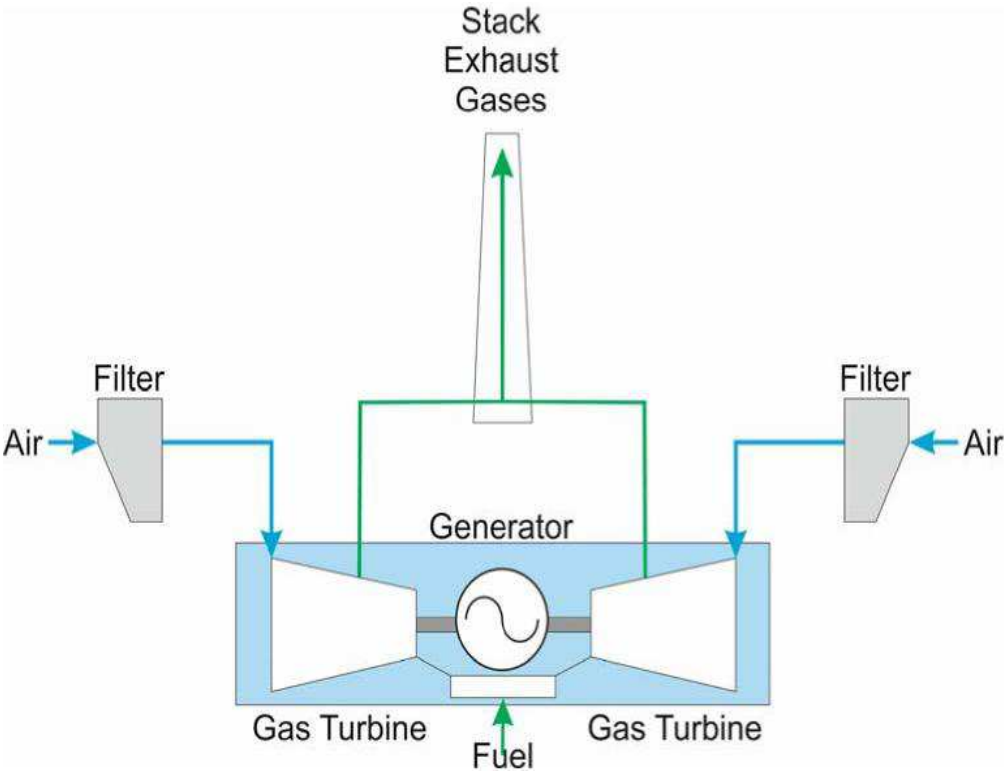
2.3.16 Natural gas sourced from the NTS (where sulphur content in the gas is generally negligible) is a clean burning fuel and does not produce the particulate or sulphur emissions associated with burning coal; consequently flue gas cleaning equipment is not required.

2.3.17 Further discussion of emissions control is provided in Section 6 below which sets out the preliminary findings of the environmental assessments undertaken to date for air quality.

2.3.18 Since no cooling is required for the condensing of steam, the cooling requirements of SCGT plants are significantly lower than, for example, Combined Cycle Gas Turbine (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).

2.3.19 Insert 2.1 shows a simple schematic of SCGT operation.

Insert 2.1 - Schematic of SCGT operation



Laydown Area

2.3.20 A temporary Laydown Area for the storage of plant and equipment during construction would be provided adjacent to the Generating Equipment Site.

Access Road

2.3.21 An access track is already in existence at the Project Site which links Green Lane to Rookery South Pit. However, this track is only currently suitable for light use by off road vehicles. The LLRS works, as described in Paragraphs 2.1.4 to 2.1.9 and Paragraph 2.6.2 of this PEIR include works to upgrade this track to agricultural standard.

2.3.22 The DCO for the Covanta RRF Project includes provision to upgrade this track further, to a road which would be suitable to deliver the requirements of the Covanta RRF Project, including provision for several thousand traffic movements a week for the delivery of waste via large trucks. Should this road be developed prior to the Project, it would be suitable to meet both the needs of the Project and the Covanta RRF Project. In this instance, there would be no requirement for the Access Road to be built as part of the Project.

2.3.23 However, as it is not certain as to when or if the Covanta RRF Project will be implemented, the Applicant has included the Access Road within its proposals for the Project. If the Covanta RRF Project is not built before construction of the Project, a new purpose built Access Road would be constructed within the Power Generation Plant Site from Green Lane to the Generating Equipment Site. The 1.7 km long Access Road would be constructed from tarmac bordered by a concrete kerb. It is anticipated to be 6 m wide allowing for two-way traffic.

2.3.24 The route of the Access Road from Green Lane would follow the existing track which borders the lake within Rookery North Pit. On reaching Rookery South Pit, the 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 along the alignment shown on Figure 1.2.

2.3.25 If Covanta implemented their proposals for an access road pursuant to the Covanta RRF Project prior to construction of the Project, then the Applicant's proposal for the Access Road pursuant to the Project would fall away.

Other Generating Equipment Plant Items

2.3.26 In addition to the Gas Turbine Generator units at the Generating Equipment Site, the following integral plant and buildings will also be present:

- Fire Water Tank: The fire water storage tank will be designed to comply with the relevant fire regulations and will be installed together with fire pumps, hose reels, fire hydrants and portable extinguishers;

- A Control Building: Required in order to monitor the plant operation and house plant controls;
- A Workshop and Stores Building: To store certain strategic and routine maintenance spares and to provide a facility for carrying out minor maintenance of the plant;
- A Gatehouse: Needed to provide security and maintain a log of site attendance, deliveries etc;
- An Electrical Banking Compound: Required to connect the electrical infrastructure from the Power Generation Plant to transformers before export to the National Grid; and
- A Gas Receiving Installation: Required to ensure that gas coming from the NTS feeds into the Generating Equipment Site at the right flow and pressure conditions.

2.3.27 Figure 2.1 shows an indicative illustration of the position and layout of the Generating Equipment. However, final design will not be undertaken until a DCO has been obtained and the Gas Turbine Generator(s) have been procured. The requirements to any DCO (similar to planning conditions) will control the detail of the final design and will require approval by the relevant planning authority at that time. The Applicant is therefore submitting its Application on the basis of a series of parameters. The environmental statement submitted with the Application will assess the realistic worst case arising out of these parameters in accordance with the "Rochdale Envelope" approach as explained in further detail in Paragraphs 2.3.4 to 2.3.8 above.

2.3.28 The maximum area for the Generating Equipment Site would be in the order of 4 ha. The Generating Equipment may be sited in a number of locations within the wider Generating Equipment Site depending on final design.

2.3.29 Table 2.1 provides indicative dimensions for the main plant items located within the Generating Equipment Site.

Table 2.1 – Indicative Dimensions of Main Plant Items and Substation

Plant Item	Minimum Dimensions (m)	Maximum Dimensions (m)
Stacks	30 (height) 4 (diameter), 1 no.	40 (height) 8 (diameter), 5 no.
Gas turbine generator	20 (length) x 10 (width) x 9 (height)	35 (length) x 15 (width) x 20 (height).
Water tank	10 (diameter) x 10 (height).Minimum 1 no. fire/raw water.	15 (diameter) x 12.5 (height) for each tank. Maximum of 1 no. tanks.
Administration / workshop / control building	40 (length) x 10 (width) x 5 (height)	40 (length) x 10 (width) x 15 (height)
Gas receiving station	N/A	50 (width) x 70 (length) x 3 (height)
Banking compound	N/A.	40 x 80 x 12.
Substation (AIS technology)	150 x 150	250 x 150 x 17.5

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

2.3.30 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 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) 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 PEIR.

Combined Heat and Power (CHP)

2.3.31 Efficient CHP plants are usually designed to meet the demands of an identified heat load. Electrical power generation is utilised, where applicable for local process plant, and the balance exported to the grid. The heat

demands of industrial processes are usually continuous, and district heating demands are also usually continuous (albeit on a seasonal basis).

2.3.32 Therefore, this is in direct contrast to the operation of a peaking plant, which is designed to operate intermittently and unpredictably. Therefore, any heat loads would be better served, and met more appropriately and efficiently by dedicated CHP plants, allowing the peaking plant to provide the necessary support to the NETS.

2.3.33 With this in mind, CHP has not been a significant factor in the technology choice of the plant.

2.3.34 In addition, as SCGT plant do not have any associated HRSG / steam turbine plant, the provision of steam from an SCGT plant would not be possible without the provision of additional steam raising plant / equipment.

2.4 Gas Connection

2.4.1 The Gas Connection would be in the form of a new underground gas pipeline connection (the Pipeline) and above ground installation (AGI) and is required to connect the Generating Equipment to the existing high pressure NTS in order to provide a reliable supply of fuel.

2.4.2 A Gas Connection Feasibility Study was undertaken for the Project in April 2014. The purpose of the study was to define and evaluate the options available for connecting the Generating Equipment to a suitable source of fuel gas, and provide a recommendation on the most appropriate option for this connection.

2.4.3 The EIA Scoping Report for the Project described the Gas Connection Opportunity Area. This was a large area in which the Gas Connection could be sited. Since the Scoping Report was issued, a number of further studies have been undertaken to refine the route of the Gas Connection. The outcome of these studies is that there are now two remaining potential options to connect into the NTS and two potential suitable routes which the Pipeline could take in order to reach the two connection options.

2.4.4 The refinement studies are outlined in more detail in Section 5 of this PEIR.

2.4.5 The two possible remaining connection options are shown on Figure 1.2 and are described below.

Gas Connection Route Corridor Option 1

2.4.6 Gas Connection Route Corridor Option 1 ("Option 1") is the current preferred option to connect the Generating Equipment to the NTS (as further explained in Section 5.4 of this PEIR). The route in Option 1 is approximately 1.2 km in length including no major road crossings, one minor road crossing, no major water crossings, two minor water crossings and no in-road mainlaying.

2.4.7 The pipeline begins at NTS Feeder 9, east of the Millbrook Proving Ground, between the railway and a set of 400 kV Overhead Lines which run from the south between the railway line and the Millbrook Proving Ground and to the north west between the Generating Equipment Site and Millbrook Proving Ground.

2.4.8 The route turns to cross Millbrook Road at 90°, in between the railway and the 400 kV overhead lines, this coincides with the crossing of a field drain. After crossing the road the route heads in a northerly direction through the fields between the railway and the overhead lines where it crosses a field boundary and continues in this direction until it turns to the north west to avoid a strip of trees classified as a Deciduous Woodland BAP Priority Habitat.

2.4.9 The route then turns to the north west crossing a field drain which coincides with a field boundary and a Public Right of Way (PRoW). The route continues in this direction briefly before taking a westerly turn for a short distance prior to undertaking a final northerly turn where it enters the Generating Equipment Site at its southern boundary.

Gas Connection Route Corridor Option 2

2.4.10 As an alternative to the current preferred Option 1, other options that the Applicant considers are less technically and environmentally preferable are still potentially deliverable as shown in the Gas Connection Route Corridor Option 2 ("Option 2") on Figure 1.2. Although Option 2 has not been defined in as much detail as Option 1, the Applicant has included Option 2 within the redline boundary for the Project as the Applicant has not as yet made any final decisions on the final routing of the Gas Connection. The final routing of the Gas Connection will be finalised by the Applicant following consultation and further assessment work.

Connection to the NTS

2.4.11 Connection of the Pipeline to an NTS feeder would require an Above Ground Installation (AGI) to be installed which will include: a Minimum Offtake Connection (MOC) facility, which would be owned by National Grid Gas Plc (NGG), and a PIG Trap Facility (PTF) which would be owned by the Applicant (together, referred to as the 'Above Ground Installation' or 'AGI').

2.4.12 The MOC (approximately 40 x 30 m) would contain:

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

2.4.13 The PTF (approximately 40 x 30 m) would contain:

- PIG launching facility;

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

2.4.14 Termination of the Gas Connection would be at a PTF on the Generating Equipment Site. This facility would be situated within the Gas Receiving Station and would contain the following equipment:

- PIG receiving facility;
- Isolation valves, metering, heating, filtering, compression and pressure regulation equipment;
- Electricity supply kiosk; and
- Control and instrumentation kiosks.

2.4.15 Until the preferred Option 1 is finalised following further consultation and studies, three options are being considered with regard to access for the Gas Connection. These four access options are shown on Figure 12.2, and are as follows:

- from M1 Junction 13 via the A507, Sandhill Close, Houghton Lane, Millbrook Road and the B530 Ampthill Road;
- from Bedford Road, via Woburn Road, Manor Road, B530 Ampthill Road and Millbrook Road,
- Through the Rookery South Pit, from the Power Generation Plant 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; or

2.4.16 Depending on the final location of the AGI it is possible that a permanent new junction will be created off Houghton Lane in the case of Option1 or off either Millbrook Road or the B530 in the case of Option 2.

2.5 Electrical Connection

2.5.1 The Electrical Connection will comprise all the necessary elements to enable power to be exported from the Generating Equipment to the NETS, such as a new substation and up to two new electrical circuits.

2.5.2 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. The most suitable point of connection would be a new substation to be located adjacent to the Generating Equipment Site, which would connect in to the line of the existing National Grid 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 and can clearly be seen on Figure 1.2.

2.5.3 For the purposes of this PEIR a realistic worst case scenario of up to two overhead line double circuits [of 400 kV] (including up to seven new transmission towers one of which will be replacing an existing tower and is likely to be located in close proximity to the location of that existing tower, thereby resulting in 6 net additional towers) has been assumed (and is being environmentally assessed) for the connection between the new substation (likely to be located adjacent to the Generating Equipment Site) and the NETS. However The Applicant will continue to work with National Grid on the indicative design of the connection over the coming months.

2.5.4 Several access route options are still being considered with regard to accessing the Electrical Connection. They are shown on Figure 12.2, and are as follows:

- From Junction 13 of the M1 via the A507, Sandhill Close, and Station Lane;
- From Bedford Road, via Woburn Road, Manor Road, B530 Ampthill Road, Millbrook Road, Houghton Lane and Station Lane;
- 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.

2.5.5 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 may 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 circuit is likely to comprise between one and four Lindsey towers, each being approximately up to 39 m high. The temporary works may also include the temporary erection of scaffolding over Station Lane.

2.5.6 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 a closure of Station Lane for a number of hours and that the temporary diversion of the existing 400 kV line would be in place for approximately three months.

2.5.7 Potential impacts could arise from the temporary diversion, through the possible closure of Station Lane and the possible removal of some vegetation where the Lyndsey towers are erected. The Lindsey towers, if required, would not require permanent foundations. At this stage, it is anticipated that these potential impacts would not give rise to any likely significant effects, however, further assessment will be carried out in the ES once the final design of the temporary works has been finalised.

Construction, Operational and Decommissioning Timescales

2.5.8 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, potential piling (if required) and the laying of the Gas and Electrical Connections. No requirements for demolition or remediation have been identified at this stage.

2.5.9 As referred to in Paragraphs 2.1.4 to 2.1.9 of this PEIR, the option agreement between the applicant and the landowner ensures that, as a minimum, the following components of the LLRS will be complete prior to construction of the Project commencing:

- 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 for use in the proposed restoration works;
- Formation of a temporary noise screening bund from stripped topsoil and subsoil along the western edge of the works adjacent to South Pillinge Farm;
- Redirection of existing surface water ditches and provision of an upper carrier ditch around the southern perimeter of the southern permitted excavation area;
- Excavation of clay from the southern permitted extraction area to provide material for the proposed restoration works and buttressing works, including provision of a new access ramp from the extraction area into the base of the pit;
- Construction of a new access ramp in the north west corner of Rookery South Pit;
- Construction of a landscaped platform graded so drainage falls across the areas of the base of Rookery South Pit required for the Project, utilising material won from either regrading of the base of the pit or from the southern permitted extraction area, to enable gravity drainage to occur in the base of the pit;
- Construction of surface water interceptor channels collecting to a single attenuation pond located at the north western corner of Rookery South Pit. The surface water interceptor channels and attenuation pond will include habitat mitigation and ecological enhancement measures;

- 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;

- Buttressing of the pit edge slopes to the south (part) and north (part) to provide a slope stabilisation solution for the existing slopes; and

- Redirection of existing surface water ditches and provision of an upper carrier ditch around the southern perimeter of the southern excavation area.

2.5.10 The Generating Equipment, Gas Connection, Electrical Connection and Access Road would be designed to have an operational life of 25 years. However, it may be that in practice all or part of the Project operates for a longer period of time than this. For the purposes of assessment, 25 years has been assumed. Following the end of the operational life of the Generating Equipment, it would be decommissioned.

2.5.11 Decommissioning would comprise the removal of all Generating Equipment plant items and restoration of the Generating Equipment Site to a similar condition compared to before the commencement of construction. This process would also take approximately 22 months. It is likely that some structures associated with the Project 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 and legislation on decommissioning of projects, which are relevant at the time of the decommissioning activities. Where possible, items of plant would be recycled or reused.

3 Regulatory and Policy Background

3.1 Introduction

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

3.1.2 A detailed description of the planning policy background and its relevance to the Project will be provided in the Planning Statement, which will be produced as a separate document to support the DCO Application. A summary of the Project in the context of the relevant NPS and such national and local policy as may be relevant and important to the SoS's decision on the Project will be discussed more fully within the environmental statement that is submitted as part of the suite of documents that accompany the DCO Application for the Project.

3.2 European Union

3.2.1 The EU Directives of particular relevance to the Project (in respect of environmental requirements) are listed below.

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

3.2.2 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 1.3) 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.

3.2.3 It is noted here that the Directive has been amended as of May 2014 and the amendments are required to have been implemented in member states by May 2017. As such, the implementing legislation isn't likely to be in force during the examination of the DCO Application for the Project and the amendments to the Directive are therefore not considered in further detail.

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

3.2.4 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 15 January 2008 concerning integrated pollution prevention and control (the IPPC Directive) and Directive 2001/80/EC of 23 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 proposed Project. The IED has been implemented in England and Wales by the Environmental Permitting (England and Wales) Regulations 2010.

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

3.2.5 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.

3.3 Nationally Significant Infrastructure Projects and Planning Act 2008

3.3.1 The Project is categorised as an NSIP and, if the DCO Application is accepted by PINs, it will be examined by PINS over a six month period. PINS will then, within three months, provide the SoS with a report setting out their conclusions and recommendations. The SoS will then have three months 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 Section 1.

3.3.2 As set out in NPS EN-1 (Overarching National Policy Statement for Energy), 'this NPS, when combined with the relevant technology-specific energy NPS, provides the primary basis for decisions' (Paragraph 1.1.1). The decision-maker 'should start with a presumption in favour of granting consent to applications for energy NSIPs' (paragraph 4.1.2) and on the basis that the urgent national need for such projects is settled. This approach is also supported by section 104 of the PA 2008 which 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).

3.3.3 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).

3.4 National Policy Statements

3.4.1 The PA 2008 introduced the concept of NPS. NPSs are not required under the PA 2008 but where a relevant NPS has been produced, the SoS must decide an application for a project in accordance with that NPS, unless

certain considerations apply. The NPSs that are potentially relevant to the consideration of the DCO Application for the Project are:

- The Overarching National Policy Statement for Energy (NPS EN-1);
- The National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (NPS EN-2);
- The National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (NPS EN-4); and
- The National Policy Statement for Electricity Networks Infrastructure (NPS EN-5).

NPS EN-1

3.4.2 NPS EN-1 recognises that there is a significant need for new energy infrastructure. It states that pending plant closures in the UK will reduce available capacity by at least 22 GW by 2020 as a result of both tightening environmental legislation and older power stations approaching the end of their useful life (paragraphs 3.3.7 to 3.3.9).

3.4.3 Paragraph 4.1.9 of EN-1 notes that where the SoS is satisfied that financial viability and technical feasibility of the proposal has been properly assessed by an applicant, such considerations are unlikely to be of relevance in IPC decision making. Accordingly, information to provide comfort that the Applicant has considered financial viability and technical feasibility will be included within the ES and other documents submitted with the DCO Application.

3.4.4 NPS EN-1 also sets out guidance on the consideration of alternatives when developing a new energy generation project (paragraphs 4.4.1 to 4.4.3) and guidance relating to criteria for ‘good design’ of new developments (Section 4.5).

3.4.5 Other assessment principles that are particularly likely to be relevant to energy NSIPs are set out as follows in NPS EN-1 (relevant paragraph numbers given in brackets):

- Pollution control (4.10): describes the relationship with other regimes (e.g. Environmental Permitting) which is essentially that the decision maker should be satisfied that “potential releases can be adequately regulated under the pollution control framework” without unacceptable cumulative impacts arising and that he or she "should not refuse consent on the basis of pollution impacts unless [they have] good reason to believe that any relevant necessary operational pollution control permits or licences or other consents will not subsequently be granted".
- Safety (4.11) and Hazardous Substances (4.12): describes the relationship with other regimes and the general requirement that the

decision maker will need to be satisfied that these regimes are complied with.

- Health (4.13): requires that where a proposed project has an effect on human beings, an assessment of potential health impacts is made in relation to each element of the project.

- Nuisance and amenity (4.14): the relationship with common law nuisance, statutory nuisance, and the importance to be attached by the SoS to their consideration during the determination process, are set out.

- Security (4.15): Government policy is set out as being "to ensure that, where possible, proportionate protective security measures are designed into new infrastructure projects at an early stage in the project development".

3.4.6 As well as generic assessment principles, EN-1 also identifies a generic list of impacts which could arise from an energy NSIP and the criteria by which they should be assessed. These specific topics include air quality, biodiversity and geological conservation, nuisance (e.g. dust), flood risk, historic environment, landscape and visual, noise, socio-economics, traffic and transport, waste management and water quality. These topics are discussed in more detail when describing the preliminary assessment of impacts presented in this PEIR.

NPS EN-2, EN-4 and EN-5

3.4.7 NPS EN-2 outlines considerations and factors relating to site selection and design for developers for fossil fuel generating stations, although it states that it is for the applicant to consider such matters, and that: "...the Government does not seek to direct applicants to particular sites for fossil fuel generating stations" (paragraph 2.2.1). NPS EN-2 sets out a number of specific impacts that could arise from a fossil fuel generating NSIP and criteria by which they should be assessed. These specific topics include air quality, landscape and visual, noise and vibration, and water quality and resources. These topics are discussed in more detail when describing the preliminary assessment of impacts in this PEIR.

3.4.8 NPS EN-4 sets Government policy on the relevant considerations and factors that should be taken into account as to route selection for developers for, inter alia, gas pipeline NSIPs. The NPS sets out a number of impacts that could arise from such development and criteria by which they should be assessed. These specific topics include biodiversity, noise and vibration, soil and geology, and water quality and resources. These topics have been discussed in more detail when describing the preliminary assessment of impacts in this PEIR.

3.4.9 NPS EN-5 provides the primary basis for decisions taken by SoS on applications it receives for electricity network NSIPs, including the relevant considerations and factors that should be taken into account related to route

selection. The NPS sets out a number of impacts that could arise from such development and criteria by which they should be assessed. These specific topics include biodiversity and geological conservation, landscape and visual, noise and vibration, and electric and magnetic fields. These topics have been discussed in more detail when describing the preliminary assessment of impacts in this PEIR.

3.5 National Planning Policy Framework

3.5.1 The NPPF sets out the Government's planning policies for England and how these are expected to be applied. In the context of an NSIP, the NPPF notes at paragraph 3 that, whilst it does not contain any specific policies for NSIPs, the NPPF may be considered as being important and relevant in the context of decision making for an NSIP.

3.5.2 The NPPF sets sustainable development at the core of its guidelines and establishes a 'presumption in favour of sustainable development' for decision-taking at paragraph 14. Policies set out in paragraphs 18-219, taken as a whole, constitute the Government's view of what sustainable development in England means in practice for the planning system. The NPPF focuses its interpretation of sustainable development into three dimensions: economic, social and environmental.

3.5.3 A set of 12 'core planning principles' are also set out in the NPPF. Paragraph 17 states that planning should 'support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy).'

3.5.4 As part of delivering sustainable development, the NPPF presents 13 different thematic titles setting out distinct ways in which Government expects the operation of planning processes at the local level to achieve the 12 core land use planning principles. The most relevant of these 13 titles to this development have been listed below:

- Building a strong, competitive economy (1);
- Supporting a prosperous rural economy (3);
- Promoting sustainable transport (4);
- Requiring good design (7);
- Promoting healthy communities (8);
- Meeting the challenge of climate change, flooding and coastal change (10);
- Conserving and enhancing the natural environment (11); and

- Conserving and enhancing the historic environment (12).

3.6 Local Planning Policy

Central Bedfordshire Core Strategy and Development Management Policies (Adopted November 2009)

3.6.1 The Central Bedfordshire Core Strategy and Development Management Policies was adopted in November 2009. The document is the key DPD for the northern part of the district and provides the long term vision and the direction for future development in this area over the period 2001 – 2026.

3.6.2 The Project Site is located within the Northern Marston Vale Strategic Area, which is allocated for significant housing, employment and environmental regeneration. Policy CS1 Development Strategy is considered relevant to this PEIR.

Central Bedfordshire Development Strategy

3.6.3 The Development Strategy for Central Bedfordshire is currently being developed and will become, once adopted (potentially in Summer 2015), the planning policy document for the whole of Central Bedfordshire. It will set out the overarching spatial strategy and development principles for the area together with more detailed policies to help determine planning applications. The strategy will address similar issues to those in the Core Strategy and Development Management Policies, but will also consider the allocation of strategic development sites.

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

3.6.1 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 emerging Minerals and Waste Local Development Framework for the three Councils, which will also include a General and Environmental Policies Local Development Document (adoption expected in 2015/16), Statement of Community Involvement (adopted in 2006), Supplementary Planning Document on Managing Waste in New Developments (adopted in 2006), and Policies Map.

3.6.2 The MWLP:SSP sets out a series of strategic objectives for waste and minerals, 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. 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.

3.6.3 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 (107ha), 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.

Bedford Borough Core Strategy and Rural Issues Plan (Adopted April 2008)

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

- Policy CP2 – Sustainable Development Principles;
- Policy CP21 – Designing in Quality;
- Policy CP23 – Heritage;
- Policy CP25 – Landscape Protection and Enhancement; and
- Policy CP25 – Biodiversity.

Bedford Borough Local Plan 2032

3.6.5 Bedford Borough Council is currently in the early stages of preparing a new Local Plan that will guide new development within the Borough up to 2032. 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. An initial 'Call for Sites' and Issues and Options consultation was undertaken in early 2014, prior to anticipated submission in late 2015 and adoption in late 2016. Upon adoption, the Local Plan 2032 will replace the adopted Core Strategy and Rural Issues Plan as the key DPD for the Borough.

Other Relevant Policy and Guidance

3.6.6 The following are considered to be potentially relevant and important policy and guidance in considering the potential impacts and effects of the Project (the below list may be updated by the time the DCO Application is submitted in 2015):

- The Electricity Market Reform (2012);
- The Energy Act (2013);
- Natural Environment White Paper (2012);

- Biodiversity 2020: A strategy for England's wildlife and ecosystem services (2011);
- The UK Climate Change Risk Assessment (CCRA) (2012);
- Gas Generation Strategy (2012);
- National Infrastructure Plan (2013); and
- Annual Energy Statement (2013).

4 Environmental Impact Assessment Methodology

4.1 Introduction

4.1.1 The information presented in this PEIR represents the available environmental information in respect of the Project as at the time of writing, based on up-to-date desk top studies, field surveys and assessments. Where additional information or studies are required in order to complete assessment of the likely significant environmental effects of the Project (which will be reported on in the environmental statement submitted with the DCO Application), this has been highlighted in this PEIR.

4.1.2 In due course, the information summarised in this PEIR will be developed, both as a result of feedback provided through consultation influencing the development of the Project, as well as the continuing assessment work indicated below. This further development will allow for preparation and finalisation of a comprehensive environmental statement that will accompany the DCO Application for the Project.

4.2 EIA Process

4.2.1 In accordance with the PA 2008 and the EIA Regulations, the EIA process for the Project has included the following:

- Establishing, through consultation, the scope of the EIA by obtaining a Scoping Opinion from the SoS;
- Consideration of potential technical and environmental alternatives to the Project;
- Establishing a comprehensive understanding of the existing baseline environmental conditions for the Project Site and the relevant study areas for each topic;
- Identifying the potential environmental impacts resulting from the Project;
- Assessing the significance of the potential environmental effects of the Project against the baseline (which includes existing developments that are constructed and/or operational);
- Assessing the significance of the potential effects of the Project arising in conjunction with proposed or consented but not yet constructed developments (cumulative effects) as well as certain effects acting in combination with other effects from the Project (in-combination effects);
- Determining how potential significant adverse environmental impacts could be avoided, reduced or off-set through informed design (embedded mitigation) and / or further mitigation (additional mitigation) as well as how any benefits of the Project may be enhanced (enhancement measures); and

- Proposing ways in which any significant adverse effects of the Project will be mitigated, managed and monitored through the DCO for the Project.

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

4.3 Scope of the Assessment

4.3.1 Under section 42 of the PA 2008, there is a duty placed on developers to consult certain prescribed bodies as well as local authorities and those with a certain interest in the Project Site. This section 42 consultation forms part of the statutory phase of consultation through which this PEIR has been published.

4.3.2 In addition to this statutory phase of consultation, the Applicant has undertaken non-statutory consultation with various communities, individuals and organisations. This will all be explained in detail in the consultation report that will be submitted as part of the suite of documents accompanying the DCO Application in 2015. However, for the purposes of this PEIR, it is worth noting that the Applicant has met CBC and BBC to discuss the Project in late May 2014. MPL will continue to liaise with these councils throughout all phases of the Project.

4.3.3 As stated in Section 1 of this PEIR, before commencing work on the EIA, the Applicant also sought a Scoping Opinion from PINS in June 2014. The request was supported by a Scoping Report that described the key anticipated environmental issues that would require detailed evaluation as part of the EIA process. The formal Scoping Opinion was received in July 2014, and has allowed for agreement on the likely significant environmental effects of the Project and, therefore, the aspects of the environment on which the EIA should focus.

4.4 Environmental Baseline

4.4.1 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 in an area and the developments that are already affecting those receptors, as at the date of the assessment. This allows the effects of the Project to be compared and / or combined with the existing quality of the environment in order to ensure an informed assessment is made of the potential effects of a project and to allow the identification of the most appropriate mitigation which could be employed to minimise any significant adverse effects.

4.4.2 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 effects (the study area for noise, for example, will cover a smaller area than that used to assess landscape and visual effects which may be experienced over a wider area). The study areas may be the same for certain assessment topics.

Confirmation of the study area for each assessment topic is clearly set out in the section for that topic below.

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

- 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 traffic levels on the road network; and
- Data held by both statutory and non-statutory consultees.

4.5 Assessment Methodology

4.5.1 To help evaluate and quantify the likely significant environmental effects of the Project, environmental significance criteria will be employed to ensure that the identified impacts and effects are understood. Effects may be positive (i.e. beneficial) or negative (i.e. adverse).

4.5.2 Environmental significance criteria are important as they will help inform the determination by the SoS of the overall acceptability of the Project.

4.5.3 The significance of environmental effects resulting from the construction, operation and decommissioning of the Project will generally be presented in this PEIR using a series of matrices as shown below in Tables 4.1 - 4.3. These will be developed to describe the sensitivity of receptors which have the potential to be impacted by the Project and the magnitude of any impacts which are likely to arise. The magnitude of impact and sensitivity of receptor will be considered together, using professional judgement, to give an overall significance of effect for any potential impact. Where it is not possible to quantify effects, a precautionary qualitative assessment will be carried out, based on available knowledge and professional judgement.

4.5.4 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 outlined below in Tables 4.1 – 4.3. However, it is noted here that for some impact sections, significance criteria may need to differ depending on the conditions encountered at the Project Site. The criteria will therefore be subject to further discussion with statutory consultees. Each technical section of the ES will clearly identify and explain any specific criteria used. Unless otherwise stated, effects of moderate significance or above are considered to be significant for the purposes of the EIA Regulations.

Table 4.1 – Example Sensitivity Matrix

Sensitivity	Example
Very High	Internationally designated site (e.g. Ramsar / Special Protection Area / World Heritage Site.
High	Nationally designated site (Site of Special Scientific Interest), / designated Landscape (e.g. National Park) / principal aquifer / main watercourse / human health.
Medium	Regionally designated ecology / heritage site / 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.
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

4.6 Structure of the PEIR

4.6.1 This PEIR has been prepared in discrete sections to allow the reader to understand the Applicant's proposals for the Project, the purpose of the PEIR, the regulatory framework in which it has been prepared, and the methodologies and preliminary assessment of the likely significant effects of the Project.

4.6.2 The environmental topics which are covered in this PEIR are:

- Air Quality – Section 6;
- Noise and Vibration – Section 7;
- Ecology – Section 8;
- Water Quality and Resources – Section 9;
- Geology, Ground Conditions and Hydrogeology– Section 10;
- Landscape and Visual – Section 11;
- Traffic, Transport and Access – Section 12;
- Archaeology and Cultural Heritage – Section 13;
- Socio-Economics – Section 14; and
- Other topics considered (Waste and Electromagnetic Frequency (EMF)) - Section 15.

4.6.3 Each topic section includes (many of the following items appear in matrix form): an explanation of the relevant legislation and policy for that topic; a brief explanation as to the assessment methodology used (including baseline); a preliminary assessment of the likely significant environmental

effects of the Project for that topic; an explanation of what additional mitigation may be appropriate; an assessment of the residual likely significant environmental effects of the Project for that topic; an assessment of the cumulative effects of the Project for that topic; and a conclusion.

4.7 Cumulative Effects

4.7.1 Schedule 4, Part 1 (para 20) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 requires an ES to include "…a description of the likely significant effects of the development on the environment, which should cover….cumulative effects".

4.7.2 In terms of assessing the effects of the Project together with proposed or approved but not implemented projects, the Applicant notes that PINS Advice Note 9 (Version 2, April 2012) provides a definition of cumulative effects in which it describes cumulative impacts as considering "…other proposed development within the context of the site and any other reasonably foreseeable proposals in the vicinity" (AN9, footnote 12).

4.7.3 AN9 also sets out that "the potential cumulative impacts with other major developments will 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 will 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".

4.7.4 As there is no standard approach to the assessment of cumulative effects and differing approaches have been adopted by different projects, for the purposes of this EIA, it is proposed that cumulative effects are treated as described below.

4.7.5 It is anticipated that construction of the Project will commence in 2017, if a DCO is granted by the SoS for the Project. In order to assess the cumulative

effects of the Project together with other developments that are proposed or consented but not yet built, the Applicant proposes to use a '2017 baseline' to provide a future baseline against which the direct, indirect and cumulative effects of the Project can be assessed. This baseline will include the developments that the Applicant knows will be completed prior to the commencement of construction of the Project. A clear example of such a project would be the LLRS. As it is not certain that the Covanta RRF Project DCO will be implemented by 2017, the Applicant has included the Covanta RRF Project within its cumulative effects assessment rather than including this in the 2017 baseline. The Applicant has not assumed that that Covanta RRF Project is already either constructed or operational as at 2017.

4.7.6 The developments which have been assessed cumulatively include:

- The Proposed Covanta RRF Project) to be developed to the north of the Generating Equipment Site;
- Integrated Waste Management Operations at Rookery South, Bedfordshire;
- Brogborough Wind Energy Project at Brogborough Landfill Site;
- Land at Moreteyne Farm at Wood End in Marston Moretaine;
- Land at Warrant Farm on Flitwick Road in Ampthill proposed for residential properties;
- Land East and West of Broadmead Road, Stewartby proposed for residential properties - under construction; and
- The new settlement at Wixams.

4.7.7 As part of the initial scoping of the EIA it was determined that certain topics are more likely to give rise to potential significant cumulative effects than others, based on the nature of the Project and surrounding development proposals. Therefore certain topic assessments have focused specifically, at this preliminary stage of the assessment, on potential cumulative effects and interactions. These topics are air quality, noise, traffic and landscape and visual effects. 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.

4.7.8 For those remaining topics where cumulative effects and interactions are unlikely, due for example to the limited geographical nature or significance of the potential effect, potential cumulative effects have been considered at a commentary level only at this preliminary stage and will be considered in detail as the assessment is completed. An example of this is in relation to ground conditions where there will be no significant effects arising from the Project and therefore no potential cumulative effects are anticipated.

4.8 Mitigation and Monitoring

4.8.1 Two broad types of potential mitigation measures will be described in the ES:

- Embedded mitigation - namely design/standard control measures, such as working within best practice guidance, which will routinely be incorporated for the Project or for any similar project constructed in the UK, and as such will be used to produce the initial assessment as to the likely significant effects of the Project; and

- Additional mitigation - which may be introduced, where appropriate, following the assessment of the likely significant effects of the Project (which will include embedded mitigation in its design). It is this additional mitigation that will then be assessed for effectiveness and so taken into account in the final 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).

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

4.8.3 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.

4.8.4 Significant adverse effects are best avoided by incorporating appropriate measures into the design process. As such, the iterative nature of the EIA process can help to inform the development of the design of the Project that will be the subject of the DCO Application in 2015.

4.8.5 The Project has and will continue to be developed in such a way that the reduction and, wherever possible, elimination of significant adverse environmental effects are integral to the overall design philosophy.

4.8.6 Where it is not possible to avoid adverse significant environmental effects, potential mitigation and monitoring measures will be discussed in each assessment Section. These measures will then be secured in the draft DCO that is submitted as part of the Application in 2015.

4.9 Residual Effects

4.9.1 Residual effects of the Project will also be described. These are defined as effects which cannot be fully remedied through the application of mitigation and therefore remain in place after mitigation has been applied.

4.10 Assumptions and Limitations

4.10.1 The following assumptions have been made in compiling this PEIR:

- The total construction programme will be approximately 22 months, with a start date of 2017 and an end date of 2018-2019;
- The operational life of the Power Generation Plant will be 25 years;
- The Generating Equipment will be decommissioned and removed at the end of its operational life;
- The Gas Pipeline will be left in situ at the end of its operational life;
- The decommissioning phase will be similar in duration to the construction phase;
- The Power Generation Plant will operate for up to 1500 hours per year. This could be at any time during the year and for any length of time up to 1500 hours;
- The Power Generation Plant will have a rated electrical output of between 50 and 299 MW;
- Current surrounding land uses do not change, with the exception of the developments to be cumulatively assessed with the Project that have been identified;
- Assessments are based on published sources of information and primary data collection.
- Assessments are based on the description of the Project described in Section 2;
- The design, construction and post-construction phases of the Project will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge.
- Any future development of the Project Site will be determined through separate planning applications and will not be assessed within the EIA.

5 Alternatives

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 further below.

5.2 Alternative Development Sites

5.2.1 In deciding upon the location for the Power Generation Plant, WPL 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." Unlike, for example, nuclear generating stations.

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

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

- Close proximity to the gas NTS;
- 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 Project Site;
- The Project Site is outside of areas at risk of flooding; and
- There is adequate space to develop the Power Generation Plant and integral infrastructure.

5.3 Power Generation Plant

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

5.3.2 SCGT is considered to be the most suitable technology choice for generating up to 299 MW as a peaking plant at the Project Site based on the following environmental, technical and feasibility considerations:

- Visual impact: SCGT plants require shorter stack(s) compared to CCGT plant and therefore are less visually intrusive in views from the surrounding environment;
- Water resources: the water requirement of a SCGT plant is significantly lower than for CCGT plants;
- Noise and available space: noise levels from a SCGT 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 will be particularly cost effective, as it will be called upon to operate flexibly to balance out the National Grid and meet changing demands of customers; and
- Start-up times: SCGT 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.

5.3.3 As discussed in Paragraphs 2.3.31 to 2.3.33 of this PEIR, the potential for using CHP opportunities with these technologies was also considered. However it is not considered to be technically or economically feasible with a SCGT peaking power station because the profile for the generation of electrical energy from the station cannot be guaranteed to coincide with the required heat demand profile of any potential consumer.

5.4 Gas Connection

5.4.1 The Project Scoping Report described a Gas Connection 'Opportunity Area, to the south of the Generating Equipment Site, in which a new gas pipeline and AGI would be developed. Since the publication of the Scoping Report, further studies have refined this Opportunity Area such that there are now two remaining Gas Connection Route Corridor Options (as described in Section 4).

5.4.2 These options have been chosen as the most direct connections between the Generating Equipment Site and the NTS, avoiding obstructions such as roads, large changes in elevation, water bodies and protected sites as much as possible.

5.4.3 Option 1 is the preferred Gas Connection Route Corridor Option. This is because it is shorter (and therefore less expensive and less damaging to agricultural land), it avoids crossing the midland mainline railway line, and other high pressure gas pipelines.

5.4.4 Nevertheless, Gas Connection Route Corridor Option 2remains a viable alternative should further studies reveal any as yet unknown constraints on Gas Connection Route Corridor Option 1such as previously undiscovered archaeological remains.

5.4.5 Consultation feedback will be considered in determining which option is the most appropriate, but for the purposes of the PEIR, both options have been assessed.

5.5 Electrical Connection

5.5.1 The Project's Scoping Report described an Electrical Connection Opportunity Area to the south of the Generating Equipment Site, in which the Electrical Connection would be developed. Since publication of the Scoping Report, further studies have been undertaken to refine the available options.

5.5.2 Based on these studies, it has been determined that the most suitable location for the substation is within Rookery South Pit, adjacent to the Generating Equipment Site. However, a number of options still exist on the best way to connect the substation to the NETS.

5.5.3 The main reasons for siting the substation adjacent to the Generating Equipment Site are as follows:

- Lower visual impact - The substation would be located entirely within Rookery South Pit, which is below ground level. The maximum height of the tallest structures within the substation would be 17.5 m, meaning they would be substantially screened by the pit, which is approximately 15 meters below ground level (mbgl). If the substation were to be developed outside of the Generating Equipment Site, 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.

- It is recognised that siting the substation in the Generating Equipment Site means that there may be a need for pylons to support a new overhead electrical cable. However, this impact is considered less than those arising from siting the substation out of the Generating Equipment Site.

- Less impact on agricultural land – As stated above, should the substation be located outside of the Generating Equipment Site, it would be developed on agricultural land. This would not only take more greenfield land than six net additional towers, but would also impact on drainage runoff rates as agricultural land would be replaced by hardstanding.

- Less impact 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 the Generating Equipment Site which has previously been disturbed removes a potential impact on the archaeology and cultural heritage of the area.

5.5.4 Although the substation is located adjacent to the Generating Equipment Site, it is assessed in this PEIR under the "Electrical Connection" sections of each topic section (and is not being included as part of the assessment for the Power Generation Plant in each topic section).

6 Air Quality

6.1 Introduction

6.1.1 This section of the PEIR presents the preliminary findings of the assessment of likely significant air quality effects arising from the construction, operation and decommissioning of the Project on sensitive human and ecological receptors in and around the vicinity of the Project Site. Potential effects could result from vehicle emissions and dust generation during construction and decommissioning, and stack emissions during operation of the Generating Equipment.

6.2 Approach

Relevant Policy and Guidance

6.2.1 Relevant policy and guidance relating to air quality is set out in Appendix 2.6.

Assessment Methodology

Study Area

6.2.2 In relation to construction and decommissioning dust effects, the study area is defined in accordance with the Institute of Air Quality Management (IAQM, 2014) 'Guidance on the assessment of dust from demolition and construction' (the "IAQM Guidance") 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 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 site or 50 m of the routes used by construction vehicles on the public highway, within 500 m of the site entrance.

6.2.3 These distances have therefore been used to set the study area in this preliminary assessment as to whether there are any likely significant effects of the Project in relation to air quality from dust. Both on-site and off-site dust effects have been considered.

6.2.4 The impact of the emissions from vehicles during the construction, operational and decommissioning phases (both on- and off-site) of the Project has been assessed 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.

6.2.5 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 Environment Agency ("EA") criteria in H1 Annex F.

6.2.6 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 of the Generating Equipment Site and therefore residential 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 Environment Agency ("EA") criteria in H1 Annex F[1].

6.2.7 Based on the risk of dust impacts, appropriate mitigation is selected from the IAQM Guidance by using professional judgement.

Realistic Worst Case Scenario for Assessment

6.2.8 In respect of Air Quality, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of this PEIR) are Five Aero-derivative gas turbine generators, each with their own 30 m high stack

6.2.9 The reason that this represents the realistic worst case in relation to air quality impacts is that the buoyancy of a plume is, principally, a function of its temperature and volume. Assuming the thermal efficiency of the units for all options of between one and five units is the same, a specific plant electrical output will require a specific amount of natural gas. The combustion of this gas would thus result in a specific volume of flue gas.

6.2.10 The temperature of the flue gases will be similar irrespective of the number of installed units. However, if the flue gases are split between multiple stacks, the volumetric flow rate of each plume will be reduced (e.g. the use of five stacks will emit 20 per cent of the total flue gas volume) thus reducing the buoyancy of the flue gases proportionately.

6.2.11 The reduction in buoyancy will limit the potential for atmospheric dispersion of the flue gases. For instance, simple plume rise calculations indicate that the

[1] H1 Annex F – Air Emissions – Environment Agency. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298239/geho0410bsil-e-e.pdf . Accessed on 15/08/14

potential plume rise for emissions from five individual stacks would be around half that which could be achieved for emissions for the same total volume of flue gas but from two individual stacks.

6.2.12 Both Gas Connection Route Corridor Options have been assessed and the worst case Electrical Connection of two double circuit overhead lines with seven new additional towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Ambient Air Quality and the Protection of Human Health

6.2.13 The AQS Regulations[2] specify a series of standards and objectives for air quality in the UK. The objectives are summarised in Table 2.6.1 of Appendix 2.6 and consider the pollutants that form the principal products of industrial combustion processes. In the case of combustion of natural gas in a power station, these are NOx 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 deposition of nutrient nitrogen and the acidity due to nitrogen as a result of operation of the Generating Equipment under all development scenarios will be undertaken in accordance with the Environment Agency (EA) guidance "AQTAG 06 - Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air" (2010). Critical loads (to be used as standards for the assessment of significance) will be obtained from the Air Pollution Information System (APIS).

6.2.14 The critical loads are specific to the individual ecological receptors. Table 6.7 in Section 6.3 below sets out the critical loads for the ecological receptors being assessed.

Building Downwash

6.2.15 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.

6.2.16 The downwash effects of buildings are considered to be potentially significant if they are within a distance from the stack(s) which is equivalent to five times the stack height and if the building height is greater than 30 per cent of the stack height. All buildings are assumed to be located in the indicative layout as shown in Figure 2.1. As such, none of the buildings present at the Project Site will give rise to significant downwash effects.

Receptors and Additional Model Data

6.2.17 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

[2] http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf

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).

6.2.18 The ADMS 5 model calculates time averaged ground level concentrations over any set of distances from the source. The preliminary study for the identification of the likely height of the stacks for the Project used a 4 km by 4 km Cartesian grid with 44.4 m spacing to predict the maximum process contributions to ground level concentrations in the immediate vicinity of the Generating Equipment Site.

6.2.19 The meteorological data used for this modelling exercise was that from the station at Cranfield; it is considered that this data will be representative of the conditions experienced at the Generating Equipment Site as it lies approximately 6km away. The data period considered was 2009-2013 inclusive as per current EA guidelines for the need to use recent meteorological data over five consecutive years. For each year the predominant wind direction was from the south west.

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

Fuel-specific Dispersion Model Inputs

6.2.21 The air dispersion modelling assumes that the Generating Equipment operates at full load for 1,500 hours per year, i.e. the maximum possible number of operational hours.

6.2.22 All emissions from the combustion of the fuel gases will be discharged from the stack(s) that will be located within the Generating Equipment Site. The indicative emission parameters for the stacks are shown in Table 6.1**.** The only pollutants of concern in relation to gas combustion are oxides of nitrogen ($NO_{x)}$ and carbon monoxide (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 NOx are the controlling pollutant for the determination of the stack height, the results of the CO modelling will be reported in the ES although, based on this preliminary assessment, it is considered very unlikely that assessment levels for CO will be breached.

Table 6.1 Model Inputs

Parameter	Value Per Generator
Type	Simple Cycle Gas Turbine
Number	5
Discharge Location	501402.9, 240658.3 501404.8, 240630.6 501406.8, 240602.9 501408.7, 240575.2 501410.6, 240547.5
Discharge Heights Tested (m)	15 – 40
Exit Flue Diameter (mm)	4486
Discharge temperature (^{o}C)	479
Flow rate (m^3/s)	395
Flow rate (Nm^3/s, dry, reference O_2)	132
Exit velocity (m/s)	25
NO_x concentration (mg/Nm^3)	50
NO_x emission rate (g/s)	6.61
CO Concentration (mg/Nm^3)	100
CO emission rate (g/s)	13.22

Atmospheric Chemistry

6.2.23 Emissions of NO_x from combustion sources include both nitrogen dioxide (NO_2) and nitrogen monoxide (NO), with the majority being in the form of NO. In ambient air, NO is oxidised to form NO_x, 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[3], namely that:

- For the assessment of long term (annual mean) impacts, at receptors 70 percent of NOx is NO_2; and

[3] 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 15/08/14

- For the assessment of short term (hourly mean) impacts, at receptors 35 percent of NOx is NO_2.

6.2.24 The oxidation of NO to NO_2 is not, however, an instantaneous process and where the maximum impacts occur within a few hundred metres 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

6.2.25 As set out in Paragraph 2.3.14 of this PEIR, a stack height sensitivity study has been undertaken for the Project - dated August 2014. This study examined differing stack heights in 2.5 m intervals from 15m to 40m (inclusive). The stack height sensitivity study considered long term and short term contributions to ground level concentrations of NO_2.

6.2.26 The stack height modelling results have been compared against the UK AQS objectives (as set out in the AQS Regulations and summarised in Table 2.6.1 of Appendix 2.6). The stack height study predicted the 99.79^{th} percentile hourly average and the annual average NO_2 ground level concentrations as a result of the operation of the Power Generation Plant. The percentile value is used for compliance with EU and UK legislation.

6.2.27 Based on this analysis it has been determined that a stack height of between 30 and 40 m is suitable for the Generating Equipment so as to achieve adequate dispersion of air emissions without impacting on sensitive receptors and ensuring compliance with the UK AQS objectives.

Significance Criteria

Construction / Decommissioning

6.2.28 In accordance with the IAQM Guidance, the dust emission magnitude is defined as high, medium or low (Table 6.2) taking into account the construction / decommissioning activity taking place on a site, combined with applying professional judgement.

6.2.29 The sensitivity of the study area to construction and decommissioning dust impacts has been defined based on the examples provided within the IAQM Guidance as set out in Table 6.2 below and taking into account and applying professional judgement.

Table 6.2 - Risk Criteria for Dust Emission Magnitude

Dust Emission Magnitude	Activity
High	**Demolition** >50,000m^3 building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >20m

Dust Emission Magnitude	Activity
	above ground level
	Earthworks >10,000m^2 site area, dusty soil type (e.g. clay), >10 earth moving vehicles active simultaneously, >8m high bunds formed, >100,000 tonnes material moved
	Construction >100,000m^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
Low	**Demolition** <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

Dust Emission Magnitude	Activity
	tonnes material moved
	Construction <25,000 m^3, non-dusty material
	Trackout <10 HDVs out / day, non-dusty soil, < 50 m unpaved roads

Table 6.3 - 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 Nationally designated site 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.	Nationally designated site or particularly important plant species 20 – 50 m Locally designated site with dust sensitive features within 50 m

6.2.30 Based on dust emission magnitude and the area sensitivity, the significance of dust effects is determined as shown in Table 6.4 below, taking into account and applying professional judgement.

Table 6.4 - Significance of Dust Effects

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

6.2.31 Effects of medium or above are considered to be significant in terms of the EIA regulations.

6.2.32 Given the distance of the nearest ecological receptor to the Project Site, dust impacts on ecological receptors have been scoped out of the assessment.

Operation – Human Health Receptors

6.2.33 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 EA H1 Annex F guidance[4]. The contribution of the Generating Equipment (the process contribution (or PC)) has been added to an estimate of the background concentration to provide the predicted environmental concentration (PEC). The maximum process contribution 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.

6.2.34 In all cases, the PEC should be below the relevant assessment level for the relevant pollutant as set out in Table 2.6.1 in Appendix 2.6 of this PEIR. Where a PC causes a breach of the relevant assessment level, and the PC is the significant causing 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).

6.2.35 Operation of the access road is not considered to give rise to any noticeable impacts on air quality given the very limited number of vehicle movements (4 staff on site at any one time).

Operation – Ecological Receptors

6.2.36 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 by Defra. In addition,

[4] H1 Annex F – Air Emissions – Environment Agency. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298239/geho0410bsil-e-e.pdf . Accessed on 15/08/14

the EA H1 Annex F Guidance has set a NO_x daily mean concentration assessment level of 75 µg/m^3 in accordance with WHO guidelines[5].

6.2.37 This preliminary 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 EA's H1 Annex F Guidance. The maximum PEC within the habitat should not exceed the critical level for the habitat set out in the guidance; whereas 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 Risk Assessment (HRA) would be necessary (see Section 8 of this PEIR for further information on HRA).

Consultation and Consultation Responses

6.2.38 Consultation is currently ongoing and will be continued through the PEIR and EIA process. A list of consultation responses to date relating to the air quality preliminary assessment and how each response has been addressed are presented in Table 6.5 below.

Table 6.5 - Summary of consultation and responses

Reference	Comment	Actions
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 6.2.
3.28	The study area should be described and reasons for it justified.	The study area for the air quality preliminary assessment is described in Section 6.2 of the PEIR.
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 of the PEIR.
3.3.0 / 3.37	There is a need for the air	A full list of potentially sensitive

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

Reference	Comment	Actions
	quality assessment to be consistent with the ecology section and to take into consideration of all relevant ecology sites.	ecological receptors is presented in Section 6 of the PEIR and this is consistent with the ecology section of the PEIR
3.32	Justification for 1 km study area needs to be through consultation with councils.	Consultation with the relevant councils is being undertaken for the EIA.
3.34	The air dispersion model needs to be clearly explained and the worst case scenario set out.	The modelling scenarios will be clearly explained and the worst case scenario will be set out in the ES.
3.35	Consideration should be given to monitoring dust complaints during all phases of the development.	Mitigation measures will be determined following completion of the assessment of fugitive dust emissions during construction and presented in the ES, as per the methodology presented in Section 6 of the PEIR. Consideration will be given to monitoring dust complaints during all phases of the Project.
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.	There will be negligible emissions of sulphur dioxide from the Generating Equipment. The effect of oxides of nitrogen emissions will be considered within the ES. The combustion fuel is natural gas and therefore there will be negligible emissions of dioxins from the Power Generation Plant.
CBC		

Reference	Comment	Actions
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 air quality impacts are being assessed in accordance with relevant guidelines as per the methodology presented in Section 6 of the PEIR. As the Power Generation Plant will be regulated by the Environment Agency, it is more appropriate to use criteria derived from Environment Agency guidance H1 Annex F[4]. In general, requirements for environmental permitting are more stringent than those applied to planning.
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 Power Generation Plant. Atmospheric dispersion modelling will be used to predict the plume dispersion from the plant, in line with the methodology outlined in Section 6 of the PEIR and the results of the modelling will be presented in the ES.

6.3 Embedded Mitigation

6.3.1 In order to undertake an assessment of the potential effects on air quality as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied during construction, decommissioning and operation. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of protection of air quality, these standard mitigation measures include:

- Adherence to a CEMP which will limit dust emissions during construction;
- Standard mitigation for low risk sites from IAQM Guidance; and
- Ensuring stack height achieves adequate dispersion to comply with relevant guidance.

6.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

6.4.1 Information on existing air quality has been obtained by collating the results of monitoring carried out by CBC and BBC. Background concentrations for the Project Site have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid (Defra, 2014).

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

6.4.3 The nearest Air Quality Management Area (AQMA) to the Project Site is within Bedford, approximately 10 km northeast of the Project Site. The AQMA, declared primarily on the basis of traffic related NO_2, covers an area of the town centre including High Street and Prebend Street. In light of the fact that this AQMA is located approximately 10 km northeast of the Project Site, based on the preliminary assessment, it is considered that emissions from the Power Generation Plant are unlikely to impact significantly on this AQMA.

6.4.4 CBC has two real time analysers sited in Sandy (approximately 18 km from the Project Site) monitoring NO_2, PM_{10} and $PM_{2.5}$ and in Marston Moretaine monitoring Ozone (O_3)). In addition a network of NO_2 diffusion tube monitors are utilised throughout CBC's district. The nearest diffusion tube is in Brogborough, approximately 4.5 km south west of the Project Site. Recent monitored concentrations for Brogborough, taken from the CBC 2013 Progress Report, are shown in Table 6.6.

Table 6.6 - Brogborough monitoring data

Location	NO_2 (µg/m^3)		
	2010	2011	2012
N7, Highfield Crescent Brogborough	40	25.7	26.8

6.4.5 Residential receptors within 1 km of the Project Site include those within the nearby settlements of Stewartby, Millbrook, Marston Moretaine, Ampthill and How End. In addition, there are also farmsteads outside of the settlements including but not exclusive to:

- South Pillinge Farm;
- Church Farm and Church Farm Cottages;

[6] www.apis.ac.uk

- Lower Farm;
- Ossory Farm;
- Park Farm;
- Manor Farm;
- Manor Farm Cottages;
- Road Farm;
- How End Farm;
- Ampthill Park House;
- Field Farm; and
- Houghton Park Residential care home.

6.4.6 Brogborough land fill gas fired power station is located approximately 4.5 km west of the Project Site and is potentially considered a source of air emissions. Further consultation will be sought with CBC, BBC and the EA to determine a definitive list of significant emission sources in the area to consider as part of the detailed air quality assessment in the ES.

6.4.7 There are no internationally designated sites within 10 km of the Project Site.

6.4.8 Nationally designated sites within 2 km of the Project Site include:

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

6.4.9 Non-statutory ecological sites within 2 km of the Project Site include:

- 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).

6.4.10 The critical loads for the receptors listed above are listed in Table 6.7, with the baseline deposition listed in Table 6.8. For the SSSIs, the site relevant critical loads from the APIS database are shown. For the CWSs, an appropriate sensitive habitat has been selected and the location specific information from APIS is shown.

Table 6.7 - Site relevant critical loads

Designated Site	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
		(keqN/ha/yr)*	(keqS/ha/yr)**
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Lowland mixed deciduous woodland)*	10 - 20	0.214 – 10.829	10.615
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Neutral grassland)*	20 - 30	0.928 – 4.928	4.00
Cooper's Hill SSSI *(Lowland Heathlands)*	10 - 20	0.571 – 1.352	0.19
Rookery Clay Pit CWS *(Broadleaved, mixed and yew woodland)*	10 - 20	0.14 – 1.10	0.95
Stewartby Lake CWS *(Calcareous grassland)*	15 - 25	0.85 – 4.74	3.88
Millbrook Pillinge Pit CWS *(Neutral grassland)*	20 - 30	0.85 – 4.74	3.88
Ampthill Park CWS	10 - 20	0.14 – 1.10	0.95

Designated Site	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
		(keqN/ha/yr)*	(keqS/ha/yr)**
(Broadleaved, mixed and yew woodland)			
Lidlington Pit CWS *(Neutral grassland)*	20 - 30	0.85 – 4.74	3.88
Millbrook Churchyard CWS *(Calcareous grassland)*	15 - 25	0.85 – 4.74	3.88
Millbrook CWS *(Broadleaved, mixed and yew woodland)*	10 - 20	0.14 – 1.10	0.95
Heydon Hill CWS *(Broadleaved, mixed and yew woodland)*	10 - 20	0.14 – 1.10	0.95
Coronation Pit CWS *(Broadleaved, mixed and yew woodland)*	10 - 20	0.14 – 1.10	0.95
Millbrook Warren CWS *(Broadleaved, mixed and yew woodland)*	10 - 20	0.14 – 1.10	0.95
Ampthill Cemetery and the Knoll CWS *(Acid grassland)*	10 - 15	0.22 – 0.68	0.46
Ampthill Tunnel CWS *(Neutral grassland)*	20 - 30	0.85 – 4.74	3.88
Marston Bypass RNR *(Neutral grassland)*	20 - 30	0.85 – 4.74	3.88

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

Table 6.8 - Baseline deposition from APIS

Designated Site	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
		(keqN/ha/yr)*	(keqS/ha/yr)**
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Lowland mixed deciduous woodland)*	39.34	2.71	0.23
King's Wood & Glebe Meadows, Houghton Conquest Site SSSI *(Neutral grassland)*	20.44	1.41	0.19
Cooper's Hill SSSI *(Lowland Heathlands)*	20.44	1.41	0.19
Rookery Clay Pit CWS *(Broadleaved, mixed and yew woodland)*	35.56	2.54	0.23
Stewartby Lake CWS *(Calcareous grassland)*	18.76	1.34	0.19
Millbrook Pillinge Pit CWS *(Neutral grassland)*	18.76	1.34	0.19
Ampthill Park CWS *(Broadleaved, mixed and yew woodland)*	37.38	2.67	0.25
Lidlington Pit CWS *(Neutral grassland)*	18.76	1.34	0.19
Millbrook Churchyard CWS *(Calcareous grassland)*	20.30	1.45	0.19
Millbrook CWS *(Broadleaved, mixed and yew woodland)*	39.34	2.81	0.23

Designated Site	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
		(keqN/ha/yr)*	(keqS/ha/yr)**
Heydon Hill CWS *(Broadleaved, mixed and yew woodland)*	37.38	2.67	0.25
Coronation Pit CWS *(Broadleaved, mixed and yew woodland)*	35.56	2.54	0.23
Millbrook Warren CWS *(Broadleaved, mixed and yew woodland)*	37.38	2.67	0.25
Ampthill Cemetery and the Knoll CWS *(Acid grassland)*	19.46	1.39	0.20
Ampthill Tunnel CWS *(Neutral grassland)*	19.46	1.39	0.20
Marston Bypass RNR *(Neutral grassland)*	18.76	1.34	0.20

Construction/Decommissioning

6.4.11 The main potential air quality effects during construction and decommissioning of the Power Generation Plant are dust deposition and elevated PM10 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 including demolition of buildings; and
- Disposal of waste materials off-site.

6.4.12 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.

6.4.13 In addition to the generation of dust and PM10 emissions, emissions of NOx can occur from road traffic and equipment used on site.

6.4.14 The preliminary assessment of effects on air quality arising from the construction/decommissioning of the Power Generation Plant is presented in Table 6.9 below.

Table 6.9 – Preliminary assessment of effects on air quality from construction / decommissioning of Power Generation Plant

Receptor name and description	Preliminary assessment of significance of effects	Potential specific mitigation	Potential residual significance of effects	Further assessment and consultation to be undertaken
Generating Equipment and Laydown Area				
Human health receptors (South Pillinge Farm)	Low	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3.	Low	An assessment will be carried out and set out in the ES in accordance with the IAQM Guidance
Ecological receptors	Screened out for dust and PM_{10} emissions from construction and decommissioning	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	None	None
Human health and ecological receptors	Emissions from construction and decommissioning vehicles and equipment –	No specific mitigation is anticipated at this stage over and above the embedded	None	Construction and decommissioning vehicle numbers to be confirmed

Receptor name and description	Preliminary assessment of significance of effects	Potential specific mitigation	Potential residual significance of effects	Further assessment and consultation to be undertaken
	unlikely to have a significant effect on local air quality due to limited number of movements.	mitigation outlined in Section 6.3		
Access Road				
Human health receptors (South Pillinge Farm and Stewartby)	Low risk of dust and PM_{10} from construction and decommissioning	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	Negligible	An assessment will be carried out and set out in the ES in accordance with the IAQM Guidance
Ecological receptors (Rookery Clay Pit)	Low risk of dust impacts from construction and decommissioning	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	Negligible	An assessment will be carried out and set out in the ES in accordance with the IAQM Guidance
Human health and ecological receptors	Emissions from construction and decommissioning vehicles and equipment – unlikely to have a significant effect on local air quality	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	None	Construction and decommissioning vehicle numbers to be confirmed

Operation

6.4.15 The most significant pollutant that would be emitted from the operation of the Generating Equipment would be NO_x. A proportion of the NO_x emitted will be converted in the atmosphere to NO_2 and the ground level concentrations of this pollutant have been used to set an appropriate stack height for the Generating Equipment (30 - 40 m) so as not to breach the AQM limits.

6.4.16 Combustion in Gas Turbine Generators is conducted at high excess air rates, (typically 200-300 percent) which provide conditions as close to complete combustion as possible. There are, therefore, very low levels of CO or unburned hydrocarbons present in the products of combustion when burning natural gas.

6.4.17 The preliminary assessment of effects on air quality arising from the operation of the Power Generation Plant is presented below in Table 6.10.

Table 6.10 – Preliminary assessment of operational effects of Power Generation Plant on air quality

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Generating Equipment				
Human health receptors in the study area	Maximum concentrations are insignificant with a 40m stack height and therefore effects at specific receptors are also likely to be insignificant	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3.	Effects are anticipated to be not significant based on maximum ground level concentrations	Maximum concentrations and concentrations at specific receptors will be tabulated in the ES.
Ecological receptors within study area	Unlikely to be significant effects from oxides of nitrogen emissions, nitrogen and	No specific mitigation is anticipated at this stage over and above the embedded	Effects are anticipated to be not significant	Results at specific receptors to be tabulated

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
	acid deposition	mitigation outlined in Section 6.3		
Human health and ecological receptors	Emissions from operational traffic unlikely to be significant due to low numbers of vehicle movements	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	None	N/A
Access Road				
Human health and ecological receptors	It is anticipated that emissions from operational traffic will not be significant due to the low numbers of vehicle movements	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	None	N/A

6.5 Gas Connection Assessment

Baseline Conditions and Receptors

6.5.1 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 described in section 6.3 above. The baseline conditions and receptors are the same for Gas Connection Route Corridor Option 1 and Gas Connection Route Corridor Option 2.

Construction/Decommissioning

6.5.2 The main potential effects on air quality during construction and decommissioning of the Gas Connection (Route Corridor Options 1 and 2) are as set out for the Power Generation Plant assessment above.

6.5.3 The preliminary assessment on effects on air quality resulting from the construction and decommissioning phase of the Gas Connection (Route Corridor Options 1 and 2) is presented in Table 6.11 below.

Table 6.11- Preliminary assessment of air quality effects from construction / decommissioning of Gas Connection

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Gas Connection				
Human health receptors (Manor Farm, Vean Parc, The Chequers)	Low	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	Low	Assessment set out in accordance with IAQM guidance
Ecological receptors	Screened out for dust and PM_{10} emissions from construction and decommissioning	None	None	None

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Human health and ecological receptors	It is anticipated that emissions from construction and decommissioning vehicles and equipment are unlikely to have a significant effect on local air quality	None	None	N/A

Operation

6.5.4 Emissions to air during the operational phase of the Gas Connection will potentially include infrequent emissions of natural gas. These are expected to be minimal and limited to infrequent venting of gas from the AGI under abnormal, maintenance or emergency conditions. There will also be very minor emissions from vehicles accessing the AGI for maintenance reasons.

6.5.5 It is also noted here that the SoS, in the Scoping Opinion, commented that the potential effects of air quality from operation of the Gas Connection could be scoped out of the assessment.

6.5.6 The preliminary assessment of effects on air quality on the operation of the Gas Connection is presented in Table 6.12 below.

Table 6.12 – Preliminary assessment of operational effects of Gas Connection on air quality

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Gas Connection				
Human health and ecological receptors in the study area	Insignificant impacts due to emissions of natural gas and vehicle	None	Effects are anticipated to be insignificant	None

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
	emissions			

6.6 Electrical Connection Assessment

Baseline Conditions and Receptors

6.6.1 Baseline conditions and receptors are as described for the Power Generation Plant in section 6.3 above.

Construction/Decommissioning

6.2.1 The main potential effects on air quality during the construction and decommissioning of the Electrical Connection are as set out for the Power Generation Plant assessment above.

6.2.2 The excavation of foundations for pylons associated with the Electrical Connection has the potential for the generation of fugitive dust and PM_{10} emissions.

6.2.3 In addition to the generation of dust and PM_{10} emissions, emissions of NO_x can occur from road traffic and equipment used for construction of the Electrical Connection.

6.2.4 The preliminary assessment of effects on air quality on the construction and decommissioning of the Electrical Connection is presented in Table 6.13 below.

Table 6.13: Preliminary assessment of effects from construction / decommissioning of Electrical Connection

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Electrical Connection				
Human health receptors (South)Pillinge	Low	Standard mitigation for low risk sites	Low	Assessment set out in accordance

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Farm		from IAQM guidance		with IAQM guidance
Ecological receptors	Screened out for dust and PM_{10} emissions from construction and decommissioning	None	None	None
Human health and ecological receptors	Emissions from construction and decommissioning vehicles and equipment – unlikely to have a significant effect on local air quality	None	None	N/A?

Operation

6.6.2 There is a very limited scope for potential impacts on air quality relating to the operation of the Electrical Connection.

6.6.3 It is also noted here that the SoS, in the Scoping Opinion, commented that the potential effects of air quality from operation of the Electrical Connection could be scoped out of the assessment.

6.6.4 The preliminary assessment of effects on air on the operation of the Electrical Connection is presented in Table 6.14 below.

Table 6.14 – Preliminary assessment of operational effects of Electrical Connection

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken

Receptor name and description	Preliminary assessment of significance of effect	Potential specific mitigation	Potential residual significance of effect	Further assessment and consultation to be undertaken
Human health and ecological receptors in the study area	Insignificant	None	Effects are anticipated to be not significant	None

6.7 Project as a Whole

6.7.1 The Summary of Effects Table 6.15 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.

6.7.2 The Project, as a whole, is not considered to have any likely significant effects on air quality during construction, operation or decommissioning, as none of the individual elements of the Project will have significant effects.

6.8 Cumulative Effects

Construction/Decommissioning

6.8.1 Construction and decommissioning of the Project could occur simultaneously with other projects located in the vicinity of the Project Site. As set out in section 4.7 of this PEIR, the project with the most potential for simultaneous construction effects is the Covanta RRF to be developed to the north of the Generating Equipment Site. Construction phase mitigation measures will be employed during the construction of the Covanta RRF which are likely to be similar to the embedded mitigation measures that would be proposed for the Applicant's Project, as set out in Section 6.3, with the resulting impact being not significant.

Operation

6.8.2 The proposed Covanta RRF 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 and therefore the location of maximum ground level concentrations will be different. In addition, based on the preliminary assessment, as the maximum concentrations from the Project are unlikely to be significant in their own right, it is anticipated that the emissions to air from the Project will be not significant in conjunction with emissions to air from the Covanta RRF Project.

6.9 Summary and Conclusions

6.9.1 Based on the above assessment methodology, the baseline data, significance criteria, and the initial air dispersion modelling results presented in this section 6 of the PEIR, a full air quality assessment is being undertaken as part of the EIA to determine whether there would be any likely significant environmental impacts arising from the Project, (both in isolation and in conjunction with other significant emissions sources identified through consultation with the relevant authorities) and will be presented in the ES. Based on this preliminary assessment, it is not considered that there will be any significant environmental effects on air quality arising from the Project, alone or in combination with other plans or projects in the area of the Project Site. A summary of this assessment is provided in Table 6.15 below.

Table 6.15 - Summary effects on air quality

	Receptor name and description	Potential mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant			
Construction / decommissioning	Human health and ecological receptors – dust and PM_{10} impacts	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	Effects are not anticipated to be significant following mitigation
Operation	Human health receptors in the study area	Emissions will be controlled in line with the environmental permitting requirements pursuant to the Industrial Emissions Directive (IED) and an appropriate stack height will be selected	Effects will not be significant based on maximum ground level concentrations
	Ecological receptors within study area		Effects are anticipated to be not significant
Gas Connection			
Construction / decommissioning	Human health and ecological	No specific mitigation is	It is anticipated that effects will be

	Receptor name and description	Potential mitigation	Preliminary Assessment of Residual Effects
	receptors – dust and PM_{10} impacts	anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	not significant following mitigation
Operation	Human health and ecological receptors – methane emissions	None required	It is anticipated that effects will not be significant
Electrical Connection			
Construction / decommissioning	Human health and ecological receptors – dust and PM_{10} impacts	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	It is anticipated that effects will be not significant following mitigation
Operation	Human health and ecological receptors – maintenance activities	None required	It is anticipated that effects will not be significant
Project (as a whole)			
Construction / decommissioning	Human health and ecological receptors – dust and PM_{10} impacts	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	It is anticipated that effects will be not significant following mitigation
Operation	Human health in the study area	Emissions controlled in line with IED	It is anticipated that effects are not significant based

	Receptor name and description	Potential mitigation	Preliminary Assessment of Residual Effects
		requirements and appropriate stack height selected	on maximum ground level concentrations
	Ecological receptors in the study area		It is anticipated that effects are anticipated to be not significant
Cumulative Effects			
Construction / decommissioning	Human health and ecological receptors – dust and PM_{10} impacts	No specific mitigation is anticipated at this stage over and above the embedded mitigation outlined in Section 6.3	It is anticipated that effects will be not significant following mitigation
Operation	Human health in the study area	Emissions controlled in line with IED requirements and appropriate stack height selected. Based on the preliminary assessment, it is anticipated that there will not be any interactions between emission plumes from the Project with other projects in the area.	Effects are not significant based on maximum ground level concentrations
	Ecological receptors in the study area		Effects are anticipated to be not significant

7 Noise and Vibration

7.1 Introduction

7.1.1 This section of the PEIR presents the preliminary findings of the assessment of likely significant noise and vibration effects arising from the construction, operation and decommissioning of the Project on noise sensitive receptors.

7.2 Approach

Relevant Policy and Guidance

7.2.1 Relevant policy and guidance relating to noise is set out in Appendix 2.7.

Assessment Methodology

7.2.2 This noise and vibration assessment focuses on the noise sensitive receptor (NSR) locations summarised in Table 7.1 and shown on Figure 7.1.

Table 7.1: Noise Sensitive Receptor Locations

NSR	Item of Potential Impact	Approximate Minimum Distance to Item (m)	Period of Potential Impact[1]
South Pillinge Farm	Power Generation Plant	330 m to the east	Construction, decommissioning and operation
	Electrical Connection	180 m to the east (substation) 70 m to the south east (to overhead lines)	Construction, decommissioning and operation
	Gas Connection	300 m to the south east	Construction decommissioning (operational impacts have been scoped out in line with Scoping opinion comments received from the SoS).
Pillinge Cottages	Power Generation	350 m to the north east	Construction decommissioning and operation

NSR	Item of Potential Impact	Approximate Minimum Distance to Item (m)	Period of Potential Impact[1]
	Electrical Connection	350 m to the north east (substation) 170 m to the south east (to overhead lines)	Construction decommissioning and operation
	Gas Connection	310 m to the north east	Construction, decommissioning
Lower Farm	Gas Connection	280 m to the north east	Construction, decommissioning
Manor Farm	Gas Connection	200 m to the south	Construction, decommissioning
Morteyne House	Electrical Connection	450 m to the north east (substation) 270 m to the south east (to overhead lines)	Construction, decommissioning and operation

[1] Construction is assumed to occur during the daytime only, operation may occur during the daytime or night-time.

[2] NSRs to construction will also be NSRs to decommissioning.

7.2.3 The NSR locations in Table 7.1 above were chosen as they are the closest residential receptors to the Project Site. The closest residential receptors have also defined the study area for the assessment.

7.2.4 A noise meter was set up approximately 50 m to the east of South Pillinge Farm and left unattended for five-days in order to measure the existing typical background noise levels.

7.2.5 The survey was undertaken between 14 and 18 August 2014. The weather conditions were suitable for environmental noise surveys throughout the survey period.

7.2.6 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.

7.2.7 Appendix 7.1 of this PEIR provides details of acoustic terminology and the instrumentation used during the survey.

7.2.8 Onsite calibration checks were undertaken before and after each set of measurements.

7.2.9 Windshields were fitted over the microphones at all times during the survey period.

7.2.10 Noise levels measured at South Pillinge Farm are considered representative of the noise levels at Pillinge Cottages and Morteyne House, given their close proximity.

7.2.11 The Public Protection Officer at CBC has agreed (verbally) that one noise measurement location at South Pillinge Farm would be sufficient for the noise and vibration preliminary assessment for the purposes of this PEIR.

7.2.12 The existing likely baseline conditions at the remaining NSRs will be determined by way of an attended noise survey to be undertaken as part of the EIA for the Project and included in the final ES. Discussions are ongoing between the Applicant and CBC to agree a noise survey methodology and suitable locations for these measurement positions.

Worst Case Scenario for Assessment

7.2.13 In respect of noise and vibration, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of this PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

7.2.14 The reason that this represents the realistic worst case in relation to noise and vibration impacts are that an increasing number of separate gas turbine generators, each with their own dedicated stack will produce increasingly more noise. Noise from the gas turbine generator units is attenuated by the turbine casing, and so varies little with higher power output turbines. The main variable noise producing element is exhaust noise through the top of the stack. The noise output from five separate low power SCGT units will be higher than that produced by one or two high power units. Similarly, the construction of five separate SCGT units will result in a longer construction lead time, which will increase the noise impact at sensitive receptors. This applies regardless of whether we are assessing aero-derivative or industrial units.

7.2.15 A preliminary assessment of both options for the Gas Connection is presented in this section. The worst case Electrical Connection of two double circuit overhead lines and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Construction and Decommissioning

7.2.16 The likely construction and decommissioning noise levels that may arise on development of the Project have been predicted using general information

regarding proposed activities and the methodology set out in BS 5228 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);
- 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.

7.2.17 Information regarding the noise output of specific items of plant such as an excavator, steam roller, compactor and welder likely to be involved in the construction and decommissioning of the Project have been taken from the BS 5228 database. The noise levels from all plant items have then been combined to assume a worst case scenario for noise relating to the construction and decommissioning phase of the Project.

7.2.18 Given the distances involved between construction works and the closest NSR (approximately 90m), it is anticipated that the level of induced vibration will be imperceptible at the nearest sensitive receptor. Construction vibration impacts are thus not assessed further.

Operation

7.2.19 The potential noise impacts during the operation of the Project are predicted using the SoundPLAN noise propagation modelling software, using typical values for the proposed plant items and considering directional and screening effects.

7.2.20 The significance of the predicted operational effects can be assessed compared to the background noise level using the criteria provided in BS 4142. BS 4142 advises that the measurement time interval for background noise measurements is “sufficient to obtain a representative value of the background noise level”. A 15 minute reference time interval has been used for the assessment of operational noise.

7.2.21 Section 1, page 1 of BS 4142 defines the applicable scope of the assessment methodology. The Standard outlines that the methodology is not suitable for use when:

“...the background levels are below about 30dB(A) and the rating level are below about 35dB(A)...”.

7.2.22 The results of the ambient noise survey undertaken for the Project have identified that the background noise levels are below the threshold of suitability, therefore the use of the BS 4142 methodology may not lead to a reliable conclusion.

7.2.23 Despite this, consultation with CBC has determined that it requires the assessment to be undertaken using the BS 4142 methodology. Therefore, we have followed this methodology for the purposes of the preliminary assessment in this PEIR, but discussions are ongoing with CBC as to the use of the most appropriate methodology, which will be further discussed in the ES.

7.2.24 Given the distances involved between the Generating Equipment and NSRs (minimum of 180 m), 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). Operational vibration impacts are thus not assessed further.

Significance Criteria

7.2.25 Rather than following a matrix based approach as set out in Tables 4.1- 4.3 of this PEIR, determining the significance of noise effects for construction and decommissioning for residential dwellings is achieved by referencing the values shown in Table 7.2 below, which are set out in BS 4142.

Table 7.2: Significance of effect for Construction and Decommissioning Noise and Vibration on Residential Dwellings

Significance of Effect	Description
Neutral	Daytime $L_{Aeq,10h}$ equal to or below 55 dB. Vibration levels below 0.3 mm s^{-1}
Slight	Daytime $L_{Aeq,10h}$ equal to or below 65 dB. Vibration levels above 0.3 and 1.0 mm s^{-1}, but below 0.3 mm s^{-1}.
Moderate	Daytime $L_{Aeq,10h}$ equal to or below 70 dB. Vibration levels above 1.0 mm s^{-1}but below 5.0 mm s^{-1}.
Large	Daytime $L_{Aeq,10h}$ equal to or below 75 dB. Vibration levels above 5.0 mm s^{-1} but below 10.0 mm s^{-1}.
Very Large	Daytime $L_{Aeq,10h}$ above 75 dB. Vibration levels above 10.0 mm s^{-1}.

7.2.26 Table 7.3 below sets out how the significance of effect is determined for operational noise and vibration.

7.2.27 Effects of moderate and above are considered significant in respect of the EIA regulations.

Table 7.3: Significance of effect for Operational Noise and Vibration on Residential Dwellings

Significance Criteria	Description
Neutral	Daytime $L_{Ar,1h}$ equal to typical background $L_{A90,15min}$. Vibration levels below 0.3 mm s^{-1}
Slight	Daytime $L_{Ar,1h}$ up to 10 dB above typical background $L_{A90,15min}$. Vibration levels above 0.3 mm s^{-1}, but below 0.1.0 mm s^{-1}.
Moderate	Daytime $L_{Ar,1h}$ up to 10 dB above typical ambient $L_{Aeq,15min}$. Vibration levels above 1.0 mm s^{-1}but below 5.0 mm s^{-1}.
Large	Daytime $L_{Ar,1h}$ more than 10 dB above typical background $L_{A90,15min}$. Vibration levels above 5.0 mm s^{-1} but below 10.0 mm s^{-1}.
Very Large	Daytime $L_{Ar,1h}$ more than 20 dB above typical ambient $L_{Aeq,15min}$. Vibration levels above 10.0 mm s^{-1}.

Consultation and Consultation Responses

7.2.28 Consultation is currently ongoing and will be continued through the PEIR and EIA process. Table 7.4 below summarises the consultation responses received to date in relation to noise, and how these have been or will be addressed in the ES.

Table 7.4 Consultation Responses

Consultee	Comment Ref	Comment	Response
SoS (Scoping Opinion)	3.13	Operational Noise from Gas Connection can be scoped out of assessment.	Noted.
	3.38	A plan showing sources of noise should be included in the ES.	This will be included in the ES. For the PEIR, a simplified approach has been taken, with assumptions made as to the total noise level of the Generating Equipment as

Consultee	Comment Ref	Comment	Response
			described in section 7.2.
	3.39	Consideration should be given to limiting noise impacts by siting plant differently in the pit.	The Generating Equipment is the main potential source of noise and it 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.
	3.42	All activities that could generate noise and vibration impacts at all phases of the proposed development should be fully identified.	A preliminary assessment is provided in the PEIR and will be developed as part of the ES.
	3.43	Impacts of noise during the night-time, weekends and public holidays should be assessed.	A preliminary assessment is provided in this document and will be developed as part of the ES.
	3.44	Consideration should be given to monitoring noise complaints at all stages of development.	This will be discussed in consultation with CBC.
	3.45	Cross reference should be made with the ecology chapter.	Noted. Section 8 of this PEIR considers potential noise impacts on ecology.
BBC	Scoping Response Letter	Noise should be assessed in line with BS 4142, rather than WHO or BS 3228.	This assessment has been undertaken in line with BS4142 as requested. However, discussions are ongoing with BBC to determine whether this is the most suitable assessment method. .

Consultee	Comment Ref	Comment	Response
		I do not believe that the draft IEMA/IOA guidance[7] should be used for determining significance. 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	Noted. Discussions are ongoing with CBC to establish the relevant noise criteria as referred to in paragraph [ ] of section 7 of the PEIR.
		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.	A preliminary assessment of noise from the Electrical Connection has been carried out and is set out in this PEIR and the assessment will be developed further as part of the EIA.
		The proposed construction and decommissioning noise and vibration assessment should look at all NSRs that will be affected by the activities.	Agreed and this is being carried out. A preliminary assessment of noise from the Electrical Connection is provided in Section 7 of the PEIR and the assessment will be developed further as part of the ES.
CBC	Scoping Response Letter	Noise should be assessed in line with BS 4142, rather than WHO or BS 3228.	As above.

[7] Institute of Environmental Management & Assessment (IEMA) / Institute of Acoustics (IoA) guidance document, Draft Guidelines for Noise Impacts Assessment, 2002

Consultee	Comment Ref	Comment	Response
		Draft noise guidance should not be used (e.g. 'Guidelines on Noise Impact Assessment')	As Above
		Noise from the Electrical Connection should be included in any noise assessment	As Above.

7.3 Embedded Mitigation

7.3.1 In order to undertake an assessment of the potential effects of noise as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of noise, these standard mitigation measures include:

- All calculations for construction noise assume a 10 dB reduction due to use of an appropriately placed acoustic screen, which is typical of this type of construction / decommissioning activity.
- Inherent best practice plant design incorporating acoustic enclosures to limit operational noise.
- Implementation of a CEMP;
- Use of appropriately maintained plant and equipment during construction, decommissioning and operation.

7.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

7.4.1 The nearest noise sensitive receptor to the Generating Equipment Site is South Pillinge Farm, approximately 180 m west at its nearest point.

7.4.2 For the assessment of operational noise, the typical $L_{A90,15min}$ from the daytime and night-time measurements at the NSR have been used. To assess construction noise, the $L_{Aeq,10h}$ will be determined by additional noise monitoring at the potentially affected NSRs. Table 7.5 below summarises the relevant noise survey results.

Table 7.5: Typical $L_{A90,15min}$ and $L_{Aeq,10h}$ Measured During the Baseline Noise Survey

NSR	Typical Measured $L_{Aeq,10h}$ (dB)	Typical Measured $L_{A90,15min}$ (dB)	
		Daytime	Night-Time
South Pillinge Farm and Pillinge Cottages	56	38	34

Construction/Decommissioning

7.4.3 Table 7.6 provides the likely noise levels generated by typical construction and decommissioning activities associated with the Power Generation Plant, and predicts the likely noise level contributed by each item of plant at each NSR.

Table 7.6: $L_{Aeq,10h}$ from Typical Construction and Decommissioning Activities during Construction of the Power Generation Plant

Receptor	Total Predicted $L_{Aeq,10h}$ (dB) during Construction of the Power Generation					
	Site prep.	Excavation	Rolling and Compaction	Welding and Cutting Steel	Concrete Pour	Tower Crane
South Pillinge Farm	46	47	50	37	40	50
Pillinge Cottages	46	47	49	36	40	49

7.4.4 Assuming a worst case scenario, if all construction activities occur simultaneously, the predicted $L_{Aeq,10h}$ is 55 dB at South Pillinge Farm and 54 dB at Pillinge Cottages compared to a baseline level of 56 dB. However, it is anticipated that this worst case scenario is unlikely to occur.

7.4.5 The significance of the effect of construction and decommissioning noise is therefore predicted to be neutral as defined by the values in Table 7.3 above.

7.4.6 Table 7.7 below summarises the preliminary assessment of construction noise effects from the Power Generation Plant.

Table 7.7: Preliminary Assessment of Construction Noise and vibration effects from Power Generation Plant

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Generating Equipment and Laydown Area				
South Pillinge Farm	Predicted $L_{Aeq,10h}$ of up to 62 dB during construction and decommissioning of the Power Generation Plant if all construction plant items operate simultaneously. This is considered to be of neutral significance.	It is anticipated that no additional mitigation will be required, over and above the embedded mitigation set out in 7.3, although in order to limit noise as much as possible, potential measures could include: • Programming of activities not to occur simultaneously; • Utilising the temporary bund used for the LLRS; • Use quieter items of plant and • Implementation of CEMP.	Neutral	A detailed assessment will be carried out as part of the EIA once the detailed construction and decommissioning programmes have been finalised.

Pillinge Cottages	Predicted $L_{Aeq,10h}$ of up to 56 dB during construction and decommissioning of the Power Generation if all plant items operate simultaneously. This is considered to be of neutral significance.	It is anticipated that no additional mitigation will be required, over and above the embedded mitigation set out in 7.3, although in order to limit noise as much as possible , potential measures could include: • Programming of activities not to occur simultaneously; • Extending and retaining the earth bund used during the LLRS; and • Use quieter items of plant.	Neutral	A detailed assessment will be carried out as part of the EIA once the detailed construction and decommissioning programmes have been finalised.
Access Road				
No NSRs along the proposed Access Road	Neutral	None required	Neutral	None required

Operation

Generating Equipment

7.4.7 At the time of writing, for the purposes of conducting a preliminary assessment of operational noise, a simplified approach has been taken, whereby the $L_{Aeq,T}$ of the Generating Equipment has been assumed to be 85 dB at 1 m from each of the Gas Turbine Generators. Although this is the figure reported by gas turbine suppliers, it is recognised that real world scenarios are often more complex given the interactions between individual plant items (e.g. stacks and cooling equipment). Therefore, the full noise assessment to be undertaken and reported in the ES will further break down the noise sources from individual items on the Generating Equipment Site.

7.4.8 Nevertheless, using a simple distance correction and applying a 5 dB penalty for likely tonal characteristics this results in an $L_{Aeq,T}$ of 40 dB at South Pillinge Farm and 39 dB at Pillinge Cottages. This corresponds to a difference in the typical $L_{A90,15min}$ of 6 dB and 5 dB respectively and is therefore considered to

be of slight adverse significance. This simple calculation does not include the barrier effect of the edge of the pit but this will be included in the full noise assessment for the ES.

Access Road

7.4.9 Noise from the small number of vehicles associated with the operation of the Generating Equipment (e.g. 4 staff on site at any one time plus limited numbers of infrequent maintenance visits) will not be a significant increase compared to the existing road traffic noise.

7.4.10 Table 7.8 below summarises the preliminary assessment of operational noise and vibration effects from the Power Generation Plant.

Table 7.8: Preliminary Assessment of Operational Noise and Vibration effects from the Power Generation Plant

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Generating Equipment				
South Pillinge Farm	An approximate $L_{Ar,Tr}$ of 40 dB based on an $L_{Aeq,T}$ of 85 dB at 1 m. This is considered to be of slight adverse significance.	It is anticipated that no additional mitigation will be required, over and above the embedded mitigation set out in 7.3.	Neutral	Detailed noise modelling and assessment will be carried out and included in the ES once noise data is available for individual items of equipment.
Pillinge Cottages	An approximate $L_{Ar,Tr}$ of 39 dB based on an $L_{Aeq,T}$ of 85 dB at 1 m. This is considered to be of slight adverse significance.	It is anticipated that no additional mitigation will be required, over and above the embedded mitigation set out in 7.3	Neutral	Detailed noise modelling and assessment will be carried out and included in the ES once noise data is available for individual items of equipment.
Access Road				

There are no NSRs along the Access Road	Neutral	None required	Neutral	None required

7.5 Gas Connection Assessment

Baseline Conditions and Receptors

7.5.1 To assess construction noise, the $L_{Aeq,10h}$ will be determined by additional noise monitoring at the potentially affected NSRs. Table 7.9 summarises the relevant noise survey results at the time of writing this PEIR. Baseline conditions and receptors do not differ for the two Gas Connection Route Corridor Options which have been assessed.

Table 7.9: Typical $L_{Aeq,12h}$ Measured During the Baseline Noise Survey

NSR	Existing $L_{Aeq,10h}$ from On-Site Measurements (dB)
South Pillinge Farm and Pillinge Cottages	56
Lower Farm	Noise survey to be undertaken as part of final assessment for the ES.
Manor Farm	Noise survey to be undertaken as part of final assessment for the ES.

Construction/Decommissioning

7.5.2 Table 7.10 provides the noise levels associated with typical construction and decommissioning activities associated with the Gas Connection (Route Corridor Options 1 and 2).

Table 7.10: $L_{Aeq,10h}$ from Typical Construction and Decommissioning Activities during Construction of the Gas Connection (Route Corridor Options 1 and 2)

Receptor	Total Predicted $L_{Aeq,10h}$ (dB) during Construction of the Gas Connection			
	Excavation	Rolling and Compaction	Welding and Cutting Steel	Concrete Pour
South Pillinge Farm	53	55	43	46
Pillinge	48	50	37	41

Receptor	Total Predicted $L_{Aeq,10h}$ (dB) during Construction of the Gas Connection			
	Excavation	Rolling and Compaction	Welding and Cutting Steel	Concrete Pour
Cottages				
Lower Farm	49	51	37	42
Manor Farm	52	54	41	44

7.5.3 If all construction activities occur simultaneously the predicted $L_{Aeq,10h}$ is 58 dB at South Pillinge Farm, 53 dB at Pillinge Cottages, 53 dB at Lower Farm and 56 dB at Manor Farm. However, it is anticipated that this scenario is unlikely to occur.

7.5.4 The construction and decommissioning activities will only occur for a short period of time in each location as the active working width moves along the Gas Connection pipeline route.

7.5.5 The effect of construction and decommissioning noise is predicted to be neutral or up to slight adverse significance if all phases are conducted simultaneously.

Table 7.11: Preliminary Assessment of Construction Noise and Vibration Effects from the Gas Connection

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Gas Connection				
South Pillinge Farm	Predicted $L_{Aeq,10h}$ of up to 58 dB during construction and decommissioning of the Gas Connection if all plant items operate simultaneously. This is considered to be between neutral and slight.	Potential measures could include: • Programming of activities not to occur simultaneously; • Retaining the temporary bund used for the LLRS; • Use quieter items of plant;	Neutral	A detailed assessment will be carried out and included in the ES once the detailed construction and decommissioning programmes have been finalised.
Pillinge	Predicted $L_{Aeq,10h}$	Potential	Neutral	A detailed

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Cottages	of up to 53 dB during construction and decommissioning of the Gas Connection if all plant items operate simultaneously. This is considered to be neutral.	measures could include: • Programming of activities not to occur simultaneously; • Extending and retaining the temporary bund used for the LLRS; and • Use quieter items of plant.		assessment will be carried out and included in the ES once the detailed construction and decommissioning programmes have been finalised.
Lower Farm	Predicted $L_{Aeq,10h}$ of up to 53 dB during construction and decommissioning of the Gas Connection if all plant items operate simultaneously. This is considered to be of neutral significance. The significance will be amended if necessary when existing ambient noise levels have been measured.	Potential measures could include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral	A detailed assessment will be carried out and included in the ES once the detailed construction and decommissioning programmes have been finalised.
Manor Farm	Predicted $L_{Aeq,10h}$ of up to 56 dB during construction and decommissioning of the Gas Connection if all plant items operate	Potential measures could include: • Programming of activities not to occur simultaneously; and	Neutral	A detailed assessment will be carried out and included in the ES once the detailed construction and decommissioning programmes

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
	simultaneously. This is considered to be of neutral significance. The significance will be amended if necessary when existing ambient noise levels have been measured.	• Use quieter items of plant.		have been finalised.

Operation

7.5.6 During operation, there will be small amounts of noise generated by the gas Above Ground Installation (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.

7.5.7 This noise is rarely perceptible. Given that there are no residential properties with a distance of less than 170 m to the location for the AGI, operational noise from the AGI is considered to be neutral.

7.5.8 Taking this into consideration and in line with the Scoping Opinion, operational noise from the Gas Connection has been scoped out of the need for further assessment.

7.6 Electrical Connection Assessment

Baseline Conditions and Receptors

7.6.1 For the assessment of operational noise, the typical $L_{A90,15min}$ from the daytime and night-time measurements at the NSR have been used. To assess construction noise, the $L_{Aeq,10h}$ will be determined by additional noise monitoring at the potentially affected NSRs. Table 7.12 summarises the relevant noise survey results.

Table 7.12: Typical $L_{A90,15min}$ and $L_{Aeq,10h}$ Measured During the Baseline Noise Survey

NSR	Typical Measured $L_{Aeq,10h}$ (dB)	Typical Measured $L_{A90,15min}$ (dB)	
		Daytime	Night-Time
South Pillinge Farm, Pillinge Cottages and Morteyne House	56	38	34

Construction/Decommissioning

7.6.2 Table 7.13 provides the predicted noise levels associated with the typical construction and decommissioning activities in relation to the Electrical Connection. The calculations include activities associated with the construction and decommissioning of the substation and pylons but Table 7.13 provides the total if all construction and decommissioning activities are performed simultaneously and therefore sets out the worst case scenario.

Table 7.13: $L_{Aeq,10h}$ from Typical Construction and Decommissioning Activities during Construction of the Electrical Connection

Receptor	Total Predicted $L_{Aeq,10h}$ (dB) during Construction of the Electrical Connection			
	Excavation	Rolling and Compaction	Welding and Cutting Steel	Concrete Pour
South Pillinge Farm	60	64	42	54
Pillinge Cottages	53	56	36	47
Morteyne House	50	53	34	43

7.6.3 If all construction activities occur simultaneously the predicted $L_{Aeq,10h}$ is 66 dB at South Pillinge Farm, 58 dB at Pillinge Cottages and 55 dB at Morteyne House. However, it is anticipated that this scenario is unlikely to occur. In addition, the worst case distance to the NSRs has been assessed (e.g. as close as possible).

7.6.4 The effect of construction and decommissioning noise associated with the Electrical Connection is predicted to be between neutral and moderate adverse and so is not significant for the purposes of the EIA Regulations.

7.6.5 Table 7.14 below summarises the preliminary assessment of construction noise effects from the Electrical Connection.

Table 7.14: Preliminary Assessment of Construction Noise effects from the Electrical Connection

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Electrical Connection				
South Pillinge Farm	Predicted $L_{Aeq,10h}$ of up to 66 dB during construction and decommissioning of the Electrical Connection if all plant items operate simultaneously. This is considered to be between neutral and moderate significance.	Potential measures include: • Programming of activities not to occur simultaneously; • Use quieter items of plant;	Neutral	A detailed assessment will be carried out and included in the ES once the detailed construction and decommissioning programmes have been finalised.
Pillinge Cottages	Predicted $L_{Aeq,10h}$ of up to 58 dB during construction and decommissioning of the Electrical Connection if all plant items operate simultaneously. This is considered to be between neutral and slight adverse significance.	Potential measures include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral	A detailed assessment will be carried out and included in the ES once the detailed construction and decommissioning programmes have been finalised.
Morteyne House	Predicted $L_{Aeq,10h}$ of up to 55 dB during construction and	Potential measures include:	Neutral	A detailed assessment will be carried out and included in

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
	decommissioning of the Electrical Connection if all plant items operate simultaneously. This is considered to be of neutral significance.	• Programming of activities not to occur simultaneously; and • Use quieter items of plant.		the ES once the detailed construction and decommissioning programmes have been finalised.

Operation

7.6.6 At the time of writing no noise data is available for the Electrical Connection substation. No likely significant effects are anticipated from the Electrical Connection substation because of the inherently low noise levels generated from this equipment along with the distance between the equipment and nearest NSRs (minimum distance of approximately 100 m). However, this will be assessed in detail once noise data has been provided and as part of the EIA.

7.6.7 It is anticipated that the significance will be neutral and therefore not significant for the purposes of the EIA Regulations due to the distance from the substation to the NSRs and embedded and additional mitigation measures described in Section 7.3 and Table 7.14.

Electrical Connection Overhead Lines (Dry Weather Conditions)

7.6.8 NPS EN-5 advises that high voltage transmission lines can generate noise, although this is usually limited to incidents when surface contamination on a conductor or accidental damage occurs during transport or installation.

7.6.9 At the time of writing, assuming a distance correction based on a line source and two new electrical circuits the predicted rating level of the Milbrook overhead Lines during dry weather is 10 dB at South Pillinge Farm, 3 dB at Pillinge Cottages and 24 dB at Morteyne House. This corresponds to a difference with the $L_{A90,15min}$ of -24 dB, -32 dB and -10 dB respectively and is therefore of neutral significance.

Electrical Connection Overhead Lines (Wet Weather Conditions)

7.6.10 NPS EN-5 advises that highest noise levels are generated by a line during rain, particularly during heavy rain following a period of dry weather. It also

advises that whilst fog may also cause increased noise levels these are lower than noise levels during rain.

7.6.11 It is anticipated that the significance will be neutral due to the distance from the Overhead Lines to the NSRs (approximately 90 m).

Total Electrical Connection Operational Noise

7.6.12 Further assessment will be undertaken once information regarding the overhead lines is available but it is anticipated that the significance will be neutral due to the distance from the substation and overhead lines to the NSRs and the available mitigation measures.

Operational Access Routes

7.6.13 Noise from the small number of vehicles associated with the operation of the Electrical Connection (e.g. only infrequent maintenance visits of around 1 every few months and no operational staff) will not cause a significant increase compared to the existing road traffic noise.

7.6.14 Table 7.15 below summarises the preliminary assessment of operational noise and vibration effects from the Electrical Connection.

Table 7.15: Preliminary Assessment of Operational Noise and Vibration Effects from the Electrical Connection

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Electrical Connection				
South Pillinge Farm	This will be assessed once information regarding the overhead lines has been received but is anticipated to be neutral to moderate adverse significance.	Potential measures include: • Acoustic enclosure • Barriers around individual noise emitting items.	This will be assessed once information regarding the overhead lines has been received but is anticipated to be of neutral significance.	Detailed noise modelling and assessment will be carried out and included in the ES once noise data is available for individual items of equipment.
Pillinge Cottages	This will be assessed once information regarding the overhead lines has been received but is anticipated to be neutral to moderate adverse significance.	Potential measures include: • Acoustic enclosure • Barriers around individual noise emitting items.	This will be assessed once information regarding the overhead lines has been received but is anticipated to be of neutral significance.	Detailed noise modelling and assessment will be carried out and included in the ES once noise data is available for individual items of equipment.
Morteyne House	This will be assessed once information regarding the overhead lines has been received but is anticipated to be neutral to moderate adverse significance.	Potential measures include: • Acoustic enclosure • Barriers around individual noise emitting items.	This will be assessed once information regarding the overhead lines has been received but is anticipated to be of neutral significance.	Detailed noise modelling and assessment will be carried out and included in the ES once noise data is available for individual items of equipment.

Receptor name and description	Preliminary Assessment of significance of effect	Potential Specific Mitigation	Potential Residual significance of effect	Further assessments and consultation to be undertaken
Access Road				
No NSRs along Access Road.				

7.7 Project as a Whole

7.7.1 The Summary of Effects Table 7.18 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).

7.7.2 None of the elements of the Project will give rise to likely significant effects alone, and will not do so in combination either.

7.8 Cumulative Effects

Construction/Decommissioning

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 of this PEIR. However, the integrated waste management facility is only a very high level concept at the moment and hence no detailed noise data is available. Should this progress further, then further details will be included with the ES.

7.8.2 It is highly unlikely that the noisiest operations at the Covanta site will occur simultaneously with the noisiest operations at the Millbrook development. Furthermore, it is unlikely that these operations would occur near the west boundaries of both sites (which are closer to the nearby South Pillinge Farm). The construction noise action levels for both sites at nearby noise sensitive premises should be similar. Therefore as an absolute worst case, the noise impact would increase by around 3 dB. This is generally considered to not constitute a significant increase. The local and temporary nature of the cumulative construction noise effect should further reduce the significance of the effect to negligible.

Operation

Covanta RRF Project

7.8.3 The DCO granted for the Covanta RRF Project dated 2011sets out the noise limits provided in Table 7.16 below.

Table 7.16: Noise Limits set out in the DCO granted for the Covanta RRF Project dated 2011

NSR	Construction Noise Limit	Operational Noise Limit	
	$L_{Aeq,1h}$ (dB)	$L_{Aeq,1h}$ (dB)	$L_{Aeq,5min}$ (dB)
South Pillinge Farm	55	39	35
Pillinge Cottages	55	35	35

7.8.4 Assuming the total plant noise emissions from the proposed Covanta RRF Project will be designed to meet the proposed criteria (and not be any lower) set out in Table 7.16 above and will include the BS4142 5 dB penalty, the worst case cumulative noise impact at the two relevant noise sensitive locations will be around 1 dB higher than these limits when taken into consideration with the Project. This is a negligible increase and based on this preliminary assessment, it is considered that the cumulative impact should be classed as not significant taking into consideration the intermittent operation of the proposed Power Generation Plant Site. Table 7.17 below presents the results of the preliminary cumulative assessment in relation to noise and vibration impacts.

Table 7.17: Likely cumulative plant noise effects

NSR	Rookery South RRF	Millbrook Project (i.e. the Project)	Cumulative Plant Noise Specific level	Cumulative Plant Noise Combined Rating Level
	$L_{Aeq,5min}$ (dB) during the night-time	$L_{Aeq,5min}$ (dB) during the night-time	$L_{Aeq,5min}$ (dB)	$L_{Aeq,5min}$ (dB)
South Pillinge Farm	30	35	36.2	41.2
Pillinge Cottages	30	34	35.5	40.5

Integrated Waste Management Operations for Rookery South

7.8.5 At the time of writing this PEIR a Scoping Opinion in relation to 'Integrated Waste Management Operations' at the Rookery south pit has been published. However, as the project is at a very early stage and proposals at this time are

purely conceptual, a noise assessment has not been undertaken for the. If the Integrated Waste Management progresses and noise data become available, it will be included in the cumulative impact assessment in the ES.

Brogborough Wind Energy Project

7.8.6 The Brogborough Wind Energy Project is approximately 4.5 km from the NSRs in the vicinity of the Project Site; therefore no cumulative impact is anticipated.

7.9 Summary and Conclusions

7.9.1 Table 7.18 below summarises the preliminary assessment of construction noise and vibration effects from the Project.

Table 7.18: Preliminary Assessment of Construction Noise and Vibration Effects from the Project

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant			
Construction / Decommissioning	South Pillinge Farm	Potential measures include: • Programming of activities not to occur simultaneously; and • Utilise the temporary bund used for the LLRS; and • Use quieter items of plant.	Neutral
	Pillinge Cottages	Potential measures include: • Programming of activities not to occur simultaneously; and • Extending and retaining the earth bund used during the	Neutral

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		LLRS; and • Use quieter items of plant.	
Operation	South Pillinge Farm	None required	Neutral
	Pillinge Cottages	None required	Neutral
	Typical worst case NSR to access routes	None required	Neutral to slight adverse significance
Gas Connection			
Construction / Decommissioning	South Pillinge Farm	Potential measures include: • Programming of activities not to occur simultaneously; and Use quieter items of plant.	Neutral to slight adverse significance.
	Pillinge Cottages	Potential measures include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral
	Lower Farm	Potential measures include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral
	Manor Farm	Potential measures include: • Programming of activities not to	Neutral

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		occur simultaneously; and • Use quieter items of plant.	
		•	
Operation	All NSRs	None required	Neutral
Electrical Connection			
Construction / Decommissioning	South Pillinge Farm	Potential measures include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral
	Pillinge Cottages	Potential measures include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral
	Morteyne House	Potential measures include: • Programming of activities not to occur simultaneously; and • Use quieter items of plant.	Neutral
		•	
Operation	South Pillinge Farm	None anticipated, although the need for appropriate mitigation will be	This will be assessed once information regarding the overhead lines has

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		assessed as part of the detailed noise assessment for the ES.	been received but is anticipated to be of neutral significance.
	Pillinge Cottages	None anticipated, although the need for appropriate mitigation will be assessed as part of the detailed noise assessment for the ES.	This will be assessed once information regarding the overhead lines has been received but is anticipated to be of neutral significance.
	Morteyne House	None anticipated, although the need for appropriate mitigation will be assessed as part of the detailed noise assessment for the ES.	This will be assessed once information regarding the overhead lines has been received but is anticipated to be of neutral significance.
	Morteyne House	None anticipated, although the need for appropriate mitigation will be assessed as part of the detailed noise assessment for the ES.	This will be assessed once information regarding the overhead lines has been received but is anticipated to be of neutral significance.
	Typical worst case NSR to access routes	None anticipated, although the need for appropriate mitigation will be assessed as part of the detailed noise assessment for the ES.	Neutral
Project as a Whole			
Construction / Decommissioning	South Pillinge Farm	Potential measures include: • Programming of activities not to occur simultaneously;	Neutral

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		and • Utilise the temporary bund used for the LLRS; and Use quieter items of plant	
	Pillinge Cottages	Potential measures include: • Programming of activities not to occur simultaneously; and • Utilise the temporary bund used for the LLRS; and Use quieter items of plant	Neutral
	Morteyne House	Potential measures include: • Programming of activities not to occur simultaneously; and • Utilise the temporary bund used for the LLRS; and Use quieter items of plant	Neutral
	Lower Farm	Potential measures include: • Programming of activities not to occur simultaneously; and • Utilise the temporary bund	Neutral

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		used for the LLRS; and Use quieter items of plant	
	Manor Farm	Potential measures include: • Programming of activities not to occur simultaneously; and • Utilise the temporary bund used for the LLRS; and Use quieter items of plant	Neutral
	Typical worst case NSR to access routes	Potential measures include: • Programming of activities not to occur simultaneously; and • Utilise the temporary bund used for the LLRS; and Use quieter items of plant	Neutral to slight adverse significance
Operation	South Pillinge Farm	None required other than embedded mitigation outlined in Section 7.3	
	Pillinge Cottages	None required other than embedded mitigation outlined in Section 7.3	
	Morteyne House	None required other than embedded mitigation outlined in	

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		Section 7.3	
	Lower Farm	None required other than embedded mitigation outlined in Section 7.3	
	Manor Farm	None required other than embedded mitigation outlined in Section 7.3	
Cumulative effects			
Construction / Decommissioning	South Pillinge Farm Pillinge Cottages Morteyne House Lower Farm Manor Farm Typical worst case NSR to access routes	The need for potential mitigation measures will be assessed and included within the ES.	Anticipated to be Neutral.
Operation	South Pillinge Farm Pillinge Cottages Morteyne House Lower Farm Manor Farm Typical worst case NSR to either access route	The need for potential mitigation measures will be assessed and included in the ES.	Anticipated to be Neutral.

8 Ecology

8.1 Introduction

8.1.1 This section of the PEIR presents the preliminary findings of the assessment of likely significant ecological effects arising from the construction, operation and decommissioning of the Project. The potential for effects associated with potential habitat loss or species disturbance during each phase of the Project are identified, along with key ecological receptors that warrant further consideration in the ES.

8.2 Approach

Relevant Policy and Guidance

8.2.1 Relevant policy and guidance in relation to ecology is set out in Appendix 2.8.

Assessment Methodology

Study Area

8.2.2 The Project has the potential to have direct and indirect ecological effects. The distance of some ecological receptors 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 preliminary ecological impact assessment the study area is therefore considered to comprise the following as described in Section 1.1 of this PEIR:

- Power Generation Plant Site
- Electrical Connection;
- Gas Connection (Route Corridor Options 1 and 2); and
- The wider area: the area within 2 km of the Project Site in relation to desk study information on protected / notable species and non-statutory designated sites; and any statutory designated sites within 5 km of the Project Site (as explained further in paragraph 8.2.3 below).

8.2.3 The assessment of direct impacts of the Project is limited to the Project Site and 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 impacts on some ecological receptors, 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 statutory and non-statutory nature conservation sites

(Appendix 8.1, Figure 1b) within 5 km and 2 km respectively of the Project Site, in accordance with criteria in the EAH1 Annex F[8] guidance.

Desk Study

8.2.4 Existing data in relation to the Project Site and the wider area were obtained 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 5 km and 2 km of the Project Site boundary, respectively 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 Site (PBA, 2009; BSG Ecology 2013).

Field Surveys

8.2.5 A wide range of habitat and protected or notable species surveys were undertaken by BSG Ecology in 2014 to inform the preliminary 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.

- Extended Phase 1 habitat survey - February 2014 and updated throughout the survey season); study area is the Project Site as reported in the Project Scoping Report (see Appendix 8.1, Figure 2);
- Terrestrial invertebrates surveys (between May and July 2014; to be completed in early-September 2014); habitat within the Project Site as reported 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 were surveyed (see Appendix 8.3, Figure 1);
- Reptile surveys (between end-April and end-July 2014; to be completed in late-August 2014); suitable habitat within the Project Site was surveyed (see Appendix 8.3, Figure 3);
- Breeding bird surveys (April, May and June 2014) the Project Site, plus a 50m buffer were surveyed (see Appendix 8.4, Figures 1 to 3);

[8] H1 Annex F – Air Emissions – Environment Agency. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298239/geho0410bsil-e-e.pdf . Accessed on 20/08/14

- Bat activity survey (May and July 2014; to be completed in September); a transect in the north and transect in the south of the Project Site 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 (see Appendix 8.5, Figure 5); and

- Badger survey (July 2014); the Project Site (see Appendix 8.5, Figure 1).

8.2.6 A summary of the survey methodologies and results is provided in Appendices 8.1 to 8.5, inclusive of this PEIR.

Impact Assessment

8.2.7 This preliminary ecological assessment has been undertaken in accordance with guidance set out in the Institute of Ecology and Environmental Management's (IEEM) Guidelines for Ecological Impact Assessment (2006) ('the IEEM Guidelines') in order to provide "clear and concise information about the likely significant ecological effects associated with the project".

8.2.8 The significance of impacts have been determined in accordance with the EIA Regulations and the IEEM Guidelines. It is considered inappropriate to attempt to investigate in detail all potential ecological issues in relation to the Project. It is therefore necessary, in accordance with the EIA Regulations, to focus on those activities that could potentially generate significant ecological effects on Key Ecological Receptors.' This preliminary assessment has therefore focussed on assessing the value of the relevant ecological receptors where there is the potential for significant effects to arise.

8.2.9 In order to determine the likelihood of a significant ecological effect, it is necessary to identify whether a receptor is sufficiently valuable for a significant effect upon it to be 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). Only those receptors that it is considered could experience significant effects (i.e. effects that could adversely affect the integrity of the habitat or the favourable conservation status of a species' local population), and which were identified as being of sufficient value to be material to decision-making (i.e. of 'District' level importance or above), have been classified as being Key Ecological Receptors and will be considered in full in the detailed assessment to be carried out as part of the EIA and presented in the ES.

8.2.10 The habitats and features within the Zone of Influence (ZoI) – i.e, the total area which may be affected by the Project are known as the 'ecological receptors'. The nature conservation importance/value of each of the

ecological 'receptors' considers the protected species and species of conservation concern that they may support.

8.2.11 This preliminary assessment and the detailed assessment that will be undertaken for the EIA and included in the ES will therefore examine impacts on receptors with reference to timescales; the area affected; and receptors, be they habitats or species. For each ecological receptor within the study area, the baseline is identified and evaluated; relevant effects characterised; impacts defined and their significance assessed; mitigation identified and residual impacts reported. This exercise is performed for each ecological receptor, for each phase of the Project.

Valuation of Ecological Resources

8.2.12 The ecological value of each ecological receptor within the study area has been determined having regard to its conservation importance.

8.2.13 The IEEM Guidelines recognise that evaluation is a complex process and that there are a number of contributory factors in determining the value of ecological resources. The IEEM Guidelines confirm that assigning value is a matter of professional judgement guided by the importance and relevance of a number of factors including designation and legislative protection as well as biodiversity value, potential value and secondary/supporting value. Consideration of each ecological receptor having regard to these factors allows each ecological resource to be valued with reference to the geographic frame of reference set out below:

- International;
- UK;
- National (England);
- Regional (East of England);
- County (Bedfordshire);
- District/ Borough (Bedford Borough and Central Bedfordshire);
- Parish/ Neighbourhood (Marston Moretaine, Stewartby and Millbrook); and
- Local (all the land within the Project Site).

8.2.14 Following valuation, the ecological receptors requiring full consideration in the impact assessment are determined. This allows exclusion of those ecological receptors that are of 'Parish/ Neighbourhood' or lower value.

Establishing Potential Air Quality Effects

8.2.15 The potential for impacts on sensitive ecological receptors, 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 PEIR.

8.2.16 An assessment of the deposition of nutrient nitrogen and the acidity due to nitrogen as a result of operation of the Power Generation Plant will be undertaken in accordance with the EA guidance "AQTAG 06 - Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air" (2010).

8.2.17 Critical loads (to be used as standards for the assessment of significance) will be obtained from the Air Pollution Information System (APIS) (see paragraph 6.2 in Section 6 of this PEIR). Should the potential for likely significant effects be identified the implications in terms of the potential requirement for mitigation and/or management of vegetation and ecosystems (i.e. the habitats and species they support) will be assessed and presented in the ES.

Realistic Worst Case Scenario for Assessment

8.2.18 In respect of ecology, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 30 m high stack.

8.2.19 Most chapters use a 40 m stack height as the realistic worst case scenario, however, the reason that this represents the realistic worst case in relation to ecological impacts are primarily because five smaller stacks will have a potentially greater impact on air quality (and therefore sensitive ecological receptors). Further discussion is provided in Section 6.2 of this PEIR.

8.2.20 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case Electrical Connection of two double circuit overhead lines and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Significance Criteria

8.2.21 The IEEM guideline state that impacts should be determined as being significant when they have an adverse or beneficial impact "on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area". Such impacts may be significant at the level of importance defined in the evaluation section or, for habitats and species, at a lesser geographical scale. By way of example, limited impacts on a woodland of county importance might be assessed as being significant at a district level of importance. This methodology supersedes the matrix-based assessment methodologies as outlined in Tables 4.1-4.3 of this PEIR.

Consultation and Consultation Responses

8.2.22 Consultation is currently ongoing and will be continued throughout the PEIR and EIA process. Table 8.1 below outlines the responses received to date associated with the Scoping Report, with regard to ecological issues.

Table 8.1: Consultation Responses in relation to Ecology

Consultee	Comment Ref	Comment	Required action or response
SoS (Scoping Opinion)	3.46	Need to consider protecting and enhancing biodiversity and habitats and species processes within the site and surrounding area.	Agreed and this will be addressed in the ES.
	3.48	Inconsistency between number of SSSIs in para 5.5.5 and Appendix 1	There are seven SSSIs within 5 km of the Project Site. The text will be consistent in PEIR and ES.
	3.48	Study areas should be clearly defined for each species.	This has been included in the PEIR, and will be included in the 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 4 of the PEIR, and the Ecology Chapter of the PEIR. The approach to defining the baseline has been discussed and agreed with Natural England and the LPA.
	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.
	3.52	Cross reference should be made to other ES sections and assessment of impacts on ecological receptors associated with air quality (including dust),	Reference will be made in the ES.

Consultee	Comment Ref	Comment	Required action or response
		noise, vibration	
	3.53	Consideration of cumulative and combined impacts are particularly relevant to assessing impacts on ecological interest.	Agreed and the ES will include a cumulative effects assessment in relation to ecology.
	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.	Discussions with NE have confirmed that given the distance of the nearest Natura 2000 site is 27 km from the Project Site, HRA Screening is not required.
	4.9-4.12	SSSIs are noted to be nearby. Resolve any issues with NE in advance of submission of the DCO application	This will be included in consultation with Natural England (currently ongoing).
	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 anticipated that it is unlikely that an EPS licence will be required. This will be reviewed and consultation undertaken with NE in advance of the DCO Application.
Natural England	Scoping Response Letter	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 is currently ongoing with regard to the findings of the habitats/species surveys undertaken to date, and the assessment undertaken in the PEIR/ to be undertaken in the ES.
CBC	Scoping Response Letter (pg 61)	No concerns raised by CBC Ecological Officer - satisfied with suite of surveys proposed and assumes baseline will be adequate.	Noted. Consultation is currently ongoing with regard to the findings of the habitat/species surveys undertaken

Consultee	Comment Ref	Comment	Required action or response
			to date, and the assessment undertaken in the PEIR/ to be undertaken in the ES

8.2.23 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 they have are addressed in the PEIR and the ES. This was followed up by further consultation on the 12th September 2014, during which the approach to determining the baseline for the preliminary assessment was agreed (as set out in detail at section 8.3 below). The NE confirmed 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.

8.2.24 Consultation has also been undertaken with CBC's Ecologist (on the 03.09.14), who has agreed, in principle, to the methodology and content of the assessment presented in this PEIR. The need to demonstrate achieving a net gain in biodiversity as a result of the Project was raised as an issue to be addressed in the PEIR and EIA process. This is being taken into account as the scheme design emerges. Off-site planting is proposed to the south of the Power Generation Plant Site; this will be designed to ensure value for biodiversity is maximised, whilst performing a landscape screening function. 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 structurally diverse and species-rich area of planting, to reflect the species composition within the wider Marston Vale Forest, would be expected to result in a net gain in biodiversity.

8.2.25 Consultation is currently ongoing with the conservation manager at Bedfordshire Wildlife Trust.

8.3 Embedded Mitigation

8.3.1 In order to undertake an assessment of the potential effects on ecology as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation measures can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of protection of ecology, these standard mitigation measures include:

- Implementation of a CEMP which will set out best practice construction methods to limit impacts on ecology such as prevention of spillages and unnecessary disturbance of habitat.

8.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

8.4.1 It will 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 2017), that will be the primary factor in determining baseline conditions relevant to this ecological assessment. Towards the end of 2014, the base of Rookery South Pit it is expected to comprise just bare earth following bulk movement of soils that are required for the LLRS.

8.4.2 The Applicant has carried out consultation with key ecological stakeholders (Natural England (NE) and CBC) and both NE and CBC have agreed the approach to determining baseline conditions for the ecological assessment as set out in this section of the PEIR. The baseline for the ecological assessment is based on the assumption that certain elements of the LLRS are implemented, including re-profiling of Rookery South Pit. A full description of the works to be undertaken as part of the LLRS in Rookery South Pit, in advance of the Project construction phase is given in sections 2.6 and 4.7 of this PEIR.

8.4.3 Baseline ecological conditions (designated sites, habitats and species) are therefore determined on the basis of their predicted status and value during the construction phase, operation phase and decommissioning years taking into account the assumption that the LLRS will have been completed prior to construction of the Project in 2017. 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, or be subject to wetland habitat creation. 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. The baseline will therefore be informed by the desk and field studies undertaken in 2014, and professional judgment as to the expected rate of habitat re-establishment in Rookery South Pit following implementation of the LLRS, during the intervening period up to 2017.

8.4.4 The Extended Phase 1 survey February 2014 – Appendix 8.1 confirmed that the base of the south-western corner of Rookery South Pit presently comprises 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 (see paragraph 8.3.15 below). The surrounds of the pit comprise a patchy mosaic of bare ground, species-poor neutral grassland and woodland/scrub habitats that have developed since clay extraction ceased. The access track comprises 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 of this PEIR.

8.4.5 The LLRS will guide planting on the Project Site and the margins of the attenuation pond and will contribute to delivery of ecological mitigation measures.

Statutory Designated Sites

8.4.6 Desk studies identified that there are no Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or RAMSAR sites within 5 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 Chiltern Beechwoods SAC, which is approximately 27 km to the south-west of the Project Site. As such, NE has agreed the Project is unlikely to result in any significant effect 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.

8.4.7 There are seven SSSIs within 5 km of the Power Generation Plant Site, the nearest of which (Coopers Hill SSSI) is approximately 550 m 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. In addition, there are two Local Nature Reserves within 5 km of the Power Generation Plant Site. The closest, Flitwick Wood LNR is located approximately 3.3 km to the south-east.

8.4.8 Given the distances of these statutory designated sites from the Power Generation Plant Site, on the basis of this preliminary assessment no direct or indirect impacts are anticipated on any statutory designated sites, and as a consequence, they will not be considered further in the detailed impact assessment to be included in the ES.

Rookery Clay Pit CWS

8.4.9 Rookery Clay Pit County Wildlife Site (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 access track, which is located along the western margin of Rookery North Pit, comprises bare ground with ephemeral vegetation, lined with scrub dominated by hawthorn (*Crataegus mongyna)*, blackthorn (*Prunus spinosa*), with young silver birch (*Betula pendula)* and alder (*Alnus glutinosa*) trees.

8.4.10 At the time of the protected species surveys, 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; all of this area will be re-profiled as part of the LLRS. By 2017, being the date of the commencement of the construction phase of the Project, these more valuable habitats within Rookery South Pit and recently associated with the Rookery Clay Pit CWS will no longer exist.

8.4.11 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 at this time, a small population of grass snakes and a medium population of common lizards at this time. 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 8.3, 8.2 and 8.4, for further information) in 2008-2009.

8.4.12 At the time that the Project is constructed in 2017 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 currently ongoing (see paragraph 8.3.15 below). In addition, the LLRS re-profiling works will replace any terrestrial habitat currently suitable for newts, reptiles, breeding birds and/or invertebrates within Rookery South Pit with clay, rendering it of negligible nature conservation value for these species. 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.

Other non-statutory designated sites

8.4.13 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 PEIR.

8.4.14 Given the distances of these other non-statutory designated sites from the Power Generation Plant Site, based on the preliminary assessment no impacts are anticipated on these other CWS within 2 km of the Power Generation Plant Site. The potential for dust and particulate matter emissions from construction and decommissioning to have a significant impact on these ecological receptors is considered low, and they can be expected to be screened out from further assessment in the Air Quality Chapter of the ES (see Table 6.13). For the same reason these sites will not be considered in the detailed ecological assessment in the ES.

Great crested newts

8.4.15 Trapping and translocation of great crested newts (and reptiles) has taken place under a mitigation licence, issued by Natural England in 2011. This has affected the southern half of the Rookery Clay Pit CWS incorporating the southern portion of the proposed Access Road and a proportion of the arable land in the north of the Project Site. At the present time, the translocation programme is continuing in Rookery South Pit and is expected to be completed by November 2014.

8.4.16 The existing access track to the north of the Project Site comprises areas of scrub, ephemeral vegetation and bare ground with cracks and crevices. 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. Great crested newts are relatively common and widespread throughout the county. For example, 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 Power Generation Plant Site is therefore considered to be of 'Local' value for great crested newts.

8.4.17 Whilst the value of the Power Generation Plant Site for the local great crested newt population is not sufficient to trigger consideration in the detailed impact assessment process in the ES, the potential exists for construction of the Access Road to have an impact on great crested newts using suitable features associated with terrestrial habitat along the route of the proposed Access Road. For this reason, great crested newts will be considered in the ES as an 'other ecological receptor requiring mitigation for legislation purposes'. The need for a derogation licence for works to proceed will be reviewed with Natural England, and an appropriate mitigation strategy devised accordingly, if required.

Reptiles

8.4.18 The existing access track to the west of the Power Generation Plant Site 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. Given that the majority of the suitable habitat will be lost as a result of the LLRS prior to commencement of the construction phase of the Project in 2017, that other similar habitat is widespread in Marston Vale and the surrounding area and that only small to medium populations of reptiles have been confirmed to date, the Power Generation Plant Site is considered to be of 'Local' value for the local reptile population.

8.4.19 Whilst the value of the Power Generation Plant Site for the local reptile population is not sufficient to trigger consideration in the detailed impact assessment process in the ES, the potential exists for construction of the Access Road to have an impact on reptiles using terrestrial habitat along the route of the proposed Access Road. For this reason, reptiles will be considered in the ES as an 'other ecological receptor requiring mitigation for legislation purposes'.

Breeding Birds

8.4.20 A relatively diverse assemblage of 65 species of breeding birds (either confirmed or potentially breeding) was recorded during the 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 2017. 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. Given that the most valuable habitats within Rookery South Pit will have been lost ahead of the time of construction (as part of the LLRS), the remaining habitats within the Power Generation Plant Site are considered to be of 'Local' value to breeding birds. This is not of sufficient ecological value to be considered in the detailed impact assessment in the ES.

8.4.21 Nevertheless, all wild birds and their nests are protected under the Wildlife and Countryside Act (1981) as amended and breeding birds will therefore be included as an 'other receptor requiring mitigation for legislative purposes' in the ES.

Bats

8.4.22 A diverse bat assemblage was recorded during the activity and automated static bat detector surveys undertaken in May and July 2014, which focussed on the 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.

8.4.23 The majority of bats were recorded foraging and commuting along the 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.

8.4.24 Although a diverse assemblage of bats have 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, where similar bat assemblages would be expected associated with wetlands and surrounding habitats. The Power Generation Plant Site is considered to be of 'Parish/ Neighbourhood' importance for the local bat population. This is not of sufficient ecological value to be considered in the detailed impact assessment in the ES. Nevertheless, bats will be considered as an 'other receptor requiring mitigation for legislative purposes' in the ES chapter. In particular, associated with maintaining the ecological functionality of the corridor.

Other mammals

8.4.25 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, no setts were revealed during the surveys. These species will not therefore be considered any further in the PEIR or the EIA assessment process.

Construction/Decommissioning

8.4.26 The construction and decommissioning of the Power Generation Plant has the potential for both temporary and permanent impacts on the ecological receptors that are assessed as likely to be present following the completion of the works comprised in the LLRS. Again, it is assumed that the re-grading works associated with the LLRS within Rookery South Pit will have been completed by the time of construction of the Project in 2017 and therefore, that the Power Generation Plant will have a lack of suitable habitat for protected species. The potential likely significant effects of the construction/decommissioning phases of the Project on ecology are therefore considered to be limited to the following:

- indirect noise and vibration disturbance to species, including protected species, during the construction and decommissioning phase within Rookery North Pit;
- loss, disturbance and/or fragmentation of scrub habitats on peripheral areas of the western edge of Rookery South Pit, including along the proposed Access Road;
- lighting effects; and
- Indirect air quality effects on retained CWS habitats associated with dust and particulate matter emissions.

8.4.27 The preliminary assessment of effects of the construction and decommissioning of the Power Generation Plant on ecology is presented in Table 8.2 below.

Table 8.2 Preliminary assessment of ecological effects during construction/ decommissioning of Power Generation Plant

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
Power Generation Plant and Laydown Area				
Statutory Designated Sites	Due to the distance involved, no direct or indirect impacts are anticipated, and hence it is anticipated that significant	None over and above embedded mitigation outlined in Section 8.3.	None	None and this approach has been agreed with NE.

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
	effects are unlikely. Scoped out of further detailed assessment in the ES Chapter			
Rookery Clay Pit CWS	Direct impact on Rookery South Pit (part of CWS). Potential for indirect impacts associated with disturbance to retained habitats within Rookery North Pit	Appropriate buffer zone to be maintained around retained habitats of CWS.	None	The Applicant will agree the approach with the Local Planning Authority's Ecologist
Other non-statutory designated sites	Scoped out of detailed assessment in the ES chapter on the basis that it is anticipated that significant adverse effects are unlikely.	None over and above embedded mitigation outlined in Section 8.3.	None	The Applicant will agree the approach with the Local Planning Authority's ecologist.
Great crested newts	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Review the need for a license from NE associated with construction of the Access Road and devise an appropriate mitigation strategy.	Based on the preliminary assessment to date, none anticipated	The Applicant is to agree the approach with NE. Confirmation is required as to whether or not vegetation removal will need to be undertaken in relation to the construction of

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
				the Access Road (including the distance from receptor ponds, to determine the likelihood of newts being encountered and whether a derogation license from NE is likely to be required)
Reptile population	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Review the need for a small-scale translocation operation associated with construction of the Access Road.	Based on the preliminary assessment to date, none anticipated	The Applicant will agree the approach with statutory consultees, and complete the Phase 2 reptile surveys. The Applicant will undertake further assessment to confirm whether or not vegetation removal will be required associated with construction of the Access Road.
Breeding birds	Not a key ecological receptor – considered to be of insufficient ecological	*Careful timing of any vegetation removal to avoid impacts on nesting	None	None

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
	value to trigger detailed assessment in the ES Chapter.	birds. New planting to include fruit and nut-baring species.		
Local bat population	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Ensure green corridor is maintained along access road; review opportunities for installation of bat boxes on retained vegetation. Ensure sensitive lighting design.	Based on the preliminary assessment to date, None	The Applicant will agree the approach with statutory consultees, and complete the Phase 2 bat surveys.
Other mammals	Scoped out of detailed assessment in the ES chapter, as likely absence confirmed from site.	None over and above embedded mitigation outlined in Section 8.3.	None	None

*No mitigation required to address significant impacts as a result of the Project, but will be included in the ES as 'other receptor requiring mitigation for legislative purposes'.

Operation

8.4.28 The operational impacts of the Power Generation Plant on ecological receptors 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 (see Chapter 6: Air Quality). No other operational impacts are anticipated on ecological receptors. No Impacts are anticipated to result from the Access Road during operation given the very limited number of vehicles and hence limited exhaust emissions. This is summarised in Table 8.3 below.

Table 8.3: Preliminary assessment of ecological effects from operation of Power Generation Plant

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
Generating Equipment				
Rookery Clay Pit CWS	Unlikely to be significant effects from NOx emissions, nitrogen and acid deposition	None	None	None
Access Road				
No Impacts resulting from the Access Road during operation given the very limited number of vehicles and hence limited exhaust emissions.	None	None	None	None

8.5 Gas Connection and Electrical Connection Assessment

Baseline Conditions and Receptors

8.5.1 The baseline conditions of the Gas Connection and Electrical Connection are extremely similar in ecological terms, and were also assessed together as one large area for the purposes of the phase 1 and phase 2 protected species surveys. Therefore they have been grouped together for the purposes of this preliminary assessment.

8.5.2 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 appear 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 of local ecological value being common and widespread, and do not constitute a key ecological receptor.

Invertebrates

8.5.3 The diversity of invertebrates recorded within the more interesting areas of habitat within areas proposed for the Gas and Electrical Connection (woodland plantations, ponds and field margins), was limited. This is largely due to the 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 eight are Species of Principal Importance, including beetles and moths. Overall, the areas proposed for the Gas and Electrical Connection are considered to be of no greater than 'Local' value for the terrestrial invertebrate population they support. The assemblage does not therefore constitute a key ecological receptor and will not be considered in the detailed ecological impact assessment in the ES.

8.5.4 Further information is provided in Appendix 8.2 of this PEIR.

Great crested newts

8.5.5 Surveys were undertaken of 13 ponds within 250 m of the Project Site 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, and eight ponds were also found to support common toad, a species of principle importance (s. 41; NERC Act 2006); full details are provided in Appendix 8.3 of this PEIR.

8.5.6 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. Population C is supported by three ponds clustered to the east, within the areas proposed for the Gas and Electrical Connections. The remaining newt populations are found in ponds adjacent to the areas proposed for the Gas and Electrical Connection, within 250 m of the areas proposed for the Gas and Electrical Connections.

8.5.7 Given that great crested newts are relatively common in the county, that four meta-populations of great crested newts have been recorded during the surveys, that a large population of great crested newts is associated with the receptor sites from the Rookery South Pit translocation, and that robust meta-populations occur elsewhere within the base of Marston Vale, the areas proposed for the Gas and Electrical Connection are considered to be of no greater than 'Parish/ Neighbourhood' importance for the local great crested newt population.

8.5.8 Whilst the value of the areas proposed for the Gas and Electrical Connections for the local great crested newt population are not sufficient to trigger consideration in the detailed impact assessment process in the ES, the potential exists for construction of the Gas Connection to have an impact on

great crested newts using suitable terrestrial habitat within 250 m of Ponds A and R see Figure 2 in Appendix 8.3) which have been confirmed to support great crested newts. The working width required for the installation of the Gas Connection is 30 m with a permanent easement requirement of 10 m. Suitable terrestrial habitat for great crested newts is limited to the areas of broadleaved plantation woodland, the field margins and hedgerows. Neither Gas Connection Route Corridor Option 1 or 2 would have any direct impacts on areas of broadleaved woodland although it would cross two hedgerows/ field boundaries. However, these are greater than 250 m from Ponds A and R, and hence the likelihood of any impacts on great crested newts is considered to be low.

8.5.9 Nevertheless, great crested newts will be considered as an 'other ecological receptor requiring mitigation for legislation purposes', depending upon the final alignment of the Gas Connection route. The need for a derogation licence for works to proceed will be reviewed with Natural England, and an appropriate mitigation strategy devised accordingly.

8.5.10 Further information is provided in Appendix 8.3 of this PEIR.

Reptiles

8.5.11 The ongoing surveys have already 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 PEIR.

8.5.12 The suitability of reptile habitat within the areas proposed for the Gas 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 current survey information, the areas proposed for the Gas and Electrical Connection are considered to be of 'Local' importance for the local reptile population. This is not of sufficient value to constitute a key ecological receptor and as a consequence, will not be considered in the detailed impact assessment in the ES.

8.5.13 Nevertheless, reptiles are afforded protection under the Wildlife and Countryside Act (1981) as amended, against intentional killing and injury. It will therefore be appropriate to implement precautionary mitigation measures in advance of the site clearance works, to avoid incidental mortality of any animals that might be present. For this reason, reptiles will be considered as an 'other ecological receptor requiring mitigation for legislation purposes'.

Breeding Birds

8.5.14 The majority of the areas proposed for the Gas 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 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 breeding in the open fields.

8.5.15 No evidence of breeding barn owls was recorded during the surveys of the farmhouse buildings. A single barn owl was recorded incidentally foraging during the bat activity surveys, although the areas proposed for the Gas and Electrical Connection as a whole 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 prey items.

8.5.16 Overall, the areas proposed for the Gas and Electrical Connection are considered to be of Local value for breeding birds. This is not of sufficient ecological value to be considered in the detailed impact assessment in the ES. Nevertheless, all wild birds and their nests are protected under the Wildlife and Countryside Act 1981 (as amended) and, and breeding birds will be included as an 'other receptor requiring mitigation for legislative purposes' in the ES, to ensure the careful timings of vegetation clearance to avoid the bird nesting season.

Bats

8.5.17 During the bat activity surveys undertaken in May and July 2014, a total of four species were recorded. 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 PEIR. The majority of bats were recorded foraging and commuting along the edge of plantation woodlands, field margins and roadside species-poor hedgerows.

8.5.18 Emergence and return to roost surveys of the building complex at South Pillinge Farm confirmed the continued presence of bat roosts (previously identified during the 2009 surveys undertaken at the Power Generation Plant Site). 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 (B5), 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 and Electrical Connection.

8.5.19 Although relatively common species of bats were recorded during the activity surveys, given the presence of confirmed bat roosts within the farmhouse buildings, the areas proposed for the Gas and Electrical Connection and surrounding area is considered to be of 'Parish/ Neighbourhood' importance for the local bat population, and therefore are not triggered for inclusion in the ES chapter as a key ecological receptor. Nevertheless, the local bat population will be included in the ES chapter as an 'other receptor requiring mitigation for legislative purposes', to ensure the sensitive design, including

lighting design, to avoid or minimise impacts on roosting, foraging and commuting bats.

Badgers

8.5.20 A single badger sett was recorded within the wooded copse within the areas proposed for the Gas and Electrical Connection This sett comprised six well-used entrance holes, and may constitute either a large 'subsidiary' or a small 'main' sett. In any event, the sett would not be affected by the current options for the Gas 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 areas proposed for the Gas and Electrical Connection are considered to be of 'Local' value to the badger population. Therefore, based on the preliminary assessment the need to include an assessment on badgers has been scoped out of the ES.

Other mammals

8.5.21 No signs of water voles were recorded during the 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 required for food and shelter. 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.

Construction/Decommissioning

8.5.22 Given the limited nature conservation value of the habitats within the areas proposed for the Gas and Electrical Connection, no significant impacts are anticipated as a result of the construction or decommissioning of either Gas Connection or Electrical Connection. The worst case Electrical Connection comprises of up to two double circuit overhead lines and up to seven additional new towers (one of which will replace an existing tower) between the existing 400 kV overhead line and a sub-station that is likely to be constructed adjacent to the Generating Equipment Site. Two options are currently being considered for the Gas Connection, and although the potential exists for habitats to be affected which could support protected species, potentially including great crested newts, reptiles and/or breeding birds, any impacts are expected to be limited in nature as the working width required for the installation of the Gas Connection is 30 m with a permanent easement requirement of 10 m. Both options 1 and 2 have been assessed.

8.5.23 The preliminary findings of the assessment of effects on ecology on the construction/ decommissioning of the Gas Connection and Electrical Connection are presented in Table 8.4 and 8.5 below.

Table 8.4 Preliminary assessment of ecological effects from construction / decommissioning of Gas Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Gas Connection				
Habitats	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	None anticipated over and above embedded mitigation.	None	The Applicant will agree approach with statutory consultees.
Great crested newts	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Review the need for a license from NE associated with construction of the Electrical Connection; devise appropriate mitigation strategy	None	The Applicant will agree approach with statutory consultees. Confirm whether or not suitable habitat affected by construction of Gas Connection.
Reptile population	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Review the need for a small-scale translocation operation associated with construction of the Electrical Connection.	None	Complete the Phase 2 reptile surveys. Confirm whether or not suitable habitat affected by construction of Gas Connection.
Breeding birds	Not a key ecological	*Careful timing of any	None	None

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
	receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	vegetation removal to avoid impacts on nesting birds.		
Local bat population	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Consider the need for a green corridor to be maintained along Access Road; review opportunities for installation of bat boxes on retained vegetation. Ensure sensitive lighting design.	None	Agree approach with statutory consultees, and complete the Phase 2 bat surveys.
Badgers	Not a key ecological receptor – sett not affected by proposals	None	None	None
Other mammals	Scoped out of detailed assessment in the ES chapter, as absence confirmed from Project Site	None	None	None

*No mitigation required to address significant impacts as a result of the Project, but will be included in the ES as 'other receptor requiring mitigation for legislative purposes'

Table 8.5 Preliminary assessment of ecological effects from construction / decommissioning of Electrical Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Electrical Connection				
Habitats	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	None anticipated over and above embedded mitigation.	None	The Applicant will agree approach with statutory consultees.
Great crested newts	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Review the need for a license from NE associated with construction of the Electrical Connection; devise appropriate mitigation strategy	None	The Applicant will agree approach with statutory consultees. Confirm whether or not suitable habitat affected by construction of Electrical Connection.
Reptile population	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Review the need for a small-scale translocation operation associated with construction of the Electrical Connection.	None	Complete the Phase 2 reptile surveys. Confirm whether or not suitable habitat affected by construction of Electrical Connection.
Breeding birds	Not a key ecological	*Careful timing of any	None	None

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
	receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	vegetation removal to avoid impacts on nesting birds.		
Local bat population	Not a key ecological receptor – considered to be of insufficient ecological value to trigger detailed assessment in the ES Chapter.	*Consider the need for a green corridor to be maintained along Access Road; review opportunities for installation of bat boxes on retained vegetation. Ensure sensitive lighting design.	None	Agree approach with statutory consultees, and complete the Phase 2 bat surveys.
Badgers	Not a key ecological receptor – sett not affected by proposals	None	None	None
Other mammals	Scoped out of detailed assessment in the ES chapter, as absence confirmed from Project Site	None	None	None

*No mitigation required to address significant impacts as a result of the Project, but will be included in the ES as 'other receptor requiring mitigation for legislative purposes'

Operation

8.5.24 Based on this preliminary ecological assessment, no likely significant effects on ecology are anticipated as being associated with the operation of either the Gas or Electrical Connections.

8.6 Project as a Whole

8.6.1 The Summary of Effects Table 8.6 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).

8.6.2 No likely significant effects are predicted on ecological receptors from any of the individual elements of the Project or from the Project as a whole.

8.7 Cumulative Effects

Construction/Decommissioning

8.7.1 Construction or decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary ecological assessment set out in this Section 8 of the PEIR has shown that it is unlikely that there will be any impacts on ecological receptors as a result of the Project. Accordingly, based on this preliminary assessment, then given that the Project alone is not anticipated to have any effects on ecological receptors, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative effects assessment is required.

Operation

8.7.2 Operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary ecological assessment set out in this Section 8 of the PEIR has shown that it is unlikely that there will be any impacts on ecological receptors as a result of the Project. Accordingly, based on this preliminary assessment, then given that the Project alone is not anticipated to have any effects on ecological receptors, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative effects assessment is required.

8.8 Summary and Conclusions

8.8.1 A full ecological assessment will be undertaken for the ES which will provide further information on the ecological impacts of the proposed Project. Based on this preliminary assessment, no significant ecological effects are considered likely to result from this Project when considered alone or cumulatively with others which have been consented in the area. A summary of this assessment is provided in Table 8.6 below.

Table 8.6: Summary of Preliminary Assessment of Effects on Ecology

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant			
Construction / Decommissioning	Statutory designated sites – potential for indirect impacts scoped out of detailed assessment.	None required	No residual effects are anticipated.
	Rookery Pit CWS – although base of pit will already be re-graded as part of LLRS scheme, potential exists for indirect impacts on retained habitats.	Appropriate buffer zone between Power Generation Plant and retained habitats within Rookery North Pit CWS.	No residual effects are anticipated.
	Other non-statutory designated sites - potential for indirect impacts scoped out of detailed assessment.	None required	No residual effects are anticipated.
	Protected species (including great crested newts, reptiles, breeding birds, bats, and other mammals). Not considered to be key ecological receptors, scoped out of detailed assessment.	Species-specific mitigation to avoid incidental mortality as a result of the Project, due to their legislative protection. Embedded mitigation measures to incorporate features of biodiversity value within scheme design, in accordance with the NPPF.	No residual effects are anticipated.
Operation	Rookery Clay Pit CWS (North Pit only) - Unlikely to	None required	No residual effects are anticipated.

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
	be significant effects from oxides of nitrogen emissions, nitrogen and acid deposition		
Electrical Connection			
Construction / Decommissioning	No key ecological receptors identified – considered to be of insufficient ecological value to trigger detailed assessment.	Species-specific mitigation to avoid incidental mortality as a result of the Project, due to their legislative protection. Enhancement measures to incorporate features of biodiversity value within scheme design, in accordance with NPPF.	No residual effects are anticipated.
Operation			
Gas Connection			
Construction / Decommissioning	No key ecological receptors identified – considered to be of insufficient ecological value to trigger detailed assessment.	Species-specific mitigation to avoid incidental mortality as a result of the Project, due to their legislative protection. Enhancement measures to incorporate features of biodiversity value within scheme design, in accordance with NPPF.	No residual effects are anticipated.
Operation			
Project (as a whole)			
Construction / Decommissioning	Statutory designated sites – potential for indirect	None required	No residual effects are anticipated.

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
	impacts scoped out of detailed assessment.		
	Loss of Rookery South Pit CWS – although base of pit will already be re-graded as part of LLRS scheme, potential exists for indirect impacts on retained habitats.	Appropriate buffer zone between Power Generation Plant and retained habitats within Rookery North Pit CWS.	No residual effects are anticipated.
	Other non-statutory designated sites - potential for indirect impacts scoped out of detailed assessment.	None required	No residual effects are anticipated.
	Protected species (including great crested newts, reptiles, breeding birds, bats, and other mammals). Not considered to be key ecological receptors, scoped out of detailed assessment.	Species-specific mitigation to avoid incidental mortality as a result of the Project, due to their legislative protection. Embedded mitigation measures to incorporate features of biodiversity value within scheme design, in accordance with NPPF.	No residual effects are anticipated.
Operation	Rookery Clay Pit CWS (North Pit only) - Unlikely to be significant effects from oxides of nitrogen emissions, nitrogen and acid deposition	None required	No residual effects are anticipated.

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Cumulative effects			
Construction / Decommissioning	None	None required	No residual effects are anticipated.
Operation			

9 Water Quality and Resources

9.1 Introduction

9.1.1 This section of the PEIR presents the preliminary findings of the assessment of likely significant effects relating to hydrology and flood risk arising from the construction, operation and decommissioning of the Project. Specifically, this section considers the following:

- the potential 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;
- the potential for the Project to increase flood risk elsewhere;
- the potential for the Project to impact on the quality of water bodies; and
- the potential for the Project to impact on water resources.

9.2 Approach

Relevant Policy and Guidance

9.2.1 Relevant policy and guidance relating to water quality and resources is set out in Appendix 2.9.

Assessment Methodology

9.2.2 The study area for the preliminary water quality and resources assessment extends to include the reaches of watercourse and surface water drainage infrastructure shown in Figure 9.1 as these have the potential for significant interaction with the Project. The study area will be confirmed following consultation (on-going) with the EA and the Bedfordshire and River Ivel Internal Drainage Board.

9.2.3 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 from PBA in August 2014. Both the EA and the Bedfordshire and River Ivel Internal Drainage Board have been consulted to identify the issues to be addressed and the scope of work required to be undertaken in order to prepare a Flood Risk Assessment (FRA) that is compliant with the National Planning Policy Framework (NPPF).

9.2.4 Data collected to support preparation of this section of the PEIR and the subsequent FRA includes:

- Topographical survey;
- Anglian Water sewer records; and

- EA flood maps.

9.2.5 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 Brook corridor undertaken in 2009. The hydraulic model extends from a point approximately 200 m 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).

Realistic Worst Case Scenario for Assessment

9.2.6 In respect of water quality and resources, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

9.2.7 The reason that this represents the realistic worst case in relation to water quality and resources are primarily because five gas turbine generators will require marginally more water during construction and operation for blade washing.

9.2.8 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case scenario for the Electrical Connection of a double circuit overhead line and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Significance Criteria

9.2.9 The significance of effects has been assessed through consideration of their magnitude, duration and nature and also the geographic context (i.e.: highly localised or widespread). The significance criteria are outlined below in Table 9.1 below.

Table 9.1 – Significance of Effects for Water Quality and Resources

Significance Criteria	Definition
Major Beneficial	Major reduction in risk to receptors. Significant local scale/widespread reduction in flood risk, significant increase in water quality.
Moderate Beneficial	Moderate reduction in risk to receptors. Moderate reduction in localised flood risk, moderate increase

Significance Criteria	Definition
	in water quality.
Minor 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.
Minor 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.
Major 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.

Consultation and Consultation Responses

9.2.10 Consultation is currently ongoing and will be continued through the PEIR and the EIA process. Table 9.2 below summarises the consultation responses received to date in relation to water quality and resources, and how these have been or will be addressed in the ES.

Table 9.2 - Consultation Responses relating to water quality and resources

Consultee	Comment Ref	Comment	Required action or 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 will form an Appendix to the ES and as such is not included within the PEIR.
	3.13	The SoS agrees that impacts on water quality from operation of the Gas and Electrical Connection	Noted.

Consultee	Comment Ref	Comment	Required action or response
		can be scoped out of the assessment.	
	3.58	It should be made clear in the ES whether discharges to watercourses will occur and if so, any impacts this will have.	No discharges to watercourses will occur as a result of the Project.
	3.59	All water crossing methods for the connections should be assessed. All crossing points should be identified.	Noted. Crossing methods are described in Section 9.4 of the PEIR.
	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 drainage regime developed as part of the LLRS has been designed to take into consideration climate change. See Section 9.4.
Network Rail	Scoping response letter	Drainage routes need to be carefully designed so as not to impact on any railway assets.	Noted. Drainage will be as per LLRS which has been consented and will not impact on Network Rail Assets.

9.3 Embedded Mitigation Measures

9.3.1 In order to undertake an assessment of the potential effects on water quality and resources as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of protection of water quality and resources, these standard mitigation measures include:

- Any surface water contaminated by hydrocarbons to be passed through oil/grit interceptors prior to discharge;

- Measures will be taken to ensure that no leachate, or any surface water that has the potential to be contaminated, will be allowed to enter directly or indirectly any water course, underground strata or adjoining land;

- 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;

- Refuelling of construction vehicles and equipment will be restricted to a designated area with properly designed fuel tanks and bunds and suitable operating procedures.

- Siting of stockpiles a minimal distance from watercourses to avoid pollution runoff and adhering to best practice working guidelines to avoid spillages near watercourses;

- All oil and chemical storage tanks and areas where drums are stored will be surrounded by an impermeable bund. Single tanks will be within bunds sized to contain 110 per cent of capacity and multiple tanks or drums will 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; and

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

9.3.2 The British Standard Code of Practice for Earthworks BS 6031:2009 contains detailed methods that should be considered for the general control of drainage on construction sites. Further advice is also available in the British Standard Code of Practice for Foundations BS 8004: 1986. These will be taken into account

9.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

9.4.1 Rookery South Pit will be subject to LLRS works prior to construction of the Project in 2017, as described in sections 2.6.2 and section 4.7 of this PEIR. 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. The completion of the LLRS works therefore provides the baseline for the assessment of likely environmental effects relating to hydrological and flood risk associated with the Project.

9.4.2 The Mill Brook flows along the western boundary of the Power Generation Plant Site and drains a predominantly rural catchment of approximately 4.5 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 1.5 km^2 joins the Mill Brook to the east of South Pillinge Farm, shown in Figure 9.1.

9.4.3 The EA's Flood Zone maps do not extend to include the Mill Brook watercourse and its tributary on account of the small size of the contributing catchment area.

9.4.4 However, the nature of flood risk associated with the Mill Brook has been assessed using a hydraulic model. 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 20 percent, as defined by the NPPF) 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.

9.4.5 Despite this, the Power Generation Plant Site landform is such that (i) the Generating Equipment Site is elevated above existing flood levels and (ii) any floodwater spill will be intercepted and routed to the Rookery South Pit attenuation pond as part of the drainage works which will be undertaken as part of the LLRS. On this basis, it is anticipated that part of Rookery South Pit that will accommodate the Generating Equipment will not be affected by flooding associated with either the 1 in 100 year or 1 in 100 year plus climate change events.

9.4.6 Discussions are ongoing between the Applicant and the EA to confirm that, following implementation of the LLRS, the Generating Equipment Site would be classified as Flood Zone 2.

9.4.7 The Generating Equipment is also classed as Essential Infrastructure in respect of the Flood Risk Vulnerability Classification set out in Table 2 of the NPPF Planning Practice Guidance. Essential Infrastructure is classed as that which is essential to the needs of the country and includes 'electricity generating power stations'[9] .

9.4.8 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 2 is appropriate from a flood risk perspective.

[9] http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/

Insert 9.1 – Table 3 from NPPF planning practice guidance on Flood Risk and Coastal Change.

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.

9.4.9 Assessment of the water quality of the surface water bodies in the vicinity of the Generating Equipment Site has been undertaken since 1999[10][11]. During this time, surface water samples have been taken from the lakes in Rookery South Pit (prior to the implementation of the LLRS) and Rookery North Pit, Harrowden Brook to the east, the drainage ditches to the south (the Mill Brook tributary) and west (Mill Brook watercourse) and Stewartby Lake.

9.4.10 Analyses have included testing for a range of potential historical contaminants.

9.4.11 The data[8, 9] shows that the ammonia concentration within all of the water bodies is generally low. The Biological Oxygen Demand (BOD) concentration is also generally low.

[10] CLA 2000. Ground Investigation – Rookery South Proposed Landfill Site, Bedfordshire. Report no: 2690072. March 2000. CL Associates.

[11] PBA 2011b. Peter Brett Associates. Marston Vale Study Area, Bedfordshire. Report on Surface Water Quality Monitoring Ref 18311-204/R1/Rev0.

9.4.12 The data[8, 9] shows that the sulphate concentrations within the Rookery North Pit and the Rookery South Pit lakes are consistently higher than those within the surrounding ditches and within the 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 (400mg/l) and the threshold for the protection of human health (250mg/l).

9.4.13 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 (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).

9.4.14 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 the 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.

9.4.15 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[8,9] shows no evidence of contamination having occurred at the Power Generation Plant Site.

9.4.16 The above information on water quality relates to sampling taken prior to the implementation of the LLRS. The ES for the LLRS sets out a number of mitigating measures to be implemented in order to ensure that there will be no significant or residual effect on water quality as a result of implementing the LLRS. The construction of the LLRS earthworks, including the construction of new drainage channels and attenuation pond within Rookery South Pit, requires dewatering of accumulated surface water with Rookery South Pit and the draw-down of waters within Rookery North Pit in a phased manner. The discharge of pumped waters from Rookery North Pit being to the Mill Brook watercourse is to be at a rate of 23 l/s, in line with the existing discharge consent.

9.4.17 The mitigation measures proposed during the construction phase of the LLRS comprise the following:

- Earthworks operations undertaken in a phased manner with earthworks materials being stockpiled such that the surface water run-off is routed to either the proposed Rookery South attenuation pond or to a local sump / silt trap with allowance for silt to settle from accumulated waters prior to pumping off-site; and,

- The use of environmental management controls and procedures such as bunding fuel tanks and locating refuelling points away from watercourses/drains.

9.4.18 Upon completion of the LLRS, surface water drainage will be directed to the Rookery South attenuation pond, prior to extraction and pumping via a new pumping station with waters discharged by the LLRS Consent to Discharge.

9.4.19 On the basis of the measures outlined above, the historic water quality information set out for Rookery North Pit, 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 resources arising from the development of the Power Generation Plant.

Construction/Decommissioning

9.4.20 A small amount of water will be required each day for the construction and decommissioning works (e.g. wheel washing and dust suppression) and hygiene. This water will likely be brought in by tanker mains water supply, and therefore no surface water or groundwater abstraction will be required. There will therefore be no impact on these resources as a result of water requirement during construction or decommissioning.

9.4.21 Construction or decommissioning activities carried to develop the Power Generation Plant could require the disposal of water from the Power Generation Plant Site. Therefore all construction contractors will be required, in conjunction with the Applicant, to reach an agreement with the EA with regard to detailed methods of disposal.

9.4.22 Based on the preliminary information for the Project referred to above and similar construction sites, it is likely that this water will either be treated and discharged to existing site drainage or it will be collected and tankered away. This will be further developed following consultation and further assessment and once the final design of the Project has been agreed.

9.4.23 Table 9.3 below identifies the hydrological receptors that may be affected during the construction and decommissioning of the Power Generation Plant, the nature of the impact and how this is to be mitigated and presents a preliminary assessment of the likely significance of effects. Where further

work is required to build on and complete the assessment, this has also been summarised.

Table 9.3 – Preliminary assessment of effects on water quality and resources from construction and decommissioning of the Power Generation Plant

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
Generating Equipment and Laydown Area				
Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces.	Negligible - As the LLRS surface water drainage strategy will be implemented and completed prior to the commencement of the Project in 2017. It is considered that the LLRS drainage strategy offers adequate capacity to accommodate the additional impermeable area associated with the Power Generation Plant.	It is anticipated that no additional mitigation works are required over and above the embedded mitigation.	Effects are anticipated to be negligible and therefore not significant.	Flood Risk Assessment to be prepared.
Contamination of surface water and groundwater resulting from spilled	Negligible.	It is anticipate that no	Effects are anticipated to be	Flood Risk Assessment to

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
hydrocarbons/petrochemicals from construction plant and mobilisation of silts during earthworks operations leading to increased silt loading in watercourses.		additional mitigation measures are required over and above the embedded mitigation measures.	negligible and therefore not significant.	be prepared.

Operation

9.4.24 Occasionally (approximately monthly) it will be necessary to wash the blades of the air compressor section of the gas turbine(s) to remove debris that has penetrated the air inlet filters and become lodged on the compressor blades. This will be done at times when the performance of the gas turbine has degraded and will depend on the air quality in the vicinity of the Project Site.

9.4.25 Any water generated during washing will be retained on the Power Generation Plant Site in a storage tank and subsequently tanked offsite by a licensed contractor for disposal at an appropriately licensed disposal facility.

9.4.26 Table 9.4 below identifies the hydrological receptors that may be affected during the operation of the Power Generation Plant, the nature of the impacts and effects and how these are to be mitigated and presents a preliminary assessment of the likely significance of the effects of the operation of the Power Generation Plant on water quality and resources. Where further work is required to build on and complete the assessment, this has also been summarised.

Table 9.4 – Preliminary assessment of effects on water quality and resources from operation of the Power Generation Plant

Receptor name and description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further assessments and consultation to be undertaken
Generating Equipment				
Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces.	Negligible. The LLRS and associated surface water drainage strategy will be implemented prior to construction of the Project.	None required.	Effects are anticipated to be negligible and therefore not significant.	Flood Risk Assessment to be prepared.
Contamination of surface water and groundwater resulting from the flushing of silts and hydrocarbons from the access road and areas of hardstanding.	Negligible.	No additional mitigation measures required over and above the embedded mitigation measures.	Effects are anticipated to be negligible and therefore not significant.	

9.5 Gas Connection Assessment

Baseline Conditions and Receptors

9.5.1 The preferred Gas Connection Route Corridor Option, Option 1, is located immediately to the south of Rookery South Pit. The Mill Brook tributary passes through part of the Route Corridor for Gas Connection Route Corridor Option 1 and 2, located to the west of the Midland Mainline Railway. A further watercourse (IDB Watercourse 3(1)) flows to the north of the Route Corridor for Gas Connection Route Corridor Option 2 to the east of the

Midland Mainline Railway. Watercourse 3(1) drains a small, predominantly rural catchment to the north-west of the settlement of Ampthill.

9.5.2 There is no flood risk information available for the minor watercourses located within Gas Connection Route Corridor Options 1 and 2. However, given the minor nature of the watercourses, the small contributing catchment areas and local topography, any floodplains would be limited to very narrow corridors.

Construction/Decommissioning

9.5.3 The potential effects associated with construction and decommissioning of the Gas Connection (Route Corridor Options 1 and 2) would be associated with the installation of the underground pipeline by open-cut methods and construction / decommissioning of the AGI. Table 9.5 below identifies the hydrological receptors that may be affected during the construction and decommissioning of the Gas Connection, the nature of the impact and how this is to be mitigated and presents a preliminary assessment of the likely significance of the effect. The assessment applies to both Gas Connection Route Corridor Options.

Table 9.5 – Preliminary assessment of effects on water quality and resources from construction and decommissioning of the Gas Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Gas Connection				
Reduced flow capacity/change to watercourse flow regime due to open cut channel works, leading to temporary increase in localised flood risk.	Negligible.	No additional mitigation measures required over and above the embedded mitigation measures.	Effects are anticipated to be negligible and therefore Not Significant.	None required.
Contamination of surface water and groundwater resulting from spilled hydrocarbons/petrochemicals from construction plant and mobilisation of silts during earthworks operations/open	Negligible	No additional mitigation measures required over and above the	Effects are anticipated to be negligible and therefore Not	None required.

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
cut works leading to increased silt loading in watercourses.		embedded mitigation measures.	Significant.	
Reduced permeability of the ground associated with temporary construction compounds and stockpile areas, leading to increased surface water run-off to nearby watercourses and therefore increased flood risk.	Negligible	No additional mitigation measures required over and above the embedded mitigation measures.	Effects are anticipated to be negligible and therefore Not Significant.	None required.

Operation

9.5.4 Based on this preliminary assessment, it is anticipated that the operation of the Gas Connection would have no impacts upon water quality and resources as it does not require any water during operation, it will not be at risk from flooding, will not cause flooding elsewhere and will not cause the release of any silt or contaminants. As confirmed by the SoS in the Scoping Response the potential operational impact of the Gas Connection has therefore been scoped out of the assessment.

9.6 Electrical Connection Assessment

Baseline Conditions and Receptors

9.6.1 The area proposed to site the Electrical Connection (excluding the substation) includes some water bodies/minor watercourses/ditches/drains. The upper reach of the Mill Brook passes along the western boundary of where the Electrical Connection is proposed and the Mill Brook tributary passes through the north-eastern part of the area.

9.6.2 There is no flood risk information available for the watercourses located within area proposed for the Electrical Connection. However, given the minor nature of the watercourses, the small contributing catchment areas and local topography, floodplains would be limited to very narrow corridors.

9.6.3 The assessment of the substation, is as for the Generating Equipment Site as it lies adjacent to it.

Construction/Decommissioning

9.6.4 The potential effects on water resources and quality associated with construction and decommissioning of the Electrical Connection would be associated with the installation of the overhead lines / pylons and construction of the substation adjacent to the Generating Equipment Site. Table 9.6 below identifies the receptors that may be affected during the construction and decommissioning of the Electrical Connection, the nature of the impacts and how these are to be mitigated and presents a preliminary assessment of the likely significance of the effects.

Table 9.6 – Preliminary assessment of effects on water quality and resources from construction and decommissioning of the Electrical Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Electrical Connection				
Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces associated with the substation.	Negligible	The LLRS and associated surface water drainage strategy will have been implemented prior to construction of the Project. The LLRS drainage strategy assumes that the whole of Rookery South Pit is impermeable. The strategy therefore offers	Effects are anticipated to be negligible and therefore not significant.	Flood Risk Assessment to be prepared.

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
		adequate capacity to accommodate the additional impermeable area associated with the substation and no further mitigation works are anticipated.		
Contamination of surface water and groundwater resulting from spilled hydrocarbons/petrochemicals from construction plant and mobilisation of silts during earthworks operations leading to increased silt loading in watercourses.	Negligible.	No additional mitigation measures required over and above the embedded mitigation measures.	Effects are anticipated to be negligible and therefore not significant.	Flood Risk Assessment to be prepared.

Operation

9.6.5 Based on this preliminary assessment, it is anticipated that the operation of the Electrical Connection would have no impacts upon water quality and resources as it does not require any water during operation. It will not be at risk from flooding and therefore will not cause flooding elsewhere and it will not cause the release of any silt or contaminants. As confirmed by the Secretary of State in the Scoping Response, the operational impacts of the Electrical Connection have therefore been scoped out of this PEIR and the assessment in the ES.

9.7 Project as a Whole

9.7.1 The Summary of Effects Table 9.7 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).

9.7.2 No likely significant effects are predicted on water quality and resources from any of the individual elements of the Project or from the Project as a whole.

9.8 Cumulative Effects

Construction/Decommissioning

9.8.1 Construction or decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary assessment set out in this Section 9 of this PEIR has shown no likely significant effects on water quality and resources are anticipated to arise from the Project. Accordingly then given that the Project alone is anticipated to have no likely significant effects on water quality and resources, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative impacts assessment is required.

Operation

9.8.2 Operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary assessment set out in this Section 9 of this PEIR has shown no significant effects on water quality and resources are anticipated to arise from the Project. Accordingly then given that the Project alone is anticipated to have no significant effects on water quality and resources, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative impacts assessment is required.

9.9 Summary and Conclusions

9.9.1 Table 9.7 below summarises potential effects from the Project on water quality and resources.

Table 9.7 - Summary of effects on water quality and resources

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant			
Construction / Decommissioning	Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces.	None required other than embedded mitigation.	Negligible
	Contamination of surface water and groundwater resulting from spilled hydrocarbons/petrochemicals from construction plant and mobilisation of silts during earthworks operations leading to increased silt loading in watercourses	None required. other than embedded mitigation.	Negligible
Operation	Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces.	None required. other than embedded mitigation.	Negligible
	Contamination of surface water and groundwater resulting from the flushing of silts and hydrocarbons from the proposed Access Road and areas of hardstanding.	None required other than embedded mitigation.	Negligible
Gas Connection			
Construction / Decommissioning	Reduced flow capacity/change to watercourse flow regime due to open cut channel works, leading to temporary increase in localised flood risk.	None required other than embedded mitigation.	Negligible
	Contamination of surface water and groundwater resulting from spilled hydrocarbons/petrochemicals	None required other than embedded	Negligible

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
	from construction plant and mobilisation of silts during earthworks operations/open cut works leading to increased silt loading in watercourses.	mitigation.	
	Reduced permeability of the ground associated with temporary construction compounds and stockpile areas, leading to increased surface water run-off to nearby watercourses and therefore increased flood risk.	None required other than embedded mitigation.	Negligible
Operation	Scoped out of assessment		
Electrical Connection			
Construction / Decommissioning	Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces associated with the substation.	None required other than embedded mitigation.	Negligible
	Contamination of surface water and groundwater resulting from spilled hydrocarbons/petrochemicals from construction plant and mobilisation of silts during earthworks operations leading to increased silt loading in watercourses.	None required other than embedded mitigation.	Negligible
Operation	Scoped out of assessment		
Project (as a whole)			
Construction / Decommissioning	Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces	None required other than embedded mitigation.	Negligible

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
	associated with the substation.		
	Contamination of surface water and groundwater resulting from spilled hydrocarbons/petrochemicals from construction plant and mobilisation of silts during earthworks operations leading to increased silt loading in watercourses.	None required other than embedded mitigation.	Negligible
Operation	Increased surface water run-off to the Rookery South Pit interceptor channels and attenuation pond arising from the increased extent of impermeable surfaces.	None required. other than embedded mitigation.	Negligible
	Contamination of surface water and groundwater resulting from the flushing of silts and hydrocarbons from the proposed Access Road and areas of hardstanding.	None required other than embedded mitigation.	Negligible
Cumulative effects			
Construction / Decommissioning	None predicted	None required other than embedded mitigation.	Negligible
Operation	None predicted	None required other than embedded mitigation.	Negligible

10 Ground Conditions

10.1 Introduction

10.1.1 This section of the PEIR presents the preliminary findings of the assessment of likely significant effects arising from the construction, operation and decommissioning of the Project in relation to ground conditions, with consideration given to potential ground stability and contamination related impacts. It also provides preliminary findings of the assessment of the likely significant effects of the Project on hydrogeology in the vicinity of the Project Site.

10.1.2 This section is supported by a Phase 1 Ground Condition Assessment report comprising a ground stability appraisal and a Tier 1 qualitative contamination risk assessment (herein referred to as PBA 2014) presented as Appendix 10.1 of this PEIR.

10.2 Approach

Study Area

10.2.1 The study area is defined by both the geotechnical considerations in close proximity to the Project Site and the potential for pollutant linkages between a source and receptor. The spatial extent of a potential pollutant linkage depends upon the physical characteristics of the particular pathway under consideration, for instance the depth to a particular stratum and the permeability of the migration pathway.

Relevant Policy and Guidance

10.2.2 Relevant policy and guidance in relation to ground conditions is set out in Appendix 2.10.

Assessment Methodology

10.2.3 Assessment of the land and water quality at the Project Site is being undertaken by following a tiered approach as recommended within the industry guidance as set out in Appendix 2.10 as follows:

- 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
- Tier 3 - detailed - a quantitative assessment involving the generation of site specific assessment criteria (SSAC).

10.2.4 For this PEIR, Tier 1 and partial Tier 2 assessments have been undertaken. The Tier 2 assessment will be further built upon and reported in the ES, alongside the Tier 3 assessment (that will also be carried out and reported in the ES).

10.2.5 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);
- A receptor/target (an entity that is vulnerable to the potential adverse effects of the hazard).

10.2.6 Without a pollutant linkage, the contamination may be a 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. 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.

10.2.7 Baseline conditions for the Project Site have been identified using the PBA 2014 Phase 1 report which present information on the geotechnical and geoenvironmental setting of the Project Site, attached as Appendix 10.1. These 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 that may result from artificial and natural cavities, and foundation conditions that may be affected by compressibility, shrinkage/swelling of clay stratum, groundwater and drainage).

10.2.8 The reports also identify the type and sensitivity of potential receptors (including consideration of human health, buildings, groundwater, surface water and ecological systems) and identification of possible migration or transportation pathways.

Realistic Worst Case Scenario for Assessment

10.2.9 In respect of ground conditions, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

10.2.10 The different options for the Generating Equipment have little bearing on the impact to ground conditions. Five separate units will have marginally more land take than a smaller number of units. However, as the Generating Equipment will all be within the previously excavated Rookery South Pit regardless of how many gas turbine generators are used, the impacts arising from the Power Generation Plant on ground conditions are similar for each potential configuration.

10.2.11 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case scenario for the Electrical Connection of a double circuit overhead line and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Significance Criteria

10.2.12 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 10.1-10.3 illustrate how the value of the receptor and the consequence of the effect determines the significance level of the effect which can be “not significant”, “minor”, “moderate”, “major” or “severe”.

10.2.13 Significance of an effect is a function of the magnitude of impact (deviation from the baseline condition), the sensitivity and value of the receptor/resource, the duration and reversibility. A receptor is classified in terms of its value or sensitivity; the criteria used in this ground conditions chapter are described in Table 10.1 below. The classifications have been generated using descriptions of environmental receptor importance and value given in various guidance documents including NHBC 2008[12] and DETR 2000[13]. Human health and buildings classifications have been generated by PBA using the attribute description for each class.

[12] http://www.nhbc.co.uk/NHBCpublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf

[13] DETR Circular 02/2000, Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990

Table 10.1 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 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).

10.2.14 For the purposes of this ground condition chapter the following criteria in Table 10.2 have been adopted to describe magnitude of impact.

Table 10.2 – Magnitude of Impact on Ground Conditions

Magnitude		Example
Large	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 soil guidance value (SGV)) but that does not cause a key attribute of the receptor to be lost/degraded.

Magnitude		Example
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements or improvement of attribute quality.
Small	Adverse	A discernible impact that is below a standard (for example a soil guidance value (SGV)) 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.

10.2.15 The matrix for assigning the significance of effects is presented as Table 10.3.

Table 10.3 Significance of Effects for assessing Ground Conditions

Sensitivity/ Value of Receptor	Magnitude of Impact			
	Large	Moderate	Small	Negligible
High	Severe	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Not Significant
Low	Moderate	Minor	Not Significant	Not Significant

Consultation and Consultation Responses

10.2.16 Consultation is ongoing and will be continued throughout the PEIR and EIA process. Table 10.4 below summarises the consultation responses to date in relation to ground conditions.

Table 10.4 – Consultation Responses relating to ground conditions

Consultee	Comment Ref	Comment	Required action or response
PINS	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 10 of the PEIR.
	3.65	The ES should provide an assessment of potential effects	Noted. Potential impacts on hydrogeology are

Consultee	Comment Ref	Comment	Required action or response
		on aquifers.	described in section 10 of the PEIR.
	3.67	Study area for this topic needs to be clearly defined and justified.	Noted. The study area is clearly defined and justified section 10.2 of the PEIR.
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.

10.3 Embedded Mitigation

10.3.1 In order to undertake an assessment of the potential effects on ground conditions as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of protection of ground conditions, these standard mitigation measures include; working in accordance with best practises, maintaining safe working practises and the use of correct and appropriate personal protective equipment (PPE).

10.3.2 During construction / demolition mitigation measures would be covered by the CEMP. The CEMP will incorporate appropriate mitigation measures that will be approved by the relevant authorities and adopted, such that it would be unlikely that any impacts would arise during construction.

10.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

10.4.1 The baseline for the ground conditions preliminary assessment has assumed that the LLRS works as noted in sections 2.6.3 and 4.7 of this PEIR will have been completed prior to the commencement of the development of the Power Generation Plant in 2017.

10.4.2 The paragraphs below summarise the findings of PBA's 2014 Phase1 Ground Condition Desk study.

Geology

10.4.3 A summary of the baseline geology associated with the Power Generation Plant Site is presented in Table 10.5 below.

Table 10.5 - Summary of Baseline Geology at the Power Generation Plant Site

Formation	Unit	Thickness	Description
Valley Gravel		<3m (inferred)	Quaternary deposits comprising sands and gravel. Indicated by British Geological Survey (BGS) records as present along the far western extent of The Rookery.
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'.
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 100 m of the Power Generation Plant Site during the PBA (2009) and CLA (2000) investigations
** - The maximum penetration proved by the PBA (2009) and CLA (2000) investigations was 7.4 m. Historical ground investigation data from approximately 3 km to the northeast of the Project Site recorded a thickness of 8.5 – 9.7 m (Williams, 1985). BGS information indicates thicknesses of 6 m – 13 m (BGS 1:10,000 map sheet)

10.4.4 Following excavation of the unweathered Oxford Clay ('Knotts') from The Rookery 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[14][15] have encountered Callow Clay Fill at all location at thicknesses in excess of 4.7 m, although more typically the thicknesses are in the region of 2 m, tapering to a thin veneer, or are absent altogether close to the pit edges.

10.4.5 The base of the Oxford Clay has a persistent pyritic shell bed less than 0.5 m 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 2.0 m of remnant Oxford Clay underlying the Callow Clay Fill, albeit that it was absent in some isolated areas.

10.4.6 Along the western edge of the Power Generation Plant Site the ground levels rise from the base of the pit at approximately 28 m AOD to approximately 38 m AOD. The slope is formed at an angle of approximately 1(Vertical):2(Horizontal) to 1(V):3(H). Boreholes situated on the top of the western slope have encountered 1.65 m – 3.0 m 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.

10.4.7 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. 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 directly upon the Callow Clay Fill in the base of the 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 1 m – 2 m but will be up to 3 m in places where existing topographic levels are lowest.

Hydrogeology

10.4.8 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 aquitards, retaining the groundwater bodies in the underlying water bearing strata.

[14] CLA 2000. Ground Investigation – Rookery South Proposed Landfill Site, Bedfordshire. Report no: 2690072. March 2000. CL Associates.

[15] PBA 2009b. Peter Brett Associates. Proposed Resource Recovery Centre – Rookery South, Stewartby. Report on Geotechnical and Geoenvironmental Ground Investigation. Ref 21780/016/GI/Rev1.

10.4.9 The permeability of the Callow Clay Fill, Oxford Clay, Kellaways Clay and Blisworth Clay Formation has been shown to be extremely low and as such these strata can be considered as aquitards.

10.4.10 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[16] 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 the Power Generation Plant Site does not lie within a Groundwater Source Protection Zone (as defined by the EA).

10.4.11 In general, the Power Generation Plant Site is situated in a relatively 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 Minor Aquifers of the Kellaways Sand and Cornbrash Formation are of limited thickness, low permeability and poor quality; the Major Aquifer of the Blisworth Limestone Formation is of low permeability, poor quality and is protected by the overlying Blisworth Clay Formation.

10.4.12 Further information on groundwater levels and previous groundwater monitoring is included in the PBA 2014 Phase 1 Report, included in Appendix 10.1.

Sites of Geological Importance

10.4.13 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

10.4.14 As part of historical ground investigations in Rookery South Pit, 10 trial pits were excavated and three boreholes were sunk in the base of the pit in the immediate area of the Generating Equipment Site. No visual or olfactory evidence of contamination was noted within any of these exploratory holes.

10.4.15 As part of historical ground investigations, 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 determinands tested showed

[16] PBA 2009a. Peter Brett Associates Proposed Resource Recovery Centre – Rookery South, Stewartby. Geoenvironmental and Geotechnical Desk Study and Phase 1 Ground Condition Assessment. Ref 21780/016/DTS/Rev1.

any evidence of elevated concentrations when compared to relevant assessment criteria.

Geoenvironmental Conditions – Groundwaters

10.4.16 The historical ground investigation works[10,11] 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.

10.4.17 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[12].

10.4.18 Historical monitoring of water quality[10, 11] within the Kellaways Formation and the Blisworth Limestone Formation has confirmed that the quality of the groundwater within the Kellaways Formation and the Blisworth Limestone Formation is similar in nature, with naturally elevated concentrations of electrical conductivity, chloride, sulphate, ammoniacal nitrogen, boron and zinc when compared to the relevant assessment criteria for the protection of Human Health (Water Supply Regulations 2000).

10.4.19 Further historical groundwater monitoring data was supplemented by groundwater analysis of samples taken from the Kellaways Formation as part of more recent historic investigations. Concentrations of ammoniacal nitrogen, antimony, boron, electrical conductivity, chloride, manganese, sulphate and zinc were recorded above the screening criteria but at concentrations that suggest that the groundwaters have not been affected by anthropogenic contamination.

10.4.20 The concentration of VOC, SVOC, PCB, dioxins, furans and pesticides have all been recorded consistently below or very close to the laboratory detection limit and the data shows no evidence of contamination having occurred at the Power Generation Plant Site.

10.4.21 Groundwater analysis for hydrocarbons has also been undertaken within the wider Rookery South are[1011], for which there are no available assessment criteria. During the more recent monitoring[12], hydrocarbon analysis was undertaken and found to be below the detection limit for the test of 10µg/l.

Construction/Decommissioning

10.4.22 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 29 m AOD compared to an average development platform level for the LLRS of 31.5 m AOD. Whilst elevated Groundwater levels could present problems in any deep excavations for drainage or earthworks during the construction process and increase the potential for

hydraulic uplift of any below ground structures, post-construction it is not anticipated that the Generating Equipment will have significant foundations or deep drainage requirements. If any such issues arise, however, they are likely to be limited to the construction activities associated with the Power Generation Plant.

10.4.23 Following the historical extraction of clay from the Rookery South Pit, there are relatively steep side slopes that show evidence of instability in places. However, the LLRS makes due allowance for remedial engineering via regrading of slopes and buttressing of slopes where necessary to provide a suitable slope profile. Any earthworks required for the Power Generation Plant would be consistent with the slope stability assessment undertaken as part of the LLRS to ensure that the Project does not compromise the integrity of such works.

10.4.24 Whilst the Phase 1 and Phase 2 assessments that have been undertaken for the Power Generation Plant Site have confirmed that the existing geoenvironmental risks associated with the Power Generation Plant are low or very low, there may remain a limited potential for small, localised, inclusions of potentially contaminated materials within any residual Made Ground/reworked deposits present at the Power Generation Plant Site.

10.4.25 Construction and decommissioning activities in relation to the Project also have the potential to lead to diffuse pollution and / or an increased silt loading to the surface water run-off.

10.4.26 Table 10.6 below summarises the preliminary assessment of potential effects on ground conditions in relation to the construction and decommissioning of the Power Generation Plant.

Table 10.6 - Preliminary assessment of potential effects on ground conditions on the construction and decommissioning of the Power Generation Plant.

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
Generating Equipment and Laydown Area				
Construction workers (on-site)	Unstable slopes. During construction, any deep excavations and/or cuttings into the toe of the western slope of Rookery South Pit could	Stability of slopes should be greatly increased by the LLRS. In any excavations, temporary works measures including trench	No residual effects anticipated	Earthworks profiles to be confirmed and reappraisal of risk

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
	present the potential for instability to occur. Potential direct adverse effect of minor significance.	sheeting will be utilised.		
	High groundwater levels and potential for hydraulic uplift. High piezometric groundwater levels may have the potential to result in ground heave and groundwater influx in the base of any deep excavations during construction. Potential direct adverse effect of minor significance.	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 mitigation measures including dewatering pumps will be implemented.	No residual effects anticipated	Ground water monitoring of existing Boreholes and Phase 2 investigations in development area to confirm findings of Phase 1 studies to date Determination of appropriate foundation solution and reappraisal of risk
	Potential contamination within soils and groundwater. Whilst ground investigations have shown no evidence of contamination present at the Power Generation Plant Site, any as yet undiscovered potential sources of contamination may cause heath impacts	No special mitigation measures required over and above the embedded mitigation referred to above and in Section 10.3.	No residual effects anticipated	Phase 2 investigations in Generating Equipment Site to confirm findings of Phase 1 studies to date

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
	as a result of direct or indirect contact with contaminated materials. Potential direct adverse effect of moderate significance.			
	Potential pollution releases during construction/demolition works. During construction works there is potential to introduce new sources of contamination into the environment (for instance; uncontrolled leaks and spills from machinery). Potential direct adverse effect of minor significance.	No special mitigation measures required over and above the embedded mitigation referred to in Section 10.3.	No residual effects anticipated	Inclusion in COCP
Controlled Waters	Mixing of aquifer bodies by creation of new pathways. Potential to introduce a pathway between aquifer bodies by construction of foundations extending through the Kellaways Sand Member, Cornbrash Formation and into the Blisworth Limestone Formation. Potential direct adverse effect of moderate significance	No special mitigation measures required over and above the embedded mitigation referred to in Section 10.3	No residual effects	Determination of appropriate foundation solution and reappraisal of risk

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
	Potential increased silt loading during construction works. There is potential for an increased silt loading to the Rookery South Pit attenuation pond as a result of the construction activities. The accumulated surface waters are in-turn to be pumped into Rookery North Pit and Stewartby Lake as part of the LLRS works. Potential direct adverse effect of minor significance.	It is anticipated that the surface water run-off from the Operations Area will be routed to either the proposed attenuation pond or to a local sump / silt trap in a controlled fashion. In order to allow any silt to settle out, the pumping of surface water run-off from Rookery South Pit to either Mill Brook or Rookery North Pit will be delayed for a suitable period after rainfall events (e.g. 24 hours). Similar practices would be required during the decommissioning phase.	No residual effects	None
Access Road				
Controlled Waters	Potential increased silt loading during construction works. There is potential for an increased silt loading to the Rookery South Pit attenuation	It is anticipated that the surface water run-off from the Access Road will be routed to the proposed Rookery South	No residual effects	None

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
	pond as a result of the construction activities. The accumulated surface waters are in-turn to be pumped into Rookery North and Stewartby Lake. Potential direct adverse effect of minor significance.	Pit attenuation pond in by way of controlled surface water drainage. In order to allow any silt to settle out, the pumping of surface water run-off from Rookery South to either Mill Brook or Rookery North will be delayed for a suitable period after rainfall events (e.g. 24 hours). Similar practices would be required during the decommissioning phase.		

Operation

10.4.27 The potential effects identified during operation of the Power Generation Plant are summarised below in Table 10.7 below.

Table 10.7 preliminary assessment of potential effects on ground conditions during operation of the Power Generation Plant.

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
Generating Equipment				
Buildings and services (on-site) and controlled waters (on-site and off-site)	High piezometric groundwater levels may have the potential to result in ground heave in the base of buried structures if piezometric pressures exceed confining pressures from the overlying structures. Resulting potential for uncontrolled release to groundwaters. Potential direct adverse effect of major significance.	A detailed assessment of the uplift forces acting upon any permanent buried structures will be undertaken following confirmation of the construction technique and therefore the mass of the buried structures. 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.	No residual effects	Ground water monitoring of existing Boreholes and Phase 2 investigations confirm findings of Phase 1 studies to date. Determination of appropriate foundation solution and reappraisal of risk
Access Road				
Controlled waters (on-site and off-site)	There is potential for contamination to arise from the vehicles trafficking	It is anticipated that the surface water run-off from the Access Road will be routed to the	No residual effects	None

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
	along the Access Road and fuel/oil leaks or spills. Potential direct adverse effect of minor significance.	proposed Rookery South attenuation pond in a controlled fashion. In order to allow any silt to settle out, the pumping of surface water run-off from Rookery South Pit to either Mill Brook or Rookery North Pit will be delayed for a suitable period after rainfall events (e.g. 24 hours). Similar practices would be required during the decommissioning phase.		

10.5 Gas Connection Assessment

Baseline Conditions and Receptors

10.5.1 Both Gas Connection Route Corridor Options (being the preferred Option 1 and Option 2 as set out in section 2.4 of this PEIR) are proposed on agricultural land to the south of the Power Generation Plant Site. The land is currently used for arable crops (wheat) but it does not represent the most biologically diverse best or most fertile land (see Section 8 of this PEIR for further details). Furthermore, the construction footprint of the Gas Connection will be relatively modest (maximum of 1.7 km in length and a construction working width of maximum 30 m).

10.5.2 The geological and hydrogeological baseline in the vicinity of the Gas Connection Route Options is similar to the natural strata which would have existed at the Power Generation Plant and the Rookery South Pit prior to excavation of clay.

10.5.3 Exploratory hole records for the area in which the Gas Connection would be sited are only present in the north-western corner of the area proposed for siting the preferred Gas Connection Option 1, close to Gas Connection Route Corridor Option 2. The records from within this area confirm the presence of 'reworked topsoil' comprising soft brown slightly sandy slightly gravelly clay to around 0.2 m bgl. This was reportedly underlain by weathered Oxford Clay comprising soft and firm light orange brown mottled slightly sandy clay proven to around 3.5 m bgl . This was underlain by Oxford Clay recorded as firm dark green brown laminated very silty clay proven in the boreholes to depths of between 13.8 m bgl (BH4) and 20.5 m bgl (BH6). The Kellaways Formation was identified underlying the Oxford Clay, recorded as interbedded dark grey sand and firm grey green clay with occasional shell fragments. The Kellaways Formation was proven to between 19.75 m bgl and 24.65 m bgl in the areas investigated. The Cornbrash Formation recorded as dark grey fine to medium grained muddy limestone was identified underlying the Kellaways Formation, and was proven to a maximum depth of 24.9 m bgl (BH6).

Hydrogeology

10.5.4 The clayey deposits of the Callow Clay Fill, Oxford Clay, Kellaways Clay and Blisworth Clay Formation underlie Gas Connection Route Corridor Options 1 and 2. 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 Aquifers, they have been shown to be insignificant water resources due to their limited thickness, low permeability and poor water quality and are considered herein to act as aquitards. The Blisworth Limestone Formation has been shown to be of a slightly higher permeability but also of naturally poor water quality.

Construction/Decommissioning

10.5.5 Table 10.8 below summarises the potential effects on ground conditions from the construction and decommissioning of the Gas Connection (Route Corridor Options 1 and 2).

Table 10.8 - Preliminary assessment of potential effects on ground conditions from the construction and decommissioning of the Gas Connection

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
Gas Connection				
Loss of agricultural	There will be a minor impact on a receptor of	None other than best practice	Negligible	N/A

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
land.	medium sensitivity. Thereby giving an overall minor significance of effect.	working methods. such as re-instating the route with topsoil removed and limiting working width as much as possible.		
Mobilisation of silt / contamination during construction	Negligible	None other than best practice working methods.	Negligible	N/A

Operation

10.5.6 Based on this preliminary assessment, there are not considered to be any potential impacts on ground conditions as a result of the operation of the Gas Connection.

10.6 Electrical Connection Assessment

Baseline Conditions and Receptors

10.6.1 The baseline conditions as described for the Gas Connection are as for the Electrical Connection.

10.6.2 It is anticipated that there will be minimal ground disturbance required for erection of towers to support the overhead lines.

Construction/Decommissioning

10.6.3 Table 10.9 below summarises the potential effects on ground conditions from construction of the Electrical Connection.

Table 10.9 - Preliminary assessment of potential effects on ground conditions from the construction and decommissioning of the Electrical Connection

Receptor name and description	Preliminary Assessment of significance of effects	Potential Specific Mitigation	Potential Residual significance of effects	Further assessments and consultation to be undertaken
Electrical Connection				
Loss of agricultural land.	There will be a minor impact on a receptor of medium sensitivity. Thereby giving an overall minor significance of effect.	None other than best practice working methods.	Minor	N/A
Mobilisation of silt / contamination during construction	Negligible	None other than best practice working methods.	Negligible	N/A

Operation

10.6.4 Based on this preliminary assessment, it is considered that there are not any likely significant effects on ground conditions as a result of the operation of the Electrical Connection.

10.7 Project as a Whole

10.7.1 The Summary of Effects Table 10.10 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).

10.7.2 No likely significant effects are predicted on ground conditions from any of the individual elements of the Project or from the Project as a whole.

10.8 Cumulative effects

Construction

10.8.1 Construction or decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary

assessment set out in Section 10 of this PEIR has shown no significant effects on ground conditions are anticipated to arise from the Project. Accordingly then given that the Project alone is anticipated to have no significant effects on ground conditions, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative impacts assessment is required.

Operation

10.8.2 Operation of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary assessment set out in Section 10 of this PEIR has shown no significant effects on ground conditions are anticipated to arise from the Project. Accordingly then given that the Project alone is anticipated to have no significant effects on ground conditions, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative impacts assessment is required.

10.9 Summary and Conclusions

10.9.1 Table 10.10 below summarises the preliminary assessment of the potential impacts of the Project on ground conditions. No impacts have been identified as a result of construction, operation or decommissioning of the Project. Further consultation is ongoing with stakeholders to ascertain the need, or otherwise for further phase 2 ground investigations.

Table 10.10 – Summary of Effects on ground conditions

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant			
Construction	Construction workers (on-site)	Stability of slopes should be greatly increased by LLRS. In any excavations, temporary works measures including trench sheeting will be utilised.	None
		Permeability test results have shown that the deposits are of limited permeability and seepage rates will	None

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		be slow. If significant groundwater flows are encountered within excavations then temporary mitigation measures including dewatering pumps will be implemented. Appropriate method statements and foundation works risks assessments will be developed in accordance with industry guidelines.	
		Adoption of appropriate health and safety and welfare standards by site workers and Control of Asbestos Regulations (CAR) 2006 and the Construction Design & management Regulations (CDM) 2007. No special mitigation measures required. (avoid)	None
		Adoption of standard industry practices for environmental management such as utilisation of bunded fuel stores and locating refueling points away from watercourses/drains as specified in EA	None

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		Pollution Prevention Guidance Notes, and set out within the Code of Construction Practice (COCP), will ensure that all risks are appropriately controlled.	
	Controlled Waters	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.	None
		It is anticipated that the surface water run-off from the Power generation Plant Site will be routed to either the proposed attenuation pond or to a local sump / silt trap in a controlled fashion. In order to allow any silt to settle out, the pumping of surface water run-off from Rookery South Pit to either Mill Brook or Rookery North	None

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		Pit will be delayed for a suitable period after rainfall events (e.g. 24 hours). Similar practices would be required during the decommissioning phase.	
Operation	Buildings and services (on-site) and controlled waters (on-site and off-site)	A detailed assessment of the uplift forces acting upon any permanent buried structures will be undertaken following confirmation of the construction technique and therefore the mass of the buried structures. 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.	None
Electrical Connection			
Construction /	Loss of agricultural	None other than	None

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Decommissioning	land.	best practice working methods such as re-instating the route with topsoil removed and limiting working width as much as possible.	
	Mobilisation of silt / contamination during construction	None other than best practice working methods.	None
Operation	N/A	None	None
Gas Connection			
Construction / Decommissioning	Loss of agricultural land.	None other than best practice working methods such as re-instating the route with topsoil removed and limiting working width as much as possible.	None
	Mobilisation of silt / contamination during construction	None other than best practice working methods.	None
Operation	N/A	None	None
Project (as a whole)			
Construction / Decommissioning	As above	As above	As above
Operation	As above	As above	As above
Cumulative Impacts			
Construction / Decommissioning	N/A	None	None
Operation	N/A	None	None

11 Landscape and Visual Impacts

11.1 Introduction

11.1.1 This section of the PEIR sets out the preliminary findings of the assessment of likely significant landscape and visual effects arising from the construction, operation and decommissioning of the Project on the landscape as an environmental resource in its own right and on people's views and visual amenity.

11.2 Approach

Relevant Policy and Guidance

11.2.1 Relevant policy and guidance in relation to LVIA is set out in Appendix 2.11.

Assessment Methodology

11.2.2 The methodology for undertaking the LVIA is based on professional experience, alongside the Landscape Institute / Institute of Environmental Management and Assessment Guidelines for Landscape and Visual Impact Assessment (third edition, 2013).

Study Area

11.2.3 A Zone of Theoretical Visibility (ZTV) plan has been created by selecting spot locations to simulate the tops of the stacks, assigning maximum heights of 40 m above the floor of Rookery South Pit and electrical towers with a maximum height of 45 m above ground level. 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.

11.2.4 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 a site walkover.

11.2.5 The ZTV is provided as Figure 11.1.

11.2.6 A data trawl has been undertaken to establish the baseline landscape and landscape character information, including topography, landscape planning designations and published sources of landscape character or, where relevant, townscape character.

Site Survey and Photographic Record

11.2.7 The Project Site and surrounding area have been visited and a photographic record to represent views of the selected assessment viewpoints has be undertaken, in order to:

- Determine the extent of visibility of existing built structures;
- Determine the 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 character; and
- Carry out the assessment of landscape and visual effects.

11.2.8 The selection of viewpoints is 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).

11.2.9 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 of Ampthill, How End, Marston Moretaine, Millbrook, Stewartby, Lidlington, Houghton Conquest and the neighbouring isolated properties and farmsteads; and
- People using roads or railways.

11.2.10 The viewpoint assessment is illustrated by a range of tools including photographs and photomontages. 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. This camera has a full-frame (35 mm negative size) CMOS sensor, therefore with a fixed 50mm lens, it provides a focal length that is in accordance with best practice. The camera is mounted and levelled on a Nodal Ninja panoramic head at 1.5 metres 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. These are all individually cylindrically projected and then digitally

joined to create a fully cylindrically projected panorama with a 72 degree field of view.

11.2.11 Photomontages of the proposed Development have been produced to provide an image of how the development might look in the context of the view. For these photomontages the worst case layout of the Development has been modelled using several coloured 'development envelopes', related to the function and maximum height of each part of the plant. The envelopes are modelled at the maximum height of the structures or buildings within each area and therefore represent a worst case scenario, showing the area in which development of the gas processing structures will be built. Indicative wireline models of the proposed transmission towers are shown and a 3D model of the Covanta consented scheme has also been produced and included in the model. These envelopes, wireline models of the proposed transmission towers and the consented Covanta RRF scheme have been used as the basis for visual modelling of the photomontages and the assessment of effects. The 3D model was created in TOPOS 3D visualisation software package from an Autocad plan of the indicative layout of the plant and a schedule of the indicative dimensions and heights. The 3D model is positioned accurately in a digital terrain model and views are then exported and brought into Adobe Photoshop, where it is positioned accurately and rendered against the photograph to create a photomontage image.

11.2.12 The model of the proposed Development, set within a computer-generated image of the landform is used in the assessment to predict the theoretical appearance of the development. These are produced with 3D visualisation software and, as they are based on digital terrain and surface feature data, have the limitations with regard to local variations in landform and surface features. The photographs and other graphic material such as photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. It should be noted that photography is only a tool to assist in the visualisation process, and cannot be expected to replicate the actual view or predicted view which would be attained on the ground.

11.2.13 Six photomontages have been produced to support the assessment described in this PEIR and represent key viewpoints from potentially sensitive receptors. They are included in Appendix 11.1.

Landscape Assessment

11.2.14 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').

11.2.15 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 specific type of development proposed.

11.2.16 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 have also be assessed.

11.2.17 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).

11.2.18 Other factors which may influence landscape value are set out in Table 11.1, below. Table 11.2 describes the landscape receptor susceptibility to change

Table 11.1: 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.

Attribute	Criteria
Associations	Relevant associations with notable figures, such as writers or artists, or events in history that contribute to landscape value.

Table 11.2: Landscape Receptor Susceptibility to Change

Susceptibility	Criteria
High	Little ability to accommodate the proposed development 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 proposed development 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 proposed development without undue consequences for the maintenance of the baseline landscape and/or the achievement of landscape planning policies and strategies.

Visual Assessment

11.2.19 The preliminary assessment of effects on views and visual amenity has assessed how the Project will affect the views available to people and their visual amenity. 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).

11.2.20 Visual receptors generally comprise users of public rights of way, public open spaces, public realm or other outdoor recreational facilities, and also travellers in vehicles who may be visiting, living or working within the study area, and their views at particular places.

11.2.21 The following terminology has been used to describe the approximate distance between the representative viewpoint and the Project and is based on guidance set out in paragraph 11.2.2:

- Local: under 0.5 km;
- Medium distance: 0.5 km – 2 km; and
- Long distance: beyond 2 km.

11.2.22 The type 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.

11.2.23 In line with the GLVIA guidance, which states that views should be 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.

Realistic Worst Case Scenario for Assessment

11.2.24 In respect of LVIA, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

11.2.25 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case scenario for the Electrical Connection of two double circuit overhead lines and seven new towers (one of which will be replacing an existing tower and is likely to be located in close proximity to that existing tower, thereby resulting in 6 net additional towers) has been assessed. Towers are assumed to be 45 m high.

11.2.26 The reason that the parameters identified above represent the realistic worst case in relation to landscape and visual effects are:

- Larger stack heights increase the likelihood of visual impact;
- Higher number of stacks increases the likelihood of visual impact; and
- Overhead lines and new towers increase the likelihood of visual impact.

Significance Criteria

11.2.27 A three-stage assessment process has been adopted for the LVIA, in accordance with the Landscape Institute/Institute of Environmental Management and Assessment Guidelines for Landscape and Visual Impact Assessment (third, edition 2013). Firstly, the nature of receptors (sensitivity) will be assessed. Secondly the nature of impacts (magnitude) likely to result from the Project will be assessed. Lastly, the significance of the identified

landscape and visual effects on receptors will be assessed by a combination of the above.

11.2.28 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.

11.2.29 The nature of effects may be positive (beneficial) or negative (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

11.2.30 The sensitivity of a particular landscape considers the factors described in Tables 11.1 and 11.2 using the following typical criteria set out below in Table 11.3.

Table 11.3: 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; • valued for contribution to recreational activity; • important cultural or historic associations; • irreplaceable landscape features or character; and • part of a long distance footpath.

Landscape Sensitivity	Description
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 • may be 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.

11.2.31 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.

11.2.32 The following criteria set out in Table 11.4 has 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 11.4: Landscape Magnitude of Impact

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 proposals 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 is 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 and 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 Impacts

11.2.33 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.

11.2.34 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.

11.2.35 The criteria for the assessment of the value of views is summarised in Table 11.5 below; note that these are provided for guidance and are not intended to be absolute.

Table 11.5: 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.

11.2.36 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.

11.2.37 For the purposes of the visual impact assessment, visual receptors' susceptibility to change has been based upon the Table 11.6:

Table 11.6: 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.

Susceptibility	Type of Receptor
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.

11.2.38 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.

11.2.39 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.

11.2.40 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 11.7:

Table 11.7: Visual Effects: magnitude of Impact

Category	Criteria
Major adverse or beneficial visual effect	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 visual effect	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.

Category	Criteria
Slight adverse or beneficial visual effect	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 visual effect	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.

11.2.41 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 11.8:

Table 11.8: Assessment of Significance of Landscape and Visual Effects

Sensitivity of Receptor	Major Effect	Moderate Effect	Slight Effect	Negligible Effect	Neutral Effect
High	**Significant**	**Significant**	**Moderately Significant**	Not Significant	Not Significant
Medium	**Moderately Significant**	**Moderately Significant**	Not Significant	Not Significant	Not Significant
Low	**Moderately Significant**	Not Significant	Not Significant	Not Significant	Not Significant

Consultation and Consultation Responses

11.2.42 Consultation is ongoing and will be continued through the PEIR and EIA process. Table 11.9 below summarises the consultation responses received to date in relation to LVIA.

Table 11.9 Consultation responses relating to LVIA

Consultee	Comment Ref	Comment	Required action or 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 proposed development, and that consideration should be given to the potential for a further turbine at Stewartby landfill site.	Noted. Cumulative impacts will be fully described in the ES and a preliminary assessment is included in this PEIR. The proposed turbine at Stewartby will be considered. As the turbine at the Marston Vale Millennium Country Park is already operational, it will be considered in the baseline assessment.
	3.72	Study area should be clearly defined - is 1km large enough?	Study Area is described in Section 11.2 of the PEIR.
	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 11.2 of the PEIR, as is fieldwork methodology and timings. Viewpoints will be agreed with key consultees.
	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 because of the significant distance between it and the

Consultee	Comment Ref	Comment	Required action or response
			Project Site (approximately 40 km). The ZTV has shown that the Project will not be able to be seen from the AONB.
	3.75	The ES should include a plan showing all landscape features including PRoW.	Noted and this will be provided in the ES.
	3.77	Careful consideration needed of siting, use and materials and colours to minimise visual impacts.	Noted. The Applicant is working together with an architectural firm and landscape consultants to ensure that the finish of the Project is complimentary to the surrounding landscape. Further details will be provided in the ES.
	3.78	Night lighting and visible plumes also need to be considered.	An outline lighting strategy will be prepared for ES. 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 Great Park a Grade II listed historic park and Houghton House ruins, a Grade I English Heritage site	A preliminary assessment of visual impacts on these resources is provided in section 11.4 of the PEIR, and will be formalised as part of the ES.
		Local policy seeks to protect, conserve and enhance the County's scheduled ancient monuments, conservation	It is considered that the proposed project aligns with local policy in that it is an appropriate development to site in

Consultee	Comment Ref	Comment	Required action or response
		areas, parks and gardens and their settings. The proposed EFW is contrary to these policies.	the Rookery South Pit. Further details on local policy are provided in Section 3 of the PEIR and Appendix 2.11 The proposed Project is not an energy from waste plant.
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 please see Table 11.11.
		The EIA would need to provide details of the landscape mitigation, including any proposed off site planting	This will be provided in the ES.
		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 GTGs is not practical given the limited roof space available on the GTGs. 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
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	No deforestation is proposed as part of the development of the Project.

Consultee	Comment Ref	Comment	Required action or response
		applications	
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 significant distance away (approximately 17 km south of the Project Site). Preliminary analysis of the ZTV has shown that there will be no views of the Project from this location.

11.3 Embedded Mitigation

11.3.1 In order to undertake an assessment of the potential effects on landscape and visual amenity as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of landscape and visual amenity, these standard mitigation measures include the fact that the Applicant is working with an architecture firm in order to ensure that there is inherent good design incorporated into the Project. This will ensure that the Project, and in particular the Generating Equipment is sited appropriately and blends in as much as possible with its surroundings.

11.3.2 During construction, it is likely that hoardings would be 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.

11.3.3 The typical design of the AGI would incorporate screen planting on all sides, so as to limit any landscape or visual impacts.

11.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

11.4.1 The Power Generation Plant Site is located within Rookery South Pit. At the baseline, Rookery South Pit will be restored to low grade agricultural land with stabilised and re-profiled pit sides pursuant to the LLRS, as described in sections 2.6.2 and 4.7 of the PEIR.

11.4.2 The history of extensive clay extraction and brick making is evident in the large flooded pits, revegetated spoil heaps, the four chimneys approximately 70 m 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.

11.4.3 Rookery North Pit, to the north of the Generating Equipment Site is occupied by a large lake. To the south, southeast and west, 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.

11.4.4 Although there are potential residential receptors within 1 km of the Project Site (e.g. South Pillinge Farm and Cottages, Manor Farm and Moreteyne House), the recent site visit has shown that it is unlikely that these properties have clear views of the stacks of the Generating Equipment owing to intervening vegetation and development. Should views be available of the overhead lines and towers of the Electrical Connection on higher ground to the south of the Project Site, they will be in the context of the existing power lines.

11.4.5 The nearest property is South Pillinge Farm, approximately 150 m west of the Project Site boundary, although it is separated by at least two belts of mature vegetation. Most settlements and outlying properties are also protected by screening vegetation and as the landform is generally level so the vegetation is more effective.

11.4.6 Exceptions include some of the properties on higher ground such as Ampthill Park House, where there are wide, occasionally oblique views towards the Power Generation Site and the Electrical Connection.

11.4.7 Recreational receptors include users of:

- Open spaces such as the Millennium Park, Ampthill Park and Folly Wood near Lidlington;
- Cycleways across the vale;
- Footpaths and other public rights of way across the vale and the surrounding ridges; and
- Heritage assets such as Houghton House and Ampthill Park.

11.4.8 Potential landscape and visual effects arising from the Power Generation Plant are those upon:

- Landscape features of the Power Generation Plant Site after implementation of the LLRS;
- Landscape character; and
- Views and visual amenity.

Landscape Character

11.4.9 Relevant published landscape character descriptions for the Power Generation Plant Site are:

- National Character Area 88: Bedfordshire and Cambridgeshire Claylands (Natural England, 2014a); and
- 5D: North Marston Clay Vale, Mid Bedfordshire Landscape Character Assessment (Land Use Consultants, 2007).

11.4.10 Relevant published landscape character descriptions for the surrounding area include:

- National Character Area 90: Bedfordshire Greensand Ridge (Natural England, 2014b); and
- 6B: Mid Greensand Ridge, Mid Bedfordshire Landscape Character Assessment (Land Use Consultants, 2007).

11.4.11 The Forest of Marston Vale: Forest Plan (The Forest of Marston Vale, 2000) also provides a landscape assessment for the forest area. The Brickfields landscape zone is also of relevance to the Power Generation Plant Site.

11.4.12 Relevant Landscape designations for the Power Generation Plant Site and surrounding area to the Power Generation Plant Site are set out in Table 11.10 and shown on Figure 11.3:

Table 11.10: Landscape Designations

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Power Generation Plant Site and Adjacent Area
Conservation Areas	Sites, features or areas of national importance with settings of high quality.	National (High)	Power Generation Plant Site: None Surrounding Area: Ampthill, Maulden, Millbrook, Steppingley (Central Bedfordshire) Stewartby, Wootton (Bedford)
Listed Buildings	Sites, features or areas of national importance with settings of high quality.	National (High)	Power Generation Plant Site: None Surrounding Area: Over 200 within 5 km of Power Generation Plant Site.

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Power Generation Plant Site and Adjacent Area
Registered Parks and Gardens of Special Historic Interest	Sites, features or areas of national importance with settings of high quality.	National (High)	<u>Power Generation Plant Site:</u> None <u>Surrounding Area:</u> Ampthill Park – adjacent to the south-east edge of the site, and Woburn Abbey (just over 5 km south west of the Power Generation Plant Site)
Scheduled Monuments	Sites, features or areas of national importance with settings of high quality.	National (High)	<u>Power Generation Plant Site:</u> None <u>Surrounding Area:</u> Houghton House, Ampthill Castle, Long Barrow and Bowl Barrow near Bury Farm, All Saints Church, Segenhoe and various moated sites

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Power Generation Plant Site and Adjacent 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 Marston Vale Forest Centre
Long distance footpaths	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
Designated Public Open Space, Tree Preservation Orders (TPO)	Sites, features or areas of district importance.	District (Medium or Low)	Power Generation Plant Site: None Surrounding Area: Marston Vale Forest Centre, Ampthill Park Picnic Site at Folly Wood, Lidlington

Typical Designation	Description	Importance (Value)	Actual Designation Applicable to the Power Generation Plant Site and Adjacent 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.

11.4.13 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 are therefore proposed for the visual impact assessment. These are set out in Table 11.11 below and on Figure 11.2 for information.

Table 11.11: Selection of Representative Viewpoints for Visual Impact Assessment

Viewpoint Reference	Location	Comments
1	Footpath south of Stewartby Way	View west towards site beyond railway embankment, in context of existing wind turbine.
2	Footpath opposite Chequers	View west towards site beyond railway embankment, in context of existing wind turbine.
3	Katherine's Cross, Ampthilll	Wide views from high ground in registered parkland and public park.
4	Rear elevation, Houghton House	Wide views from high ground from scheduled monument with public access.
5	In front of Cottages, track to Houghton House	Views from track adjacent to residential property and footpath with access to Houghton House.

Viewpoint Reference	Location	Comments
6	Footpath on outskirts of Ampthill	Views looking north west towards Project Site
6a	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	Marston Vale Millennium Country Park	Views from country park and Cycle Route 51 above woodland and in context of existing turbine.
7	Public footpath in front of Ampthill Park House	Low level view across Vale to site, with Ampthill Park House on slightly elevated ground behind.
8	Rear of St Mary's Church, Marston Moretaine	Views only from footpaths in fields to east of church owing to intervening vegetation.
9	Marston Trail to the north of Lidlington Village	Limited views owing to intervening vegetation across Vale to site.
10	John Bunyan Way. Wood End Road, Cranfield	Elevated and extensive views of vale and surrounding ridges, including existing industrial/energy development.
11	Picnic Site at Folly Wood, Lidlington	Elevated and extensive views across Proving Ground to site and wide context of vale.
12	Location of access road off Green Lane	View of site access from public road.
13	From bridleway, off Beancroft Road	Elevated and extensive views of vale and surrounding ridges, including existing industrial/energy development.
14	From footpath adjacent to Gas Connection Option 1 to south west.	Elevated and relatively close views to site and within connection option area.

11.4.14 Areas which have been identified in the draft ZTV as potentially experiencing visual effects, but considered unlikely to be significant, have been scoped out for the visual impact assessment, namely those below in Table 11.12:

Table: 11.12 Scoped Out Views

Location / Area	Reasoning
Stewartby	(intervening vegetation),
Sand Hill Close, Millbrook	(intervening vegetation/buildings)
Warden Hills in Luton	(distance) approximately 17 km away
A6 across Barton Le Clay	(distance) approximately 17 km away
Chilterns AONB	(distance) approximately 40 km away

Construction/Decommissioning

11.4.15 The main works associated with the construction / decommissioning phases of the Power Generation Plant would be excavation and site levelling for new foundations and, potential piling (if required) and craning the Gas Turbine Generator units into position. Potential 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 from the Power Generation Plant Site;
- 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. Temporary buildings required for construction and parking on site materials stockpiles; presence of temporary hoardings and protective fencing; temporary hoardings and protective fencing; and signage; and
- Construction site lighting, in particular during the winter months

11.4.16 Despite this, the construction phase is of a limited duration (22 months) and the potential impacts listed above will not all occur simultaneously. Furthermore, the majority of works will take place within Rookery South Pit and will therefore be below ground level, so will have limited potential of having visual impacts on receptors listed in Table 11.11. In terms of landscape effects, these are also limited, due to the fact that Rookery South Pit is a previously excavated bare earth pit, with limited landscape features.

11.4.17 In terms of the Access Road, construction will involve lower vehicles (e.g. tipper trucks rather than cranes) and the work will be undertaken on the route of the existing access track. There may be a requirement for small amounts of vegetation removal, but no landscape or visual effects are anticipated as a result of construction of the Access Road.

11.4.18 Table 11.13 below summarises the preliminary assessment of landscape and visual effects arising from the Power Generation Plant during construction and decommissioning.

Table 11.13 – Preliminary assessment of effects on landscape and visual receptors from construction and decommissioning of the Power Generation Plant

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Generating Equipment and Laydown Area				
Landscape	Not Significant.	None anticipated during construction over and above embedded mitigation measures described above in Section 11.3.	Not Significant.	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Visual Receptors in Table 11.11	Not Significant	None anticipated during construction over and above embedded mitigation measures described above in Section 11.3.	Not Significant.	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Access Road				
Landscape and Visual receptors	Not Significant	None anticipated during construction over and above embedded mitigation measures	Not Significant.	Further consultation with statutory consultees and

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
		described above in Section 11.3.		production of photomontages during winter months when screening is at its least.

Operation

11.4.19 The key potential visual effects arising from the Power Generation Plant will be during the operational phase and will be in relation to the Generating Equipment and associated 40 m high stacks. Although the Power Generation Plant Site is already well screened by the virtue that it is mainly within the Rookery South Pit (which is approximately 15 m bgl), and by surrounding vegetation, the stacks are still likely to be visible from certain locations in and around the Project Site (e.g. viewpoint 14) as well as from further afield.

11.4.20 Due to the local topography in the area, views are likely to be mainly limited to the south and south east of the Project Site, along higher ground, particularly around the Greensands Ridge or from the footpath in close proximity to Gas Connection Option 1 (viewpoint 14).

11.4.21 In the majority 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 and embankments, the large pylons associated with the existing 400 kV Sundon to Grendon line and the four remaining chimneys at the former brickworks at Stewartby. The Power Generation Plant Site is also very well screened by intermediate hedges and belts of woodland.

11.4.22 Table 11.14 below summarises the preliminary assessment of landscape and visual effects arising from the Power Generation Plant during operation.

Table 11.14 – Preliminary assessment of effects on landscape and visual receptors from operation of the Power Generation Plant

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Generating Equipment				
Landscape	Not significant	None anticipated over and above embedded mitigation measures described above in Section 11.3.	Not significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Visual receptors – south (views 3, 6, 7)	Moderately Significant as views of from high level, looking down into Power Generation Plant Site and therefore views are clearer, although they will be seen in context of other structures as described above.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Views from footpath adjacent to Gas Connection Route Corridor Option 1 (Viewpoint 14)	Significant as there will be clear views of the Power Generation Plant Site	Possible Screen Planting	Moderately Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Views from the east (2, 4, 5	Moderately significant at worst. Views will be mainly screened by natural topography and vegetation and seen in the context of other industrial type development.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Views from west and south west (6a, 6b, 8, 9, 10, 11, 13)	Moderately significant at worst. Views are screened by topography and also the Millbrook Proving Ground, dense development in Lidlington and Marston Moretaine.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Views from the North (1, 12)	Moderately significant at worst. Views will be mainly screened by natural topography and vegetation and seen in the context of other industrial type development.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Access Road				
Landscape and Visual Receptors	Unlikely to be significant impacts; potentially some minor loss of vegetation.	Possibly New planting/management	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

11.5 Gas Connection Assessment

Baseline Conditions and Receptors

11.5.1 The area proposed to site the Gas Connection (options 1 and 2) is characterised by gently rolling large, open arable fields, with hedge boundaries and belts of relatively recent plantations. The fields are crossed by existing electricity pylons. The Midland Mainline and Marston Vale Lines form strong linear boundaries to the eastern and western edges of The Rookery. There is also a newly erected wind turbine to the west within the Marston Vale Millennium Country Park, which is 85m to the hub and 125m to the blade tip.

11.5.2 The main visual receptors are likely to be users of footpaths and roads in close proximity to the AGI.

Construction/Decommissioning

11.5.3 Construction of the Gas Connection and particularly the AGI would have similar impacts to those described above for the Power Generation Plant, although they would be of a more limited extent. They are summarised below in Table 11.15.

Table 11.15 – Preliminary assessment of effects on landscape and visual receptors from construction and decommissioning of the Gas Connection

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Gas Connection				
Landscape	Not Significant.	None anticipated during construction over and above embedded mitigation measures described above in Section 11.3.	Not Significant.	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Visual Receptors in Table 11.11	Not Significant	None anticipated during construction over and above embedded mitigation measures described above in Section 11.3.	Not Significant.	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

Operation

11.5.4 During operation, the majority of the Gas Connection (the pipeline) will be buried underground, and covered with re-instated topsoil. The AGI at the NTS would be a relatively modest structure in comparison to the Generating Equipment. The typical design of the AGI would incorporate screen planting on all sides, so as to limit any landscape or visual impacts. Given the significant distance of the AGI from residential properties, there are not considered to be any impacts arising from visual amenity as a result of operation of the Gas Connection.

11.5.5 In sensitive landscapes the construction of an underground pipeline can have effects on landscape features such as hedges, trees and leave crop marks in fields. Gas Connection Route Corridor Option 1 and 2 may have some minor

effects on the landscape where they crosses hedge boundaries, but these crossings will be replanted and will not give rise to any significant effects.

11.6 Electrical Connection Assessment

Baseline Conditions and Receptors

11.6.1 The baseline landscape for the Electrical Connection is similar to that already described for the Gas Connection.

11.6.2 The main visual receptors are likely to be residential properties to the west, including South Pillinge Farm and Pillinge Cottages.

Construction/Decommissioning

11.6.3 Construction of the Electrical Connection would have similar impacts to those described above for the Power Generation Plant, although they would be of a more limited extent, high vehicles including cranes are likely to be required for erecting the new towers. They are summarised below in Table 11.16.

Table 11.16 – Preliminary assessment of effects from construction and decommissioning of the Electrical Connection

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Electrical Connection				
Landscape	Moderately significant.	None anticipated during construction over and above embedded mitigation measures described above in Section 11.3.	Not Significant.	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Visual Receptors in Table 11.11	Moderately Significant from certain views to the south.	None anticipated during construction over and above embedded mitigation measures described above in Section 11.3.	Moderately Significant.	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.

Operation

11.6.4 During operation of the Electrical Connection, the main potential landscape and visual impacts will be the introduction of up to seven new towers (one of which will be replacing an existing tower, thereby resulting in 6 net additional towers) and a and up to two double circuit overhead lines to the landscape.

11.6.5 A new substation will also be built as part of the Electrical Connection, within Rookery South Pit and adjacent to the Generating Equipment Site. However, the impacts from this are likely to be less than the overhead lines and towers due to siting the substation in this location.

11.6.6 The Electrical Connection is likely to be visible from locations in and around the Project Site as well as from further afield.

11.6.7 Due to the local topography in the area, views are likely to be mainly limited to the south and south east, along higher ground, particularly around the Greensands Ridge or within the Project Site.

11.6.8 In the majority however, views of the Electrical Connection will be seen in the context of the existing wind turbine at the Millennium Country Park, existing railways with gantries and embankments, the large pylons associated with the existing 400 kV Sundon to Grendon line and the four remaining chimneys at the former brickworks at Stewartby. The substation would also be very well screened by intermediate hedges and belts of woodland.

11.6.9 Table 11.17 below summarises the preliminary assessment of landscape and visual effects arising from the Electrical Connection during operation.

Table 11.17 – Preliminary assessment of effects on landscape and visual receptors from operation of the Electrical Connection

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Electrical Connection				
Landscape	Moderately significant	None anticipated over and above embedded mitigation measures described above in Section 11.3.	Not significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least.
Visual receptors – south (views 3, 6, 7)	Significant / Moderately Significant as views are from high level, looking down into Electrical Connection and therefore views are clearer, although they will be seen in context of other structures as described above.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least. Further investigation of effective mitigation through e.g. screen planting.

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Viewpoint 14	Significant as there will be direct views of the Electrical Connection at close proximity.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Moderately Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least. Further investigation of effective mitigation through e.g. screen planting.
Views from the east (2, 4, 5	Moderately significant at worst. Views will be mainly screened by natural topography and vegetation and seen in the context of other industrial type development.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least. Further investigation of effective mitigation through e.g. screen planting.

Receptor Name and Description	Preliminary Assessment of Effects	Potential Specific Mitigation	Potential Residual Effects	Further Assessments and Consultation to be Undertaken
Views from west and south west (6a, 6b, 8, 9, 10, 11, 13)	Moderately significant at worst. Views are screened by topography and also the Millbrook Proving Ground, dense development in Lidlington and Marston Moretaine.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least. Further investigation of effective mitigation through e.g. screen planting.
Views from the North (1, 12)	Moderately significant at worst. Views will be mainly screened by natural topography and vegetation and seen in the context of other industrial type development.	Potentially some local reinforcement of hedgerows or plantations within Project Site.	Not Significant	Further consultation with statutory consultees and production of photomontages during winter months when screening is at its least. Further investigation of effective mitigation through e.g. screen planting.

11.7 Project as a Whole

11.7.1 The Summary of Effects Table (11.18) 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).

11.7.2 In isolation, from certain views, there is the potential that the Power Generation Plant and Electrical Connection could both give rise to moderately significant impacts, as well as in combination.

11.8 Cumulative Impacts

Construction/Decommissioning

11.8.1 Construction or decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary assessment has shown in the majority of cases that there will be no significant effects on landscape or visual amenity arising from the Project during construction or decommissioning. However, there is the potential for significant impacts to occur from views to the south, particularly footpath 14. Should construction of other developments occur simultaneously, then a significant cumulative effect may arise. However, work is ongoing to determine effective mitigation to limit these effects. Furthermore, other developments would also be required to mitigate any construction effects through e.g. screen planting or use of hoardings.

Operation

11.8.2 During operation, there is the potential for cumulative effects to arise from the Project together with other planned developments. The most significant of these other planned developments from a landscape and visual impacts perspective are anticipated to be from large scale industrial or power developments such as the Covanta Rookery RRF, the integrated waste management operations planned for the Rookery South Pit and the Brogborough Wind Energy Project.

11.8.3 Whilst work is ongoing as to the cumulative impacts assessment with these other developments, a preliminary assessment has been undertaken which has concluded the following:

- Not enough details are available at this time to make an assessment of cumulative impacts with the integrated waste management operations proposed for the Rookery South Pit. The scheme is a high level outline concept only at this stage.

- The Brogborough Wind Energy Project is approximately 4.5 km from the Project Site and the Project and the Brogborough Wind Energy Project would not be seen in views together apart from when viewed from a significant distance away. Therefore no significant cumulative effects are anticipated.

- It is recognised that the addition of the Project and the Covanta RRF within close proximity would have the potential to cause cumulative effects, particularly for visual receptors to the south of the Project Site. Although the two projects would be viewed in the context of other industrial development and would look to be complimentary to each other in terms of layout and design. Although there is the potential for a Significant effect cumulatively, it is anticipated that based on the preliminary assessment, the Project would add little to the much larger Covanta RRF project. Work is also ongoing to determine any suitable mitigation measures which would limit these impacts, such as effective screen planting.

11.9 Summary and Conclusions

11.9.1 There is the potential that from certain views, the Power Generation Plant and Electrical Connection could give rise to significant effects. However, there is the potential for further mitigation by using careful screen planting to reduce these effects. Further work will focus on taking worst case photomontages from key viewpoints, during the winter when the screening effects of vegetation are at their most limited.

11.9.2 Table 11.18 below summarises the preliminary assessment of landscape and visual effects.

Table 11.18 - Summary of preliminary assessment of landscape and visual effects

	Receptor name and description	Potential Mitigation	Preliminary assessment of Residual Effects
Power Generation Plant			
Construction / Decommissioning	Landscape and Visual Receptors	None anticipated over and above embedded mitigation outlined in Section 11.3	Not Significant
Operation	Landscape	Potential screen planting	Not Significant
	Visual	Potential screen planting	Moderately Significant
Electrical Connection			
Construction / Decommissioning	Landscape and Visual Receptors	None anticipated over and above embedded mitigation outlined in Section 11.3	Moderately significant

	Receptor name and description	Potential Mitigation	Preliminary assessment of Residual Effects
Operation	Landscape	Possible screen planting	Moderately significant
Operation	Visual	Possible screen planting	Moderately significant
Gas Connection			
Construction / Decommissioning	Landscape and Visual Receptors	None anticipated over and above embedded mitigation outlined in Section 11.3	Not Significant
Operation	Landscape and Visual Receptors	None anticipated over and above embedded mitigation outlined in Section 11.3	Not Significant
Project (as a whole)			
Construction / Decommissioning	Landscape and Visual Receptors	None anticipated over and above embedded mitigation outlined in Section 11.3	Moderately Significant
Operation	Landscape	Possible screen planting	Not Significant
Operation	Visual	Possible screen planting	Moderately significant
Cumulative Impacts			
Construction / Decommissioning	Landscape and Visual Receptors	None anticipated over and above embedded mitigation outlined in Section 11.3	Not Significant
Operation	Landscape	Possible screen planting	Not Significant
Operation	Visual	Possible screen planting	Moderately significant

12 Traffic and Transport

12.1 Introduction

12.1.1 This section sets out the preliminary findings of the assessment of the likely significant transport-related effects arising from the construction, operation and decommissioning of the Project.

12.2 Approach

Relevant Policy and Guidance

12.2.1 Relevant policy and guidance in relation to traffic and transport is set out in Appendix 2.12.

Assessment Methodology

Study Area

12.2.2 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 Section 2 of this PEIR.

12.2.3 A full Transport Assessment will be completed in accordance with the relevant policy and guidance in Appendix 2.12 and presented in the ES. The Applicant has held initial consultations with the relevant highway authorities in order to agree the scope and methodology of the Transport Assessment and the preliminary findings of the Transport Assessment are presented in this Section of the PEIR.

12.2.4 The Transport Assessment will be supplemented by a Travel Plan which will set out a plan for reducing construction and operational traffic movements to the Project site. The Travel Plan will be included as an Appendix to the ES.

Environmental Effects

12.2.5 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.

12.2.6 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.

12.2.7 Full definitions of these potential effects are set out in the IEMA Guidance.

Realistic Worst Case Scenario for Assessment

12.2.8 In respect of traffic and transport, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

12.2.9 The reason that this represents the realistic worst case in relation to traffic, transport and access impacts is that the more gas turbine generator units required, the more deliveries are required during construction. Five is the maximum number of units being considered for this Project. More units will also generate the most vehicle movements during operation for maintenance visits etc.

12.2.10 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case scenario for the Electrical Connection of a double circuit overhead line and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

12.2.11 For the purposes of this assessment, it has been assumed that the number of decommissioning movements would reflect the construction movements.

12.2.12 For the purposes of providing a worst case assessment, it is assumed that all movements would be made by car.

Significance Criteria

12.2.13 The significance criteria derived for this assessment reflects that contained within the guidance documents referred to in Appendix 2.12.Together with professional judgement.

12.2.14 The effect of significance is derived from a combination of the sensitivity (or importance) of the receptors affected and magnitude (or scale) of the change on the receptors. Categories of sensitivity and magnitude are defined and assessed to determine the significance of effect.

12.2.15 For the transport-related effects considered in this section of the PEIR, 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 Table 4.1. They are set out below in Table 12.1:

Table 12.1 – 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.

12.2.16 In addition, although not specifically identified within the IEMA Guidelines as being sensitive, it has been assumed that residential areas and employment areas have low sensitivity to these effects as they typically experience regular traffic movements.

12.2.17 The magnitude of effect 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.

12.2.18 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 guidance states 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 Manual") 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." (The potential effects as set out later in this section are based in an assessment which takes this into account). Table 12.2 summarises these thresholds:

Table 12.2 – Pedestrian Severance Threshold (DMRB)

Severance Level	Traffic Flow (AADT)
Major	> 16,000
Moderate	8,000 - 16,000
Minor	> 8,000

- **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 12.2 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 guidance states 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 12.3:

Table 12.3 - 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.

12.2.19 The sensitivity of the receptor and the magnitude of impact are combined to give the overall significance of effect, as set out in Table 4.3 of this PEIR Table 12.4 sets out the significance criteria which have been used, at this preliminary stage in the assessment, to describe likely significant transport effects. The criteria are based on guidance referred to above together with professional judgement.

Table 12.4 – Significance criteria (preliminary assessment)

Significance criteria	Description
Major	Assessment where majority of effects are of high adverse (or beneficial) magnitude; for receptors of medium and high sensitivity.
Moderate	Assessment where majority of effects are of medium adverse (or beneficial) magnitude; for receptors of all sensitivities.

Significance criteria	Description
Minor adverse	Assessment where majority of effects are of low adverse magnitude, with isolated medium adverse (or beneficial) effects; for receptors of all sensitivities.
Negligible	Assessment where majority of effects are negligible, with isolated low adverse or beneficial magnitude; for receptors of all sensitivities.
Neutral	No significant effects anticipated
Minor beneficial	Assessment where majority of effects are low beneficial magnitude; for receptors of all sensitivities

Consultation and Consultation Responses

12.2.20 Consultation is still ongoing and will continue through the PEIR and EIA process. Table 12.5 below sets out the relevant transport-related consultation responses or comments received so far, together with an indication as to how any of the issues raised have been or will be addressed.

Table 12.5 – Consultation Responses

Response Reference	Issues raised	Action required
Planning Inspectorate (PINs)		
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.	This information will be included within the Transport Assessment and ES. The framework of a Route Management Strategy will be developed and reported within the Transport Assessment, and would be finalised upon the appointment of the contractor.
2.60	The SoS considers that information on construction including: …number, movements and parking of	

Response Reference	Issues raised	Action required
	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.	
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.	
	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.
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	This information will be included within the Transport Assessment and ES. The framework of a Route Management Strategy will be developed and reported within the Transport Assessment, and would be finalised upon the appointment of the Contractor.

Response Reference	Issues raised	Action required
	HGV movements.	
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.	
3.83	The SoS would expect on-going discussion and agreement with the local highways authorities and the Highways Agency where possible.	Meetings are being arranged with all parties to develop the assessment of this Project.
3.84	The SoS notes that opportunities for traffic movements will be investigated, and suggests mitigation measures such as a travel plan and sourcing material.	The framework of a CEMP will be reported, to be completed upon the appointment of a Contractor. A Travel Plan will also be developed.
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.	This information will be included within the Transport Assessment and ES.
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.	The framework of a Travel Plan will be reported within the Transport Assessment, and would be completed upon the appointment of a Contractor.
3.87	This topic (transport) should be cross referred to the air quality topic chapter in the ES, particularly in relation to traffic	This will be undertaken as part of the ES.

Response Reference	Issues raised	Action required
	emissions.	
Highways Agency (HA)		
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 constriction, operation and decommissioning periods.	This information will be included within the Transport Assessment and ES.
2.	Any abnormal loads will need to be discussed and their route agreed either at the planning stage or shortly after to ensure that the impact on road network is minimised.	The framework of a Route Management Strategy will be developed and reported, and would be finalised upon the appointment of the contractor. .
3.	A construction 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.	
4.	The HA 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.	
Luton Borough Council		
Paragraph 8	There is no indication of the number of people wanting to access the site during its	This information will be included within the Transport Assessment and ES.

Response Reference	Issues raised	Action required
	operational phase. I would therefore expect the Transport Assessment to cover this in more detail.	
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 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 Rockery 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.	Further details of this proposal have been requested from Network Rail – it is understood that this relates to an option for consideration by Network Rail only at this stage and there are no firm proposals. Meetings are being arranged with the relevant parties in order to discuss and consider the East West Rail Scheme in relation to the proposed Project.
Paragraph 10	The scoping report should take into consideration a growing network of routes used by cyclists, walkers and equestrians around the area.	This information will be included within the Transport Assessment and ES.
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.	The Transport Assessment and ES will be completed as discussed.
Bedford Borough Council (BBC)		
Transport	The main issue will be the	This information will be

Response Reference	Issues raised	Action required
Paragraph 1	traffic and travel resulting from the development and the environmental, operational and safety impacts of this on the local communities and transport networks.	included within the Transport Assessment and ES.
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 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.	The framework of a Route Management Strategy will be developed and reported, and would be finalised upon the appointment of the contractor.
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 meeting is being arranged with Network Rail to enable these issues to be discussed. This information will be provided in the ES when the proposals for the Project become more established (following further consultation and design work).

12.3 Embedded Mitigation Measures

12.3.1 In order to undertake an assessment of the potential effects on traffic and transport as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of traffic and transport, these standard mitigation measures include:

- Ensuring traffic movements are timed to avoid peak periods; and
- Adherence to a CEMP which would limit impacts from construction traffic movements.

12.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

12.4.1 Operational access to the Power Generation Plant Site is proposed from the north near Stewartby via Green Lane as shown on Figure 12.2. Green Lane links to Bedford Road and the A421 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.

12.4.2 A new purpose built Access Road would be constructed within the Power Generation Plant Site from Green Lane to the Generating Equipment Site. The route of the Access Road from Green Lane would follow the existing track which borders the lake within Rookery North Pit. On reaching Rookery South Pit the Access Road would use the access ramp (being constructed as part of the LLRS) to enter into the pit and cross through the base of the pit until it reaches the Generating Equipment Site along the alignment shown on Figure 12.2. It is proposed that the 1.7 km long Access Road would be bitumen construction formed with kerbs, and would be approximately 6 m wide allowing for two-way traffic.

Local and Strategic Highway Network

12.4.3 The road network in the vicinity of the Project Site is shown on Figures 12.1 and 12.2.

12.4.4 Green Lane is a rural single carriageway road, connecting Stewartby to Marston Moretaine on Bedford Road, the old A421, at a ghost island priority junction 1.3 km to the north-west. The Green Lane carriageway is around 6.5 m, with no lighting or footway to the north-west of the STEM College. The road is subject to the national speed limit of 60 mph from Bedford Road to 100 m west of the Access Road, where a 30 mph speed limit is applied.

12.4.5 To the east of the Power Generation Plant Site, the road is around 6.5 m to 7.0 m 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.

12.4.6 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 of the Green Lane junction, and 2 km south of the Green Lane junction.

12.4.7 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.

12.4.8 The M1, located 8 km to the south-west of the Green Lane junction, 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

12.4.9 There are no Public Rights of Way within the Power Generation Plant Site. Footpaths within close proximity to the Power Generation Plant Site, and with specific relevance to the Power Generation Plant are shown in Appendix 12.1, 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 160 m west of the railway crossing.

- To the west of Stewartby Lake, there is a footpath link to Bedford Road, via FP19. This joins Bedford Road within a national speed limit zone, where no footway is present. The speed limit is reduced to 30 mph 90 m south of the FP19 link: after a further 40 m into this zone, a footway is formed.

Footways and Cycle ways

12.4.10 On a section of Green Lane within Stewartby, there is a footway in the northern verge of the road, with a width varying around 1.5 m. The footway in this section is illuminated by the street lighting system. Green Lane in this section is subject to a speed limit of 30 mph

12.4.11 The footway on Green Lane continues north-west for a further 50 m after the railway crossing. This section of road is subject to the national speed limit, which applies 20 m after the railway crossing. To enhance the pedestrian connectivity to the STEM College located to the north of Green Lane, this footway is to be continued along Green Lane to the college by the STEM College promoter – as well as the students walking to this facility, this would accommodate any pedestrian walking from Stewartby along Green Lane continuing to the Stewartby Lake FP72 footpath. A school crossing patrol will be provided around the school opening hours to assist the movements of students from this footpath.

12.4.12 There are no further pedestrian facilities along Green Lane to the north past this point.

12.4.13 On Bedford Road, a footway starts 160 m south of the Green Lane Junction, with a width between 1.5 m and 2 m. This section is illuminated by the street lighting system.

12.4.14 No cycle ways are present on either Bedford Road, or Green Lane.

Equestrian

12.4.15 There are no bridleways or equestrian facilities on the Power Generation Plant Site.

12.4.16 As shown on Appendix 12.1 of this PEIR, 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

12.4.17 Existing bus services are summarised in Table 12.6 below

Table 12.6 – Existing Bus Services

Service Number	Nearest Bus Stop	Operator	Route	Frequency
C2	Green Lane	UNo - Cranfield	Cranfield University – Cranfield – Marston Moretaine – Caulcott – Stewartby – Ampthill – Flitwick	Two services a day – one in the morning and one in the evening Mondays to Fridays No services on Sundays and on Public Holidays
68	Outside Stewartby Brickworks	Grant Palmer	Bedford – Kempston – 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

12.4.18 As shown on Figure 12.1, the nearest bus stops to the Power Generation Plant Site are on Green Lane and are located within 70 m of the Access Road. These bus stops are currently served by service C2 only.

12.4.19 The closest bus stop served by Service 68 is located outside Stewartby Village Hall – approximately 350 m east of the existing Rookery Pit access on Green Lane. A further four stops are located within Stewartby further away.

Existing Rail Routes and Services

12.4.20 As shown on Figure 12.1, whilst the nearest rail station to the Power Generation Plant Site is the Millbrook Rail Station, approximately 700 m south-west from the centre of the Power Generation Plant Site, practically, the closest station is the Stewartby Rail Station to the northern side of Green Lane. This station is approximately 90 m from the Green Lane Site Access, and 1.7 km north-west from the centre of the Power Generation Plant Site.

12.4.21 Both the Stewartby and Millbrook Rail Stations are served by the Marston Vale Line that provides an hourly service operated by London Midlands in each direction between Bedford and Bletchley from Mondays to Saturdays (16 trains per day in each direction).

12.4.22 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.

12.4.23 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 the Bedford Railway Station, served by the adjacent Marston Vale Line, located approximately 9.3 km north-east from the centre of the Project Site. The Bedford Rail Station is served by East Midlands Trains, London Midlands and First Capital Connect, providing direct rail connections to northwards - to Wellingborough, Kettering, Market Harborough, Leicester, Loughborough and Nottingham - and southwards to Luton, St Albans City and London St Pancras.

12.4.24 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. 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), with completion expected in 2019.

Road Safety

12.4.25 Personal Injury Collision ((PIC) - formerly known as Personal Injury Accident – (PIA)) summary data was obtained from Bedfordshire Highways for the period covering the 1st July 2009 to 31st March 2014.

12.4.26 The Transport Assessment will provide a detailed summary of the PICs (location and nature) for links and junctions in the study area, and would provide an estimate of the likely anticipated number of PICs for similar types of links and junctions using national data, to enable comparison.

12.4.27 An initial assessment has identified that for all the links and junctions close to the Power Generation Plant Site, the number of observed PICs is low, likely to be less than that which would be expected based on the highway layout and traffic flows. No trends appear to be apparent within the PICs data, nor any indication that there are trends relating to vulnerable users.

12.4.28 As such, there appears to be no existing road safety issues in relation to the road links and junctions close to the Power Generation Plant Site.

Baseline Survey Information

12.4.29 Details of the traffic counts data for the Old A421 taken covering the period 10th May to 16th May 2012 have been obtained from Highways Agency, these have been reviewed and summarised in Table 12.5 below. It is noted here that updated data will be collected and analysed as part of the EIA.

Table 12.7 – Baseline Traffic flows (Total 2-way)

Link No on Fig 12.2	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	Old A421 - South of Marston Moretaine (May 2012)	3828	3657	223	180
2	Old A421 – North of Beancroft Junction (May 2012)	4760	4414	207	165
3	Old A421 - North of Salford Road (May 2012)	4823	4657	262	220

12.4.30 A Pedestrian / Cyclist survey was undertaken to support the Covanta RRF Project. It was undertaken on a Saturday, Sunday and Monday in May 2010 - prior to the opening of the STEM College - and recorded the movements of all non-vehicular movements along Green Lane. This data is summarised below in Table 12.8.

Table 12.8 – Baseline Pedestrian and Cyclist flows (Total 2-way)

Date	Pedestrian movements	Cyclist movements
Saturday 8/5/10	71	12
Sunday 9/5/10	40	12
Monday 10/5/10	44	22

12.4.31 No equestrian movements were recorded during the survey period.

12.4.32 These weekday pedestrian and cyclist flows will increase as activity at the STEM College increases, the existing situation will be surveyed during the preparation of the assessment.

Receptors

12.4.33 It is concluded that the only receptor with a high sensitivity likely to be affected by the Power Generation Plant is the STEM Sixth Form College on Green Lane. However, whilst the STEM College, an educational establishment, is a high sensitivity receptor, as the students attending will be sixteen or older they will be more risk-aware than primary or secondary school children.

12.4.34 Receptors with a medium sensitivity are considered to be:

- The Water Sports Club on Green Lane, but located 300 m south of the road itself;
- The narrow footway / cycleway across the level crossing; and
- Cyclists on Green Lane.

Construction/Decommissioning

12.4.35 An assessment has been made of the likely average traffic that is likely to be generated by the construction of the Power Generation Plant from experience, and with reference to the traffic flows identified from similar projects. It is assumed that all these trips would all be made by car, assuming 1.6 occupants per car, as per DfT guidance.

12.4.36 For the purposes of this assessment, it has been assumed that the number of decommissioning movements would reflect the construction movements.

12.4.37 In addition, a further assessment has been made of the likely peak Construction movements, which would typically occur over a very short timescale. For the purposes of this assessment, it is assumed that these

would be generated by deliveries of ready mixed concrete for the main foundation construction. For the purposes of deriving a worst case assessment, it is assumed that this operation would have a total of 30 operatives on site, receiving deliveries of concrete every 5 minutes through the day for ten hours – i.e., 120 HGV movements and 20 car movements. The number of days when the foundation construction operation is on-going at full capacity and generating these higher levels of flow are anticipated to be limited to one or two days in total across the whole project.

12.4.38 The likely construction trip generation in relation to the construction and decommissioning of the Power Generation Plant is summarised in Table 12.9:

Table 12.9 – Average and Peak Construction movements (Total 2-way)

Construction Period	Vehicles / day		Peak Hour trips	
	Car	HGV	Car	HGV
Q1	12	47	6	9
Q2	22	42	11	8
Q3	28	40	14	7
Q4	53	20	28	4
Q5	54	20	28	4
Q6	44	24	23	4
Q7	34	53	18	10
Q8	3	0	2	0
Peak Construction Movement (in Q3)	20	120	14	12

12.4.39 For the purposes of this assessment, it has been assumed that the number of decommissioning movements would reflect the construction movements.

12.4.40 With respect to the minimum environmental impact thresholds for Pedestrian Severance and Fear and Intimidation identified in section 12.2, the preliminary assessment has shown that all of these relatively limited construction movements – indeed, even the peak construction movement - are considered to be not significant.

12.4.41 Notwithstanding, to minimise the impact of the contractor's vehicles on Stewartby, the Applicant will seek to agree a contractor's Route Management Plan at the detailed design stage of the Project to ensure that all employees, but especially delivery contractors' vehicles travel to and from the Power Generation Plant Site only along Green Lane to the west towards Bedford Road and the old A421, on to the new A421 dual carriageway. The only car-

driving employees permitted to assign via Stewartby will be those who live locally.

12.4.42 It is proposed that the Route Management Plan could, for example, include the following:

- HGV traffic travelling to / from the south would route through the Bedford Road / Green Lane junction, then along the old A421 to the new grade-separated Marston Moretaine Junction to access the new A421 dual carriageway towards the M1 Junction 13; and
- HGV traffic travelling to / from the north would route through the Bedford Road / Green Lane junction, then along the old A421 to the new grade-separated Marsh Leys Junction to access to the new A421 dual carriageway towards Bedford.

12.4.43 The results of the preliminary assessment of the potential environmental effects of the commissioning and decommissioning of the Power Generation Plant are summarised in Table 12.10 below.

Table 12.10 summary of effects on traffic and transport from construction and decommissioning of the Power Generation Plant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Generating Equipment and Access Road				
STEM College • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation Accidents and Highway Safety	Neutral	No specific mitigation is anticipated over and above the embedded mitigation outlined in Section 12.3	Based on the preliminary assessment, no residual effects are anticipated	• Collect further traffic count data; • Monitor traffic movements.

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Water Sports Club: • Severance • Pedestrian and Cyclist Delay	Neutral	No mitigation is anticipated over and above the embedded mitigation outlined in Section 12.3	Based on the preliminary assessment, no residual effects are anticipated.	• Collect further traffic count data; • Monitor traffic movements.
• Limited width footways on Green Lane:Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral	No mitigation is anticipated over and above the embedded mitigation outlined in Section 12.3	Based on the preliminary assessment, no residual effects are anticipated.	• Collect further traffic count data; • Monitor traffic movements.
No footway on a short, 90m section of Green Lane between the current termination point and the FP72 connection: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral	No mitigation is anticipated over and above the embedded mitigation outlined in Section 12.3	Based on the preliminary assessment, no residual effects are anticipated.	• Understand the likely patronage and demand for this movement • Collect further traffic count data; • Monitor traffic movements.
Cyclists along Green Lane: • Pedestrian Amenity	Neutral	No mitigation is anticipated over and above the embedded	Based on the preliminary assessment, no residual effects are anticipated.	• Collect further traffic count data; • Monitor traffic movements.

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
• Fear and Intimidation • Accidents and Highway Safety • Hazardous loads		mitigation outlined in Section 12.3		

Operation

12.4.44 During 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. These shift changes would be timed to avoid the network peak hour, hence the highway impact would be minimised. For the purposes of providing a worst case assessment, it is assumed that all movements would be made by car.

12.4.45 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 DfT guidance. Reflecting the typical working hours on similar power station sites, it is assumed that majority of these movements would be made outside of the network peak – to provide a robust assessment it has been assumed that only 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 the maintenance.

12.4.46 The likely operational trip generation in connection with the operation of the Power Generation Plant is summarised in Table 12.11 below.

Table 12.11 – Operational movements (Total 2-way)

Construction Period	Vehicles / day		Peak Hour trips	
	Car	HGV	Car	HGV
Normal operation	12	2	0	0
During Annual Maintenance	12 +25 37	5	0 + 7 7	0

12.4.47 With respect to the minimum thresholds identified in section 12.2, it is shown that even during the higher traffic generating periods in the short-term

maintenance period, all of these operational phase movements are so low that the magnitude of effect from these is considered to be negligible.

12.4.48 To minimise the impact of the maintenance contractor's vehicles on Stewartby, the Applicant will agree a Route Management Plan with the relevant authorities at the detailed design stage of the Project.

12.4.49 An initial assessment has been undertaken of the perceived environmental impact of the operational phase of the Power Generation Plant. The results are summarised in Table 12.12:

Table 12.12 - Summary of effects on traffic and transport from operation of the Power Generation Plant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Generating Equipment and Laydown Area				
STEM College • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation Accidents and Highway Safety	Neutral	No specific mitigation is anticipated over and above the embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Collect further traffic count data; • Monitor traffic movements.
Water Sports Club: • Severance • Pedestrian and Cyclist Delay	Neutral	No specific mitigation is anticipated over and above the embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Collect further traffic count data; • Monitor traffic movements.
Limited width footways on Green Lane: • Severance • Pedestrian	Neutral	No specific mitigation is anticipated over and above embedded	Based on the preliminary assessment, no residual effects are anticipated	• Collect further traffic count data; • Monitor traffic movements.

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety		mitigation		
No footway on a short section of Green Lane: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral	No specific mitigation is anticipated over and above embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Understand the likely patronage and demand for this movement • Collect further traffic count data; • Monitor traffic movements.
Cyclists along Green Lane: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety • Hazardous loads	Neutral	No specific mitigation is proposed over and above embedded mitigation.	Based on the preliminary assessment, no residual effects are anticipated	• Collect further traffic count data; • Monitor traffic movements.

12.5 Gas Connection Assessment

Baseline Conditions and Receptors

12.5.1 As described on Sections 2.4, 4 and 5 of this PEIR, there are currently two potential Gas Connection Route Corridor Options under consideration. These are Option 1 and Option 2 (as defined and more particularly described in Section 2.4 of Section 2 of this PEIR) "). Until the preferred Option 1 is finalised following further consultation and studies, four options are being considered with regard to access for the Gas Connection. These three access options are shown on Figure 12.2, and are as follows:

- from M1 Junction 13 via the A507, Sandhill Close, Houghton Lane, Millbrook Road and the B530 Ampthill Road;
- Through the Rookery South Pit, from the Power Generation Plant Site;
- from Bedford Road, via Woburn Road, Manor Road, B530 Ampthill Road and Millbrook Road, or;
- 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.

12.5.2 It is anticipated that any operational access requirements would have minimal and ephemeral usage. Depending on the final location of the AGI, a permanent access may be created off either Houghton Lane (in the case of Option 1) or Millbrook Lane or the B530 (in the case of Option 2). It is assumed that the operational routes would be as were agreed for the construction phase.

Local and Strategic Highway Network

12.5.3 The road network in the vicinity of the Gas Connection Route Corridor Options, 1 and 2 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 Route Corridor Options 1 and 2 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 connects to Houghton Lane, then on to Sandhill Close.
- Sandhill Close runs north-south, to the south of Gas Connection Route Corridoroption 1, connecting to the A507 via 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. To the north-east, Millbrook Road links to the B530 at a priority junction.

- The B530 runs on a north to south axis, crossing the extreme east edge of Gas Connection Route Corridoroption 2, going from Bedford south towards Ampthill. The B530 is a single lane 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, it is concluded that this route is only suitable for cars and light vehicles.

- The A507 provides a single carriageway connection from the M1 Junction 13 to Ampthill and passes to the south of Gas Connection Route Corridoroption 1.

Existing Pedestrian, Cyclist and Equestrian Facilities

12.5.4 The Public Rights of Way in the vicinity of the proposed Gas Connection Options are shown on the indicative plans included in Appendix 12.1.

Public Rights of Way

12.5.5 The southern part of Gas Connection Route Corridor Option 1 is bisected east-west by FP14, FP65 and FP15, connecting between Station Road to Millbrook Road, crossing under the Midland Main railway line by a culvert. The FP4 spur from FP15 is aligned north-south to the west of the rail line, crossing eastwards by a further culvert towards FP16.

12.5.6 To the north-east of the proposed Gas Connection Route Corridor Option 2, footpath FP3 is aligned north-south from Stewartby Way, from west of the junction with the B530. FP3 meets an intersection with FP10 and FP16, before travelling east to terminate at the B530.

12.5.7 To the north-east of the Gas Connection Route Corridor Option 2, FP10 links from FP3 to Millbrook Road. Meanwhile, FP16 travels west at the FP3 intersection for a short distance before terminating.

Footways and Cycle ways

12.5.8 The footway links to the adjacent communities – Stewartby, Millbrook and Marston Moretaine – are limited, and are not continuous.

12.5.9 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.

12.5.10 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.

12.5.11 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.

12.5.12 No cycle ways are present in the vicinity of either Gas Connection Route Corridoroption.

Equestrian

12.5.13 There are no bridleways in the area of either of the proposed Gas Connection Route Corridor Options.

Existing Bus Routes and Services

12.5.14 The Gas Connection Options are served by one regular bus service, 42 which runs along the B530 to the east of the Project Site, and provides 24 services in both directions between Bedford bus station and Flitwick. As shown on Figure 12.1, the nearest bus stop is located to the east of the Gas Connection Route Corridoroption 2 at the B530 Ampthill Road / Millbrook Road Junction.

12.5.15 The area is also served by four other irregular bus services, C2, FL2, FL5 and FL6B, which run along Millbrook Road and the B530.

12.5.16 The services are summarised in Table 12.13.

Table 12.13 – Existing Bus Services

Service Number	Nearest Bus Stop	Operator	Route	Frequency
42	B530 Ampthill Rd Millbrook Road Junction	Stagecoach / Grant Palmer	Bedford – Ampthill – Flitwick – *Dunstable	Every 20 to 30 minutes between 0539 to 2007 Mondays to **Saturday (providing a total of 24 services in both directions)
C2	Green Lane	UNO - Cranfield	Cranfield University - Cranfield – Marston Moretaine – Caulcott – Stewartby – Ampthill – Flitwick	Two services a day – one in the morning and one in the evening

* Service does not always continue as far as Dunstable

**Saturdays - Service starts at a different time on Saturdays

Existing Rail Routes and Services

12.5.17 As shown on Figure 12.1, Millbrook Rail Station is located 1 km to the west of the preferred Option 1.This station is served by the Marston Vale Line services reported in section 12.4.

Receptors

12.5.18 Receptors with a high sensitivity potentially affected by the Gas Connection Options 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.

12.5.19 Whilst these receptors are of a high sensitivity, the numbers of pedestrians and cyclists are considered to be minimal.

12.5.20 The other receptor, with a medium sensitivity, would be the cyclists on the B530 and Millbrook Road – albeit the numbers of cyclists are also considered to be minimal.

Construction/Decommissioning

12.5.21 An assessment has been made of the likely traffic generated by the construction of the Gas connection Options. It is assumed that all trips made by car would have 1.6 occupants per car, as per DfT guidance.

12.5.22 The likely construction trip generation in relation to the construction and decommissioning of the Gas Connection Options is summarised in Table 12.14 and applies for either Route Corridoroption.

Table 12.14 – Gas Connection Construction movements (Total 2-way)

Construction Period	Vehicles / day		Peak Hour trips	
	Car	HGV	Car	HGV
Q1	12	47	6	9
Q2	22	42	11	8
Q3	28	40	14	7
Q4	53	20	28	4
Q5	54	20	28	4
Q6	44	24	23	4
Q7	34	53	18	10
Q8	3	0	2	0

12.5.23 With respect to the minimum vehicle increase thresholds identified in section 12.2, all of these construction movements are so low that any impact would be considered to be not significant.

12.5.24 Notwithstanding, and to minimise the impact of the contractor's vehicles on surrounding settlements, the Applicant will commit to the implementation of a contractor's Route Management Plan.

12.5.25 The results of the preliminary assessment of the potential environmental impact on the construction and decommissioning of the Gas Connection Options are summarised in Table 12.12:

Table 12.15 summary of effects on traffic and transport from construction and decommissioning of the Gas Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Gas Connection Construction				
No footways on B530: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral	No specific mitigation is anticipated over and above embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Understand the likely patronage and demand for this movement • Collect further traffic count data; • Monitor traffic movements.
No footways on Millbrook Road: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents	Neutral	No specific mitigation is anticipated over and above embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Understand the likely patronage and demand for this movement • Collect further traffic count data; • Monitor traffic movements.

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
and Highway Safety				
Cyclists along Millbrook Road: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety • Hazardous loads	Neutral	No specific mitigation is anticipated over and above embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Collect further traffic count data; • Monitor traffic movements.

Operation

12.5.26 There would be a minimal number of movements to the Gas Connection Options during the Operational phase (less than 1 per week) of the Gas Connection Options. These movements would be intermittent, and would be limited to routine inspection and maintenance operations at the AGI.

12.5.27 As such, this has therefore been scoped out from further assessment and no assessment has been undertaken of these movements.

12.6 Electrical Connection Assessment

Baseline Conditions and Receptors

12.6.1 Several access route options are still being considered with regard to accessing the Electrical Connection. They are shown on Figure 12.2, and are as follows:

- From Junction 13 of the M1 via the A507, Sandhill Close and Station Lane;
- From Bedford Road, via Woburn Road, Manor Road, B530 Ampthill Road, Millbrook Road, Houghton Lane and Station Lane;

- 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.

12.6.2 It is considered that any operational access requirements would have minimal and ephemeral usage. It is assumed that the operational routes would be the same as those for the construction phase of the Electrical Connection

Existing Pedestrian, Cyclist and Equestrian Facilities

12.6.3 The Public Rights of Way in the vicinity of the proposed Electrical Connection are shown on the indicative plans in Appendix 12.1 of this PEIR.

12.6.4 In addition to the Public Rights of Way detailed for the Power Generation Plant and the Gas Connection, the area proposed for siting the Electrical Connection is bisected by several footpath routes:

- Footpath FP7 is aligned from north-west to south-east through the Electrical Connection Area, connecting between Millbrook Road and Station Lane;

- the same Footpath FP14 – FP65 – FP15 referred to in section 12.4 also connects between Millbrook Road and Station Lane; and

- Footpath FP6 runs north-south from the FP7 link to Sandhill Close to the south of the site.

Existing Bus Routes and Services

12.6.5 In addition to the Bus Services detailed for the Power Generating Plant and the Gas Connection, there are three other irregular bus services (45, 49 and 164) which run along Station Lane to the west of the Electrical Connection.

Existing Rail Routes and Services

12.6.6 As shown on Figure 12.1, Millbrook Rail Station is located 0.5 km to the west of the centre of the proposed Electrical Connection. This station is served by the Marston Vale Line services reported in section 12.3.

Local and Strategic Highway Network

12.6.7 Station Road / Station Lane runs from the junction of Houghton Lane / Sandhill Close junction to Marston Moretaine, crossing the Marston Valley Rail Line at a level crossing. It continues through Marston Moretaine to link towards the A421.

Receptors

12.6.8 In addition to the receptors with a high sensitivity possibly affected by the Power Generation Plant and Gas Connection as referred to in sections 12.4 and 12.5 above, there is also a lack of footways on Station Road / Station Lane. Whilst this receptor may be considered to be a high sensitivity, the numbers of pedestrians and cyclists are minimal.

12.6.9 Another receptor with a medium sensitivity includes the cyclists on Station Road – albeit these numbers are also considered to be minimal, given the survey data presented in Table 12.6.

Construction/Decommissioning

12.6.10 An assessment has been made of the likely traffic generated by the construction of the Electrical Connection. It is assumed that all trips made by car would have 1.6 occupants per car, as per DfT guidance.

12.6.11 The likely construction trip generation for the construction and decommissioning of the Electrical Connection is summarised in Table 12.16 below.

Table 12.16 – Electrical Connection Construction movements (Total 2-way)

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

12.6.12 With respect to the minimum vehicle increase thresholds identified in Section 12.2, all of these construction movements are so low that any impact would be considered to be not significant.

12.6.13 Notwithstanding, to minimise the impact of the contractor's vehicles on surrounding settlements, the Applicant will commit to the implementation of a contractor's Route Management Plan.

12.6.14 The results of the preliminary assessment of the potential environmental impact of the construction and decommissioning of the Electrical Connection are summarised in Table 12.17 below.

Table 12.17 Summary of effects on traffic and transport from construction and decommissioning of the Electrical Connection

Receptor name and description	Initial Assessment of Existing and Future Significance of Effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Electrical Connection Construction				
No footways on Station Lane: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral	No mitigation is anticipated over and above embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated	• Understand the likely patronage and demand for this movement • Collect further traffic count data; • Monitor traffic movements.
Cyclists along Station Road: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety • Hazardous loads	Neutral	No mitigation is anticipated over and above embedded mitigation	Based on the preliminary assessment, no residual effects are anticipated.	• Collect further traffic count data; • Monitor traffic movements.

Operational

12.6.15 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.

12.6.16 As such, no assessment has been undertaken of these movements.

12.7 Project as a Whole

12.7.1 The Summary of Effects Table 12.18 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).

12.7.2 No impacts are predicted on ecological receptors from any of the individual elements of the Project or from the Project as a whole.

12.8 Cumulative Effects

12.8.1 Construction, operation and decommissioning of the Project could occur simultaneously with other projects in the vicinity of the Project Site. However, as shown in the preliminary traffic assessment in Sections 12.3 to 12.5 of this PEIR, the significance of effects of the Project is no more than negligible and is therefore not significant for the purposes of the EIA Regulations. Accordingly,, then given that traffic effects of the Project alone are no more than negligible, it follows that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is considered that no cumulative effects assessment is required.

12.8.2 On carrying out the detailed traffic assessment during the EIA process, if the position in 12.6.1 is shown not to be the case, then the EIA will take into account other developments in the vicinity of the Project Site, and will include a cumulative impacts assessment in accordance with Section 4 of this PEIR.

12.8.3 As set out above, although the impact of the Project in all of its stages is considered to be neutral, should a cumulative effects assessment of Project be required (pursuant to section 12.6.2 above) in relation to the road and highway network, it is proposed that reference is made to the A421 Traffic Model. This model was developed by Hyder Consulting Ltd to understand the strategic effect of the A421 dualling, and is jointly owned by the Highways Agency and CBC. The output from this model would be manually revised to respond to any of the emerging developments considered necessary by the joint authorities and considered within the model.

12.9 Summary and Conclusions

12.9.1 Table 12.18 below summarises the potential transport related impacts of the Project.

Table 12.18– Summary of the potential traffic and transport related effects of the Project

Work element, and phase	Receptor name and description	Potential Effect and Mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant and Laydown Area			
Construction / Decommissioning	Water Sports Club • Severance: • Pedestrian and Cyclist Delay	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	Limited width footways on Green Lane: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	No footway on a short, 90m section of Green Lane between the current termination point and the FP72 connection: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	Cyclists along Green Lane: • Pedestrian Amenity • Fear and Intimidation	Neutral – it is anticipated that no mitigation over and above embedded	None

Work element, and phase	Receptor name and description	Potential Effect and Mitigation	Preliminary Assessment of Residual Effects
	• Accidents and Highway Safety • Hazardous loads	mitigation is required	
Operational	Water Sports Club • Severance: • Pedestrian and Cyclist Delay	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	Limited width footways on Green Lane: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	No footway on a short, 90m section of Green Lane between the current termination point and the FP72 connection: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and	Neutral – it is anticipated that no mitigation over and above embedded mitigation is	None

Work element, and phase	Receptor name and description	Potential Effect and Mitigation	Preliminary Assessment of Residual Effects
	Intimidation • Accidents and Highway Safety	required	
	Cyclists along Green Lane: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety • Hazardous loads	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
Gas Connection Construction			
Construction / Decommissioning	No footways on B530: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	No footways on Millbrook Road: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	Cyclists along Millbrook Road or B530: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None

Work element, and phase	Receptor name and description	Potential Effect and Mitigation	Preliminary Assessment of Residual Effects
	• Hazardous loads		
Operational	No trip generation in normal operation	No change – it is anticipated that no mitigation over and above embedded mitigation is required	None
Electrical Connection Construction			
Construction / Decommissioning	Water Sports Club • Severance: • Pedestrian and Cyclist Delay	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	Limited width footways on Green Lane: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	No footway on a short, 90m section of Green Lane between the current termination point and the FP72 connection: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None

Work element, and phase	Receptor name and description	Potential Effect and Mitigation	Preliminary Assessment of Residual Effects
	Cyclists along Green Lane: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety • Hazardous loads	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	No footways on B530: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	No footways on Millbrook Road: • Severance • Pedestrian Delay • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required	None
	Cyclists along Millbrook Road or B530: • Pedestrian Amenity • Fear and Intimidation • Accidents and Highway Safety • Hazardous loads	Neutral – it is anticipated that no mitigation over and above embedded mitigation is required.	None
Operational	No trip generation in normal operation	Neutral – it is anticipated that no mitigation over and	None

Work element, and phase	Receptor name and description	Potential Effect and Mitigation	Preliminary Assessment of Residual Effects
		above embedded mitigation is required	
Project (as a whole)			
No further effects to those identified above.			
Cumulative Effects			
The preliminary traffic assessment has shown that the significance of effects of the Project is no more than Neutral. If this position is confirmed within the detailed traffic assessment and survey work to be carried out as part of the EIA for the Project it is maintained that no cumulative impacts assessment of the Project in relation to traffic impacts would be required.			

13 Archaeology and Cultural Heritage

13.1 Introduction

13.1.1 This section presents the preliminary findings of the heritage impact assessment for the Project. It presents a preliminary assessment of the potential for likely significant effects of the Project on cultural heritage assets. It describes the likely significant direct (physical) and indirect (visual) effects of the Project on heritage assets within the study area.

13.2 Approach

Relevant Policy and Guidance

13.2.1 Relevant policy and guidance in relation to archaeology and cultural heritage is set out in Appendix 2-13.

Assessment Methodology

Study Areas

13.2.2 The following study areas have been chosen for the heritage impact assessment based on professional judgment and experience of potential likely significant effects:

- 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 undesignated 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 (visual) effects on Scheduled Monuments, Grade I and Grade II* Listed Buildings, Conservation Areas and Registered Parks and Gardens.
- 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.

13.2.3 The significance of Grade II listed buildings generally resides within their architectural interest (i.e. their form and fabric) and the positive contribution of their settings to their significance is generally limited to their immediate vicinity. These are almost all situated within the surrounding villages and in general have localised settings which do not have a strong interaction with the surrounding countryside. The extensive woodland present in all directions further serves to interrupt any views towards the Project Site.

13.2.4 Beyond a distance of 2 km these factors are considered to reduce the potential for impact 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.

13.2.5 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 been collected, plotted and reviewed to identify any buildings of this grade beyond 2 km that are considered to have a highly sensitive setting.

13.2.6 These study areas are shown on Figures 13.1 and 13.2.

Methodology

13.2.7 In order to provide an understanding of the baseline conditions of the Project Site and study areas, a desk study, site walkover and visits to selected designated assets have been undertaken, supplemented by consultations with interested parties, expert advice and professional judgment.

13.2.8 In order to assess the indirect (visual) effects of the Project, ZTVs, together with fieldwork observations and professional judgement were used.

13.2.9 In all cases, the various levels of predicted effects have been defined in accordance with the scales of change provided in Tables 13.1 - 13.3 below:

13.2.10 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 heritage asset are taken from *The Setting of Heritage Assets* (English Heritage 2011b).

Realistic Worst Case Scenario for Assessment

13.2.11 In respect of archaeology and cultural heritage, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

13.2.12 The reason why this configuration has been chosen is that it represents the maximum number of stacks possible (e.g. 5) at their greatest height (40 m). This is therefore considered to represent the greatest potential visual impact on the setting of cultural heritage assets. The various scenarios have little difference in terms of ground take or impacts on buried heritage assets

13.2.13 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case scenario for the Electrical Connection of a double circuit overhead line and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Significance Criteria

13.2.14 The criteria employed for determining the sensitivity of a heritage asset, magnitude of impact and the significance of effects are set out below.

Sensitivity

13.2.15 The sensitivity of each type of heritage asset and its setting is defined using the scales in Table 13.1.

Table 13.1: 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

Magnitude of impact

13.2.16 The magnitude of impact is a measure of the degree to which the significance of a heritage asset will be increased or diminished by a proposed development. In determining the magnitude of impact, the asset's heritage significance is defined. This allows the identification of key features and provides the baseline against which the magnitude of change can be assessed; the magnitude of impact being proportional to the degree of change in the asset's baseline significance.

Table 13.2 Magnitude of Impact

Magnitude	Description
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. Considerable harm to a heritage asset's setting, such that the asset's significance would be materially affected/considerably devalued, 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

Magnitude	Description
	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 Impact	No change to a heritage asset or its setting.

Significance of Effects

13.2.17 The sensitivity of the receiving environment, together with the magnitude of impact, defines the significance of the effect (Table 13.3). 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. Impacts of moderate significance and above are considered to equate to significant impacts in the context of the EIA Regulations.

Table 13.3: Significance of Effects

Sensitivity	Magnitude of Change			
	Major	Moderate	Minor	Negligible
Very High	Major	Major	Moderate	Minor
High	Major	Major / Moderate	Moderate / Minor	Minor
Medium	Moderate/Major	Moderate	Minor	Negligible
Low	Minor/Moderate	Minor	Negligible / Minor	Negligible / Minor

13.2.18 Where the significance of heritage assets is unknown, even if the magnitude of change could be reasonably estimated the significance of the effects would remain unknown. Where such findings occur, then these have been noted in the assessment.

Consultation and Consultation Responses

13.2.19 Consultation is ongoing and will continue as part of the PEIR and EIA process. The following organisations have been consulted to date both in order to obtain information of heritage assets and to assist in the scoping of the surveys and the future EIA.

- English Heritage;
- Central Bedfordshire HER;
- National Heritage List; and
- Central Bedfordshire Council for Conservation Area maps and Conservation Area Appraisals.

13.2.20 Table 13.4 below sumarises the consultation responses received to date in relation to the cultural heritage assessment and how these responses have been or will be dealt with.

Table 13.4 – Consultation Responses to Date in relation to archaeology and cultural heritage

Consultee	Comment Ref	Comment	Required action or response
SoS (Scoping Opinion)	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.	Noted. The preliminary results of this assessment are provided in Section 13 of the PEIR and the full assessment will be presented in the final ES.
Ampthill Town Council	Scoping Response Letter	The plant will have an impact on the restoration project currently being undertaken at Ampthill Great Park.	A preliminary assessment of impacts on Ampthill Great Park has been described in section 13.4of the PEIR.
CBC	Scoping Response Letter	The EIA should deal with the impact of the proposal on the remains of the Rookery Pit clay pit.	Noted. A preliminary assessment has been undertaken on the remains of the Rookery clay pit and will be developed as part of the ES.
		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.	Noted. This is the case. The DBA will form an Appendix to the final ES and is summarised in section 13.4 of the PEIR.

Consultee	Comment Ref	Comment	Required action or response
		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.	Noted. The scope of such investigation, if required, will be agreed with relevant consultees once more detail about the final choice of gas and electrical connection routes is determined.
		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.	A preliminary assessment of the potential effects of the Project on the setting of cultural heritage assets is provided in Sections 13.4 and 13.5 and will be further assessed in the ES. Further assessment of visual effects is provided in Section 11 of the PEIR.

13.3 Embedded Mitigation

13.3.1 In order to undertake an assessment of the potential effects on archaeology and cultural heritage as a result of the construction, decommissioning and operation of the Project, it has been assumed that certain elements of 'embedded mitigation' will be applied. These mitigation items can often be considered as standard, best practice working methods, without which the Project would not be allowed to be developed. In terms of protection of archaeology and cultural heritage, these standard mitigation measures include:

- Adherence to a CEMP, which will set out the process for stopping work and notifying the appropriate person (usually the county archaeologist) if any remains of potential archaeological significance are found during construction; and
- Directing development away from known areas of buried archaeology.

13.4 Power Generation Plant Assessment

Baseline Conditions and Receptors

Non-designated Heritage Assets

13.4.1 No 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 it is located within a former clay extraction pit. However, it is recognised that the former Rookery Pit which, although not recorded on the HER, could be considered as a non-designated heritage asset of local significance.

Designated Assets

13.4.2 A review of the National Heritage List confirmed there to be no designated heritage assets within the Power Generation Plant Site. Tables 13.5-13.9 list the designated assets within the 5 km 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.

13.4.3 The locations of designated assets within the 5 km study area are presented on Figure 13.1. The locations of non-designated assets within the 1 km study area are presented on Figure 13.2.

Table 13.5 Scheduled Monuments within 5km of the Power Generation Plant Site

ID	Name	Distance (m)
SM 1	Moat Farm moated enclosure and associated settlement earthworks	1790
SM 2	Ampthill Castle: a medieval magnate's residence	2276
SM 3	Medieval village and moated sites at Thrupp End	2405
SM 3	Medieval village and moated sites at Thrupp End	2560
SM 4	Houghton House: a 17th century mansion and associated courtyard and formal garden remains	2605
SM 5	Moated site and two fishponds at The Rectory	2858
SM 5	Moated site and two fishponds at The Rectory	2955
SM 6	Pump and signpost in Market Place	3122
SM 7	Long barrow 350m south east of Bury Farm	3980

ID	Name	Distance (m)
SM 8	Kempston Hardwick moated site	4110
SM 9	Bowl barrow 500m south east of Bury Farm	4142
SM 10	Bolebec Farm moated enclosure, associated platforms and enclosures	4162
SM 11	Ringwork at The Round House, Brogborough Park Farm	4543
SM 12	A moated site, three fishponds, two trackways and field systems at Moat Farm	4985

Table 13.6 Grade I and II* Listed Buildings within 5km of the Power Generation Plant Site

ID	Name	Grade	Distance (m)
LB 4	Parish Church Of St Mary The Virgin	I	1542
LB 5	Tower Belonging To Church Of St Mary The Virgin	I	1546
LB 25	Ruins Of Houghton House, Houghton Park	I	2679
LB 35	Church Of All Saints	I	2935
LB 126	Parish Church Of St Andrew	I	3175
LB 180	Parish Church Of St Mary The Virgin	I	4298
LB 9	Moat Farmhouse	II*	1883
LB 10	Park House (Cheshire Home For The Disabled), Ampthill Park	II*	1885
LB 14	Church Of St Michael	II*	1958
LB 99	Avenue House	II*	3128
LB 130	Dynevor House	II*	3184

ID	Name	Grade	Distance (m)
LB 134	37, Church Street	II*	3192
LB 182	Wootton House	II*	4302

13.4.4 As discussed in section 13.2, only those grade II listed buildings within 2 km of the Power Generation Plant Site have been considered in detail. These are summarised in Table 13.7. The data for all grade II listed buildings within 5 km of the Power Generation Plant Site has been collected, plotted and reviewed to identify any buildings of this grade beyond 2 km that are considered to have a highly sensitive setting.

Table 13.7 Grade II Listed Buildings within 2 km of the Power Generation Plant

ID	Name	Distance (m)
LB 1	South Pillinge Farmhouse	182
LB 2	Millbrook Station	437
LB 3	Stone Known As The Devil's Toenail	1228
LB 6	The Old Rectory	1698
LB 7	Old School House And Former School	1741
LB 8	Statue Of Hound At Ampthill Park	1860
LB 11	16 And 17, How End Road	1902
LB 12	The Old Cottage	1907
LB 13	Two Kilns And Four Chimneys At The Stewartby Brickworks	1956

Table 13.8 Conservation Areas within 5 km of the Power Generation Plant

ID	Name	Distance (m)
CA 1	Stewartby	1384
CA 2	Millbrook	1577

CA 3	Ampthill	1771
CA 4	Wootton	4133
CA 5	Maulden	4685

Table 13.9 Registered Parks and Gardens within 5km of the Power Generation Plant

ID	Name	Grade	Distance (m)
RPG 1	Ampthill Park	II	1370

Construction/Decommissioning

13.4.5 The extent of any previous disturbance to buried archaeological remains is an important factor in assessing the potential impact of the Project.

13.4.6 Given that the Power Generation Plant Site is within formerly developed land (e.g. previously excavated Rookery clay pits, it is likely that any archaeology would have already been removed. Therefore, this preliminary assessment has concluded that there will be no physical direct impacts on any designated heritage assets.

13.4.7 The majority of the construction works will not be visible outside of Rookery South Pit and therefore will have no impacts on the setting of any designated heritage assets.

13.4.8 The Access Road will have no potential impacts on designated heritage assets.

Table 13.10 – Preliminary assessment of effects on archaeology and cultural heritage from construction and decommissioning of the Power Generation Plant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Generating Equipment and Laydown Area				
Non-Designated heritage Assets –	Removal of any historic pit features surviving within	None is anticipated over and above the	Effects are anticipated to be minor and therefore not	Visit to pit to assess presence of former pit

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Rookery Pit	the area of the Power Generation Plant	embedded mitigation measures outlined in Section 13.3.	significant.	features
Designated and non-designated assets – impact on setting.	Construction is of a relatively short duration and the majority of construction equipment will be within the pit and working below ground level. However, given the distance of the Power Generation Plant Site to the nearest receptor (182m). Minor impacts are predicted.	None is anticipated over and above the embedded mitigation measures outlined in Section 13.3.	Minor	None
Access Road				
Non-Designated heritage Assets – Rookery Pit	Removal of any historic pit features surviving within the area of the Access Road	None is anticipated over and above the embedded mitigation measures outlined in Section 13.3.	Effects are anticipated to be minor and therefore not significant.	Visit to pit to assess presence of former pit features

Operation

13.4.9 During operation, there are not anticipated to be any impacts on buried archaeology. However, the presence of large structures in the landscape (e.g.

up to five new stacks) has the potential to impact on the setting of designated and non-designated assets.

13.4.10 The preliminary assessment of impacts is presented as per type and grade (where relevant) of designation. Full detailed assessment of each individual designated asset and its setting will be undertaken for the full EIA and presented in the ES.

Table 13.11 – Preliminary assessment of effects on archaeology and cultural heritage from operation of Power Generation Plant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Generating Equipment				
Scheduled Monuments	Seven of the scheduled monuments within the study area (SM1, 6, 7, 8, 9, 10 & 12) have no intervisibility with Generating Equipment and therefore will not be impacted. Five scheduled monuments have some theoretical intervisibility with the Generating Equipment	None None	None Effects are anticipated to be no more than minor and therefore not significant.	Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Generating Equipment upon the significance of each asset. Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Generating Equipment upon the significance of

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Grade I Listed Buildings	Three of the grade I listed buildings within the study area (LB35, 126 & 189) have no intervisibility with Generating Equipment and therefore will not be impacted.	None	None	each asset. Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Generating Equipment upon the significance of each asset.
Grade II* and !! Listed Buildings	Five scheduled monuments have some theoretical intervisibility with the Generating Equipment	None	Effects are anticipated to be no more than minor and therefore not significant.	Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Generating Equipment upon the significance of each asset.
Access Road				
N/A as Access Road will be low lying and will not be visible from any heritage	None	None	None	None

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
assets.				

13.5 Gas Connection Assessment

Baseline Conditions and Receptors

13.5.1 Land on which the Gas Connection Route Corridor Options 1 and 2 are situated is agricultural, and has remained undeveloped according to the earliest historical mapping data.

Non-designated Heritage Assets

13.5.2 A number of cropmarks of possible archaeological origin have been recorded within the Gas Connection Option 1 and for the area of investigation for Gas Connection Option 2. Archaeological investigations (trial trenching) have been undertaken in the vicinity of Gas Connection Option 1 in relation to an unrelated previous proposed development. The archaeological evaluation failed to reveal archaeological remains within the small portion of the gas connection area that it considered despite the results of the cropmarks recorded within the area.

13.5.3 An archaeological assessment of the Gas Connection Route Corridor Options 1 and 2 has been undertaken which considers non-designated heritage assets within the Gas Connection areas and the inner and wider study areas in detail. In summary, the archaeological potential of both of the Gas Connection Route Corridor Options, for the purposes of this preliminary assessment is summarised below.

- Later Upper Palaeolithic; low likelihood of presence
- Mesolithic; low likelihood of presence
- Neolithic; low likelihood of presence
- Bronze Age; low likelihood of presence
- Iron Age and Romano-British; moderate likelihood of presence
- Early Medieval; low likelihood of presence
- 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).

Designated Heritage Assets

13.5.4 There are no designated heritage assets within either Gas Connection Route Corridoroption 1 or 2. The nature of the gas connection (below ground apart from the small AGI compound) means that there will be no effects on the settings of designated heritage assets within the wider study area.

Construction/Decommissioning

13.5.5 Construction of the Gas Connection options 1 and 2 has the potential to impact on both known and as yet unrecorded buried heritage assets, as land on which the options are located has remained as undeveloped agricultural land.

13.5.6 Table 13.12 below summarises the potential effects of construction and decommissioning of the Gas Connection on heritage assets.

Table 13.12 – Preliminary assessment of effects on archaeology and cultural heritage from construction and decommissioning of the Gas Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Gas Connection				
Non-Designated heritage Assets	Construction of the Gas Connection could potentially physically impact upon known and as yet unrecorded archaeological features.	Routing of gas connection route to avoid known archaeological remains. Archaeological evaluation comprising of geophysical survey and / or trial trenching) of final route, followed by archaeological excavation, recording and publication of archaeological features impacted by the gas connection.	Effects are anticipated to be minor/moderate and therefore not significant.	Further archaeological evaluation of Gas Connection route, the scope of which will be agreed with CBC.
Designated heritage assets	None	None	None	None

Operation

13.5.7 Operation of the Gas Connection options 1 and 2 will not impact on any buried assets.

13.5.8 Given that the Route Corridor of both Gas Connection Options will be mainly buried, the Pipeline will not have any impacts on above ground heritage assets. The AGI will be a relatively small structure, screened by vegetation. It

is unlikely that it will give rise to any setting impacts on above ground heritage assets.

13.5.9 The AGI would be far smaller and less intrusive than the Power Generation Plant, at this preliminary stage there are not considered to be any impacts to the setting of above ground heritage assets.

13.6 Electrical Connection Assessment

Baseline Conditions and Receptors

Non-designated Heritage Assets

13.6.1 A number of cropmarks of possible archaeological origin have been recorded within the area proposed to site the Electrical Connection. Archaeological investigations have been undertaken in the northern part of this area in relation to an unrelated previous proposed development. This revealed the remains of an enclosed late Iron Age/Roman settlement and a possible prehistoric settlement either side of a former stream channel. The putative line of a Roman road crossed north west-south east across the south western part of the area.

13.6.2 In summary, the archaeological potential of the Electrical Connection area, for the purposes of this preliminary assessment is summarised below.

Later Upper Palaeolithic; low likelihood of presence

Mesolithic; low likelihood of presence

Neolithic; low likelihood of presence

Bronze Age; low likelihood of presence

Iron Age and Romano-British; known/high likelihood of presence

Early Medieval; low likelihood of presence

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).

<u>Designated Heritage Assets</u>

13.6.3 There are no designated heritage assets within the area of the proposed Electrical Connection.

Construction/Decommissioning

13.6.4 The construction / decommissioning of the Electrical Connection is likely to involve a very minimal amount of ground disturbance from the erection of up to seven new towers.

13.6.5 Table 13.13 below summarises the potential effects of construction and decommissioning of the Electrical Connection on heritage assets.

Table 13.13 – Preliminary assessment of effects on archaeology and cultural heritage from construction and decommissioning of the Electrical Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Electrical Connection				
Non-Designated heritage Assets	Construction of the Electrical Connection could potential physically impact upon known and as yet unrecorded archaeological features.	Placing of towers to avoid known archaeological remains. Archaeological evaluation comprising of geophysical survey and trial trenching of final route, followed by archaeological excavation, recording and publication of archaeological features if required.	Effects are anticipated to be minor/moderate and therefore not significant.	Archaeological evaluation of Electrical Connection if required, the scope of which will be agreed with CBC.
Designated heritage assets	None	None	None	None

Operation

13.6.6 The main potential impacts from operation of the Electrical Connection will be the introduction of up to seven new towers (one of which will be replacing an

existing tower, thereby resulting in six net additional towers) six and a double circuit overhead line. This, in turn has the potential to impact on the setting of heritage assets. Potential effects on cultural heritage from operation of the Electrical Connection are summarised below in Table 13.14.

Table 13.14 – Preliminary assessment of effects on archaeology and cultural heritage from operation of the Electrical Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Electrical Connection				
Scheduled Monuments	Seven of the scheduled monuments within the study area (SM1, 6, 7, 8, 9, 10 & 12) have no intervisibility with Electrical Connection and therefore will not be impacted.	None	None	Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Electrical Connection upon the significance of each asset.
	Five scheduled monuments have some theoretical intervisibility with the Electrical Connection	None	Effects are anticipated to be no more than minor and therefore not significant.	Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Electrical Connection upon the significance of each asset.
Grade I Listed Buildings	Three of the grade I listed buildings within	None	None	Detailed

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
	the study area (LB35, 126 & 189) have no intervisibility with Electrical Connection and therefore will not be impacted.			individual assessment of each asset, the contribution of their settings to their significance and the impact of the Electrical Connection upon the significance of each asset.
Grade II* Listed Buildings	Five scheduled monuments have some theoretical intervisibility with the Electrical Connection	None	Effects are anticipated to be no more than minor and therefore not significant.	Detailed individual assessment of each asset, the contribution of their settings to their significance and the impact of the Electrical Connection upon the significance of each asset.
Grade II Listed Buildings				

13.7 Project as a Whole

13.7.1 The Summary of Effects Table 13.15 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).

13.7.2 No likely significant effects are predicted on cultural heritage and archaeological receptors from any of the individual elements of the Project or from the Project as a whole.

13.8 Cumulative Effects

13.8.1 The Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary archaeology assessment set out in this Section 13 of the PEIR has shown that no significant effects on heritage assets are predicted as a result of the Project. Given that the Project alone is predicted to have no significant effects on heritage assets, it follows on that the Project is also unlikely to result in or contribute to any likely significant cumulative or in-combination effects with other developments in the vicinity of the Project Site. As such, it is anticipated that no cumulative impacts assessment is required.

13.9 Summary and Conclusions

13.9.1 Table 13.15 below summarises the preliminary effects on archaeology and cultural heritage.

Table 13.15 – Summary of effects on archaeology and cultural heritage

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Power Generation Plant			
Construction / Decommissioning	Non-designated heritage assets (non-below ground archaeological remains)	Photographic record of Rookery Pit in the area of the proposed Power Generation Plant.	Effects are anticipated to be minor and therefore not significant.
	Designated heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
Operation	Non-designated heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
	Designated heritage assets	None	Effects are anticipated to be minor / moderate and therefore not significant.
Electrical Connection			

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
Construction / Decommissioning	Non-designated heritage assets (non-below ground archaeological remains)	Archaeological evaluation comprising of geophysical survey and/or trial trenching. Where avoidance of remains is not feasible, impacted archaeological remains will be subject to full excavation and recording ahead of the construction of the electrical connection.	Effects are anticipated to be minor/moderate and therefore not significant.
	Designated Heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
Operation	Non-designated heritage assets (non-below ground archaeological remains)	None	Effects are anticipated to be negligible and therefore not significant.
	Designated Heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
Gas Connection			
Construction / Decommissioning	Non-designated heritage assets (non-below ground archaeological remains)	Archaeological evaluation comprising of geophysical survey and/or trial trenching. Where avoidance of remains is not feasible, impacted archaeological remains will be subject to full	Effects are anticipated to be minor/moderate and therefore not significant.

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		excavation and recording ahead of the construction of the electrical connection.	
	Designated Heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
Operation	Non-designated heritage assets (non-below ground archaeological remains)	None	Effects are anticipated to be negligible and therefore not significant.
	Designated Heritage assets	None	Archaeological evaluation comprising of geophysical survey and/or trial trenching. Where avoidance of remains is not feasible, impacted archaeological remains will be subject to full excavation and recording ahead of the construction of the electrical connection.
Project (as a whole)			
Construction / Decommissioning	Non-designated heritage assets	Archaeological evaluation comprising of geophysical survey and/or trial trenching. Where avoidance of remains is not feasible, impacted archaeological remains will be subject to full	Effects are anticipated to be minor/moderate and therefore not significant.

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
		excavation and recording ahead of the construction of the electrical connection.	
	Designated heritage assets	None	Effects are anticipated to be negligible or minor/moderate and therefore not significant.
Operation	Non-designated heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
	Designated heritage assets	None	Effects are anticipated to be negligible or minor/moderate and therefore not significant.
Cumulative effects			
Construction / Decommissioning	Non-designated heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
	Designated heritage assets	None	Effects are anticipated to be negligible or minor/moderate and therefore not significant.
Operation	Non-designated heritage assets	None	Effects are anticipated to be negligible and therefore not significant.
	Designated heritage assets	None	Effects are anticipated to be negligible or

	Receptor name and description	Potential Mitigation	Preliminary Assessment of Residual Effects
			minor/moderate and therefore not significant.

14 Socio-economics

14.1 Introduction

14.1.1 This section of the PEIR presents the preliminary findings of the assessment of likely significant labour market, tourism economy and community infrastructure effects arising from the construction, operation and decommissioning of the Project. Potential effects could result from labour market distortions, pressure on community infrastructure facilities from construction workers and their families and potentially positive and negative effects on the tourism economy.

14.2 Approach

Relevant Policy and Guidance

14.2.1 Relevant policy and guidance in relation to archaeology and cultural heritage is set out in Appendix 2.14.

Assessment Methodology

Study Area

14.2.2 The proposed socio-economic and tourism study areas formed part of the consultation on methodology. The study areas are as follows:

- **Socio economic study area** - The socio-economic assessment is based on drive time catchment areas from the Project Site. 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).

- **Tourism study area** - The tourism assessment is focussed on the area defined by a 15 km radius from the Project Site. Facilities or notable points of focus of visitor attraction within this area have been reviewed. Any significant tourism facilities located just outside the boundary of the Project Site have also been included (Figure 14.2).

- **Community Infrastructure study area** - The community infrastructure assessment is focussed on the area defined within a 15 km radius from the Project. Proximity is likely to be the main determinant of impacts and their scale. The status of community facility receptors in an area is also used to determine the scale and significance of any impacts.

Review Available Data/Information

14.2.3 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.

Baseline

14.2.4 The study area's socio-economic position has been described using standard indicators. This provides a baseline from which potential impacts can be assessed:

- Socio-economic / Labour Market : the area has been defined using a combination of: standard sources and indicators; research available at study area level; and research into the business and labour market structure of the local economy;
- Tourism economy: the area's visitor attraction has been profiled including: visitor attractions; visitor accommodation; tourism volume and value; and the local tourism economy;
- Community infrastructure: An audit of community infrastructure has been prepared; 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 Potential Economic Impacts

14.2.5 A detailed assessment of likely 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) that are wholly or largely related to construction, decommissioning, and operation and maintenance of the Project;
- Indirect economic impacts (positive and negative): 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 (positive and negative): employment and income generated in the economy related to the wider role of the Project in influencing economic activities (including wider socio-economic effects).

14.2.6 For economic impacts and effects (including employment), the availability of labour and skills is critical in accommodating the demands, needs and requirements of the proposed development. Adequate capacity results in a low sensitivity while a shortfall or constrained capacity results in a high sensitivity.

14.2.7 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;
- 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.

Assessment of Potential Tourism Impacts

14.2.8 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.

14.2.9 A business survey has been carried out to gain a more detailed understanding of the local tourism economy and its current performance. Businesses contacted include key visitor accommodation providers, leisure activity providers and other relevant tourism businesses.

14.2.10 Visitor facilities and notable points of focus in the study area have been identified. Based on the Project's anticipated visibility, the assessment comments on the likelihood of the Project influencing visitor and tourist attitudes and behaviour towards them.

14.2.11 The significance of effects on tourism is assessed by reference to the sensitivity of the receptor and the anticipated magnitude of impact.

14.2.12 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 study 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 Potential Community Infrastructure Effects

14.2.13 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 (i.e. effects on local schools, local authority services and other infrastructure).

Assessment of Potential Agricultural Land Impacts

14.2.14 Significance of effects 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 socioeconomic factors and have been adopted to assess receptor sensitivity and impact magnitude. They therefore differ from those listed in Tables 4.1-4.3 of this PEIR.

Determining Sensitivity of Economic Receptor

14.2.15 Table 14.1 below sets out the criteria for determining the sensitivity of socio-economic receptors. The criteria have been established by PBA following extensive socio-economic related environmental impact assessments of energy projects.

Table 14.1 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.

Determining Socio-Economic Magnitude of Effect

14.2.16 The magnitude of the effect of potential socio-economic impacts is assessed against the thresholds shown in Table 14.2.

Table 14.2 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[17]). and/or Effects would be of long-term duration (i.e. greater than 5 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 5 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).
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

[17] http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/

Magnitude	Adverse/ Beneficial	Example
		Effects would be short-term (i.e. 1-2 years).
Negligible	Adverse	Very minor loss
	Beneficial	Very minor benefit
No Change		No change would be perceptible, either positive or negative.

Determining Sensitivity of Tourism Receptor

14.2.17 The main factors relevant to determining tourism sensitivity are outlined below in Table 14.3.

Table 14.3 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.

Determining Magnitude of Tourism Effect

14.2.18 The magnitude of effect is gauged by estimating the amount of change to the receptor arising from the proposed Project and relevant components. It is evaluated in line with the criteria set out below in Table 14.4.

Table 14.4 Tourism Magnitude of Effect 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

Magnitude	Adverse/ Beneficial	Example
		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 positive or negative

Determining Sensitivity of Community Infrastructure Receptor

14.2.19 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 14.5).

Table 14.5 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

Determining Magnitude of Community Infrastructure Effect

14.2.20 The magnitude of the effect on community infrastructure is gauged by estimating the amount of change on the receptor arising from the scheme. The magnitude of change is evaluated in line with the criteria below (Table 14.6).

Table 14.6 Community Infrastructure Magnitude of Effect 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 positive or negative.

Significance of effect

14.2.21 In line with standard EIA practice, the sensitivity of receptors as defined in the tables above (Table 14.1, Table 14.2 and Table 14.3) are considered against the Magnitude of impact (Table 14.4, Table 14.5 and Table 14.6) to determine the significance of effect (Table 14.7).

Table 14.7 Significance of effect

		Magnitude of Effect				
		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

Worst Case Scenario for Assessment

14.2.22 In respect of socio-economics, the realistic worst case scenario from within the proposed Project parameters (which are described in Sections 2 and 5 of the PEIR) are five aero derivative gas turbine generators, each with their own 40 m high stack.

14.2.23 The different options for the configuration of the Generating Equipment have little bearing on the impact to socio-economics. However, it is recognised that installing only 1 gas turbine generator at this site will have a marginally lower construction and operational workforce than installing a greater number of units.

14.2.24 A preliminary assessment of both Route Corridor Options for the Gas Connection is presented in this section. The worst case scenario for the Electrical Connection of a double circuit overhead line and seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers) has been assessed.

Consultation and Consultation Responses

14.2.25 Table 14.8 below sumarises the consultation responses received to date in relation to the cultural heritage assessment and how these responses have been or will be dealt with.

Table 14.8 – Consultation responses relating to socio-economics

Consultee	Comment Ref	Comment	Required action or response
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 14.5.

Consultee	Comment Ref	Comment	Required action or response
	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 14.2 and includes the local and regional context.
Ampthill Town Council	Scoping Response Letter	We are 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.
		There will be a detrimental effect on existing property prices which in turn will depress 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. An assessment of potential tourist related impacts in included in Section 14.5 of this PEIR.

14.3 Power Generation Plant Assessment

Baseline Conditions and Receptors

Socio-economics

14.3.1 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.

Population

14.3.2 The local, 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 2021. Over the same period the population of the UK has increased and is also projected to increase but at a lesser rate.

14.3.3 Table 14.9 below sets out the population statistics in the vicinity of the Project Site.

Table 14.9 Population

	Local Area	Wider Area	Wider Region	United Kingdom
Population (2001)	733,060	1,871,165	3,858,628	58,791,867
Population (2013)	836,461	2,110,696	4,318,263	63,539,349
Population (2021)	903,244	2,271,147	4,629,292	67,014,954
% change				
2001-2013	14.1%	12.8%	11.9%	8.1%
2013-2021	8.0%	7.6%	7.2%	5.5%

Source: Experian 2013, Census 2011

Age Structure

14.3.4 The local area has a declining proportion of working age people and an increasing dependency ratio[18] which is likely to put additional pressure on services in the area. By 2021 over a fifth of the local area's population is expected to be of retirement age. This is greater than the projected UK averages.

14.3.5 Table 14.10 below sets out the age structure in the vicinity of the Project Site.

Table 14.10 Age Structure

	Local Area	Wider Area	Wider Region	United Kingdom
2001				
Children (0-15)	44%	42%	41%	20%
Working age (16-64)	45%	46%	46%	64%
Retirement age (65+)	11%	12%	13%	16%
2013				
Children (0-15)	21%	20%	20%	19%
Working age (16-64)	64%	64%	64%	64%
Retirement age (65+)	15%	16%	16%	18%
2021				
Children (0-15)	34%	33%	33%	19%

[18] 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

Working age (16-64)	45%	45%	45%	62%
Retirement age (65+)	22%	22%	23%	19%

Source: Experian 2013, Census 2011

Economic Activity

14.3.6 The economic activity rate is a useful measure of the labour market opportunities available in the area[19]. 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

	Local Area	Wider Area	Wider Region	United Kingdom
Total people (16-74)	546,101	1,369,958	2,845,027	41,126,540
Economically Active (%)	80.1%	81.1%	80.0%	69.7%
Economically Inactive (%)	14.7%	14.9%	14.4%	30.3%

Source: Experian 2013, Census 2011

14.3.7 The local area is characterised by marginally higher levels of unemployment compared to 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.

Table 14.12 Economic Activity by Type

	Local Area	Wider Area	Wider Region	United Kingdom
Economically Active				
Employee (%)	18%	18%	18%	20%
Self-employed with employees (%)	58%	58%	57%	55%
Self-employed w/out employees (%)	13%	13%	15%	14%
Unemployed (%)	6%	5%	5%	6%
Full-time student (econ active) (%)	5%	5%	5%	5%
Economically Inactive				

[19] 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.

	Local Area	Wider Area	Wider Region	United Kingdom
Retired (%)	44%	46%	43%	46%
Student (economically inactive) (%)	18%	18%	22%	19%
Looking after home/family (%)	18%	17%	17%	14%
Permanently sick/disabled (%)	12%	11%	11%	14%
Other economically inactive	8%	7%	8%	7%

Source: Experian 2013, Census 2011

Employment Structure

14.3.8 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

	Local Area	Wider Area	Wider Region	United Kingdom
Agriculture, forestry and fishing	0%	0%	0%	1%
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	5%	4%	5%	6%
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%	7%
Administrative and support service activities	5%	5%	5%	5%
Public administration, defence, compulsory social security	5%	5%	5%	6%
Education	11%	10%	11%	10%
Human health and social work activities	10%	11%	11%	13%
Other	5%	5%	5%	5%

Source: Experian 2013, Census 2011

Social Grade/ Skills

14.3.9 National Readership Survey (NRS) social grades are a system of demographic classification widely used in market research[20]. 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

	Local Area	Wider Area	Wider Region	United Kingdom
AB - High/intermed mgr/admin/prof	24%	26%	28%	23%
C1 - Supervis/clerical/jr mgr/admin/prof	32%	32%	32%	31%
C2 - Skilled manual	20%	20%	19%	21%
DE - Semi-skilled/unskilled manual/State benefit/unempl/lowest grade	24%	22%	21%	26%

Source: Experian 2013, Census 2011

Qualifications

14.3.10 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 Qualifications21

	Local Area	Wider Area	Wider Region	United Kingdom
Level 4/5	27%	29%	31%	27%
Level 3	12%	12%	12%	12%

[20] Originally developed by the National Readership Survey (NRS). Now used by many other organisations for wider applications and a standard for market research.

[21] 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.

	Local Area	Wider Area	Wider Region	United Kingdom
Apprenticeship	4%	4%	3%	4%
Level 2	16%	16%	15%	15%
Level 1	15%	14%	13%	13%
Other qualifications	6%	6%	7%	6%
No Qualifications	20%	20%	19%	23%

Source: Experian 2013, Census 2011

Summary

14.3.11 The socio-economic study area22 surrounding the Project is characterised by:

- An increasing population (2001-2013) c.4% above the nationally rate;
- Projected population increase of c.7% between 2013 and 2021, which is higher than the UK average;
- a rapidly growing retirement age population;
- an economic activity rate higher than the UK average;
- lower levels of unemployment comparable to the UK average;
- A comparable proportion of people working in the manufacturing and construction sector;
- High 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.

14.3.12 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).

14.3.13 The overall sensitivity of the labour market is assessed as low.23

[22] Defined as the area with a 60 minute drive time

Tourism

14.3.14 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.

14.3.15 Tourism volume and value in Central Bedfordshire recovered strongly during the period 2011-13 and 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 at their highest level since 2006.

14.3.16 On average 204 million trips were taken to Central Bedfordshire between 2011-13 which equated to 53 million bed-nights. The annual value of these trips was £507 million. This is summarised in Table 14.16.

Table 14.16 Tourism Volume and Value in Central Bedfordshire, Bedfordshire and England 2006-2008 to 2011-2013

	2006-8	2007-9	2009-11	2010-12	2011-13
Trips (million)					
Central Bedfordshire	171	147	141	134	204
Bedfordshire Total	675	591	517	575	649
England	98,265	98,724	97,516	100,682	101,418
C.Bed. As % of Bed total	25%	25%	27%	23%	31%
Nights (million)					
Central Bedfordshire	30	29	33	32	53
Bedfordshire Total	102	121	110	127	144
England	301,044	302,767	296,377	300,915	300,922
C.Bed. As % of Bed total	29%	24%	30%	25%	37%
Spend (£million)					
Central Bedfordshire	507	704	544	358	507
Bedfordshire Total	1,735	1,734	1,518	1,350	1,501
England	16,044	16,414	16,314	16,924	17,751
C.Bed. As % of Bed total	29%	41%	36%	27%	34%

Source: Experian 2013, Census 2011

14.3.17 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 and one attraction in the top 20

[23] 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)

unpaid tourist attractions in the East of England. The Marston Vale Millennium Country Park and the RSPB The Lodge Nature Reserve are listed by Visit England as the 4th and 18th most visited free attractions in the East of England in 2013.24 ZSL Whipsnade Zoo located in Central Bedfordshire was listed as most popular paid visitor attraction in the East of England25.

14.3.18 Visitor trips, bed-nights, spending and visitor numbers to key attractions are increasing. The overall sensitivity of the Central Bedfordshire's tourism economy is therefore assessed as low.

14.3.19 The Marston Vale Millennium Country Park is located within close proximity of the Project Site. Woburn Abbey is also located with 5km. Both attractions will be assessed as individual receptors and included in the tourism business survey to establish perceived impact on visitor activity. The remaining attractions are outwith the 15km study area.

14.3.20 The overall sensitivity of the Marston Vale Millennium Country Park and Woburn Abbey is assessed as medium.

14.3.21 Demand for community infrastructure facilities could arise from the in-migration of construction workers and their families during the temporary construction phase. This requirement is likely to be minimal. An initial audit of community facilities also shows there is sufficient capacity to accommodate additional demand.

14.3.22 The community infrastructure audit has identified:

- 15 schools within c.5km of the Project site (capacity for 204 pupils);
- Six GP surgeries (all accepting new patients);
- One hospital;
- Five pharmacies; and
- One library.

14.3.23 The overall sensitivity of the local area's community infrastructure has therefore been assessed as low.

Construction/Decommissioning

14.3.24 Table 14.17 below summarises the effects of the construction and decommissioning of the Power Generation Plant on the socio-economics of the area.

[24] The Fitzwilliam Museum was the most popular free attraction in the East of England in 2013 (337,793)

[25] The RSPB Minsmere Nature Reserve was the 20th most visited paid attraction in 2013 (89,900)

Table 14.17 Preliminary assessment of effects on socio-economics from construction / decommissioning of the Power Generation Plant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Power Generation Plant and Laydown Area				
Labour Market (Socio-economic receptor)	Slight positive	None required (although positive impacts and local opportunities could be explored with relevant local business and enterprise organisations, education providers or local Job Centers)	Slight positive impact and therefore not significant	An economic impact model will be built to calculate the impact of construction employment on the local, regional and national economy
Tourism receptors such as accommodation providers and visitor facilities may be affected by the following potential impacts: • visual • noise • traffic/ accessibility • air quality	Slight positive impact to accommodation providers from temporary construction workers Natural/ Slight negative impacts to tourism receptors from noise and traffic restrictions during temporary construction and decommissioning phases	None required	Slight positive for accommodation providers Neutral/ Slight negative impact on tourism economy and receptors therefore not significant	Tourism Business Survey to establish impact with a 15km radius. Mapping of tourism receptors alongside ZTV to assess impact based on sensitivity of receptor and magnitude of effect

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
				Review of the relevant findings of LVIA, Noise, Traffic and Air Quality Chapters to determine residual impact on receptors
Community Infrastructure receptors such as hospitals, schools GP surgeries and dentists may be affected by the in-migration of construction workers and their families.	The likely construction programme and experience of other similar assessments indicates a low number of in migrant construction workers will choose to permanently live in the area with their families. Demand for community facilities from this development is considered to be minimal. Any impacts would also only be relevant during temporary construction and decommissioning phases. Slight negative	None required	Neutral/ Slight negative or and therefore not significant	Community infrastructure mapping and review of existing capacity. The estimated requirement based on in-migrants and their families will be evaluated against existing capacity to determine the pressure and impact on facilities.

Operation

14.3.25 Table 14.18 below summarises the impacts of the operational phase of the Power Generation plant on the socio-economics of the area.

Table 14.18: Preliminary assessment of effects on socio-economics from Operation of the Power Generation Plant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Power Generation Plant				
Labour Market (Socio-economic receptor)	Slight positive	None required (although positive impacts and local opportunities could be explored with relevant local business and enterprise organisations, education providers or Job Centres)	Slight positive impact and therefore not significant	We will calculate the net additional employment and GVA impact that will be created locally, regionally and nationally
Tourism receptors such as accommodation providers and visitor facilities may be affected by the following potential impacts: • visual • noise • traffic/ accessibility	Potential slight negative visual impact however the visual impact of industrialisation has already been established at the Project Site. The Project Site has been previously worked for clay. Buildings and chimneys associated with the former	None required	Slight negative or neutral and therefore not significant	Tourism Business Survey Mapping of tourism receptors alongside MPP ZTV to assess impact Review of the construction programme and the relevant

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
• air quality	brickworks remain at the north of the Project Site. The Project Site also has overhead power lines that run west to east south of Rookery South Pit. Operational noise, traffic and air quality impacts are likely to be neutral during the operational phase. Neutral/ Slight positive			findings of MPP LVIA, Noise, Traffic and Air Quality Chapters
Community Infrastructure receptors such as hospitals, schools GP surgeries and dentists may be affected by the in-migration of construction workers and their families.	Demand for community facilities from in-migrant construction works and their families is considered to be minimal and only relevant during temporary construction and decommissioning phases. Neutral/ Slight positive	None required	Neutral	Community infrastructure mapping and review of existing capacity. The estimated requirement based on in-migrants and their families will be evaluated against existing capacity to determine the pressure and impact on

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
				facilities.

14.4 Gas Connection Assessment

Baseline Conditions and Receptors

14.4.1 The Gas Connection would be in the form of a new underground gas pipeline connection and AGI. Both gas connection Route Corridor Options 1 and 2 are situated to the south and east of the Generating Equipment Site in gently rolling arable fields bounded by hedgerows and drainage ditches.

14.4.2 As the baseline assessment considered the Project as a whole, the baseline conditions reported above for the Power Generation Plant can be considered as representative of both Gas Connection route corridors as well.

Construction/Decommissioning

14.4.3 Table 14.19 below summarises the impacts of the Gas Connection on the socio-economics of the area. This applies for both Route Corridor Options 1 and 2.

Table 14.19: Preliminary assessment of effects on socio-economics from construction / decommissioning of the Gas Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Gas Connection				
Labour Market (Socio-economic receptor)	Construction and decommissioning of the Gas Connection is likely to support a negligible number of temporary jobs Neutral impact	None	Neutral	Individual assessment of the employment impact of the construction phase of the Gas Connection to ensure labour

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
				market requirement is negligible
Tourism Economy	An absence of tourism receptors has been identified from the preliminary assessment of the immediate area Neural impact	None	Neutral	Mapping of tourism receptors alongside ZTV to assess impact Review of the relevant findings of LVIA, Noise, Traffic and Air Quality Chapters to determine impact on receptors
Community Infrastructure	Negligible employment required for this element. Negligible demand for community facilities from the in-migration of construction workers and their families Neutral impact	None	Neutral	Community infrastructure mapping and review of existing capacity The estimated labour market requirement based on in-migrants and their families will be evaluated against existing capacity to determine the pressure and impact on

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
				community infrastructure facilities

Operation

14.4.4 Table 14.20 below summarises the impacts of the operational phase of the Gas Connection on the socio-economics of the area.

Table 14.20: Preliminary assessment of effects on socio-economics from operation of the Gas Connection

Receptor name and description	Preliminary Assessment of effects	Potential Specific Mitigation	Potential Residual effects	Further assessments and consultation to be undertaken
Gas Connection				
Labour Market (Socio-economic receptor)	Minimal maintenance and labour required for Gas Connection element during operational phase. Neutral impact	None	Neutral	Individual assessment of the employment effect of the operation and maintenance of the Gas Connection to ensure requirement is negligible
Tourism Economy	Neutral effect	None	Neutral	Mapping of tourism receptors alongside ZTV to assess effect Review of the relevant findings of LVIA, Noise,

				Traffic and Air Quality Chapters to determine impact on receptors
Community Infrastructure	Minimal maintenance and labour for Gas Connection element during operational phase. No demand or pressure would therefore be placed on community facilities Neutral effect	None	Neutral	The estimated labour market requirement based on in-migrants and their families will be evaluated against existing capacity to determine the pressure and impact on community infrastructure facilities

14.5 Electrical Connection Assessment

Baseline Conditions and Receptors

14.5.1 As set out in sections 2.5 and 5.5 of this PEIR, the Electrical Connection is likely to comprise up to seven new towers (one of which will be replacing an existing tower, thereby resulting in six net additional towers), a new substation and up to two new overhead line electrical circuits.

14.5.2 As the baseline assessment considered the Project as a whole, the baseline conditions reported above for the Power Generation Plant can be considered as representative of the Electrical Connection route corridors as well.

Construction/Decommissioning

14.5.3 Table 14.21 below summarises the impacts of the construction and operational phases of the Electrical Connection on the socio-economics of the area.

Table 14.21: Preliminary assessment of effects on socio-economics from construction / decommissioning of Electrical Connection

Receptor name and description	Preliminary Assessment of Impacts	Potential Specific Mitigation	Potential Residual Impacts	Further assessments and consultation to be undertaken
Electrical Connection				
Labour Market (Socio-economic receptor)	Neutral impact	None	Neutral	Individual assessment of the employment impact of the construction phase of the Electricity Connection to ensure requirement is negligible
Tourism Economy	An absence of tourism receptors have been identified from a preliminary audit of the area. Neural impact	None	Neutral	Mapping of tourism receptors alongside MPL ZTV to assess impact Review of the relevant findings of MPL LVIA, Noise, Traffic and Air Quality Chapters to determine impact on receptors
Community Infrastructure	Negligible employment required for the Electricity Connection. Demand for community	None	Neutral	Community infrastructure mapping and review of existing capacity

Receptor name and description	Preliminary Assessment of Impacts	Potential Specific Mitigation	Potential Residual Impacts	Further assessments and consultation to be undertaken
	facilities will also be negligible Neutral impact			The estimated requirement based on in-migrants and their families will be evaluated against existing capacity to determine the pressure and impact on community facilities

Operation

14.5.4 Table 14.22 below summarises the impacts of the operational phase of the Electrical Connection on the socio-economics of the area.

Table 14.22: Preliminary assessment of effects on socio-economics from construction / decommissioning of the Electrical Connection

Receptor name and description	Preliminary Assessment of Impacts	Potential Specific Mitigation	Potential Residual Impacts	Further assessments and consultation to be undertaken
Electrical Connection				
Labour Market (Socio-economic receptor)	Minimal maintenance and labour for Electricity Connection element during operational phase. Neutral impact	None	Neutral	Individual assessment of the employment impact of the construction phase of the Electricity Connection to ensure requirement is

Receptor name and description	Preliminary Assessment of Impacts	Potential Specific Mitigation	Potential Residual Impacts	Further assessments and consultation to be undertaken
				negligible
Tourism Economy	Neutral/ Slight negative impact	None	Neutral	Mapping of tourism receptors alongside MPL ZTV to assess impact Review of the relevant findings of LVIA, Noise, Traffic and Air Quality Chapters to determine impact on receptors
Community Infrastructure	Minimal maintenance and labour for Electricity Connection during operational phase. No demand or pressure would therefore be placed on community facilities Neutral impact	None	Neutral	Community infrastructure mapping and review of existing capacity The estimated requirement based on in-migrants and their families will be evaluated against existing capacity to determine the pressure and impact on community facilities

14.6 Project as a Whole

14.6.1 The Summary of Effects Table 14.23 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).

14.6.2 Slight positive impacts are predicted on socio-economic receptors from the Power Generation Plant and from the Project as a whole.

Table 14.23 – Summary of Effects

	Receptor Name and Description	Potential Mitigation	Potential Residual Effects
Power Generation Plant			
Construction / Decommissioning	Labour Market	None required	Slight positive
	Tourism Economy	None required	Slight positive and slight negative
	Community Infrastructure	None required	Slight negative
Operation	Labour Market	None required	Slight positive
	Tourism Economy	None required	Neutral/ Slight negative
	Community Infrastructure	None required	Neutral
Electrical Connection			
Construction / Decommissioning	Labour Market	None required	Neutral
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Operation	Labour Market	None required	Neutral
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Gas Connection			
Construction / Decommissioning	Labour Market	None required	Neutral
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Operation	Labour Market	None required	Neutral

	Receptor Name and Description	Potential Mitigation	Potential Residual Effects
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Project (as a whole)			
Construction / Decommissioning	Labour Market	None required	Slight positive
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Operation	Labour Market	None required	Slight positive
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Cumulative Impacts			
Construction / Decommissioning	Labour Market	None required	Slight positive
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral
Operation	Labour Market	None required	Slight positive
	Tourism Economy	None required	Neutral
	Community Infrastructure	None required	Neutral

14.7 Cumulative Impacts

14.7.1 The Project could occur simultaneously with other projects in the vicinity of the Project Site. However, the preliminary socio-economic assessment set out in this Section 14 of the PEIR has shown that there are minor positive effects associated with the Project. Should construction, decommissioning or operation occur simultaneously with any other projects in the area, it is anticipated that this would enhance local benefits for goods, services and employment, resulting in a minor positive cumulative effect.

15 Other Issues Considered

15.1 Introduction

15.1.1 It is recognised that some of the statutory consultees have raised concerns that the Project may give rise to environmental impacts over and above those described in Sections 6-14 of this PEIR. Specifically, it has been requested that the Applicant assesses waste arising from the Project and Electromagnetic Frequency (EMF) arising from operation of the Electrical Connection.

15.1.2 This section of the PEIR therefore looks to address these potential impacts.

15.2 Waste

15.2.1 As part of the construction works, there is likely to be limited potential for the generation of waste given that the LLRS will ensure that a level platform is created in the base of the Rookery South Pit on which to site the Generating Equipment. There may be small amounts of waste spoil produced from excavations for foundations, for the Gas Connection and for the new towers associated with the Electrical Connection, although it is hoped that as much of this as possible can be re-used on site.

15.2.2 The Project will operate in full accordance with the Waste Framework Directive, the EPR 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.

15.2.3 The waste hierarchy consists, in order of preference, of:

- Prevention;
- Re-use;
- Recycling;
- Other recovery (e.g. energy recovery); and
- Disposal

15.2.4 A CEMP will be produced, which provides for the submission of construction method statements for approval by the local authority prior to commencement of construction, secured by a requirement attached to the DCO.

15.2.5 Measures will include, amongst others, the stockpiling of excavated spoil and testing for Waste Acceptance Criteria, 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.

15.2.6 In order to facilitate the implementation of the Waste Framework Directive during decommissioning, much of the structures and equipment for the proposed Project will be made of materials suitable for recycling as far as is practicable. For example, a large proportion of the buildings will be constructed of pre-fabricated steel and will therefore be of interest to scrap metal merchants.

15.2.7 Only small quantities of potentially hazardous waste will be stored on the Project Site at any time, and any such substances will be held in secured containers to prevent contaminant migration. Closed storage facilities or suitable dampening techniques will be utilised within the Project where emissions of dust etc. from waste are possible. All mitigation measures will be in full accordance with industry good practices.

15.2.8 The CEMP will ensure that all construction waste will be dealt with in a manner that complies with relevant legislation and (upon leaving the Project Site) waste will be treated and disposed of by suitably licensed contractors. Where hazardous waste is transported from the proposed Project Site, it will be handled in accordance with relevant regulations, and, where necessary, be transported in sealed tankers.

15.2.9 During operation a feature of the gas turbine generator technology to be incorporated in the proposed Project is that waste generated should be minimal and will be restricted to the following:

- General office wastes;
- Used GT air intake filters (typically replaced annually);
- Used ion exchange resins or used RO membranes (typically replaced every 5 to 10 years);
- Separated oil / sludge from oil / water separators; and
- Used oil, chemicals or chemical containers.

15.2.10 Based on the above, it can be concluded that that the proposed Project will result in no adverse impacts with respect to waste.

15.3 EMF

15.3.1 The potential effects of electric and magnetic fields is a very specialised area which relies upon extensive work of worldwide experts. 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.

15.3.2 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.

15.3.3 Based on these guidelines, it is likely that that the EMF field strength for the Project would be the same as that which is already present associated with the existing 400kV Sundon to Grendon overhead line, and that the field strength remains within the1998 ICNIRP occupational exposure Reference Level.

15.3.4 A full EMF report will be produced as part of the ongoing EIA and reported in the ES.