Chapter 3

Project and Site Description

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APPENDICES

3. Project and Site Description

3.1 Introduction

3.1.1 This chapter provides a description of the Project, the Project Site and of its surrounding environment. It also provides an overview of the likely construction methods, the approximate timescale over which various construction activities will take place and an overview of the operational and decommissioning phases of the Project.

3.1.2 Table 3-1 provides a summary of the Project Components and their consenting route. More detail of each element is provided in Section 3.4.

Table 3-1: Project Components

Project Component	Description	Consenting Route
Power Generation Plant	An Open Cycle Gas Turbine (OCGT) peaking power generating station, fuelled by natural gas and capable of providing a rated electrical output of up to 299 Megawatts (MW). The *Power Generation Plant* comprises: • Generating Equipment including one Gas Turbine Generator with one exhaust gas flue stack and Balance of Plant (BOP) (together referred to as the '*Generating Equipment'*) which are located within the '*Generating Equipment Site'* (see Section 3.4); • An *Access Road* (see Figure 3.2) to the Project Site from the B4489 which lies to the west, formed by upgrading an existing access road between the B4489 junction and the Swansea North Substation (the *Substation*) and constructing a new section of access road from the Substation to the Generating Equipment Site (see Section 3.4); and • A temporary construction compound for the storage of materials, plant and equipment as well as containing site accommodation and welfare facilities, temporary car parking (see Section 3.4) and temporary fencing (the *Laydown Area*, see Section 3.4). A	*Development Consent Order (DCO) through The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009*

Project Component	Description	Consenting Route
	small area within the Laydown Area will be retained permanently (the *Maintenance Compound*). • *Ecological Mitigation Area* – area for potential reptile translocation and ecological enhancement. Location and area to be confirmed post-consultation once discussions with NRW and CCS have been undertaken. Area likely to be commensurate with the extent of mitigation required and within the Order Limits of the Project. • Permanent parking and drainage to include: a site foul, oily water and surface water drainage system (see Section 3.4).	
Gas Connection	The Gas Connection will be in the form of a new above ground installation (AGI) and underground gas connection (the Gas Pipeline). This is to bring natural gas to the Generating Equipment from the *National Gas Transmission System*. The Gas Pipeline will follow an approximate north-south route corridor, between the National Gas Transmission System south of Rhyd-y-pandy Road and the Generating Equipment Site (see Section 3.5).	*The Gas Connection will be consented through the Town and County Planning Act (TCPA) and is not part of the DCO Application. Though this Project element is not part of the DCO Application, APL is likely to seek powers of compulsory acquisition over the land required for the Gas Connection.*
Electrical Connection	This is an underground electrical cable to export power from the Generating Equipment to the *National Grid Electricity Transmission System (NETS)* (see Section 3.6).	*The Electrical Connection will be consented through Permitted Development and is not part of the DCO Application. Though this Project element is not part of the DCO Application, APL is likely to seek powers of compulsory acquisition over the land required for the Electrical Connection.*

3.2 Changes since the 2014 PEIR (Phase 1 Consultation)

3.2.1 Since the 2014 PEIR there has been changes to the Project either as a result of the Project evolution and / or due to an update in environmental baseline information. Table 3-2 provides a summary of these changes to the Project since the 2014 PEIR.

3.2.2 Within the Introduction section to each technical chapter, a short summary of any changes which have been undertaken has been included where necessary. Further detailed information on the design changes to the Project is included in **Chapter 5: Alternatives Considered**.

Table 3-2: Summary of Changes since the 2014 PEIR (Phase 1 Consultation)

Project Component	Changes in design since the 2014 PEIR (Phase 1 Consultation)
Power Generation Plant	• The Power Generation Plant is now made up of only one Gas Turbine Generator with one exhaust gas flue stack, rather than up to five. • The stack height is now a maximum of 45 m, instead of 40 m. • The Generating Equipment Site has now been moved north of the Welsh Water Main (Water Main). • Selection of an access route from the B4489 to the west of the Generating Equipment instead of the alternative construction access route from the north; and • There are now two onsite options for the new Access Road.
Electrical Connection	The Electrical Connection now runs alongside the road rather than under for ease of maintenance.

3.3 Project Site and Surroundings

a) The Project Site

3.3.1 The Project Site (see Figure 1.1) is located on open agricultural land approximately 2 km north of Junction 46 on the M4, approximately 3 km to the north of the city of Swansea, approximately 1 km southeast of Felindre and 1.4 km north of Llangyfelach. The current land use is predominantly agricultural, with sheep and horse grazing. The western extent of the Project Site encompasses parts of the Substation (comprising a 400 kV and 132 kV substation) and the existing access road leading to the Substation and Felindre Gas Compressor Station from the B4489.

3.3.2 The Power Generation Plant is accessed from Junction 46 of the M4 (see Figure 12.1). From the M4 vehicles would travel north via the B4489, with the Power Generation Plant accessed from the west utilising the existing access road from the B4489 and then via a new Access Road to the south of the Felindre Gas

Compressor Station before crossing over agricultural land immediately west of the Project.

3.3.3 Ground levels at the Project Site vary from approximately 146 m above ordnance datum (AOD) at the highest point in the north-west corner at Rhyd-y-pandy Road to approximately 80 m AOD along the southern perimeter, with ground levels generally falling in a southerly and south easterly direction. The land within the Generating Equipment Site is at approximately 90 m AOD (see site levels on Figure 3.1).

3.3.4 There are no residential dwellings located within the boundary of the Project Site. Most of the Project Site is improved grassland but there are areas of marshy grassland in the south eastern part of the Generating Equipment Site. There are parts of a Site of Importance for Nature Conservation (SINC) within the Project Site (Lletty Morfil SINC). A block of broadleaved woodland, classified as Ancient Woodland, and a SINC lie to the east. There are also further blocks of Ancient Woodland, also classified as SINCs, to the west surrounding the Substation, Felindre Gas Compressor Station and the existing access road leading to these facilities from the B4489.

3.3.5 Within the Project Site there are springs, with their associated streams and drainage ditches which discharge into the Afon Llan (see Figure 3.1). The Afon Llan links with the Afon Lliw and the River Loughor, which discharges into the Bristol Channel. There are no Main Rivers within the Project Site.

3.3.6 The Generating Equipment Site is located primarily within fields used for grazing, bounded by a mixture of drainage ditches, fencing and poor quality hedgerows with substantial gaps in them. The Generating Equipment Site and Laydown Area are both crossed by a soft surface horse training track known as ‘the gallops’ (Figure 1.2), which runs diagonally north-west to south-east.

b) The Surrounding Area

3.3.7 The area surrounding the Project Site is, at present, predominantly rural in character, although there the Felindre Park and Share facility to the south and a substantial amount of utility infrastructure in the area, some of which cross the Project Site (see Figure 3.4). Please refer to Table 4-6 which describes future development in the vicinity.

3.3.8 The National Gas Transmission System (see Figure 5.2), and a Water Main (see Figure 3.4), cross the Project Site and there is also a network of electricity pylons and overhead lines which lead to and from the Substation (see Figure 3.4). The Felindre Water Treatment Works is located to the northwest, while the Cefn Betingau Solar Park and Abergelli Solar Farm are located to the east of Project Site. A further two solar parks are built in the vicinity, Rhyd-y-pandy solar park and Abergelli Farm. All of these features have been considered in the design of the Project to ensure that they are safeguarded either through avoidance or minimal interaction.

3.3.9 Other features of the area include public footpaths, bridleways and tracks located in and around the Project Site (see Figure 3.3), linking it to the wider area.

3.3.10 The closest residential dwellings to the Generating Equipment Site (Figure 1.1) are:

- Abergelli Farmhouse approximately 620 m to the north of the Generating Equipment Site;
- Llwynhelig approximately 590 m to the south east of the Generating Equipment Site;
- Felin Wen Farm approximately 830 m to the east of the Generating Equipment Site;
- Lletty Morfil Farm approximately 740 m to the west of the Generating Equipment Site;
- Cefn betingau approximately 650 m to the north east of the Generating Equipment Site; and
- Maes-eglwys approximately 440 m to the south of the Generating Equipment Site.

3.3.11 The remains of Aber-gelli Colliery are located north of Abergelli Farmhouse.

3.4 Development Parameters and the 'Rochdale Envelope'

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

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

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

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

a) Overview

3.4.5 The maximum area for the Generating Equipment Site would be approximately 2.64 ha. Figure 3.2 shows an indicative illustration of the position and layout of the Generating Equipment with the Electrical Connection. The design would be

finalised in the event that a DCO is made by the SoS and the Gas Turbine Generator has been procured. The requirements of the DCO (similar to planning conditions) would control the detail of the final design and would require approval by the relevant planning authority at that time. In addition, embedded and additional mitigation would be inherent to the design. APL is therefore proposing to submit its application on the basis of a series of parameters for the Project which allows an assessment of the realistic worst case in accordance with the 'Rochdale Envelope' approach.

3.4.6 The nature and purpose of peaking plants such as that which is proposed for the Project is set out in paragraph 3.4.7 and the reason for selecting OCGT plant as the most appropriate technology choice is further described in **Chapter 5: Alternatives Considered**. The paragraphs below therefore describe the operation of OCGT plants in more detail.

b) Open Cycle Gas Turbine (OCGT)

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

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

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

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

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

3.4.11 Further information on why the exhaust gases are emitted to the atmosphere and cannot be recovered is given in **Chapter 5: Alternatives Considered** and in a

separate Combined Heat and Power (CHP) statement to be provided in the DCO Application.

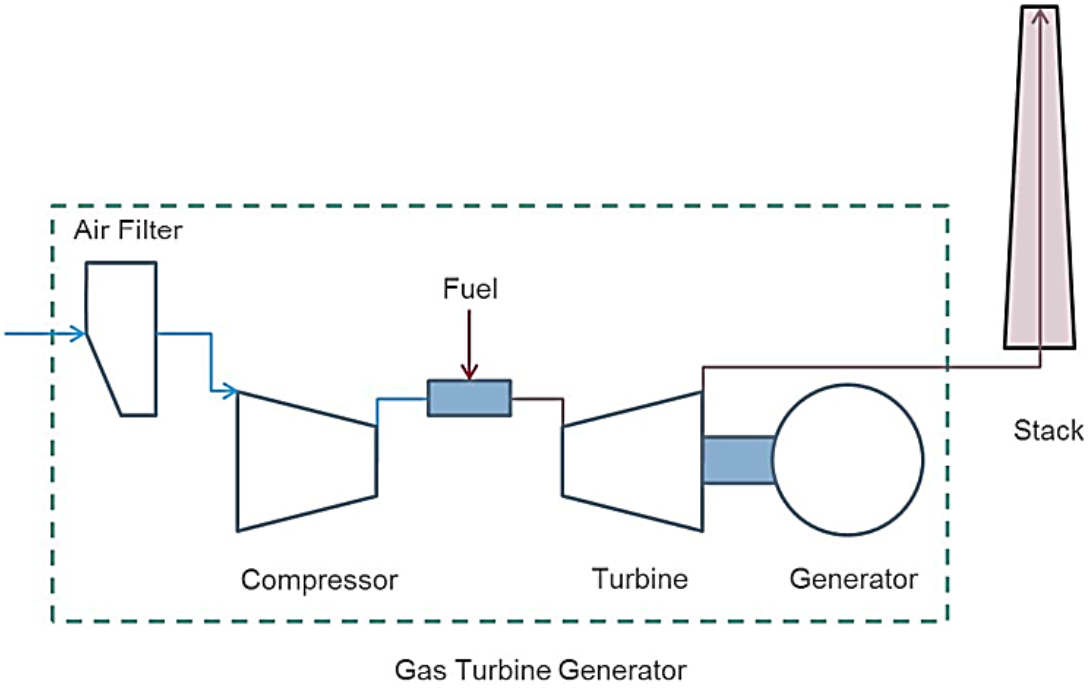
3.4.12 An initial stack height sensitivity study has been undertaken for the Project to determine the minimum stack height for the Gas Turbine Generator required for adequate dispersion of emissions to meet legislative air quality targets. The findings of this initial study setting out the height parameters are in Table 3-3.

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

3.4.14 Processed natural gas sourced from the National Gas Transmission System is a clean burning fuel and does not produce the levels of particulate or sulphur emissions associated with burning coal. Further discussion of emissions characteristics from the Generating Equipment is provided in **Chapter 6: Air Quality**, which sets out the findings of the air quality assessment.

3.4.15 The Power Generation Plant consists of one Gas Turbine Generator and its associated single stack arrangement. Figure 3-1 shows a simple schematic of an OCGT operation.

Figure 3-1: Schematic of OCGT Operation



c) Other Generating Equipment Plant Items

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

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

- Emergency Generator: A small diesel fired generator to provide power for the safe shutdown of the Gas Turbine Generator and running of essential security systems in emergency situations.

3.4.17 Table 3-3 provides indicative maximum and minimum dimensions for the main plant items which will be present at the Generating Equipment Site and the EIA has been prepared using these parameters following a 'Rochdale Envelope' approach, as described at the start of this section. The ground level at the Generating Equipment Site will be approximately 90 m AOD and the heights in the Table 3-3 are measured from this level.

Table 3-3: Parameters for Assessment

Building or Structure	Maximum Height (m)	Minimum Height (m)	Maximum Length (m)	Maximum Width (m)
Gas Turbine Generator (including gas turbine, generator, air inlet filter house, air inlet duct, exhaust diffuser, and auxiliaries such as lube oil system, air dryers, fuel gas filter package, instrument air system, compressor washing)	27	-	50	40
Exhaust gas emission flue stack	45	35	-	12
Control room/office/ workshop	7	-	45	25
Emergency Generator	6	-	13	5
Gas receiving station (including compression station, emergency generator, Joule-Thompson boilers and other auxiliary control cabinets))	10	-	70	50
Gatehouse	4.5	-	9	8
Demineralised water tank	5	-	5	5
Fire water tank	15	-	15	15
Above ground installation (AGI)	3	-	85	35
Minimum offtake connection (MOC)	3	-	35	35

Building or Structure	Maximum Height (m)	Minimum Height (m)	Maximum Length (m)	Maximum Width (m)
Gas Pipeline inspection gauge facility	3	-	35	35
Fin Fan Coolers	10	28	-	14
Transformer compound (including generator step up transformer, unit and other transformers, connection to underground cable and associated equipment.)	15	-	65	60

d) Access

3.4.18 An Access Road to the Generating Equipment Site from the B4489 will be formed by upgrading an existing access road between the B4489 junction and the Substation and constructing a new Access Road from the Substation to the Generating Equipment Site.

3.4.19 The existing access road between the B4489 junction and the Substation will be upgraded and potentially widened to accommodation passing places. The location and design of these improvements is currently under review, and will be confirmed in the submitted ES to accompany the DCO application. APL intends to consult on these improvements with the relevant landowners, users and interested parties as this design progresses.

3.4.20 In addition, two access options are being currently considered for the new Access Road between the Substation and Generating Equipment Site.

- Option A: This option was originally shown within the 2014 PEIR, and extends south from the car park adjacent to the Felindre Gas Compressor Station down a grassed embankment towards open fields and then north-eastwards towards the Generating Equipment Site.
- Option B: This option has identified an alternative which begins before the original spur at the car park adjacent to the Felindre Gas Compressor Station and again extends southward towards open fields but with a more gentle angle of approach, visibility and descent towards the open fields. This would also avoid an element of cut and fill, although some excavation is still likely.

3.4.21 Investigation is ongoing on the viability of both options for the new Access Road from the Substation to the Generating Equipment Site and therefore both are included within the Project Site boundary provided at this stage. APL intends to gain comments from interested parties and landowners in this regard and confirm the finalised option within the submitted ES at DCO Application.

3.4.22 Should Option A be chosen, the National Grid car park will be affected and therefore reinstated in an alternative location. If Option B is chosen, the existing car park is not affected and will remain in situ.

e) Laydown Area

3.4.23 A temporary Laydown Area during construction will be provided for the storage of materials, plant and equipment as well as containing site accommodation and welfare facilities, temporary car parking and temporary fencing. The Laydown Area will be provided adjacent to the Generating Equipment Site as shown in Figure 3.2. A small permanent area within the Laydown Area is required for maintenance during the operational phase of the Project.

f) Car Parking

3.4.24 During construction adequate car parking would be provided within the Laydown Area. During operation car parking for operational and maintenance staff would be provided within the Generating Equipment Site. The Project will take into account CCS's policy on parking standards during the operational phase of the Project and implement sustainable transport methods where possible.

g) Ecological Mitigation Area

3.4.25 An area has been set aside within the Project Site boundary if ecological mitigation is required. The location and area are to be confirmed following Phase 2 statutory consultation once discussions with NRW and CCS have been undertaken. The area is likely to be commensurate with the extent of mitigation required and within the Order Limits of the Project.

h) Lighting and Security Fencing

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

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

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

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

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

j) Drainage

3.4.30 The Project will require a site foul water drainage system, and an oily water drainage system. A surface water drainage system will also be required to adequately drain the site and prevent ponding.

3.4.31 To prevent inundation of the Project Site from surface runoff, cut off drainage ditches will be placed around the uphill site perimeter. Further details can be found in Section 3.11 and **Chapter 9: Water Quality and Resources**.

3.5 Description of Gas Connection

3.5.1 The Gas Connection would comprise all the necessary elements to enable gas to be imported to the Generating Equipment at a suitable rate and pressure to produce up to 299 MW, including a Gas Pipeline, AGI and Gas Receiving Station.

3.5.2 The Gas Connection will be in the form of a new AGI and underground Gas Pipeline, which is required in order to connect the Generating Equipment to the existing National Gas Transmission System so as to provide a reliable supply of fuel.

3.5.3 Connection of the Gas Pipeline to the National Gas Transmission System will require an AGI to be installed which will comprise: a Minimum Offtake Connection (MOC) facility, which will be owned by National Grid; and a Pipeline Inspection Gauge (PIG) Trap Facility (PTF) which will be owned by APL.

3.5.4 Termination of the Gas Connection will be at a second PTF located on the Generating Equipment Site. A further facility known as the Gas Receiving Station (GRS) will be situated downstream of the PTF within the Generating Equipment Site.

3.5.5 The AGI (both the MOC and PTF) will be located at the northern end of the Project Site, on the southern side of the Rhyd-y-pandy Road leading to Felindre. Once complete, maintenance access for the AGI will be from the Rhyd-y-pandy Road via a short, purpose built tarmacadam access track. The Gas Connection will then follow a route corridor shown on Figure 3.2 running in southerly direction to the Generating Equipment Site. It will be approximately 1.4 km in length. It will cross the National Gas Transmission System in two locations, a Public Right of Way (LC35B) in one location, two private farm tracks (see Figure 3.3) and one ditch (field drain).

3.6 Description of Electrical Connection

3.6.1 The Electrical Connection will comprise all the necessary elements to enable power to be exported from the Generating Equipment to the NETS. The connection will be approximately 900 m in length. It will consist of a 400kV underground cable to the Substation and associated works inside the Substation to connect to a gas-insulated switchgear (GIS) bay. The GIS bay will be consented by National Grid and owned, maintained and operated by APL, while National Grid will extend the existing Substation building at the eastern end of the Substation to house the GIS bay (the extension of the Substation building is included in the projects considered in the cumulative assessment as described in Section 4.7).

3.6.2 The Electrical Connection route (see Figure 3.2) leaves the Generating Equipment Site passing through open land to the east and south-east of the National Grid Gas Transmission System. The route crosses into National Grid's land to the east of tower 4YW251 heading towards the Substation. Once within National Grid's land the Electrical Connection turns to the north-west to run outside the Substation and parallel with the Substation fence line. The Electrical Connection then turns into the Substation close to the northern corner.

3.6.3 The route passes twice under one 400 kV overhead lattice tower mounted transmission line and once under one wooden pole mounted 11 kV overhead distribution line. The route crosses two ditches and a Local Transmission System pipeline within the field to the east of tower 4YW251.

3.6.4 The Electrical Connection route coincides with the Access Road for approximately 500 m of the route length.

3.6.5 The Electrical Connection will be drilled (for example using drilling techniques such as Horizontal Directional Drill (HDD)) under the Water Main with at least 2 m clearance from the underside of the Water Main. Though the route corridor of the Water Main is defined, the depth and exact location is unknown and is currently under investigation. Further consultation with Welsh Water will be undertaken as those investigations continue.

3.7 Construction and Site Preparation

a) Overview

3.7.1 Construction and commissioning of the Project would take approximately 22 months with an anticipated starting date in 2020. Typical construction activities and construction assumptions are described in this section and have been used in undertaking the assessment.

3.7.2 The main works associated with the construction phase will be excavation and site levelling for new foundations, piling (if required) and the laying of the Gas and Electrical Connections, as well as erection of the Generating Equipment.

b) Commencement and Site Preparation

3.7.3 Once a DCO has been granted and the relevant pre-commencement Requirements discharged, work can start on the Project Site.

3.7.4 An Outline Construction Environmental Management Plan (see Outline CEMP in Appendix 3.1) will be developed and contain the relevant topic specific management plans on health and safety and environmental management.

3.7.5 The Project Site will be surveyed to mark out with pegs the boundaries and key features and to fix the equipment centrelines according to approved planning and engineering drawings.

3.7.6 The Access Road will cross over the Water Main and National Gas Transmission System (see Figure 3.4). Construction details to be confirmed within the final ES. There will be temporary bridges over the Water Main and National Gas Transmission System during construction. Method statements for working in proximity to the Water Main and National Gas Transmission System will be agreed.

3.7.7 Water courses and ditches will be diverted around the Generating Equipment Site, with silt traps, straw bale filters and attenuation pond formed for any surface water outlet from the Generating Equipment Site. Water from the attenuation ponds will be discharged in a controlled manner to the Afon Llan.

3.7.8 The new Access Road will be excavated and formed by placing and rolling stone with macadam base course from the B4489 up to the Generating Equipment Site to allow clean vehicle access. A wheel cleaning system will be installed where vehicles leave the construction site and before reaching the existing section of the Access Road. The Access Road will have a tarmacadam surface.

3.7.9 The perimeter of the Generating Equipment Site will be cleared of undergrowth and a permanent or temporary security fence placed with locked gates for main and emergency exits (capable of being opened in an emergency). A security cabin will be established to provide accommodation for security personnel to be on site during construction 24 hours, seven days a week.

3.7.10 The Laydown Area will be cleared and surfaced with stone, and site cabins placed with offices, first aid, changing rooms, mess facilities with temporary sewage system and parking for cars and machinery.

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

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

c) Foundations and Piling

3.7.13 The need for piling will be determined following ground investigation works prior to construction. However, it has been assumed as part of the realistic worst case

scenario for certain environmental topics that piling will be required for the purposes of this assessment.

3.7.14 The main foundation building column bases for heavier structures (e.g. Gas Turbine Generator, water tanks and transformers) will be excavated to firm ground, the base rolled, blinding concrete placed, and pile caps cropped before fixing meshes of reinforcing steel. Timber shuttering boxes will then be placed, holding down bolts fixed, and concrete poured and finished for each base.

3.7.15 Shallow foundations for lighter buildings and bases will be excavated to firm ground, the base rolled, blinding concrete placed, before fixing meshes of reinforcing steel. Timber shuttering boxes will then be placed, holding down bolts fixed, and concrete poured and finished for each base.

3.7.16 Piling will be carried out using rotary driven piles in high load areas of the Generating Equipment Site such as plant and building column foundations. This technique will minimise disturbance of nearby sensitive ecological receptors. Shallow foundations for lighter buildings will be excavated.

3.7.17 The ground will be backfilled between foundations and floor slabs will be cast with polished finish with spoil from excavations.

d) Access and Traffic

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

3.7.19 It is estimated that the construction and decommissioning phases will each result in a maximum of approximately 209 vehicle trips (two way) per day. This will include around 146 HGV deliveries (two way) per day during the peak construction and decommissioning periods.

3.7.20 The construction phase is anticipated to take 22 months with the peak of HGV deliveries occurring during the first quarter of construction (months 1 to 3) and the peak car and van trips occurring during the fifth quarter of construction (months 12 to 14). The car or van trips would be mainly at the start and end of the working day whilst HGV trips would be spread across the day outside of peak times (see **Chapter 12: Traffic, Transport and Access**).

3.7.21 The majority of embedded mitigation measures are set out in the Outline CEMP (Appendix 3.1) as set out at the end of this chapter.

e) Buildings

3.7.22 Factory finish painted building steelwork, columns, frames and roof trusses will be delivered and erected on to the cured foundations.

3.7.23 Liner sheet cladding will be fixed to building frames, insulation blanket attached and outer cladding fixed to walls and roof.

3.7.24 Windows, personnel and roller shutter equipment doors will be fitted to make buildings weather tight.

3.7.25 Block work internal walls will be erected where buildings are divided. All buildings will be fitted out with electrical systems, plumbing and drainage.

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

f) Generating Plant Installation

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

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

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

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

g) Gas Connection

3.7.31 The Gas Connection includes both the Gas Pipeline together with its connection with the AGI. The route for the actual Gas Pipeline will be marked out, topsoil stripped and moved to one side and the trench excavated. The exact construction method for the Gas Pipeline will be subject to further survey and dependant on the National Gas Transmission System depth and ground conditions.

3.7.32 The Gas Pipeline will be delivered to the Project Site in spools and laid out along the route before welding into a string. The sections of pipe would then be lowered into the trench using side arm booms and backfilled for testing. Where the Gas Pipeline route crosses the National Gas Transmission System, an appropriate method of crossing will be undertaken which affords the appropriate level of protection to the National Gas Transmission System at its existing depth. This may include open cut techniques or a trenchless crossing such as horizontal directional drilling.

3.7.33 Following the laying of the Gas Pipeline, the excavated material and topsoil will be returned to its original position. The surface will then be seeded to restore it to its original state.

3.7.34 Gas systems skids will be placed and piping connected before commissioning the Gas Pipeline, pressure regulators and metering.

3.7.35 The Gas Connection and Electrical Connection will cross an existing Public Right of Way (PRoW) as shown on Figure 3.3. During construction, the PRoW will likely be

stopped up temporarily during certain elements of construction phase works to maintain public access and safety.

h) Electrical Connection

3.7.36 The Electrical Connection will be constructed within the curtilage of the Access Road within a 5 m working width adjacent to the road. A cable duct will be installed adjacent to the Access Road to allow the cable to be pulled through at a later date. Short sections of open cut trench will be required at either end of the cable route where it does not coincide with the Access Road. The installation of the cable within the Substation is anticipated to be in cable ducts, although National Grid has recently started using direct buried cables within the Substation.

3.7.37 As described in Section 3.6, the Electrical Connection will require temporary bridges over the Water Main during the construction phase to enable access from the new Access Road and Laydown Area. Final construction methods and type of bridges will be confirmed in the final ES once further investigations in to the location and depth of the Water Main is confirmed so that the level of protection required can be designed and agreed with Welsh Water Dwr Cymru.

3.8 Commissioning and Completion

a) Generating Plant

3.8.1 All mechanical systems will be cold commissioned once alignment or rotating parts and pressure test of enclosed systems has been completed.

3.8.2 Electrical systems will be checked, commissioned and energised stage by stage.

3.8.3 The Gas Turbine Generator system will be checked and cold commissioned together with control room and National Grid communications.

3.8.4 When all systems are energised and cold commissioned, the gas turbine will be started and ‘first fired’. The turbine is run to full speed before synchronising to the grid and producing electrical energy in increasing load steps.

3.8.5 Grid Code compliance tests will be carried out as well as performance, noise and emissions tests.

3.8.6 All buildings will be completed, with sealing, painting, floor finishes and decoration.

3.8.7 All areas of the plant and buildings will be surveyed for outstanding work and minor defects and a programme established to complete these.

3.8.8 The base course at the side of each site road will be cut back to the final width and kerbs will be placed before the final wearing course of macadam is placed. Road marking and signs will be added.

3.8.9 Lighting will be installed in accordance with the Outline Lighting Strategy to be submitted within the DCO Application.

3.8.10 Areas surrounding and between the Generating Equipment will be levelled and crushed stone placed. Stored topsoil is placed in areas free from Generating Equipment, including the temporary site laydown areas. An indicative Outline Landscaping Strategy is included in Figure 11.10.

3.8.11 The estimated excavation volume for ground works and site levelling is approximately 19,000 m^3.

3.9 Operation and Maintenance

a) Generating Plant

3.9.1 For the purpose of EIA it has been assumed that the Generating Equipment will be designed to have a minimum operational life of 25 years, and that after its operational life it will be decommissioned and this scenario has been assessed in this PEIR. However, it should be noted that it is common for power stations to run safely for a much longer period than 25 years. It does not make a material difference to the assessment how long the operational life is in practice. A decision as to whether the Project is decommissioned or 're-powered' (depending on the condition of the electricity market and energy mix) would be made at the appropriate time.

3.9.2 The plant is expected to operate for up to 2,250 hours per year and 1,500 running hours rolling average over 5 years, supporting National Grid during periods of peak demand and system stress. The plant will have fast start up, response and ramping capability in order to meet the demand profile and compensate for the intermittency of certain forms of renewable power generation connected to the grid.

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

3.9.4 The Generating Equipment would benefit from on line monitoring and operational diagnosis to identify maintenance needs according to lifecycle use.

3.9.5 The permanent maintenance compound would be used to store/transfer spare parts should any need to be replaced during maintenance/repair. The maintenance compound would also be used periodically during operation for any maintenance activities that require movement of large plant items.

3.9.6 Materials and finishes would be selected to ensure that the appearance of the Power Generation Plant does not deteriorate with time. Periodic and routine maintenance would take place on average once yearly. Typically, planned maintenance would be carried out by one or two skilled personnel.

3.9.7 Inspections to replace or refurbish combustion and turbine hot parts equipment are typically carried out approximately every six years. For industrial gas turbines, this

work can be done on site using a mobile crane and hand tools. The shutdown duration is typically 15-20 days.

3.9.8 A gas turbine with dry low NO_x combustion will be used. This will avoid the requirement for large amounts of demineralised water for emissions control. Water will be transported to the Project Site by water tankers for multiple uses including compressor washing in the Gas Turbine Generator and for servicing welfare facilities including potable water and hygiene consumption. Water for the gas turbine compressor washing will be demineralised. Demineralised water tankers will attend site approximately once a month to maintain a store of demineralised water. Typical quality requirements are for conductivity to be lower than 0.2 µS/cm, but vary with gas turbine supplier. After use, the compressor wash water is taken by tanker from site for licensed disposal.

3.9.9 In the event of an unscheduled issue with the Generating Equipment, alarms would signal to the control room instances where there are issues with abnormal operation. These alarms would not be audible externally. The plant would be shut down immediately in such instances and an engineer would attend site. The Generating Equipment would not start up again until the issue had been resolved. Alarms would only be audible outside where there was an event affecting personnel safety such as a fire alarm.

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

b) Indicative Gas Connection Maintenance Activities

3.9.11 The Gas Connection would remain operational for the entire lifetime of the Power Generation Plant. No parts of the Gas Connection would be manned. Telemetry apparatus (both within the Gas Pipeline trench and at the AGI) would report back any issues to a central control room. Should any issues be identified, the Gas Pipeline would be isolated and the supply switched off, pending investigation of any faults. Access to the AGI during maintenance / repair would be via a new permanent access off Rhyd-y-pandy Road.

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

- Visual checks;
- In-line inspection;
- Cathodic protection checks; and
- Valve operation checks.

c) Indicative Electrical Connection Maintenance Activities

3.9.13 No regular maintenance is anticipated to be carried out on the underground electrical cable. Maintenance of the electrical cable will be limited to repair in the

event of a fault in the cable, in which case the cable will be isolated for repair in line with industry good practice.

3.9.14 The electrical equipment would be subject to periodic inspection. To perform such inspections, pedestrian access is adequate.

3.9.15 The route would be regularly checked to ensure that there are no excavation or construction works in the direct vicinity of the cables, that mounds of soil are not deposited above the cables and that trees are not planted above the cables; this should normally require little more than a drive past.

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

3.10 Decommissioning

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

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

3.11 Embedded Mitigation

3.11.1 Mitigation which is either implicit in the design of the Project or its construction and operation through standard control measures routinely used, such as working within best practice guidance during construction, is known as embedded mitigation. This embedded mitigation has been assumed for the purposes of this PEIR to be in place from the outset. This PEIR has therefore assessed the likely significant effects of the Project including embedded mitigation. The following section describes the measures which are considered to be embedded mitigation for the purposes of the assessment. Where not already an inherent part of the design of the Project, such embedded mitigation is secured by the DCO and its Requirements.

3.11.2 A CEMP will be prepared and then implemented during construction to mitigate any adverse environmental effects. An Outline CEMP for the Project is provided at Appendix 3.1 of this PEIR for consultation. It includes measures relating to the environmental topics assessed in this PEIR which will mitigate the effects of construction. The CEMP will be finalised and followed by the Contractor on site, once the content has been agreed with CCS. The finalised CEMP will include the following information:

- Community liaison;
- Nuisance management including measures to avoid or minimise the impacts of construction works (covering dust, noise, vibration and lighting);
- Site waste and materials management measures;
- Surface and ground water protection measures;
- Pollution control measures;
- Peat management measures as required;
- Landscape and visual impact mitigation (such as retention of existing trees and minimising visual intrusion of construction works);
- Security measures; a protocol in the event that unexpected contaminated land is identified during ground investigation or construction;
- A protocol for the restoration of land which is temporarily used for construction following the date of final commissioning;
- Environmental training requirements; and
- Ecological mitigation measures including avoidance of sensitive features.

a) Drainage

i. Construction

3.11.3 The Project incorporates welfare facilities which will require a site foul water drainage system. The Project Site is remote and it is believed it will be unfeasible to connect to a public sewer. Therefore, a foul water drainage system will either drain to a septic tank or a package treatment plant within the Project Site but outside any area at risk of flooding. It is likely that the latter would be the preferred option for ease of maintenance and environmental criteria. The processed water would then discharge on site or to a nearby watercourse.

3.11.4 An oily water drainage system will be required to receive surface water from potentially contaminated oil retaining areas and prevent contaminated water discharging from site. Oily water drainage shall be designed in accordance with National Grid Technical Specification 2.20 'Oil Containment at Electricity Substations and Other Operational Sites' (Ref 3.1) or similar approved guidelines.

3.11.5 The surface water drainage system will be required to adequately drain the Project Site and prevent ponding. The surface water drainage system will adopt the principles of the SuDS Manual – Ciria C753. – Updated SuDS Manual reference 2015 (Ref 3.2).

3.11.6 To prevent inundation of the Project Site from surface runoff cut off drainage ditches will be placed around the uphill site perimeter. These new drainage ditches will be designed to carry the surface runoff around the Project Site and downstream back to the original drainage ditches/watercourses.

3.11.7 Where possible, the new levels and surfacing will be designed so they naturally drain by infiltration into the surrounding ground. Where this is not economically possible or presents an unsatisfactory risk of flooding, infiltration drains will be installed. All infiltration drains will connect to the surface water drainage system.

3.11.8 It is not expected that it will be possible to connect the surface water drainage system to an infiltration basin due to the presumed predominantly clayey ground and high groundwater level in places. This will be confirmed when the Ground Investigation surveys are carried out. Instead the discharged flow of water at the Generating Equipment Site boundary from the surface water drainage system will be attenuated in order to maintain the equivalent greenfield runoff flow for a range of events up to the 1 in 100 year event (with climate change allowance). The flow will be attenuated using suitably sized attenuation ponds with restricted discharge pipes to the existing greenfield runoff rates. An emergency overflow will be provided to the attenuation ponds to prevent site flooding in the event of an extreme rainfall event.

3.11.9 Where possible, roadside swales and infiltration drains will be used to remove and convey any standing water into the surface water drainage system from internal roads within the Project Site including the new Access Road. Where there are space constraints, or there is an elevated risk of contamination, the new site roads will be kerbed and drain via road gullies with pollution control measures. It is expected that roadside swales will discharge to nearby local watercourses at the existing greenfield runoff rate.

3.11.10 Existing field drainage that will cross the new Access Road will be culverted or bridged for a short length to allow flow up to the 1 in 100 year return period.

b) Air Quality

i. Construction

3.11.11 The CEMP will include standard good practice dust mitigation measures, as set out in the Outline CEMP in Appendix 3.1.

3.11.12 Daily visual inspections of dust emissions will be made in conjunction with dust emissions monitoring at locations to be agreed with NRW. If plumes of dust are visible, behind moving vehicles for example, or dust was visibly deposited on roads outside of the Project Site, more vigorous control measure may be required.

3.11.13 Institute of Air Quality Managers (IAQM) guidance on monitoring air quality at construction sites (Ref 3.3) recommends that, in addition to visual inspections, ambient air monitoring is undertaken in the vicinity of high risk sites. This data is required for two reasons: the first relates to ensuring that mitigation measures are appropriate and being applied rigorously; the second is to provide early warning of increased dust emissions which allows for the cessation or modification of activities prior to impacts occurring.

3.11.14 Monitoring will be undertaken in the vicinity of the Lletty Morfil SINC. Since the risk for ecosystems relates to dust deposition, a real time monitor for total suspended particulate matter will be installed but this needs be an 'indicative instrument' only. Trigger levels for the instrument, which would suggest increasing risk/emissions, should be agreed with NRW prior to the commencement of construction. The monitoring stations will be mobile and would be moved around the Project Site as the principal activities move.

ii. Operation

3.11.15 The Generating Equipment will be designed to comply with Industrial Emissions Directive (IED) emission limits. In addition the stack height determination (Appendix 6.2) has demonstrated that a minimum stack height of 35 m is appropriate to ensure the adequate dispersal of pollutants to ensure that no harm is caused.

3.11.16 The Project will require an Environmental Permit to operate as required by the Environmental Permitting Regulations 2016 (as amended), and monitoring the performance of the Generating Equipment against the permit conditions will be the responsibility of NRW. The performance of the emissions control will require monitoring by stack emissions testing throughout operation and the Generating Equipment will be 'fine-tuned' so as to ensure that limits are not exceeded.

3.11.17 The operation of the Project will not require a significant onsite workforce. Visits by service/maintenance vehicles etc. will occur on average every year. Nevertheless, an outline Travel Plan will be been prepared to ensure that any impacts on traffic (and by definition roadside air quality) are minimised.

c) Noise and Vibration

i. Construction

3.11.18 It is anticipated that core working hours and boundary noise will be limited during construction by a Requirement in the DCO. Working hours are likely to be between 08.00 and 18.00 on weekdays, and between 08.00 and 13.00 hours on Saturdays and public holidays. Some works may be allowed to take place outside of normal working hours provided they do not cause any noise disturbance. Should it be necessary to conduct work with the potential to generate noise, outside these core

hours, this would be with the prior written agreement of CCS. These limits will not apply during commissioning and testing of the Project.

3.11.19 Measures to mitigate noise and ensure compliance with any imposed maximum boundary noise limits will be implemented during the construction phase of the Project in order to minimise impacts at local residential Noise Sensitive Receptors (NSRs), particularly with respect to activities required outside of normal working hours.

3.11.20 Construction noise mitigation measures are included in the Outline CEMP (Appendix 3.1). In order to keep noise effects from the construction phase to a minimum, all construction activities relating to the Power Generation Plant, Gas Connection, and Electrical Connection would be carried out in accordance with the recommendations of British Standard (BS) 5228 'Noise and Vibration Control on Construction and Open Sites' (Ref 3.4) as explained in **Chapter 7: Noise & Vibration**.

3.11.21 Mitigation measures for inclusion within the CEMP may contain, but is not limited to:

- Abiding by any construction noise limits at nearby NSRs;
- Ensuring that all processes are in place to minimise noise before works begin and ensuring that best practicable measures (BPM) are being achieved throughout the construction programme, including the use of localised screening around significant noise producing plant and activities;
- Ensuring that modern plant is used, complying with the latest European noise emission requirements. Selection of inherently quiet plant where possible;
- Hydraulic techniques for breaking to be used in preference to percussive techniques where practical;
- Use of lower noise piling (such as rotary bored or hydraulic jacking) rather the driven piling techniques (if required), where possible;
- Off-site pre-fabrication, where practical;
- All plant and equipment being used for the works to be properly maintained, silenced where appropriate, operated to prevent excessive noise, and switched off when not in use;
- All contractors to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2) (Ref 3.4), which should form a prerequisite of their appointment;
- Loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the Project Site, to be conducted in such a manner as to minimise noise generation;
- Appropriate routing of construction traffic on public roads and along access tracks;
- Consultation with CCS and local residents to advise of potential noisy works that are due to take place; and
- Monitoring of noise complaints, and reporting to the contractor for immediate investigation.

3.11.22 Method statements regarding construction management, traffic management, and overall site management would be prepared in accordance with best practice and relevant British Standards, to help to minimise impacts of construction works. One of the key aims of such method statements would be to minimise noise disruption to local residents during the construction period.

3.11.23 Consultation and communication with the local community throughout the construction period would also serve to publicise the works schedule, giving notification to residents regarding periods when higher levels of noise may occur during specific operations, and providing lines of communication where complaints can be addressed.

3.11.24 A detailed noise assessment would be carried out once the contractor is appointed and further details of construction methods are known, in order to identify specific mitigation measures for the Project.

3.11.25 In addition, it is proposed that the contractor would be a member of the 'Considerate Constructors Scheme' which is an initiative open to all contractors undertaking building work.

ii. Operation

3.11.26 The selection of the Project Site and development of the indicative concept layout have already included consideration of potential noise effects and proximity to NSRs, with Generating Equipment being located as close to the existing electrical infrastructure as possible and as far from the NSRs as practicable.

3.11.27 Other measures with regards to noise and vibration during operation, to be incorporated into the design include:

- The gas turbine generator and major compressors are to be housed in acoustic enclosures. In addition, these will be housed within secondary acoustic enclosures specified at 75 dB(A) Sound Pressure Level at 1 m.
- Gas turbine air inlet filter and ventilation apertures are to be fitted with silencers, and designed such that all sensitive noise receptors benefit from screening and/or directivity corrections.
- Silencers are to be fitted in the exhaust stack. Due to the impracticality of screening stack noise, discharge noise will be controlled using these silencers, which will be tuned to attenuate low frequencies from the gas turbine generator exhausts.
- All plant items will be controlled to minimise noise of an impulsive or tonal nature.
- Noise breakout from the stack will be controlled using silencers. To achieve the predicted noise levels used in this assessment, noise from the top of the stacks should not exceed the maximum octave band sound power levels identified in Table 7-8 in **Chapter 7: Noise and Vibration**.

3.11.28 During the detailed design stage, options to mitigate potential significant residual noise effects by design will be further explored.

3.11.29 Several options for configuration and suppliers of the Generation Equipment are under consideration. Preliminary modelling has shown that options are available that are capable of meeting the threshold noise levels.

3.11.30 The Project would operate in accordance with an Environmental Permit issued and regulated by NRW. This would require operational noise from the Generating Equipment to be controlled through the use of BAT, which would be determined through the Environmental Permit application.

3.11.31 If any non-normal and/or emergency operations were to lead to noise levels in excess of the agreed limits specified in the DCO Requirements, the operator will inform the local authority and residents of the reasons for these operations, the anticipated emergency period and the steps to be taken to bring it back to compliance.

d) Ecology

i. Construction

3.11.32 Local habitats and protected species would be protected during the construction works through measures included within the Outline CEMP (Appendix 3.1) such as fencing to prevent access of species to working areas and translocation of protected species (e.g. reptiles).

3.11.33 Sensitive ecology features such as the Ancient Woodland, trees and habitats have been avoided as much as possible during the Project design development and will continue to be considered in the potential improvements and widening of the existing access road from the B4489, drainage and landscape reinstatement.

3.11.34 The Outline Ecological Management Plan will set out all necessary ecological mitigation measures as necessary to sufficiently mitigate the impacts on ecological receptors. The plan also outlines procedures to manage invasive species and will be submitted with the DCO Application.

ii. Operation

3.11.35 The stack has been designed to minimise impacts from emissions during operation, which includes minimising deposition that could affect ecological receptors.

e) Water Quality and Resources

i. Construction

3.11.36 Hydrological protection measures have been included in the Outline CEMP (Appendix 3.1) to prevent pollution events, with particular reference to the Gas Connection and includes silt traps to reduce flow of suspended solids, suitable phasing to reduce the need for unprotected slopes and avoidance of stockpiled materials. The drainage strategy is included in Appendix E of Appendix 9.1.

3.11.37 All designated oil retaining areas (e.g. oil filled transformers and oil storage areas) will be designed and constructed to contain at least 110% of the stored oil.

3.11.38 Rainwater will be removed from oil retaining areas by an automatic pump to the oily water drainage system. The automatic pumps will be designed to shut down in the event that a major oil spillage is detected. This will help prevent large quantities of oil entering the oily water drainage system.

3.11.39 The oily water drainage system will ultimately pass through a Class 1 Full Retention Oil Separator (as defined in BS EN 858) before discharging into surface water bodies or drainage systems.

3.11.40 All oil unloading areas on site have been designed to include containment for accidental spillage of fuel during unloading with the loading system equipped such that drainage is isolated during filling and any spillage goes to the dedicated interceptor.

3.11.41 The oil separator will be fitted with an alarm to indicate when the oil coalesce requires emptying. All oil separators will be sized to suit the oily water catchment area.

i. Operation

3.11.42 Adaptation of different platform levels at the locations of key elements of the Project development. In line with this, the ground level of the Water Main easement area will be retained at the existing level in order to provide a path for any flood water to pass through the Project Site, thereby avoiding the elevated Power Generation Plant areas – with the Power Generation Plant finished floor level to be raised by approximately 150 mm above the site road crown level while keeping the plant plinths at 300 mm above the site level.

3.11.43 Provision for all process water (i.e. gas turbine compressor wash water) to be collected in a drain tank removed by road tanker and disposed by an accredited company to a designated treatment facility off-site.

f) Ground Conditions

i. Construction

3.11.44 The CEMP will be implemented during construction to mitigate any adverse environmental effects and includes working in accordance with best practices, such as the completion of all necessary ground investigation and risk assessments, maintaining safe working practices and the use of correct and appropriate Personal Protective Equipment (PPE).

3.11.45 The following information which relates specifically to geology, ground conditions and hydrogeology will be included within the CEMP:

- Surface and groundwater protection measures;
- Peat management measures as required; and
- Security measures; a protocol in the event that unexpected contaminated land is identified during ground investigation or construction.

3.11.46 Intrusive ground investigation will be conducted post-consent, to be secured via a DCO Requirement, to identify ground conditions and potential contaminants, as will risk assessments including gas, control waters and human health.

3.11.47 A detailed mining risk assessment may be required to establish the risk of untreated shallow underground workings beneath the Project Site. There is potential for mine workings and entries requiring stabilisation treatment so ground stability will be improved.

3.11.48 A mineral resources survey may be undertaken to establish the value of the sand, gravel and coal reserves.

3.11.49 A foundations risk assessment is likely to be required to assess the risk of piling foundations to controlled waters, however this will be confirmed by the ground investigiation.

g) Landscape and Visual

i. Construction

3.11.50 Mitigation measures will be implemented during the construction phase as set out in the Outline CEMP (Appendix 3.1) in order to limit impacts on the landscape and visual resource. These measures will include:

- The use of tall hoardings to screen views of ground level construction activities in relation to sensitive receptors such as residential views and views from nearby PRoW;
- Materials and machinery will be stored tidily during the construction works in order to minimise impacts on views;
- Lighting of compounds and work sites will be restricted to agreed working hours and those which are necessary for security in accordance with the Institution of Lighting Professionals guidelines (Ref. 3.5);
- The unnecessary removal of vegetation will be avoided;
- The retention and protection of existing trees in accordance with BS5837:2012 Trees in Design, Demolition and Construction, Recommendations (Ref 3.5);
- public roads providing access to construction site will be maintained fee of dust and mud;
- The Contractor will clear and clean all working areas and accesses as work proceeds and when no longer required for the works;
- On completion of construction works, all structures, equipment, surplus materials, waste, notice boards and temporary fences used during construction will be removed from the Project Site with minimum damage to the surrounding area; and
- Prompt reinstatement of areas that are no longer required following construction.

ii. Operation

3.11.51 Mitigation has been developed through a collaborative and iterative design process and is embedded into the Project design. These design measures are set out in the following paragraphs.

3.11.52 Utilising technology OCGT will allow a significant reduction in stack height compared to other technology types. As a result of selecting OCGT technology, there will be no visible plume arising from the stack. The high temperature of the exhaust gases means that water vapour is well above the condensation point which would give rise to a visible plume.

3.11.53 The architectural design of the buildings and structures on the Project Site has been designed to reduce glare and to assimilate the Project into the surrounding landscape as much as possible by using neutral recessive colours to lessen the contrast with the surrounding landscape and break up the overall massing of the large scale structures.

3.11.54 External lighting has been designed to reduce trespass and configured to avoid glare and spillage Details will be provided in the Outline Lighting Strategy to be submitted as part of the DCO Application and undertaken in accordance with the Institution of Lighting Professionals Guidelines (Ref. 3.5).

3.11.55 An outline landscape mitigation strategy has been developed to both provide reinstatement planting as well as to integrate the Project into the landscape and its wider setting. The planting proposals will be developed in accordance with the various utility and service constraints within the site and are presented on Figures 11.10 – 11.12. Investigations are ongoing at present and this will be confirmed for the DCO Application.

3.11.56 The landscape proposals will cover a minimum period of five years of monitoring, management and maintenance to ensure the landscape objectives are successfully achieved.

h) Traffic, Transport and Access

i. Construction

3.11.57 The embedded mitigation for traffic, transport and access includes the following:

- Modifications to the B4489/Access Road junction to facilitate movements by abnormal loads;
- Widening and extension of the access road to facilitate access by construction traffic;
- Physical management of the access road to ensure the security and safety of all staff;
- A Construction Traffic Management Plan (CTMP) including details of the management of construction traffic and PROW; and
- A Construction Staff Traffic Plan (CSTP) to minimise the level of single occupancy car use by construction staff travelling to/from the site.

3.11.58 Details of these embedded mitigation measures are still to be finalised.

i) Cultural Heritage and Archaeology

i. Construction

3.11.59 A Written Scheme of Investigation (WSI) will be prepared in advance of construction commencing. A watching brief will then be implemented in accordance with WSI during construction for any works associated with ground disturbance.

j) Other Effects

i. Construction

3.11.60 The Outline CEMP includes a section on Site Waste Management, which will encourage reuse and recycling of waste before disposal in accordance with the waste hierarchy.

3.12 References

Ref 3.1 National Grid. (2014). NGTS 2.20: Oil Containment at Electricity Substations and Other Operational Sites.

Ref 3.2 CIRIA. (2015). C753: The SUDS [Sustainable Urban Drainage] Manual;

Ref 3.3 IAQM. (2012). Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. [Online].
Available: http://www.iaqm.co.uk/wp-content/uploads/guidance/monitoring_construction_sites_2012.pdf

Ref 3.4 British Standards Institute (BSI). (2014). BS 5228 -1: 2009+ A1:2014. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise.

Ref 3.5 ILP. (2011). Guidance Notes for the Reduction of Obtrusive Light. [Online].
Available: https://www.theilp.org.uk/resources/free-resources/ilp-guidance-notes/

Ref 3.6 BSI. (2012). BS 5837. Trees in Relation to Design, Demolition and Construction – Recommendations.