

Outline Landscape and Ecology Mitigation Strategy (Revision 3)

21st December 2018

CONTENTS

1.	Introduction	2
1.1	Overview	2
1.2	The Purpose and Structure of this Document.....	2
2.	Baseline Conditions	4
3.	Construction Mitigation	6
3.1	Landscape Working Methods.....	6
4.	Landscape and Ecological Mitigation Proposals.....	7
4.1	Overview	7
4.2	Habitats and Protection	7
4.3	Habitat Replacement.....	8
4.4	Tree Management and Root Protection.....	9
4.5	Species-Specific Measures	9
4.6	Planting Proposals	10
4.7	Management and Maintenance	12
4.8	Roles and Responsibilities	13
4.9	Reinstatement	14
5.	References	16
	Appendix A Reptiles	18
	Appendix B Breeding Birds	21
	Appendix C Bats	22
	Appendix D Otter and Water Vole	23
	Appendix E Badger	25
	Appendix F Invasive Non Native Species.....	26
	Appendix G Hedgerows	30

1. Introduction

1.1 Overview

- 1.1.1 This document describes the landscape and biodiversity impact mitigation measures that will be implemented prior to and during the construction phase of the Project, as well as the mitigation, management and monitoring measures to be implemented once the Project is operational.
- 1.1.2 This document should be read in conjunction with ES **Chapter 8: Ecology, Chapter 11: Landscape and Visual Assessment** and the Landscape and Ecology Mitigation Plan (LEMP) (ES Figure 3.6a-e). This strategy also refers to the following plans: Construction Environmental Management Plan (CEMP), Surface Water Management Plan (SWMP) and an Outline Lighting Strategy to demonstrate a holistic approach.
- 1.1.3 The proposed landscape and biodiversity mitigation measures are summarised below. These proposals have been designed to be delivered within the Project Site Boundary, as well as to retain where possible the existing planting within the Project Site Boundary. New habitat creation and landscaping have been accommodated, alongside the protection and enhancement of existing habitats where feasible.
- 1.1.4 The key measures proposed are:
- biodiversity mitigation by the provision of newly created replacement habitats;
 - woodland structure planting within the Project Site Boundary to partially screen structures; and
 - management of newly created replacement habitats.
- 1.1.5 The proposed landscape and ecological mitigation measures are illustrated in ES Figures 3.6a-e which graphically demonstrate the primary mitigation measures embedded into the project design as well as the new habitat creation. Combined with this document they outline the proposed mitigation measures for the Project in relation to landscape and ecology using a holistic and integrated approach, and have been produced to support the DCO Application.
- 1.1.6 The landscape and ecological mitigation measures described in this document will be subject to a management period running concurrently with the operational design lifetime of the Project. The execution of these works will be the responsibility of the operator of the Site. The planting operations in association with the Above Ground Installation (AGI) will be undertaken by National Grid.

1.2 The Purpose and Structure of this Document

- 1.2.1 The purpose of this document is to set out the proposed strategy to mitigate potentially adverse effects of the Project on the biodiversity features within the Project Site Boundary and on the landscape and visual resource. It provides a

clear landscape and ecological rationale, which responds to the Project Site and the assessments prepared in **ES Chapter 8: Ecology** and **Chapter 11: Landscape and Visual**.

1.2.2 The Project has been designed, as far as is practicable, to avoid or reduce effects on landscape and biodiversity features through design development and impact avoidance. Opportunities to secure net gains for landscape and biodiversity as a consequence of the Project have also been considered.

1.2.3 The document has been structured as follows:

- Baseline Conditions;
- Construction Mitigation;
- Landscape and Ecological mitigation proposals; and
- Management and Maintenance.

1.2.4 Outline species specific method statements are provided in Appendices A-G.

1.2.5 At this stage, it is not possible to provide specific and detailed landscape and ecological proposals outwith the principles and minimum requirements set out in this document. This Strategy will be finalised once construction timings are established, detailed design has been undertaken and the final layout of the Project confirmed, with contractor and further stakeholder involvement. The finalised document will detail the following as a minimum:

- Aims and objectives of the management of the landscape and ecological mitigation area and other mitigation measures;
- How the management will be implemented and the appropriate responsibilities;
- Details of permitted grazing regimes, including type of stock, timings and management;
- Schedule of reporting;
- Pre-construction and construction management measures to ensure the protection of species during the infilling and creation of ponds and other enhancement features;
- Methods to identify and implement any remedial measures and to establish a feedback mechanism to change or add new mitigation (if required), should landscaping or ecological mitigation measures fail during establishment;
- Approach to document survey and monitoring results including the supply of wildlife data to the South East Wales Biodiversity Records Centre (SEWBRc);
- Details of monitoring including frequency, reporting and responsibility; and
- Detailed information on the landscape and ecological management strategy including prescriptions for all species and habitats of local or national importance identified as present or possibly present.

1.2.6 The finalised document will be submitted for comment and approval to CCS prior to the commencement of construction.

2. Baseline Conditions

- 2.1.1 The Project Site is located within a valley with ground rising to the north, east and west which provides visual containment. Ground levels vary across the Project Site from approximately 146 m Above Ordinance Datum (AOD) in the north-west corner to 80 m AOD along the southern perimeter. Ground levels generally fall in a southerly and south easterly direction.
- 2.1.2 The Project Site is predominantly covered with pasture which is currently used for sheep and horse grazing as well as a band of broadleaf woodland to the east. A soft surface horse training track, known as 'The Gallops', crosses the Project Site and runs diagonally north-west to south-east. Broadleaf woodland which is classified in part as Ancient Woodland lies to the east of the Project Site as well as around the Access Road to the Substation and Felindre Gas Compressor Station. Fields across the Project Site support a mix of improved grassland, semi-improved grassland (acid/neutral) and wet grassland (marshy grassland) which are subdivided by ditches, post and wire fencing, remnant hedgerows (forming rows of mature trees) and are interspersed with scrub vegetation. The habitats are heavily grazed and as such support a limited range of floristic species.
- 2.1.3 The western part of the Project Site encompasses part of the Substation, adjacent to the Felindre Gas Compressor Station. Both the Substation and the Felindre Gas Compressor Station comprise large scale power infrastructure facilities characterised by tall industrial structures enclosed by security fencing and set within woodland planting. Pylons are prominent across the landscape and converge at the Substation.

Generating Equipment Site

- 2.1.4 Pre-construction, the Generating Equipment Site is dominated by an area of marshy grassland surrounded by broadleaf woodland and semi-improved neutral grassland. There are five ditches running through the centre of the Generating Equipment Site of which two pairs run parallel to each other and are wooded. Part of the broadleaf woodland and marshy grassland is designated as a Site of Importance for Nature Conservation (SINC) (Lletty-Morfil SINC), the boundary of which extends beyond the Project Site Boundary.
- 2.1.5 The construction of the Generating Equipment Site will require the creation of a temporary construction compound 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). A small area within the Laydown Area will be retained permanently (the Maintenance Compound). The area is dominated by marshy grassland and a small area of improved grassland and semi-improved neutral grassland.
- 2.1.6 Habitats within the Generating Equipment Site are known to support or are suitable for supporting the following protected and priority species:

- Priority species of butterfly and moth;
- Common toad (priority species);
- Common lizard and grass snake (protected species);
- Breeding birds (protected species);
- Bats (protected species);
- Water vole (protected species);
- Otter (protected species);
- Brown hare (priority species); and,
- Badger (protected species).

2.1.7 The Generating Equipment Site also supports invasive non-native species (INNS) of plants – Japanese knotweed, Himalayan balsam and floating pennywort.

Access Road

2.1.8 The Access Road runs from the B4489, which lies to the west, to the Generating Equipment Site. The Access Road will be formed by upgrading an existing access road between the B4489 junction and the Substation and constructing a new section of Access Road from the Substation to the Generating Equipment Site.

2.1.9 Pre-construction, the Access Road comprises hard standing, improved grassland, semi-improved neutral grassland, row of trees and marshy grassland. The new section of Access Road crosses two watercourses, and has been rerouted to avoid an area of Ancient Woodland.

2.1.10 Habitats within the Access Road are known to support or are suitable for supporting the following protected and priority species:

- Common toad (priority species);
- Common lizard and grass snake (protected species);
- Breeding birds (protected species);
- Bats (protected species);
- Otter (protected species);
- Brown hare (priority species); and,
- Badger (protected species).

2.1.11 The Access Road also supports INNS plants, namely Japanese knotweed.

Electrical Connection

2.1.12 The Electrical Connection is an underground electrical cable to export power from the Generating Equipment to the National Grid Electricity Transmission System (NETS). For the first 160 m (approx.) the route runs from the NETS through an area of semi-improved neutral grassland, a ditch and row of trees, after which it runs alongside the Access Road.

Gas Connection

- 2.1.13 The Gas Connection will be in the form of a new AGI and underground 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.
- 2.1.14 The Gas Connection is dominated by improved grassland, with boundary features including one hedgerow, two rows of trees and post and wire fences.
- 2.1.15 Habitats within the Gas Connection are known to support or are suitable for supporting the following protected and priority species:
- Priority species of butterfly and moth;
 - Common toad (priority species);
 - Common lizard and grass snake (protected species);
 - Breeding birds (protected species);
 - Bats (protected species);
 - Otter (protected species);
 - Brown hare (priority species); and,
 - Badger (protected species).
- 2.1.16 The Gas Connection also supports INNS plants.

3. Construction Mitigation

3.1 Landscape Working Methods

- 3.1.1 Mitigation measures will be implemented during the construction in order to limit impacts on the landscape and visual resource. These are summarised below:
- Land and vegetation clearance and occupation will be limited to the minimum area necessary for the works;
 - Good housekeeping measures will minimise unsightly waste and secure storage will be provided for materials at risk from displacement by wind;
 - Temporary stockpiles will be located in defined storage areas, away from sensitive visual receptors;
 - No advertisements or fly posting will be permitted on any fence and all graffiti will be removed and made good as soon as reasonably practicable;
 - All boundary fences will be maintained in a neat and tidy condition;
 - Any temporary fencing will be removed as soon as reasonably practicable after completion of the works; and
 - Temporary lighting will be selected and sited so as to minimise visual intrusion to residents, whilst maintaining the safe and efficient operation of the work site. At night and during periods of darkness, directional security lighting will be used where required.

3.1.2 The following good practice measures will be adopted and implemented for the protection of trees retained onsite:

- A Root Protection Area (RPA) will be set up around trees to be retained onsite prior to commencement of construction;
- The RPA will be demarcated by 'Netlon' fluorescent mesh fencing or similar physical barrier. The protective fencing will be maintained for the duration of the construction phase and checked on a regular basis;
- In the event that an RPA cannot be maintained at 12 times the diameter at breast height (DBH) mitigation such as bog matting, flotation tyres and hand digging will be utilised;
- No machinery or material will be stored within the RPA;
- To ensure retained trees do not become hazardous, the condition of trees will be checked by the Environmental Manager or Ecological Clerk of Works (ECoW) at an appropriate frequency and following storm events where there may be damage from wind throw;
- Where a tree is damaged or diseased advice will be sought from an Arboriculturalist (unless the ECoW is appropriately qualified) for appropriate treatment measures;
- Where hazardous branches or trees require to be felled this will be done by a qualified tree surgeon in line with BS 3998: 2010;
- Before felling trees, surveys for potential bird nest or bat roosts will be undertaken by the ECoW; and

4. Landscape and Ecological Mitigation Proposals

4.1 Overview

4.1.1 The primary focus of the landscape and ecology mitigation is habitat creation and landscape planting which will be accommodated within the Project Site Boundary alongside the protection and enhancement of existing habitats. It is anticipated that existing planting within the Project Site would be retained and protected where possible. ES Figure 3.6 identifies the woodland and trees to be retained and the areas of new habitat and planting.

4.1.2 The overall construction working methods to be implemented during the construction phase are outlined in the outline CEMP (Appendix 3.1), outline SWMP (Appendix 3.2) and Outline Lighting Strategy (Appendix 3.5) and are secured via corresponding Requirements in schedule 2 of the DCO (Document Reference 3.1). Therefore these are not repeated here but are referred to where necessary for completeness.

4.2 Habitats and Protection

4.2.1 Existing habitats will be retained where possible. Where this is not possible those habitats removed with conservation value will be compensated for through the

provision of newly created habitats or enhancement of existing habitats. Mitigation to help avoid injury or killing of protected and priority species will be implemented.

- 4.2.2 Newly created habitats will be designed to be of value to those protected and priority species known to be present within the Project Site Boundary.
- 4.2.3 Lighting has been designed to limit the effects on wildlife (refer to outline Lighting Strategy (Appendix 3.5)).
- 4.2.4 The Generating Equipment Site will have security fencing, whilst other areas will have fencing to allow the free movement of species across the Project Site.

4.3 Habitat Replacement

- 4.3.1 The total area of habitat with conservation value (i.e. not improved grassland or hard standing) permanently removed during construction is estimated to be 2.9 ha. An area of land approximately 3 ha in size within the Project Site boundary has been identified as suitable for habitat enhancement and will mitigate for the loss of habitats including a proportion of Lletty-Morfil SINC. The habitat enhancement measures will also provide valuable habitats for a range of species including invertebrates, amphibians, reptiles, breeding and foraging birds, marsh fritillary, brown hare and badger, commuting and foraging bats and, once trees mature, roosting bats. This area is known as the Ecological Mitigation Area and will be implemented by the end of construction (ES Figure 3.6c).
- 4.3.2 In addition, woodcrete bat and bird boxes will be placed in suitable locations (i.e. mature trees) within the Project Site as a habitat enhancement measure. The number and size of boxes will be agreed in consultation with CCS and NRW when the Ecological Management Plan is finalised.
- 4.3.3 During construction there will be no night time illumination of hedgerows, woodland or mature tree lines. Operational external lighting has been designed to reduce trespass and configured to avoid glare and spillage, and otherwise in accordance with the Outline Lighting Strategy undertaken in accordance with the Institution of Lighting Professionals guidelines. The strategy will seek to limit effects of lighting on habitats (and therefore species) adjacent to the Project Site. During the hours of darkness, only critical light sources will remain in operation.
- 4.3.4 The sensitivity of the infrared motion detectors will be set so as not to be activated by the movement of large mammals such as badgers and otters. The lighting strategy will ensure that all lighting columns will be fitted with cowls to reduce light spill and will be directed away from boundary features. A 'dark corridor' (as shown in ES Figure 3.6) has been designed to keep lighting to no more than 1 lux along adjacent woodland edges and watercourses that are likely to be used by nocturnal species such as bats, badgers, water vole and otters. The Gas Connection and Electrical Connection will not be lit.

4.4 Tree Management and Root Protection

4.4.1 The following good practice measures will be adopted and implemented as part of this Strategy for the protection of trees retained onsite, including Ancient Woodland:

- A Root Protection Area (RPA) will be set up around trees to be retained onsite prior to commencement of construction;
- The RPA will be demarcated by 'Netlon' fluorescent mesh fencing or similar physical barrier. The protective fencing will be maintained for the duration of the construction phase and checked on a regular basis;
- In the event that an RPA cannot be maintained at 12 times the diameter at breast height (DBH) mitigation such as bog matting, flotation tyres and hand digging will be utilised;
- No machinery or material will be stored within the RPA;
- To ensure retained trees do not become hazardous, the condition of trees will be checked by the Environmental Manager or Ecological Clerk of Works (ECoW) at an appropriate frequency and following storm events where there may be damage from wind throw;
- Where a tree is damaged or diseased advice will be sought from an Arboriculturalist (unless the ECoW is appropriately qualified) for appropriate treatment measures;
- Where hazardous branches or trees require to be felled this will be done by a qualified tree surgeon in line with BS 3998: 2010;
- Before felling trees, surveys for potential bird nest or bat roosts will be undertaken by the ECoW; and
- The waste hierarchy will be applied to vegetation and biomass arisings and alternate onsite uses will be sought before disposal is considered.

4.5 Species-Specific Measures

4.5.1 Measures have been specified to help avoid injury or killing of protected and priority species, and control the spread of INNS plants and have been incorporated into the management strategy. These are outlined in Appendices A-G.

- Reptile (Appendix A);
- Breeding Birds (Appendix B);
- Bats (Appendix C);
- Otter and Water Vole (Appendix D);
- Badger (Appendix E);
- Invasive Non-Native Species (Appendix F); and
- Hedgerows (Appendix G).

4.6 Planting Proposals

i. Overview

4.6.1 A palette of native tree and shrub planting has been compiled to meet the various planting proposals identified below. The function of the planting is primarily to help integrate the various components of the Project into the local landscape and views whilst providing biodiversity value by enhancing existing habitats and creating new habitats.

ii. Woodland Planting

4.6.2 Woodland structure planting is proposed adjacent to the Generating Equipment Site to assist in screening lower level structures from view and to assist in integrating the Project Site within the immediate landscape (refer to ES Figure 3.6c). Woodland planting is also proposed along the western edge of the Ecological Mitigation Area (refer to ES Figure 3.6c).

4.6.3 The western edge of the Ecological Mitigation Area will be planted with a row of trees native to the local area. The trees will be allowed to mature and will create a linkage between a row of trees in the north and the watercourse in the south (Afon Llan). A mixture of standards and feathered will be used. This area compensates for the loss of the woodland habitat within Lletty-Morfil SINC.

4.6.4 Indicative typical species will include the following:

- *Betula pendula* (silver birch);
- *Betula pubescens* (downy birch);
- *Quercus robur* (pedunculate oak);
- *Salix alba* (white willow);
- *Alnus glutinosa* (Alder)
- *Ilex aquifolium* (holly); and
- *Corylus avellana* (hazel).

iii. Woodland Edge Scrub Planting

4.6.5 The Woodland Planting above will grade into an area of scrub habitat within the Ecological Mitigation Area refer to ES Figure 3.6c). Species will comprise those native to the local area and include species capable of thriving in a wetter environment. The scrub will be allowed to mature and be managed to have a scalloped edge. This area compensates for the loss of the scrub habitat.

4.6.6 Indicative typical species will include the following:

- *Crataegus monogyna* (hawthorn);
- *Prunus spinosa* (blackthorn) and,
- *Sorbus aucuparia* (rowan); and,
- *Eupatorium cannabinum* (hemp agrimony; and
- *Filipendula ulmaria* (meadowsweet).

4.6.7 It is anticipated that willow species and bramble will develop naturally and will not require planting.

iv. Hedgerow and Hedgerow Trees

4.6.8 Hedgerow and hedgerow tree planting is proposed along the Access Road (refer to ES Figure 3.6e) and to the west of the AGI as well as to reinstate any hedgerow planting removed during construction of the Gas Connection (refer to ES Figure 3.6d).

4.6.9 Mixed hedgerow and tree planting will provide vegetation structure and commuting corridors for bats as well as integrating the new Access Road into the immediate landscape structure. Reinstatement hedgerow planting is also proposed along the Gas Connection corridor where hedgerows are removed and also to the west of the AGI along an existing field boundary to provide partial screening of the AGI and local landscape enhancement, providing continuity of hedgerow boundary planting.

4.6.10 Indicative typical species will include the *following*:

- *Acer campestre* (field maple) *Corylus avellana* (hazel);
- *Crataegus monogyna* (hawthorn);
- *Rosa canina* (dog rose);
- *Viburnum opulus* (guelder rose);
- *Prunus spinosa* (blackthorn);
- *Sorbus aucuparia* (rowan);
- *Ilex aquifolium* (holly); and,
- *Lonicera periclymenum* (honeysuckle).

v. Wet Meadow and Acid Grassland

4.6.11 Wet meadow and acid grassland is proposed to the south of the Generating Equipment Site within the Ecological Mitigation Area (refer to **ES Figure 3.6c**).

4.6.12 The Woodland Edge Planting will grade into a mosaic of marshy grassland and acid grassland within the Ecological Mitigation Area. The area currently supports degraded versions of these habitat types, and a relaxation of the grazing regime (grazed less intensively) and therefore reduction in nutrient inputs will allow a greater botanical species diversity to develop without the need for seeding or plant plugs. The enhancements in this area compensate for the loss of the marshy grassland habitat within Lletty-Morfil SINC within the Generating Equipment Site.

vi. Wetland Habitat and New Drainage Routes

4.6.13 Four new ponds, with a range of sizes and depths will be created within the Wet Meadow and Acid Grassland of the Ecological Mitigation Area to the south of the Generating Equipment Site. Two ponds will be at least 2 m x 2 m and two ponds will be at least 4 m x 4 m. All ponds will have shallow sides to allow animals to

enter/exit the pond freely and should taper to a depth of at least 0.5 m in the centre; the larger ponds will taper to a depth of around 1 m. The ponds will be planted with native plant species and will not be stocked with fish. This will give native amphibians and invertebrates the best chance of colonising the pond. The creation of ponds for wildlife compensates for the loss of the ponds within the Project Site and further enhances the area through increasing the overall area of standing water.

- 4.6.14 Within the Generating Equipment Site (ES Figure 3.6c), adjacent to the Access Road (ES Figure 3.6c) and AGI (ES Figure 3.6d) the attenuation ponds will be planted with emergent native wetland species and where possible maintained as wetland features.
- 4.6.15 New ditches and rerouted ditches (Generating Equipment Site – ES Figure 3.6b) will be planted with emergent native wetland species and where possible maintained as wetland features.
- 4.6.16 Typical species will be determined at detailed design stage, as the species proposed will likely differ between waterbodies, depending on the aspect of the waterbody, substrate, the profile of the water body and potential water depth.

4.7 Management and Maintenance

vii. Management Aims

- 4.7.1 This section sets out the management and maintenance objectives for the protection and enhancement of the landscape and biodiversity fabric of the Project Site. A detailed landscape management and maintenance plan will be developed alongside the detailed landscape and ecological design. The maintenance and management plan will cover a management period covering the operational design lifetime of the Project. Within the first five years after planting, all plants found to be dead or dying will be replaced within the first available planting season.
- 4.7.2 In general terms the landscape and ecological management aims for the Project Site are to:
- Secure the long-term future of the landscape;
 - Enhance local landscape character;
 - Integrate the Site into the surrounding landscape and local views;
 - Retain and manage existing woodland/hedgerow and scrub planting and provide additional supplementary planting to provide links for wildlife across the site;
 - Create, maintain and enhance habitats of value to wildlife to provide benefits for the local environment and biodiversity;
 - Create marshy habitats in conjunction with the attenuation areas for amphibians and invertebrates (including the marsh fritillary); and,

- Establish a flexible management and maintenance regime able to respond to changing needs or objectives.

i. New Tree and Shrub Planting

4.7.3 Tree and shrub planting shall be subject to routine maintenance operations that include pruning, litter picking, prevention of weeds and invasive species. The maintenance regime will seek to:

- To create and maintain a vegetation structure, horticultural interest and to partially screen the built structures and movement within the Project Site; and
- To extend and enhance habitat diversity in a variety of different areas, including corridors for commuter bats.

ii. Management Aims – Grassland

4.7.4 Both wet meadow grassland and acid grassland areas will be subject to a similar maintenance regime. Both areas shall ensure a healthy sward of native wildflowers and grasses which will increase biodiversity as well as create visual interest. The maintenance regime will seek to:

- Maintain the quality and integrity of the ditches, such that they are free of litter, tree roots and invasive species.
- To establish and maintain species-rich swards of wet meadow and species rich grassland, including wildflowers that support invertebrate larvae and flowers that attract pollinating bees, butterflies, moths and other invertebrates.
- To establish and maintain devil's-bit scabious within the species rich grassland to enhance the area for marsh fritillary.
- Sward management to ensure the sward is longest in the summer and shorter in the spring and autumn will allow flowering species to set seed and germinate.
- Within the Ecological Mitigation Area, restricted grazing will be permitted at varying levels, from an initial establishment period during which no grazing will be permitted to limited grazing to complement the establishment and maintenance of the Ecological Mitigation Area.
- When appropriate, the low-level grazing will be complemented with periodic manual vegetation management to help control undesirable encroachment of scrub into grassland areas.

4.8 Roles and Responsibilities

4.8.1 Roles and responsibilities for implementation of the landscape and ecological mitigation measures during the construction phase are identified in the outline CEMP (Appendix 3.1).

4.8.2 Management of habitat enhancement measures during the operational phase will be secured by requirement in the DCO and via appropriate grazing and

management agreements. Use of the Gallops, as well as horse-riding, will no longer be permitted within the Ecological Mitigation Area (Work No. 4, as shown in the Works Plans Document Reference 2.3) in order to establish the Wet Meadow and Acid Grassland habitat. Management of the Ecological Mitigation Area will be agreed and approved by CCS, as outlined in paragraph 1.2.5.

4.9 Reinstatement

4.9.1 Reinstatement of temporary construction areas and working widths will be undertaken as soon as reasonably practical once construction has ceased. Prompt implementation of reinstatement and restoration measures aim to reduce the effects of:

- Compaction of subsoil, which can lead to inhibited drainage and root growth;
- Exposed ground, which can cause loss of topsoil, dust and water pollution through wind blow and erosion; and
- Visual intrusion.

4.9.2 Planned reinstatement at the Project Site includes the following considerations and measures:

- Land reinstatement should normally take place in the autumn following the construction phase. The length of the Gas Pipeline route will be reinstated to its original condition and returned to its previous use;
- Where compaction may have occurred a 'sub-soiler', which lifts and shatters the subsoil will be used before the topsoil is reinstated;
- Topsoil that has been stored in the Laydown Area will be spread and levelled across the width of the strip, using hydraulic excavators or bulldozers. In areas where stones have been brought to the surface, stone picking will be carried out mechanically;
- The finish in which the soil is left will be agreed with the relevant land occupier. Land to be reinstated as grassland will either be reseeded in the autumn or the following spring. Reptile fences will remain in place until the grass crop is established;
- Temporary construction fences will be removed once agreement has been reached with the landowners that the land over which temporary possession powers have been exercised has been reinstated and can be handed back to the landowner, and no later than three months from completion of construction and
- Hedgerows will be reinstated in the first planting season following the completion of construction and land reinstatement work.

4.9.3 The following general reinstatement good practice measures that will be adopted:

- Reinstatement will be carried out as soon as possible following any vegetation stripping to ensure integrity is maintained;

- The reinstatement of the construction areas will be undertaken to the standard to be agreed with CCS, using the existing soil and vegetation wherever possible;
- Stripped soil will be reinstated as close to where it was removed as possible;
- Subsoil, topsoil and turf will be replaced in the same order as removed;
- Restoration works will be carried out in suitable weather conditions noting that wet ground conditions can be difficult, as can hot, dry and windy spells; and
- Natural regeneration of habitats will be promoted in all appropriate areas as advised by the Environmental Manager or ECoW.

5. References

Construction (Design and Management) Regulations 2015. S.I. 2015/51.

ILP. (2011). Guidance Notes for the Reduction of Obtrusive Light. [Online]. Available: <https://www.theilp.org.uk/resources/free-resources/ilp-guidance-notes/> [Accessed: 30/11/17]

BCT. (2014). Artificial Lighting and Wildlife. Interim Guidance: Recommendations to Help Minimise the Impact Artificial Lighting. [Online]. Available: http://www.bats.org.uk/pages/bats_and_lighting.html [Accessed 07/12/17].

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.

BSI. (2009). BS 6031:2009 Code of Practice for Earthworks.

HSE. (n.d.) Speed Limits. [Online]. Available: <http://www.hse.gov.uk/workplacetransport/factsheets/speed.htm> [Accessed 20/11/17].

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 [Accessed: 30/11/17]

The Waste (England and Wales) Regulations 2011. S.I. 2011/988. Environmental Protection, England and Wales.

NRW, SEPA, NIEA and EA. (2015). Waste Classification. Guidance on the Classification and Assessment of Waste (1st Edition 2015). Technical Guidance WM3. [Online]. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf [Accessed 20/11/17].

Welsh Government. (2012). Guidance on Applying the Waste Hierarchy. [Online]. Available: <http://gov.wales/docs/desh/publications/120119wastehierarchyguideen.pdf> [Accessed 01/12/17].

DEFRA. (2016). Waste Duty of Care Code of Practice. [Online]. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/5069

17/waste-duty-care-code-practice-2016.pdf
[Accessed 01/12/17].

Herpetofauna Groups of Britain and Ireland (HGBI) (1998). Evaluating local mitigation/translocation programmes: best practice and lawful standards. HGBI advisory notes for Amphibian and Reptile Groups (ARGs).

Appendix A Reptiles and Amphibians (Herptiles)

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. The risk of herptiles and the mitigation measures discussed below will be included in the site induction package and prior to any site clearance and construction tasks.
3. The trapping and translocation programme has been designed following the guidance set out in Herpetofauna Groups of Britain and Ireland 1998 publication (HGBI, 1998).
4. Due to the 'Good' population of common lizard and the presence of low numbers of grass snakes within the survey area a trapping and translocation programme will be undertaken to help protect any herptiles from being injured or killed. Due to the presence of suitable habitat for adder, the programme includes measures for this species. The actions involved in the proposed trapping and translocation are detailed below.

Fencing

5. Any construction areas suitable or known to support herptiles, including any routes in and out, areas for site compounds, offices or storage of materials/waste, will be fenced off using suitable fencing to limit herptiles attempting to enter the site from the adjacent land.
6. Fencing should remain in situ for the duration of construction to help limit the re-colonisation of the Project Site by herptiles. Depending on the construction duration it may be suitable to use recycled HDPE plastic semi-permanent, rigid reptile fencing with a 50 mm return folded and welded into the top edge forming an overlap to comply with EN guidelines and 100 mm underground return. It provides a reptile barrier that is highly resistant to vandalism and general site damage. Drift fencing can be used for construction duration lasting 18 months or less.
7. Fencing will be installed by a suitable contractor under the supervision of an ecologist. Contractors will be given a toolbox talk prior to works commencing, and advised on the identification of herptiles, what species were expected on site, the legal protection afforded to such species, and how to safely move herptiles to avoid injury or killing.
8. Any areas subject to machines tracking over or repeated foot traffic, as well as the route of the fence line, will be hand searched by an ecologist for the presence of herptiles. Herptiles encountered will be captured by hand and moved out of the way into suitable habitat (see 'Translocation Area' below). The routes will then be mown

to a height of less than 150 mm and maintained as such for the duration of the fencing installation.

9. No vehicles, machinery or materials will be stored in areas suitable for supporting herptiles without first being checked by an ecologist; preference will be given to those areas not suitable for supporting herptiles.
10. No construction activities, including pedestrian access will be allowed outside of the fenced areas in habitat suitable for supporting herptiles.

Trapping and Translocation

11. Artificial refugia comprising approximately 1 m x 0.5 m square sheets of heavy-duty mineral roofing felt, corrugated iron and carpet tiles will be placed at a density of 50/ha in suitable habitat within the fenced area to attract reptiles.
12. The refugia will be left to 'bed-in' and will remain undisturbed for a period of at least fourteen days. After the 'bedding-in' period, each day, up to twice a day for a minimum of 60 days, an ecologist will check the refugia for the presence of reptiles. Any reptiles or amphibians found will be captured for relocation into suitable habitat outside of the fenced areas. After 60 days, the trapping can cease once there have been five consecutive days where no reptiles have been found.
13. After the fenced area has been cleared of reptiles and prior to soil stripping the vegetation can undergo a process of habitat management and hand searches for reptiles. Supervision of the soil strip during construction work by a suitably qualified ecologist will be required to help protect injury or killing of reptiles.
14. Any litter or rubble piles will be removed by hand under the supervision of an ecologist to avoid injuring or killing any reptiles. If the material is too heavy to be removed by hand it will be done so using a mini excavator carefully and slowly removing the material, under the supervision of an ecologist.
15. Any amphibians captured during the reptile trapping programme will be moved to a suitable location within the Project Site Boundary.

Translocation Area

16. During the reptile survey, very few numbers of reptiles were found within the footprint of the Project; the majority of reptiles were found along the Gallops. Due to the relatively low numbers of reptiles likely to be present within the fenced area it is considered appropriate to move any captured reptiles to the areas of habitat suitable for supporting reptiles that are to be retained outside of the fenced area.

Habitat Manipulation and Destructive Search

17. Once capture rates decrease significantly habitat manipulation will be used to enhance the process. This involves reducing the amount of suitable vegetation cover by strimming the vegetation between the refugia mats (leaving a 10cm buffer around the edge of each refugia mat) to a height of no less than 100mm, after 48

hours the cut will be repeated to ground level, concentrating the remaining reptiles to the retained vegetation and refugia. Naturally occurring refugia (stones, rocks, litter etc) will be hand searched by and ecologist before being removed and located within the receptor area. After which the final remaining areas of vegetation and refugia will be cut to ground level and removed following a final check for herptiles by an ecologist; any animals found will be removed and located within the receptor area.

18. Contractors will be given a toolbox talk prior to habitat manipulation works commencing, and will be advised on the identification of herptiles, what species are expected on site, the legal protection afforded to such species, and how to safely move these species to avoid injury or killing. Any that herptiles identified during the strimming works will be moved by hand into suitable habitat outside of the fenced area. An ecologist will provide ecological support and advice during the works.

Timing

19. A method statement detailing the location and specification of fencing, timing and methodology for the management of herptiles will be submitted to CCS (in conjunction with NRW) for approval.

Appendix B Breeding Birds

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.

2. To avoid destruction of active bird nests or eggs, vegetation clearance works should be undertaken between September – February inclusive. Should works be required from 1 March – end August then an ecologist should inspect the area to be cleared no more than 48 hours prior to works. Should any active nests be found, works will have to halt in this area until the chicks have fledged and no longer return to the nest, which can take up to eight weeks. Should a nest be found a species-specific buffer should be implemented.

Appendix C Bats

1. These measures will be applicable to the following Project components:

- Generating Equipment Site;
- Access Road;
- Electrical Connection; and
- Gas Connection.

Roosting Bats

2. Pre-construction checks will be undertaken on trees and any hedgerows prior to their removal for their current suitability for supporting roosting bats.
3. Checks will be undertaken to allow time for any follow up (emergence and re-entry) surveys to be undertaken and an application for a European Protected Species License (EPSL) should any works require a confirmed roost to be destroyed.
4. The survey results will be used to inform any further mitigation to seek to avoid impacts on roosting bats.

Commuting and Foraging Bats

5. New planting will include wooded linear features to create new commuting and foraging routes linking existing rows of trees to the Afon Llan.
6. To allow bats to continue to use commuting and foraging routes during construction, the connectivity of tree lines and hedgerows along the Gas Connection, Access Road and Electrical Connection routes will be maintained utilising 'brown hedgerows' of brash. At least one hour before sunset key linear features as identified in ES Figure 3.6e will be reinstated utilising brash.

Access Road

7. To maintain connectivity post-construction, replacement planting of trees removed to facilitate the construction of the Access Road (including the new section of Access Road) should be undertaken. Using standards of the same species as those trees removed, trees will be planted along the existing boundary tree lines up to the edge of the Access Road. Over time the canopies will grow closer together thereby creating a linear feature than can be used by bats to cross the new section of Access Road.

Appendix D Otter and Water Vole

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road; and
 - Electrical Connection.

Water Vole

2. As identified in ES Appendix 8.10, no evidence of water vole was identified during the surveys. However, there is habitat suitable for burrow creation along watercourses within the Project Site Boundary. To minimise the risk of the creation of burrows by water voles prior to construction, it is recommended that the vegetation is cleared to reduce the quality of the habitats for burrow creation following the pre-construction checks (to check that there are no holts/couches/burrows that have been newly created since the surveys in 2017).
3. There is abundant suitable habitat for holt/couch/burrow creation outside of the working area and zone to be cleared of vegetation including ditches, and the Afon Llan, which are bordered by marshy grassland. The small loss of habitat will be temporary as bankside vegetation will regenerate post-construction.
4. A pre-construction check for water vole burrows and activity will be undertaken where construction is present within 100 m of watercourses identified as suitable for supporting the species during the 2017 field surveys, as identified in ES Appendix 8.10 Figure 1.
5. Should the pre-construction check return a negative result, habitat management will be undertaken to help reduce the quality of the habitats for burrow creation in the period leading up to, and for the duration of construction in that area.
6. Should water vole be confirmed as present on watercourses within 100 m of construction works during the pre-construction check, a Water Vole Conservation License from Natural Resources Wales (NRW) may be required to allow works to proceed and additional mitigation may be required.

Otter

7. As identified in ES Appendix 8.10, no evidence of otter was identified during the surveys. However, there is habitat suitable for holt and couch creation along watercourses within the Project Site Boundary. To minimise the risk of the creation of holts or couches by otters prior to construction it is recommended that the vegetation is cleared to reduce the quality of the habitats for holt and couch creation following the pre-construction checks (to check that there are no holts or couches that have been newly created since the surveys in 2017).
8. There is abundant suitable habitat for holt and couch creation outside of the working area and zone to be cleared of vegetation including ditches, and the Afon

Llan, which are bordered by woodland. The small loss of habitat will be temporary as bankside vegetation will regenerate post-construction.

9. A pre-construction check for otter holts/couches and activity will be undertaken where construction is present within 100 m of watercourses identified as suitable for supporting the species during the 2017 field surveys, as identified in ES Appendix 8.10 Figure 1. A pre-construction check for otter holts/couches and activity will be undertaken where construction is present within 100 m of watercourses identified as suitable for supporting the species during the 2017 field surveys, as identified in ES Appendix 8.10 Figure 1.
10. Should the pre-construction check return a negative result, habitat management will be undertaken to help reduce the quality of the habitats for holt/couch creation for the period leading up to, and for the duration of construction in that area. Should otter be confirmed as present on watercourses within 100 m of construction works during the pre-construction check, a European Protected Species License from NRW may be required to allow works to proceed and additional mitigation may be required.

Appendix E Badger

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. A pre-construction check for badger setts and activity will be undertaken where construction is present within 30 m of habitats identified as suitable for supporting the sett creation. Where access is not obtainable, badger setts will be viewed using binoculars.
3. Should badger setts be confirmed as present in habitat within 30 m of construction works during the pre-construction check, a licence from Natural Resources Wales (NRW) may be required to for the temporary/permanent closure of the sett to allow works to proceed, and additional mitigation may be required.

Appendix F Invasive Non Native Species

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. An updated INNS survey (Invasive Species Assessment – ISA) will be undertaken to accurately assess INNS and extents within the Project Site boundary prior to the implementation of control measures and a site specific Invasive Non Native Species Protocol will be produced that elaborates on the outline recommendations provided below.
3. Many remediation options are available for the management of invasive species. All control options will be considered to identify appropriate management actions relevant in the context of controlling Schedule 9 species on land impacted by the proposed works.
4. The optimal control measures for the proposed works will involve a combination of biosecurity precautions (i.e. good site hygiene) and mechanical and/or chemical treatment.

Biosecurity Precautions

5. At a minimum, the following biosecurity measures will be implemented when working within the Project Site:
 - All appropriate staff members will be made aware of the locations of INNS and will be informed of the necessary precautions required to prevent spread. This will include informing personnel who might come into contact with any of the species of the requirements to prevent spread (e.g. during vegetation clearance, and vegetation management).
 - A toolbox talk will be provided by a suitably qualified Ecological Clerk of Works (ECoW) at the onset of works, providing details on identification and the required biosecurity precautions. An ECoW will be present during all works to help implement biosecurity measures.
 - Clearance works should avoid the period when Himalayan balsam has ripe seeds. When seeds ripen is dependent on the weather that year, but typically the period is from July until the end of October.
 - Vegetation clearance works will be undertaken methodically; commencing in areas with no presence of INNS, then working through areas with increasing levels of infestation. This will help prevent works spreading seeds and contaminated soils to areas onsite that are not currently infested.
 - Clearance works will avoid the area with INNS if the infestation is outside the treatment area or until treatment on the species has been completed. Before any treatment commences, if there is risk of vehicular or pedestrian incursion

into the area where INNS are growing then the plant stems will be fenced with temporary orange mesh fencing. Default stand-off distances are provided below. It may be possible to reduce these distances following the ISA, based on the data collected.

- Vehicular and people movements will be restricted to specific routes within the Project Site thereby helping to limit the spread of seeds and contaminated soils around Site.
- Cleaning stations will be set up at designated entry/exit points to demarcated areas. A jet wash should be available for vehicles and brushes and buckets of water should be available for clothing and equipment.
- No plant, equipment or personnel should leave a demarcated area without ensuring that all mud and/or plant material has been removed from vehicles, equipment and clothing/footwear.
- Any soil within demarcated areas will be considered to potentially contain INNS material (seeds etc.). When soils potentially containing viable INNS material seeds are taken off Site, such soils are classified as controlled waste and there is a duty of care for their proper disposal, i.e. the soil must be transported by an appropriately licensed carrier and disposed of at an appropriately licensed waste disposal facility.
- Personnel will be reminded of biosecurity requirements at the start of each work day and should be updated on any changes to management plans, i.e. information on the locations of any newly identified stands.
- Following the ISA, where additional biosecurity hazards are identified, they will be incorporated into the Invasive and Non Native Species Protocol.

Control

6. Potential control measures have been provided for each species identified within the Project Site Boundary below. Following the ISA a single actionable option will be specified for each stand, based on the recommendations below, in combination with a review of site development plans and activities.

Himalayan Balsam

7. Away from watercourses, depending on development plans, stands within working areas or stands within 6 m of a working area will be controlled by a combination of:
 - Herbicide treatment (potentially followed by hand removal once the quantity of plants has been reduced):
 - excavation and (i) burial or (ii) offsite disposal; and
 - raising the soil profile above existing stands, thus preventing future growth
8. Any herbicide treatments will use appropriate herbicide, which will be applied by an appropriately qualified contractor.
9. Seeds from Himalayan balsam typically remain viable for 18 months in soil. Follow-up monitoring of the treated stands will confirm treatment has been successful when no new seeds have germinated; after which the soil is considered inert

(assuming no other contaminants are present). Typical treatment periods are for 2 years of control action followed by at least a 1 year monitoring period. Herbicide should be applied three times in the year.

10. Where excavation is required, the recommended excavation area is 6 m radius to a 30 cm depth, although through the commissioning of soil core analysis it may be possible to reduce the depth at which soil needs to be removed. The excavated material will need to be disposed of as controlled waste or buried within the Project Site.
11. Where the soil profile is raised, 30 cm soil is sufficient to prevent regrowth.
12. Where Himalayan balsam is growing next to a watercourse control will not be effective in the long term, since new seeds will travel from further up the catchment (where Himalayan balsam is abundant) and re-colonise the area. In such areas, management will focus on containment (i.e. implementation of biosecurity protocols).

Japanese Knotweed

13. In areas where there is a risk of spreading Japanese knotweed (stands within 7 m of access routes and storage compounds – following the ISA and through risk assessment it may be possible to reduce this distance to 4 m), the stands will be managed appropriately. A single actionable option for each stand will be determined for each stand with takes account of development plans. Options include:
 - Herbicide treatment;
 - Rhizome fragmentation and cultivation (e.g. soil rotation) to stimulate growth and reduce herbicide treatment time requirements;
 - excavation and (i) stockpiling, (ii) burial or (ii) offsite disposal; and
 - raising the soil profile above existing stands, thus preventing future growth.
14. Any soil containing Japanese knotweed material will be removed from the Project Site following the appropriate duty of care, or buried within the Project Site.
15. To reduce the risk of spread and future growth, a herbicide treatment programme will commence as far in advance of construction works as is practical. Typical treatment periods are for 3 years followed by a 2 year monitoring period. However, mature stands can take significantly longer to successfully treat. The presence of mature stands will be identified as part of the ISA. Herbicide should be applied once in the year.
16. Where herbicide treatment is used in isolation there is a risk that dormant but viable rhizomatous material remains underground after treatment appears successful above ground, and as such the soil in such areas should not be disturbed and if it is subsequently removed, it remains classified as controlled waste moving forward.
17. Where the soil profile is to be raised above Japanese knotweed, the plants should first be treated with herbicide in advance for as long as possible. Depending of

maturity and time scales, it may be beneficial to lay a geomembrane in the area prior to raising the soil level.

Floating Pennywort

18. There is one pond recorded as supporting floating pennywort in 2014. The pond is under the footprint of the proposed Power Generation Plant and is not hydrologically connected to any other waterbodies or watercourses. As such, the pond can be infilled with inert soil and then built on. No material or water will be removed from the pond.

Rhododendron and Montbretia

19. The ISA will be used to confirm locations and extents.
20. Montbretia is located on the edge of the Access Road, and should be treated by herbicide at the same time as the other species. The corms react well to herbicide treatment, and since the plant does not produce viable seed, this course of action will be effective at controlling the plant.
21. Rhododendron is present in woodland within the Project Site Boundary, and it is not intended to disturb the plant during construction. However, if Rhododendron is to be disturbed during construction, the plant will be cut and its stems removed by hand or chainsaw, cutting as close to the ground as possible to remove above ground growth.
22. There are four recommended methods to achieve successful management after the initial cut and removal:
- Digging the stumps out;
 - Direct stump treatment by painting or spot spraying freshly cut low stumps with a herbicide immediately after been cut;
 - A variation on the stump treatment method is stem injection, using a 'drill and drop' methodology, whereby, if the main stem is cut and is large enough for a hole to be drilled into it, the hole can be used to facilitate the targeted application of glyphosate (25% solution); and
 - Stump regrowth and seedlings can be effectively killed by spraying regrowth with a suitable herbicide, usually glyphosate. Best practice spraying protocols should be carefully followed.
23. The preferred removal method is to be agreed with CCS when an invasive species management, maintenance and monitoring scheme is finalised.

Appendix G Hedgerows

1. These measures will be applicable to the following Project components:
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. To allow bats to continue to use commuting and foraging routes during construction, the connectivity of tree lines and hedgerows along the Gas Connection, Access Road and Electrical Connection routes will be maintained utilising 'brown hedgerows' of brash. At least one hour before sunset key linear features as identified in ES Figure 3.6 will be reinstated utilising brash.
3. On completion of construction works the hedgerow gaps will be reinstated by planting species typical of the hedgerow as whips of four per metre in a double staggered row. Shrubs will be bare rooted and comprise 1.5 m size class. Spiral guards will be used to help prevent damage from rabbits. Some brash can be left in situ to help maintain the linear feature whilst the whips are establishing.
4. In the two winters following planting, any dead shrubs should be replaced with the same species mix as the original planted.
5. The grass around the base of the trees/shrubs (0.5 m diameter) should be killed at least once annually using an approved non residual herbicide for three years following planting.
6. Additional hedgerow planting is covered in Planting Proposals Section 4.6.
7. For Important hedgerows where the ground flora is particularly species rich, the hedgerows shall be removed, stored and replaced.
8. The existing hedgerow should be cut to between 1 and 1.25 m. A large machine is then used to dig-out the existing hedge to at least 1 m below ground level and 1 m either side of the hedge. This reduces the chance of the roots drying-out loss of ground flora associated with the hedgerow. This section of hedgerow is then moved directly to the storage area and replanted once the Gas Pipeline has been laid.
9. The success of hedgerow storage and reinstatement cannot be guaranteed until attempts are actually made to move a hedgerow; at which point the proximity of adjacent structures, hardstanding, underground services or debris or even unexpectedly large rootstocks can hamper translocation efforts and mean that sections of hedgerow cannot be moved intact.
10. In the event that the hedgerow fails to re-establish then the equivalent amount will instead be newly created using the same methodology as set out above.