

6 Biodiversity

6.1 Introduction

This Chapter provides an assessment of the potential impacts to biodiversity arising from the proposed modifications to the West Offaly Power (WOP) Station and associated ash disposal facility (ADF) to facilitate the continued operation of these facilities and phased transition of that station to exclusive firing with biomass. As the existing development is subject to the condition that all existing activity ceases in December 2020 the potential impacts of the continued operation of WOP station and the ADF will also be assessed. This will subsequently be referred to as the ‘proposed development’.

Ecological surveys were undertaken to identify habitats and species present within and adjacent to the development sites and assess the potential impacts of the proposed development on local biodiversity. The text also considers areas designated for nature conservation.

This chapter also specifies mitigation measures to reduce potential adverse impacts on biodiversity, where appropriate. Hydrological / water quality impacts are considered in **Chapter 8 - Surface Water**.

The potential for indirect environmental impacts associated with the supply of peat fuel and biomass to WOP station and the ongoing operation of WOP station and ADF, as they relate to biodiversity, are also considered as are the potential cumulative impacts

A standalone Appropriate Assessment (AA) Screening and subsequent Natura Impact Statement (NIS) have also been produced, in accordance with the requirements of the EU Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations 2011, which considers designated sites within the potential Zone of Influence of the proposed activities at the station and should be read in conjunction with this chapter. The Appropriate Assessment Screening and Natura Impact Statement are presented as a separate assessment in a standalone document, but are also duplicated as an appendix to the EIAR. (**Appendix 6.1: Appropriate Assessment**).

6.1.1 Legislative Context

Directive 2011/92/EU on the assessment of certain public and private projects on the Environment as amended by Directive 2014/52/EU of the of the European Parliament and of the Council (“the EIA Directive”) requires that the EIAR provides:

“A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.”

It is noted that if the WOP station were to close in 2020 then there would no longer be any emissions to the River Shannon or atmosphere as currently occurs under its IE Licence.

There would be no foregoing impacts from the station and the ecological baseline would reflect this fact. The proposed project will see the continued operation of the WOP station and ADF with continued emissions from the power plant as well as day to day operational activities within the site (e.g. fuel deliveries). It is important therefore to determine the impact arising from plant emissions which would continue to be licenced by the EPA.

Specifically with respect to biodiversity, Article 3 of the EIA Directive states that the EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC, and the interaction of impact should also be considered.

The Wildlife Acts, 1976 to 2018, is a group of Acts and Amendments (Wildlife Act 1976 (39/1976), Wildlife (Amendment) Act 2000 (38/2000), Wildlife (Amendment) Act 2010 (19/2010), Wildlife (Amendment) Act 2012 (29/2012) and Heritage Act 2018). This legislation provides the principal mechanism for wildlife conservation in Ireland and outlines protection for species of conservation significance. Consideration must be given in the planning and development of projects (or in relation to works associated with existing infrastructure) to species of flora and fauna that are protected by national or international legislation or that are considered to be rare in a national or international context. Under the Wildlife Acts (as amended), it is an offence to damage or disturb a protected species and its habitat (including breeding and resting places). Separately, the Flora Protection Order (2015) provides protection for a suite of vascular plant, moss, liverwort, lichen and stonewort species. This legislation makes it illegal to cut, uproot or damage a listed species in any way or to alter, damage or interfere in any way with their habitats. The EU Habitats Directive 92/43/EEC provides legal protection for habitats and species of European importance through the establishment of a network of designated conservation areas known as the Natura 2000 Network. The Natura 2000 network includes sites designated as Special Areas of Conservation (SAC) under the EU Habitats Directive and Special Protection Areas (SPA) designated under the EU Birds Directive 79/409/EEC (as amended by 2009/147/EC). These are collectively referred to as '*European Sites*'.

The Habitats Directive was initially transposed into Irish national law in 1997, with the European Communities (Natural Habitats) Regulations, SI 94/1997. These Regulations have since been amended by SI 233/1998 & SI 378/2005. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate and replace the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010. Part XAB of the Planning and Development Act 2000 (as amended) presents the obligation to carry out a Screening for Appropriate Assessment and, where necessary, an Appropriate Assessment. The requirements for an Appropriate Assessment are set out under Article 6(3) and 6(4) of the Habitats Directive, and are presented in detail in the Screening for Appropriate Assessment and Natura Impact Statement (these are provided in a standalone document, but are also provided as an Appendix to this EIAR; refer to **Appendix 6.1**).

Article 10 of the Habitats Directive recognises the importance of ecological coherence in protecting European Sites and requires Member States to protect landscape features that are of major importance for wild flora and fauna through land use planning and development.

6.2 Methodology

6.2.1 Guidance used

The assessment was carried out in accordance with the following Environmental and Ecological Impact Assessment guidance and tailored accordingly based on professional judgement:

- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (National Roads Authority, 2009).
- EPA Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002) (and revised draft guidelines 2017);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (EPA, 2003)
- Advice Notes for Preparing Environmental Impact Statements (Draft September 2015) (EPA, 2015)
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Union, 1999).
- Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management, 2018).

The potential for impacts on nature conservation interests has been assessed in light of habitats and the species that are likely to be affected by the proposals. In addition to the guidance documents referenced above, the approach also takes into account the following additional biodiversity-specific guidance documents:

- EirGrid (2012) Ecology Guidelines for Electricity Transmission Projects: A Standard Approach to Ecological Impact Assessment of High Voltage Transmission Projects;
- Scottish Natural Heritage (2018) Assessing the impact of repowered wind farms on nature - Consultation Draft - June 2018.
- Fossitt, J. (2000) A Guide to Habitats in Ireland. Heritage Council, Kilkenny;
- Smith, G. F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011) Best Practice Guidance for Habitat Survey and Management. Heritage Council, Kilkenny;
- Institute of Ecology and Environmental Management (2006) Guidelines for Ecological Impact Assessment;

- National Roads Authority (2006) Environmental Assessment and Construction Guidelines;
- National Roads Authority (2006) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes;
- National Roads Authority (2006) Guidelines for the Treatment of Otters prior to the Construction of National Roads Schemes;
- National Roads Authority (2006) Guidelines for the Treatment of Bats during the Construction of National Roads Schemes; and
- Countryside Bird Survey Fieldwork Guidelines (BirdWatch Ireland and National Parks and Wildlife Service).

6.2.2 Baseline Data Gathering

6.2.2.1 Desktop Study

The desktop review for this project comprised the following elements:

- The identification of all sites designated for nature conservation (under the EU Habitats Directive, EU Birds Directive and the Irish Wildlife (Amendment) Act 2000) within 15 km (as suggested in DEHLG (2010)) of the study area (i.e. WOP station, ash disposal facility and respective supply bogs) and sites beyond this distance threshold with viable source-receptor impact pathways (such as hydrological connections). A subsequent review of associated Site Synopses and Conservation Objectives documents was carried out as appropriate. This encompasses Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for birds (both internationally important) as well as Natural Heritage Areas, both designated and proposed (of national importance) (NHAs and pNHAS);
- An examination of contemporary and historic mapping and aerial imagery for the WOP site and its surroundings to determine broad habitat types and successive land use change;
- A review of the Environmental Impact Statement for the original development of the current WOP station (ESBI2001) and associated background ecology reports;
- West Offaly Power, Thermal Plume Synthesis Report (ESB, 2018) (refer to **Appendix 6.2**);
- West Offaly Power, Thermal Plume Modelling Report (ESB, 2018) (refer to **Appendix 8.2**);
- A review of the EPA IE Licence for the site (P0611-02) and Annual Environmental Reports (AER) submitted by the station to the EPA;
- A review of a suite of reports relevant to aquatic biodiversity, including Inland Fisheries Ireland (IFI) fish survey reports, the EPA water quality monitoring database and associated reports, the Shannon RBMP 2009-2015, the Lough Ree and Upper Shannon WMU Action Plans 2009-2015 and The River Basin Management Plan for

Ireland 2018-2021 (Department Housing, Planning, Community and Local Government (DHCLG) (17th April, 2018);

- A review of the Bord na Móna Biodiversity Action Plan 2016-2021, baseline ecological studies and data (including a baseline ecology report produced on behalf of Bord na Móna as part of provisional studies to inform the EIA process for Bord na Móna peat supply activities – refer to **Appendix 6.3**), Draft Rehabilitation Plans and Land Use Mapping;
- The compilation of publicly available biodiversity data for the WOP site and its environs, as distributed via the National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) websites;
- An appraisal of the BirdWatch Ireland Irish Wetlands Bird Survey (I-WeBS) database for important sites associated with the River Shannon and River Suck; and
- A review of local flora distribution data via the CD-ROM version of the New Atlas of British and Irish Flora (Preston et al., 2002) and cross-referencing of the data with the Flora (Protection) Order 2015 and the Irish Red Data Book (Wyse-Jackson et al. 2016¹).

The relevant Development Plan under the Planning and Development Act 2000 (as amended) is the Offaly County Council Development Plan 2014-2020. Section 7.2 of the Development Plan (Natural Heritage) has also been reviewed as part of this biodiversity assessment. Relevant national forestry and biomass strategies as published by the Forest Service were also consulted.

6.2.2.2 Field Surveys and Monitoring

Ecology surveys undertaken by ESBI to inform this chapter are summarised in **Table 6-1**. Further details of the aspects of the respective surveys are presented in the subsequent text.

Table 6-1: Summary of field surveys undertaken

Survey date	Nature of surveys	Surveyor
24 th June 2016	Terrestrial habitat and species survey at WOP station	G. Hamilton, ESBI
26 th September 2016	Bat survey at WOP station	T. Aughney, Bat Eco Surveys
14 th October 2016	Terrestrial habitat and species survey at WOP ADF	G. Hamilton, ESBI
15 th December 2016	Wintering bird survey adjacent to WOP station & ADF	G. Hamilton, ESBI
31 st January 2017	Wintering bird survey adjacent to WOP station & ADF	G. Hamilton, ESBI

¹ Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service
QS-000206-01-R0460-007

Survey date	Nature of surveys	Surveyor
24th February 2017	Wintering bird survey adjacent to WOP station & ADF	G. Hamilton, ESBI
14th March 2017	Terrestrial habitat and species survey at WOP station	G. Hamilton, ESBI
5th April 2017	Terrestrial habitat and species survey at WOP ADF	G. Hamilton, ESBI
27th October 2017	Terrestrial habitat and species survey at WOP ADF	G. Hamilton, ESBI
15th January 2018	Wintering bird survey adjacent to WOP station	G. Hamilton, ESBI
28th March 2018	Terrestrial habitat and species survey at WOP station	G. Hamilton, ESBI
8th June 2018	Terrestrial habitat and species survey at WOP station	G. Hamilton, ESBI

WOP station

It should be noted that as the project design for the proposed development was iterative in nature, initial ecology surveys covered a significantly larger footprint and range of on-site habitats than the final design footprint will impinge upon; the final biomass storage areas are contained entirely within the developed footprint of WOP station on existing artificial surfaces which are predominantly of minimal ecological value.

Terrestrial ecology surveys within and adjacent to WOP station were carried out by an ESBI staff ecologist in June 2016, April 2017, March 2018 and June 2018. The purpose of these assessments was to identify all habitats in the receiving environment, create a comprehensive species list and to accurately map out the nature and extent of all habitats onsite. The habitats within the site were defined in relation to the habitat classification scheme published by the Heritage Council in *A Guide to Habitats in Ireland* (Fossitt, 2000). Habitat mapping follows Smith et al. (2011).

Terrestrial mammal walkover surveys were undertaken during the course of the habitat surveys previously described. The aims of the surveys were to determine which, if any, mammal species utilise the WOP station site and its adjoining habitats. Mammal tracks and signs were identified according to Bang and Dahlstrom (2001).

Additionally, a specific bat activity survey of the WOP station site was undertaken on behalf of ESBI by Bat Eco Services; as the development requires no removal or alteration of existing buildings with the potential to be used as bat roosts, a single survey on 16th and 17th September 2016 (comprising overnight passive recording monitoring and dusk/dawn heterodyne surveys) was considered adequate.

All bird species identified during the field surveys were recorded following the Countryside Bird Survey methodology and identified following Mullarney et al. (1999). Most passerine

species detected were present in areas of woodland, scrub and open recolonising ground around the periphery of WOP station.

Additionally, vantage point-based wintering bird surveys based on Scottish Natural Heritage (2014) along the bank of the River Shannon immediately east of WOP station (and at its confluence with the River Suck), as well as adjacent habitats were carried out in December 2016, January 2017 and February 2017, with a follow up survey undertaken in January 2018, as noted in **Table 6-1**. These surveys aimed to identify the frequency of occurrence of the Special Conservation Interest species for the Middle Shannon Callows SPA in the locality.

The conservation status of each bird species recorded by the study was assessed. 'Birds of Conservation Concern in Ireland' (BoCCI) (Colhoun et al. 2013²) are classified into three separate lists, namely Red-listed species of high conservation concern, Amber-listed species of medium conservation concern and Green listed species of no conservation concern. The EU Birds Directive (79/409/EEC) also has a list of high priority bird species, known as Annex-I listed species.

Specific surveys undertaken by and on behalf of ESB and ESBI in relation to aquatic ecology in the River Shannon in the locality of Shannonbridge with reference to the WOP cooling water discharge have been carried out between 2014 and 2017 (ESBI/ASU 2018 – See **Appendix 6.2**). These studies comprise discrete assessments of macrophytes, diatoms, macroinvertebrates and fish, as well as continuous temperature monitoring and thermal cooling water plume modelling.

WOP ADF

Terrestrial ecology walkover surveys were also carried out by an ESBI staff ecologist at the WOP ADF in October 2016, April 2017 and October 2017, during which time habitats and species occurring at the site were assessed using the same protocols as described for the WOP station site.

The overall ADF site was surveyed on foot while parallel transects through the undeveloped cells to the southeast and southwest of the existing capped and open cells were walked and any mammal tracks or signs e.g. holts, dens, scats etc. were noted. The national bat landscape suitability map hosted by the NBDC was reviewed, as were bat records for the N02 hectad, (which indicated only Daubenton's bat records 8 km to the southeast of the ADF). Given the low overall landscape suitability for bat species in general and the absence of mature trees within the peripheral scrub at the site which could provide roosting habitat, no specific bat surveys were carried out.

Previous surveys have also been carried out by Bord na Móna ecologists at the Blackwater Bog site immediately surrounding the ADF, with associated habitats and species being recorded during 2010 surveys. Previous mammal surveys carried out prior to the original development of the ADF and more recently as part of a baseline ecology report (refer to

² Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523-544.
QS-000206-01-R0460-007

Appendix 6.3) associated with ongoing harvesting activities at Blackwater Bog have also been consulted as part of this assessment.

WOP peat supply bogs

WOP station is supplied by peat sourced from four bog groupings (see Section 6.3) distributed around the Midlands. Baseline ecology surveys have been carried out by the Bord na Móna in-house ecology team over the last decade, with supplementary baseline information being provided by commissioned sub-consultant ecologists (refer to **Appendix 6.3**). Draft rehabilitation plans of the respective bogs have been prepared by Bord na Móna and submitted to the EPA for approval as part of the respective bog grouping IPC licences, with land-use mapping for the supply bog estate also being created and updated as necessary. It should be noted that these draft plans may be subject to change prior to publication by Bord na Móna.

6.2.2.3 Consultation

Consultation relevant to the biodiversity impact assessment undertaken as part of the EIAR Screening and Scoping and subsequent data gathering exercise was undertaken with the following organisations with a potential interest in biodiversity:

- An Taisce
- Birdwatch Ireland
- Offaly County Council (Environmental Section)
- Roscommon County Council (Environmental Section)
- Galway County Council (Environmental Section)
- Environmental Protection Agency (EPA)
- Bord na Móna
- Friends of the Irish Environment (FoIE)
- Inland Fisheries Ireland (IFI)
- Irish Peatland Conservation Council
- National Parks & Wildlife Services (NPWS)
- Irish Raptor Study Group

Of the above, responses were received from Offaly County Council (Environment Section), Roscommon County Council (Environment Section), An Taisce, Environmental Protection Agency, Irish Peatland Conservation Council. These responses are summarised in **Chapter 1 - Table 1-1**.

6.2.3 Assessment Methodology

6.2.3.1 Valuation of ecological receptors

Ecological receptors in Ireland comprise designated conservation sites, specific species (or associated assemblages, populations and communities) as well as habitats, both terrestrial and aquatic. The determination of the significance of an impact is generally determined by the context of a proposed project and by a combination of objective and subjective concerns. Impact significance is therefore assessed in the context of the importance of an ecological receptor and the nature, magnitude and duration of the impact that a project may have upon it.

The determination of the significance of an impact is generally determined by the context of a proposed project and by a combination of objective and subjective concerns. The National Road Authority’s valuation of ecological features at different geographical scales (NRA, 2009) was implemented as part of this impact assessment. This *geographic frame of reference* categorizes ecological features as being of:

- *International importance*
- *National importance*
- *County importance*
- *Local importance (higher value)*
- *Local importance (lower value)*

It should also be noted that the proportion of a known feature impacted at county scale (i.e. 1% of the known or estimated population in a given county) is measurably different from that impacted ‘at national scale’ (i.e. 1 % of the known or estimated national population).

Examples of the above ecological valuation criteria are presented in NRA (2009) and are summarised in **Table 6-2**.

Table 6-2: Examples of the importance of ecological receptors (NRA 2009)

Ecological importance	Examples
International	<ul style="list-style-type: none"> – ‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance – (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. – Proposed Special Protection Area (pSPA). – Site that fulfils the criteria for designation as a ‘European Site’ (see Annex III of the Habitats Directive, as amended). – Features essential to maintaining the coherence of the Natura 2000 Network. – Site containing ‘best examples’ of the habitat types listed in Annex I of the Habitats Directive. – Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. – Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). – World Heritage Site (Convention for the Protection of World Cultural & Natural

Ecological importance	Examples
	<p>Heritage, 1972).</p> <ul style="list-style-type: none"> - Biosphere Reserve (UNESCO Man & The Biosphere Programme). - Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). - Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). - Biogenetic Reserve under the Council of Europe. - European Diploma Site under the Council of Europe. - Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National	<ul style="list-style-type: none"> - Site designated or proposed as a Natural Heritage Area (NHA). - Statutory Nature Reserve. - Refuge for Fauna and Flora protected under the Wildlife Acts. - National Park. - Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. - Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Direct
County	<ul style="list-style-type: none"> - Area of Special Amenity. - Area subject to a Tree Preservation Order. - Area of High Amenity, or equivalent, designated under the County Development Plan. - Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. - Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. - County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared. - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local (higher value)	<ul style="list-style-type: none"> - Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. - Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological

Ecological importance	Examples
	corridors between features of higher ecological value.
Local (lower value)	<ul style="list-style-type: none"> – Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; – Sites or features containing non-native species that are of some importance in maintaining habitat links.

6.2.3.2 Magnitude of impacts

Ecological impacts can be categorised and assessed in a number of ways; based on EPA (2017) for the purposes of this EIAR, they can be considered to be:

- **positive**, i.e. a change which improves the quality of the environment.
- **neutral**, i.e. a change that does not affect the quality of the environment.
- **negative**, i.e. a change which reduces the quality of the environment. It is noted that a negative impact, even if initially considered to be significant, can be sufficiently minimised or eliminated by the adoption of appropriate mitigation measures.

The characteristics of an impact may also be described in terms of the following aspects:

- **direct** versus **indirect** (e.g. direct impacts may occur as a result of a loss of a species or habitat from land take, while indirect impacts may occur as a result of transmission of impacts along a hydrological connection);
- **extent** (e.g. physical footprint of a development);
- **duration** (with reference to EPA (2017), see Chapter 1, a temporary impact lasts <1 year; short-term impact lasts 1-7 years, medium-term impacts last 7-15 years, long-term impacts last 15-60 years; permanent impacts last >60 years);
- **timing** and **frequency** (e.g. arising from scheduling and duration of project construction/operation); and
- **reversibility**.

Impacts may also be **cumulative**, wherein the addition of many small impacts to create one larger, more significant impact, and **synergistic**, wherein the resultant impact is of greater significance than the sum of its constituents.

These factors are assessed together to determine the overall magnitude of the impact on the respective ecological receptors, and on the integrity of the site that supports them. Magnitude is then classified in one of four levels, based on the criteria presented in **Table 6-3**.

Table 6-3: Magnitude Definition

Magnitude	Definition
High	An irreversible or long-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group, which, if adverse, is <u>likely</u> to threaten its sustainability (or if beneficial, is likely to enhance its conservation status).
Medium	A medium to long-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group, which if adverse, is <u>unlikely</u> to threaten its sustainability (or if beneficial, is likely to be sustainable but is unlikely to enhance its conservation status).
Low	A short-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group that is within the range of variation normally experienced between years.
Negligible	A temporary impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group that is within the normal range of annual variation.

6.2.3.3 Significance of impacts

Impact significance is an index of the value of an ecological receptor in the context of the potential impact upon it, as informed by professional judgement. For the purposes of this EIAR, an impact matrix is implemented which relates the aforementioned variables and generates a significance class for the respective impacts (see **Table 6-4**), ranging from **imperceptible** to **profound** (with reference to EPA (2017)), namely:

- **Imperceptible:** An effect capable of measurement but without significant consequences.
- **Not significant:** An effect which causes noticeable changes in the character of the environment but without significant consequences.
- **Slight:** An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- **Moderate:** An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- **Significant:** An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- **Very Significant:** An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
- **Profound:** An effect which obliterates sensitive characteristics

Table 6-4: Matrix utilised to determine impact significance

		Magnitude of impact			
		High	Medium	Low	Negligible
Value of ecological receptor	International	Profound or Very significant	Significant	Moderate	Slight
	National	Significant	Moderate	Slight	Slight
	County	Moderate	Slight	Slight	Not significant
	Local	Slight	Slight	Not significant	Not significant
	Negligible	Not significant	Not significant	Not significant	Not significant or Imperceptible

It should also be noted that the CIEEM (2018) EclA (Ecological Impact Assessment) guidance document notes that for the purpose of EclA, a “*significant effect*’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’...or for biodiversity in general.” This guidance subsequently defines a significant effect as “an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect is a positive or negative ecological effect that should be given weight in judging whether to authorise a project...A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission.”

6.3 Study Area

The below sections outlines the study area considered for the biodiversity assessment.

6.3.1 West Offaly Power Station including ADF

The assessment focuses on ecology receptors within the footprint of the proposed development at WOP station and ADF, the respective immediate terrestrial environs and the River Shannon from which WOP station abstracts and discharges cooling water. The extent of aquatic ecology receptors downstream of WOP station was extended as required based on the findings of specific targeted surveying relating to river temperature and suitable biological indicators. Designated sites within 15 km of WOP station and WOP ADF were identified and mapped, as well as those with a direct hydrological connection to the aforementioned locations.

6.3.2 Peat Supply to West Offaly Power Station

Peat is exclusively supplied to the WOP station by Bord na Móna and harvested, under EPA IPC licence, from a defined number of existing supply bog groupings as follows:

- P0500-01 (Boora Group)
- P0501-01 (Derrygreenagh Group)
- P0502-01 (Blackwater Group)
- P0503- 01 (Allen Group)

The study area for the peat supply resource for WOP station is therefore defined as the IPC license boundaries which define the maximum footprint of the respective supply bogs in the aforementioned five groupings; watercourses with a direct hydrological connection to the supply bogs are also within the defined study area. It is envisaged that the peat will principally be delivered to the station by rail, with some road deliveries and handled using existing plant facilities.

In order to assess the potential indirect impacts, a review of the current licence requirements was undertaken to gain an understanding of the baseline conditions, existing discharges/issues and current licence EPA IPC licence conditions, monitoring requirements and Annual Environmental reports (AER).

Designated sites within 15 km of all peat bogs supplying WOP station were identified and mapped, as well as those with a direct hydrological connection to the respective bogs.

6.3.3 Biomass Supply to WOP station

Biomass will be transported to the WOP station by road both from indigenous sources and from import sources. Initially, indigenous sources will be unable to fully meet the requirements of the station and biomass will mainly be imported through Irish ports. Indigenous biomass may come from Irish forestry operations, sawmill residues and agricultural residues generally within a 100 km radius of WOP station. In order to assess the potential indirect impacts, a review of current forestry policy, standards and operational best practices (including afforestation, management, felling and processing) has been undertaken to gain an understanding of the baseline conditions in relation to forestry practices, existing issues and current licence requirements.

6.4 Relevant Characteristics of the Proposed Development

The potential impacts to terrestrial ecology arising from the proposed development are relatively limited, given the developed industrial nature of the site. These are generally limited to changes in composition of predominantly artificial habitats. With regard to the ADF, additional capacity (or cells) will be required, which necessitates the need for some clearance of habitats surrounding the current ADF footprint, predominantly scrub with some peripheral reedbeds in waterlogged areas.

The potential impacts to aquatic ecology likely to be caused by the proposed development on the various hydrological attributes such as water quality and flood risk have been identified as a result of:

- The continued operation of the WOP Power Station and the ADF and associated surface water discharges, these are:
 - PS-SW1- Condenser Cooling Water
 - PS-SW2 - Screen Wash Water
 - PS-SW3 - Treated Sewage Effluent
 - PS-SW4 - Boiler Blowdown
 - PS-SW5 - Water Treatments Effluent
 - PS-SW6 & PS-SW7 - Surface water drainage from the station
 - AL-PS-SW1- ADF surface runoff and leachate

The locations of the above surface water discharges are indicated in **Figures 8.2 and 8.3**.

- Water quality impacts on receiving rivers and streams from construction works generating silt laden runoff and/or from accidental spillages (e.g. oil/chemical spillages, bulk liquid cement);
- Construction work in proximity to watercourses or hydrological links (i.e. the surface water drainage system) to watercourses; and
- Increased flood risk as a result of reducing the volume of flood storage available on the floodplain and/or increasing runoff rates and volume.

It is noted that the principal aqueous discharge from the WOP station is the cooling water discharge, PS-SW1. The station is licensed to discharge a maximum thermal load of 186 MWth to the River Shannon when on full load under the existing IE Licence P0611-02. This consists of a flow through the condenser of 5.5 m³/s with a temperature rise of approximately 8.5°C.

6.4.1 Established Environmental Control Measures

The potential effects from the proposed development have been assessed with the following environmental controls already in place:

The WOP station including the ADF currently operates under the EPA IE licence P0611-02. It also underwent a full planning cycle accompanied by an Environmental Impact Assessment at the time of planning. A suite of established mitigation measures are in place for existing surface water discharges from the site, and these are presented in Chapter 8 – Surface Water.

It is noted that there are no additional discharge points proposed as part of the proposed project and there are no instream or bankside works required. Surface water runoff generated from the new biomass storage slabs will connect to the existing drainage network associated with PS-SW6 and surface water runoff generated from the new pellet storage area will connect to the existing drainage network associated with PS-SW7. Drainage from

the new biomass and pellet storage areas associated with the proposed development will be subject to the following design measures:

- The biomass storage areas (Slab A and Slab B) will incorporate the following:
 - New attenuation system;
 - Drainage channels;
 - New silt traps;
 - New settlement tank;
 - New oil interceptor.
- The pellet storage area will incorporate the following:
 - New attenuation system associated with Storage Slab A above.

Further details of the drainage design for the proposed project are contained in **Appendix 8.5**.

6.5 Receiving Environment

6.5.1 WOP station

Habitats occurring within and adjacent to WOP station are mapped in **Figure 6.1**, based on field surveys undertaken at the site. Descriptions of the respective habitats are presented below.

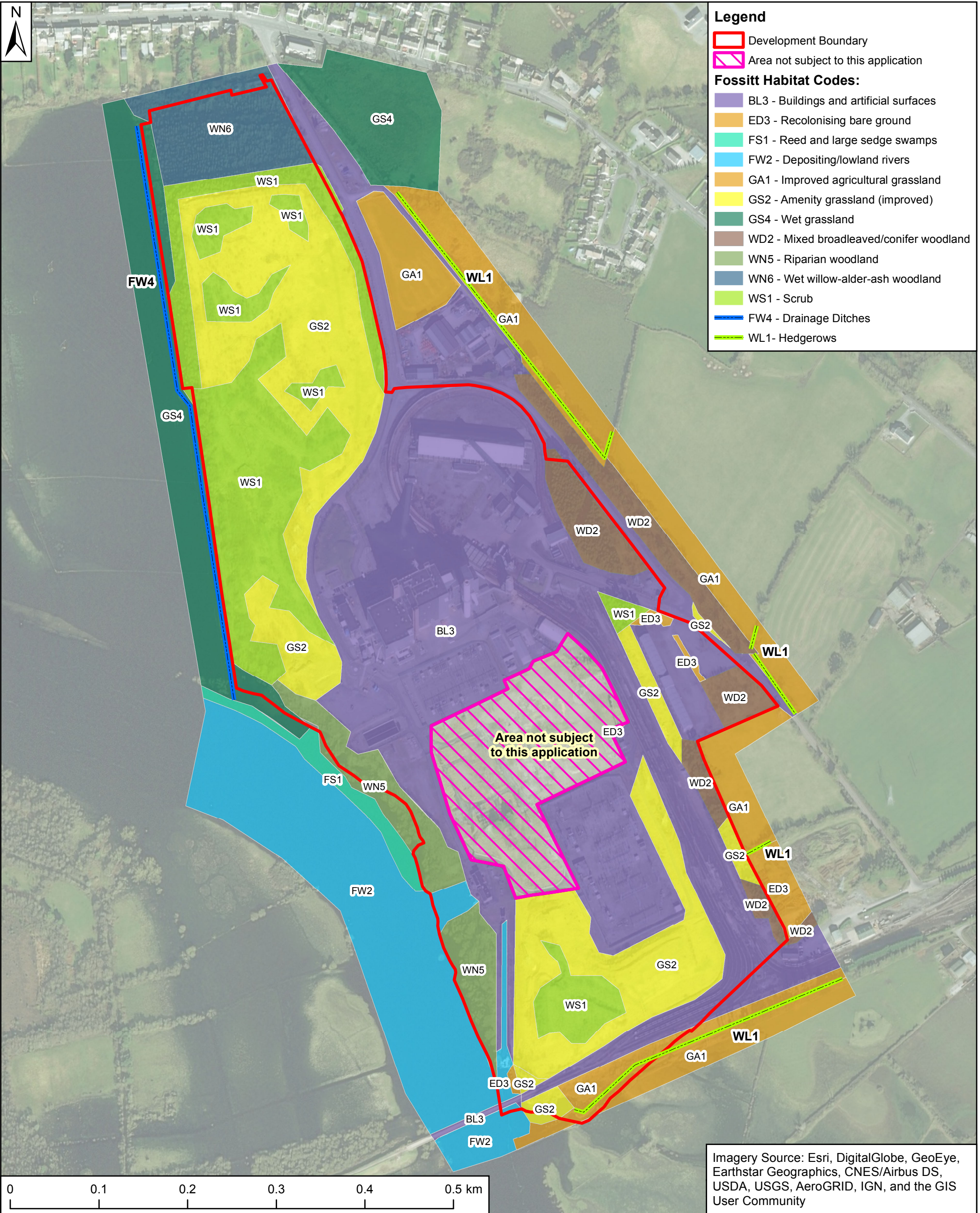
- The habitats at WOP station can be broadly delineated into the following main types:
 - Artificial surfaces associated with roads, storage areas, previously developed ground and buildings;
 - Areas comprising recolonising vegetation of varying degrees of maturity;
 - Planted or landscaped areas including small woodland compartments;
 - Peripheral grassy areas (verges and adjacent fields).

The habitats presently found at the site are further described in Section 6.5.2.1

6.5.1.1 Habitats within development footprint

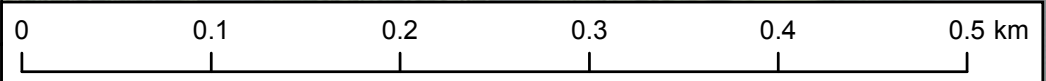
Buildings and artificial surfaces (BL3)

The majority of the WOP station footprint is heavily modified, mainly comprising buildings and artificial surfaces (i.e. compacted hardcore and tarmacadam) (BL3) with minimal amounts of ruderal vegetation (see **Plate 6.1**); these habitats comprise the entire footprint of the proposed Biomass Storage Slab A and pellet storage silos. These habitats are generally of **low ecological importance**. However, the main boiler building hosts an artificial nest box used by breeding peregrine falcon (Annex I, EU Birds Directive) on the southern elevation, which increases the value of the boiler building overall to **County Importance**.



- Legend**
- Development Boundary
 - Area not subject to this application
- Fossitt Habitat Codes:**
- BL3 - Buildings and artificial surfaces
 - ED3 - Recolonising bare ground
 - FS1 - Reed and large sedge swamps
 - FW2 - Depositing/lowland rivers
 - GA1 - Improved agricultural grassland
 - GS2 - Amenity grassland (improved)
 - GS4 - Wet grassland
 - WD2 - Mixed broadleaved/conifer woodland
 - WN5 - Riparian woodland
 - WN6 - Wet willow-alder-ash woodland
 - WS1 - Scrub
 - FW4 - Drainage Ditches
 - WL1 - Hedgerows

Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



<p>One Dublin Airport Central, Dublin Airport, Cloghran, Co. Dublin</p> <p>Tel: 353 1 703 8000 Email: marketing@esbi.ie Web: www.esbinternational.ie</p> <p>ESB International is a trading name of ESBI Engineering & Facility Management Ltd.</p> <p>Registered Office: as above Registered in Ireland No. 155249</p>	<p>REV DATE REVISION DESCRIPTION DRN PROD VER APP</p> <p>PURPOSE OF ISSUE - PRELIMINARY UNLESS INDICATED</p> <p>CLIENT APPROVAL <input type="checkbox"/> PLANNING <input type="checkbox"/> TENDER <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> AS-BUILT <input type="checkbox"/></p>	<p><small>COPYRIGHT © ESB INTERNATIONAL LIMITED ALL RIGHTS RESERVED. NO PART OF THIS WORK MAY BE MODIFIED, REPRODUCED OR COPIED IN ANY FORM OR BY ANY MEANS - GRAPHIC, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, TAPING OR USED FOR ANY PURPOSE OTHER THAN ITS DESIGNATED PURPOSE, WITHOUT THE WRITTEN PERMISSION OF ESB INTERNATIONAL ENGINEERING AND FACILITY MANAGEMENT LTD., TRADING AS ESB INTERNATIONAL</small></p> <p>DRAWING TITLE:</p> <p style="text-align: center;">Figure 6.1- Habitat Map for WOP Station</p>									
	<p>CLIENT: ESB</p>	<p>PROJECT: West Offaly Power, Transition to Biomass</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">DRAWN E.O'Shea</td> <td style="width: 25%;">PRODUCED E.O'Shea</td> <td style="width: 25%;">VERIFIED G.Hamilton</td> <td style="width: 25%;">APPROVED P.Kavanagh</td> </tr> <tr> <td>CLIENT REF. 00-00</td> <td>NO. OF SHEETS 00-00</td> <td>SIZE A3</td> <td>SCALE 1:4,000</td> </tr> </table>	DRAWN E.O'Shea	PRODUCED E.O'Shea	VERIFIED G.Hamilton	APPROVED P.Kavanagh	CLIENT REF. 00-00	NO. OF SHEETS 00-00	SIZE A3	SCALE 1:4,000
DRAWN E.O'Shea	PRODUCED E.O'Shea	VERIFIED G.Hamilton	APPROVED P.Kavanagh								
CLIENT REF. 00-00	NO. OF SHEETS 00-00	SIZE A3	SCALE 1:4,000								
<p>CONTRACT</p>	<p>PRODUCTION UNIT: Civil & Environmental Engineering</p>	<p>DRAWING NUMBER QS-000206-01-D460-137</p>									

Recolonising bare ground (ED3)

Part of the area proposed for Storage Slab B in the eastern part of the WOP site comprises a crushed aggregate surface which has been colonised by a discontinuous low sward of birdsfoot trefoil (*Lotus corniculatus*) and kidney vetch (*Anthyllis vulneraria*) (see **Plate 6.2**). This is predominantly to the northern part of this fenced off area, though a small area of similar habitat occurs in the central area in proximity to the existing poleset in this site. This specific area of recolonising habitat is considered to be of **County Importance** due to its ecological value to a specific species; see Section 6.5.1.3.

Mixed woodland (WD2)

A 0.25 ha oak-dominated (*Quercus spp.*) planted mixed woodland (WD2) with a small amount of ash (*Fraxinus excelsior*), Scot's pine (*Pinus sylvestris*) and downy birch (*Betula pubescens*) is located adjacent to an existing storage building in the east of the WOP site (see). The trees here are 4-5 m in height and form a relatively closed canopy when in leaf; the understory is dominated by ruderal grasses, particularly false oat grass (*Arrhenatherum elatius*), cocksfoot grass (*Dactylis glomerata*) and bramble (*Rubus fruticosus agg.*). This woodland is within part of the proposed footprint of Biomass Storage Slab B. This habitat is considered to be of **Local Importance (lower value)**.

Scrub (WS1)

A very small area of willow (*Salix spp.*) scrub also occurs around the poleset adjacent to the



proposed Biomass Storage Slab B. This habitat is of **low ecological importance**.

Plate 6.1: Artificial hardcore surface proposed for development as Storage Slab A and pellet storage silos



Plate 6.2: Artificial hardcore surface and recolonising habitat proposed for development as Storage Slab B



Plate 6.3: Planted oak woodland within footprint of proposed Storage Slab B
QS-000206-01-R0460-007

6.5.1.2 Unimpacted habitats outside development footprint

Outside of the proposed development boundary, a number of peripheral semi-natural, recolonising, managed or landscaping habitats also occur on and immediately adjacent to the broader WOP station site. These will be unaffected by the proposed development, but are listed and categorised here for context:

- Scrub (WS1)
- Mixed broadleaved/conifer woodland (WD2)
- Dry meadows and grassy verges (GS2)
- Hedgerows (WL1)
- Improved agricultural grassland (GA1)
- Wet grassland (poorly drained grassland to north of WOP station and seasonally flooded callows grassland to the west and south) (GS4)

The former ash disposal site for the original power station to the northwest of the site is currently dominated by rank grassland and expanding willow scrub. These habitats provides marginal nesting opportunities for breeding birds.

The WOP station site directly abuts the River Shannon south of Shannonbridge, due east of the confluence with the River Suck. Both rivers are categorised as lowland depositing rivers (FW2); WOP station abstracts from and discharges cooling water directly to the River Shannon.

6.5.1.3 Species occurring within development footprint

As previously noted, the majority of the proposed development footprint comprises habitats with low ecological value. Consequently, the presence of any fauna is quite restricted. There are no records on the NPWS or NBDC databases of any species of high conservation value.

Mammals

No evidence of any terrestrial mammals was recorded within the respective development footprints; the habitats therein are generally considered to be of minimal value to such species, though the woodland compartment at biomass slab B may be considered to be of **Local Importance (Lower Value)** as it provides some connectivity to adjacent habitats.

Birds

Bird activity was minimal being limited to jackdaws on the areas of hardstanding which may roost in the eaves of the adjacent buildings and on the underside of the peat conveyor belt which connects the IPS building to the boiler house. Peregrine falcon (annex I, EU Birds Directive) nests on the main WOP building (an artificial nest box is located on the south face of the main boiler building) and may hunt jackdaws over the proposed development site. Pied wagtail were also observed intermittently on the areas of hardstanding.

The small planted woodland compartment at the location of Storage Slab B provides some potential breeding and foraging habitat for passerine birds. A subset of bird species observed around the broader WOP site were recorded in this planted woodland, namely robin, blackbird, song thrush, great tit and magpie. As previously noted, this woodland habitat is considered to be of **Local Importance (lower value)**.

It is worth noting that the habitats within the proposed development footprint are unsuitable for specialised bird groups such as migratory waterfowl, waterbirds and waders typically associated with the River Shannon. No records were recorded within the development footprint during the survey period.

Invertebrates

The ruderal recolonizing vegetation within and adjacent to proposed biomass slab B provides a minor nectar and breeding resource for invertebrates. Small blue butterfly (*Cupido minimus*) was observed here in early June 2018, where there are a number of small flowering stands of kidney vetch, the larval food plant for this species. While no butterfly species is specifically protected in the Republic of Ireland under the Wildlife Act, 1976 or the Wildlife (Amendment) Act, 2000, this species is listed on *Ireland Red List No. 4 – Butterflies*, which notes:

The Small Blue is confined to coastal sand dunes and semi-natural calcareous grassland in Ireland. The only larval food plant is Kidney Vetch (Anthyllis vulneraria). It appears to have disappeared from colonies on the south coast and declined at many eastern sites. In Northern Ireland it has not been seen since 2001 at its last known site. This, combined with the assessment of the overall status and future prospects of its habitats (NPWS, 2008), meets the criteria for Endangered due to restricted extent of occurrence (B2ab(ii,ii,iv); i.e. the area of occupancy is less than 500 km² based on tetrad distribution data, the populations are severely fragmented and there is continuing decline in area of occupancy, quality of habitat, and number of locations).

6 individuals were recorded on the wing over the kidney vetch sward inside the proposed development footprint; these were observed flying from this area to more extensive areas of vetch outside the footprint of Storage Slab B to the north of the existing storage building and also on the verge of the WOP access road to the east of the fenced area. At least 20 individuals combined were observed on the wing over these latter areas. This population is considered to be of **County Importance**.

6.5.1.4 Species occurring outside development footprint

Birds

Bird species recorded around the overall WOP station site are typical of woodland and scrub habitats. The following species were recorded using the peripheral woodland, hedgerows and treelines along the eastern boundary of the site during the respective surveys: Robin, wren, blackbird, song thrush, chaffinch, bullfinch, goldfinch, great tit, long-tailed tit, coal tit, dunnock, stonechat, starling, magpie, wood pigeon and collared dove. The willow scrub colonising the old ash disposal area and the riparian corridor to the southwest of the site also supports a number of these species as well as willow warbler, sedge warbler, pheasant and reed bunting. Swallow, meadow pipit and pied wagtail were also observed over the open areas of rank grassland on the old ash disposal area. These species occurring in the vicinity of the WOP station site are considered to be of **Local Importance (Higher value)**.

The above records are summarised in **Table 6-5** below, with the current BoCCI status for each species.

Table 6-5: Breeding bird records around WOP station site

Species	Status (BoCCI, Annex)	Habitat associated with record
Robin	Amber	Woodland, scrub
Wren	Green	Woodland, scrub
Blackbird	Green	Woodland, scrub
Song thrush	Green	Woodland, scrub
Chaffinch	Green	Woodland, scrub
Bullfinch	Green	Woodland, scrub
Goldfinch	Green	Woodland, scrub
Great tit	Green	Woodland, scrub
Long-tailed tit	Green	Woodland, scrub
Coal tit	Green	Woodland, scrub
Duncock	Green	Woodland, scrub
Stonechat	Amber	Scrub
Starling	Amber	Woodland, scrub
Magpie	Green	Woodland
Wood pigeon	Green	Woodland
Collared dove	Green	Woodland
Willow warbler	Green	Scrub
Sedge warbler	Green	Scrub
Pheasant	Green	Scrub
Reed bunting	Green	Scrub
Swallow	Amber	Open grassy areas
Meadow pipit	Red*	Open grassy areas
Pied wagtail	Green	Recolonising bare ground

* The Red-listing of Meadow Pipit was largely a consequence of two extremely cold winters of 2009/10 and 2010/11 where populations throughout Ireland dropped dramatically. Countryside Bird Survey data collected between 2012 and 2014 has indicated a progressive recovery in numbers back to pre-2010 levels and Meadow Pipit is again considered one of the most common upland bird species on the island of Ireland.

The overall WOP station site does not contain any habitats suitable for use by migratory waterfowl which use the River Shannon Callows in winter. The seasonally flooding wet grassland on the east bank of the Shannon during the survey supports small numbers of wintering birds. IWeBS data suggests that the closest areas of callows with a regular high diversity and significant numbers of wintering waterfowl are the River Suck callows to the west of Shannonbridge, and Bullock Island near Shannon Harbour, approximately 10 km

downstream. The Little Brosna callows, to the south of Banagher, also hold important concentrations of wildfowl. Observations from wintering birds surveys undertaken in 2016, 2017 and 2018 recorded small flocks of curlew (<10) and lapwing (<30) utilising the fields abutting the western boundary of the WOP site when water levels lay just below inundating levels for these areas. Whooper swans were also observed flying along the River Shannon at this location with very small numbers (5-10) of individuals occasionally resting and feeding on the callows grassland on the west bank of the River Shannon, just downstream of the River Suck confluence. Larger numbers (40-50) of whooper swans were observed feeding on the recolonising vegetation on Clonfert Bog west of the River Shannon, 1 km west of WOP station; wintering whooper swans also occur frequently in the larger locality, particularly throughout the seasonally flooded farmland extending 5 km southeast of WOP station. A small number of wigeon (7 individuals) was also observed upstream of Shannonbridge on one occasion. At least one pair of mute swans is resident on the river around Shannonbridge. Special Conservation Interest bird populations associated with the River Shannon and its connected callow habitats (as relates to the Middle Shannon Callows SPA) are considered to be of **International Importance**, though it is noted that the flock numbers observed in the locality of WOP station are well below the 1% national population thresholds for the respective species, as presented in Crowe & Holt (2013).

Mammals and other species

Mammal activity around the overall WOP station site is relatively limited, with no evidence of any such activity within the footprint of the proposed biomass storage development. An active badger sett is located on the old ash storage area to the northwest of WOP station, 250 m northwest of the proposed location of Storage Slab A; based on a site assessment of flattened trails indicating regular badger foraging and commuting activity, individual animals from this sett forage widely over the rank grassland areas of the ash storage area and also cross the WOP station entrance road to access the agricultural land to the east and north of the site. This sett is considered to be of **Local Importance (Higher value)**. Positive evidence of otter (spraint) was recorded under the bridge west of Shannonbridge village as well as on the east bank of the river approximately 100 m upstream of the railway bridge; this species can be expected to forage extensively along the River Shannon and its associated riparian vegetation. Otter populations occurring along the Shannon are considered to be of **International Importance** (a Qualifying Interest of the River Shannon Callows SAC). Other mammal species such as fox, hedgehog, hare and rabbit are also expected to occur in the surrounding areas of grassland and woodland; these are of **Local Importance (Lower value)**.

Bat surveys carried out in September 2016 by Bat Eco Services found that the existing storage building 200 m to the southeast of the proposed development is likely used as a satellite roost by three species of bat: soprano pipistrelle, common pipistrelle and brown long-eared bat. Additional survey work undertaken in vicinity of WOP station indicated that three species of bat forage over the scrub area on the old ash disposal area (common pipistrelle, Leisler's bat and soprano pipistrelle). Soprano pipistrelles and common pipistrelles were also regularly recorded foraging along of the road entrances to WOP station while a large volume of Daubenton's bat activity was recorded on the River Shannon at the

bridge west of Shannonbridge village. Bat populations in the vicinity are considered to be of **County Importance**.

While no individuals were observed during site surveys, common frog potentially utilise the drainage ditch which runs along the western boundary of the old ash disposal area north of WOP station for breeding.

Protected or Rare Plant Species

There are no protected (Flora (Protection) Order 2015) or rare (Wyse Jackson et al. 2016) plant species known to occur within the respective proposed biomass storage development footprints.

Marsh pea (*Lathyrus palustris*), a rare species listed in Wyse Jackson et al. (2016) is known to occur on drier areas along the banks of the River Shannon in the locality of Shannonbridge.

Invasive species

There are no invasive terrestrial species occurring within the proposed development areas.

6.5.1.5 Aquatic Ecology

A Water Framework Directive (WFD) fish monitoring survey was undertaken by IFI on the Shannon in 2010 on the Shannon at Clonmacnoise approximately 10 km upstream of WOP station. Subsequent IFI surveys were undertaken in 2016 (IFI, 2017), which included sites at Cloniff, 2 km upstream of WOP station and at the railway bridge, immediately downstream of the WOP station cooling water outfall. Site-specific fisheries studies were also undertaken to survey the area within and downstream of the WOP station cooling water outfall (ESB Fisheries 2016 & 2017). A synthesis report comprising the results of these studies is included in **Appendix 6.2**. A summary of the respective findings is presented below.

The ESB fisheries study found perch, roach, bream, roach-bream hybrids, eel, pike, gudgeon and trout in the sampled sites along the River Shannon near WOP. No juvenile nor adult salmon were recorded at any sampling site. This is consistent with the findings of IFI as part of the WFD fish assessments carried out in 2010 and also in 2016. The overwhelming numerical dominance of cyprinid fish, as well as the greater diversity of this group at WOP, indicates that the main channel of the Shannon at this location can be classified as a cyprinid water.

Aquatic macrophytes were sampled in each of the three annual monitoring events in August 2014, 2015 and 2016 along with observations on macroalgal cover and freshwater sponge occurrence. The surveys comprised percentage cover assessment of 2 to 5 quadrats along transects of variable lengths, one at each sampling site. The precise length of each transect as well as the number of transects varied between years depending on the water levels in the river at the time. In all three sampling events, the photic zone appeared only to penetrate to about 2 m, below which no plants were present. The macrophytes were represented by a limited list of species, the majority of which are very common in lowland rivers in Ireland which are also quite common in fairly eutrophic conditions. They can therefore be described as tolerant species in the wider sense.

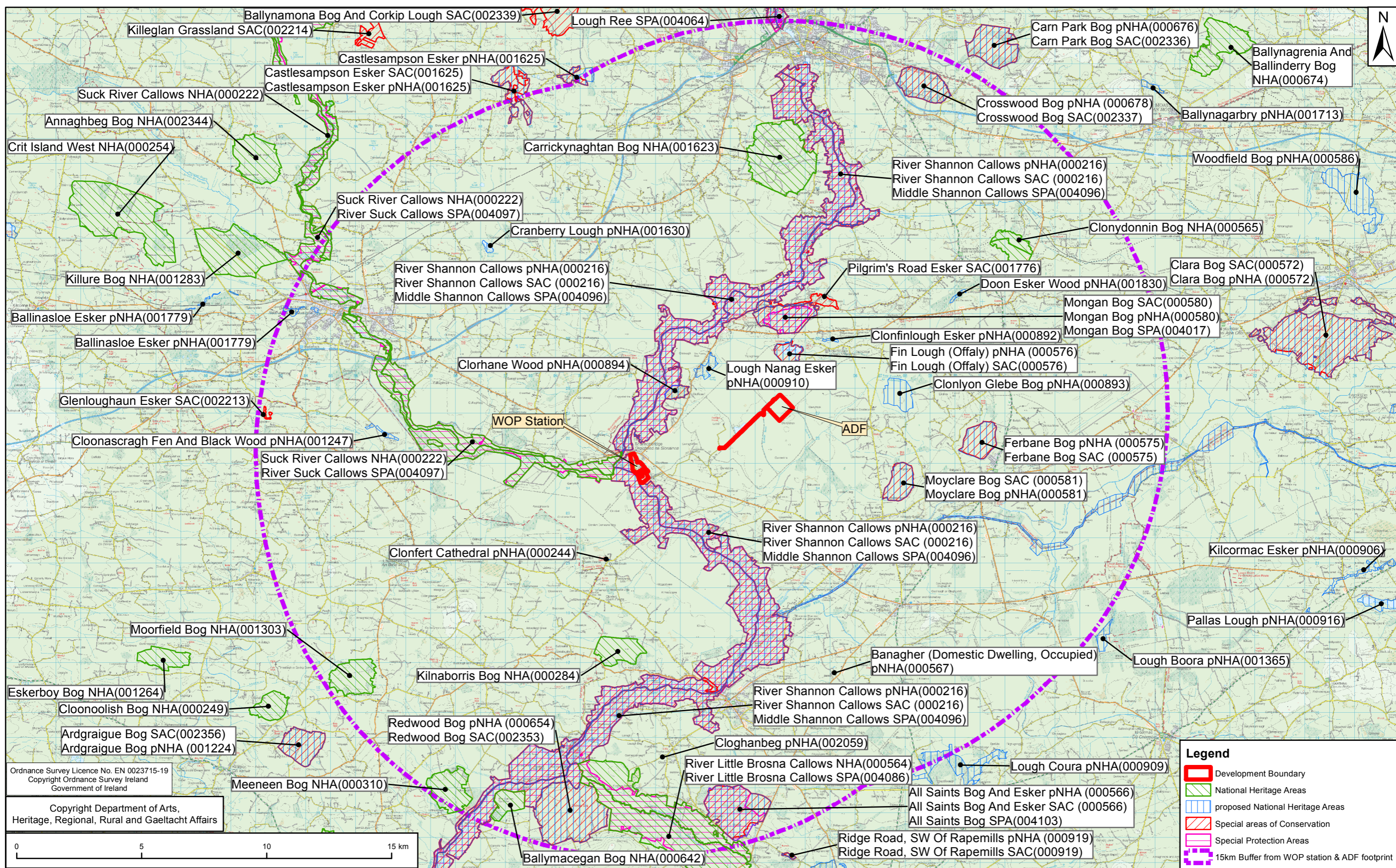
Diatoms were collected from macrophytes for analysis at 8 sites from WOP respectively in 2014 and from 10 sites in 2015 and in 2016. These collections were analysed for TDI (Trophic Diatom Index) which in turn is used to generate EQR (Ecological Quality Ratio) which determines the WFD (Water Framework Directive) Ecological Status of a given site. Each diatom collection generally contained a diverse range of species, several of which tend to be found at the majority of sample sites. One of the most numerous diatom species collected at upstream and downstream study sites was *Achnantheidium minutissimum*. This species is recognised to be a prominent diatom at Good and High Status sites.

Water Framework Directive status for waterbodies in the region are presented in Chapter 8 - Surface Water.

The alien species Zebra mussel (*Dreissena polymorpha*) (listed on the 'Third Schedule' of the European Communities (Birds and Natural Habitats) Regulations 2011) is known to occur in the River Shannon in the locality of Shannonbridge. The alien species Asian clam (*Corbicula fluminea*) has also been recorded in the River Shannon at Clonmacnoise, 10 km upstream of Shannonbridge.

WOP station is located adjacent to Shannonbridge village, which comprises a wastewater collection network which routes untreated sewage to the Shannonbridge wastewater treatment plant (WWTP), which subsequently discharges treated effluent via an outfall on the eastern shore, approximately 1.5 km upstream of the cooling water outfall. The WWTP is currently licensed under a Waste Water Discharge Authorisation (Irish Water Reference A0171-01). The Inspectors Report (2011) noted that while the WWTP was overloaded at the time, it was considered that subject to the mitigation measures proposed in the associated Stage 2 Appropriate Assessment, the discharge was not likely to have a significant impact, in terms of maintaining favourable conservation status of the qualifying interests, on the designated European Site. The WWTP was subsequently upgraded with a Pumped Flow Biofilm Reactor (PFBR) package plant in 2013; this has increased the capacity of the plant. Given the absence of any chemical or organic enriching aspect of the cooling water discharge, it is not envisaged that there is any interaction between the WWTP and power station discharges which could negatively impact upon the aquatic habitats of the River Shannon.

The NPWS site synopsis for the River Shannon Callows SAC notes that "*The Shannon Callows are used for summer dry-stock grazing (mostly cattle, with some sheep and a few horses), and permanent hay meadow. About 30 ha is a nature reserve owned by voluntary conservation bodies. The River Shannon is also used increasingly for recreational purposes with coarse angling and boating accounting for much of the visitor numbers. Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition, water-skiing, ploughing and neglect of hay meadow (or reversion to pasture).*" Despite these localised pressures, the site synopsis concludes that "*none of these damaging activities can yet be said to be having a serious impact.*"



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PURPOSE OF ISSUE - PRELIMINARY UNLESS INDICATED

CLIENT APPROVAL PLANNING TENDER CONSTRUCTION AS-BUILT

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CLIENT: **ESB**

PROJECT: **West Offaly Power, Transition to Biomass**

CONTRACT:

PRODUCTION UNIT: **Civil & Environmental Engineering**

DRAWING TITLE: **Figure 6.2- SACs, SPAs, NHAs & pNHAs within 15 km of WOP Station and ADF footprint**

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DRAWN	PRODUCED	VERIFIED	APPROVED	APPROVAL DATE
E.O'Shea	E.O'Shea	G.Hamilton	P.Kavanagh	19/11/2018
CLIENT REF: 00-00		NO. OF SHEETS: 00-00		SCALE: A3 1:140,000
DRAWING NUMBER: QS-000206-01-D460-138				

6.5.1.6 Designated sites

The WOP station development footprint is not part of any site designated for nature conservation. The closest European Site is the River Shannon Callows SAC/Middle Shannon Callows SPA which abut the western boundary of the overall WOP station site.

A standalone AA Screening and Natura Impact Statement has also been produced, in accordance with the requirements of the EU Habitats Directive and the European Communities (Birds and Habitats) Regulations 2011, which considers designated sites within the potential zone of impact of the proposed activities at WOP station and should be read in conjunction with this EIAR chapter. Designated sites within a 15 km radius of the ADF are presented in **Table 6-6**. These sites are mapped in **Figure 6.2**.

Table 6-6: Designated Sites within 15 km of WOP station

Designated site	Distance from WOP station
River Shannon Callows SAC/pNHA	0 km
Middle Shannon Callows SPA	0 km
Suck River Callows NHA	0.6 km
River Suck Callows SPA	1 km
Clorhane Wood pNHA	2.8 km
Moyclare Bog SAC/pNHA	10 km
Cranberry Lough pNHA	10 km
Clonlyon Glebe Bog pNHA	10 km
Banagher (Domestic Dwelling, Occupied) pNHA	10.5 km
Cloghanbeg pNHA	11 km
River Little Brosna Callows NHA	11.5 km
Carrickynaghtan Bog NHA	12 km
River Little Brosna Callows SPA	12.5 km
Redwood Bog SAC/pNHA	12.5 km
Ferbane Bog SAC/pNHA	13 km
Moorfield Bog NHA	13 km
All Saints Bog and Esker SAC/pNHA	13.5 km
All Saints Bog SPA	13.5 km
Meeneen Bog NHA	13.5 km
Ballymacegan Bog NHA	13.5 km
Ballinasloe Esker pNHA	13.5 km
Doon Esker Wood pNHA	14 km

Designated site	Distance from WOP station
Glenloughaun Esker SAC	14.5 km
Castlesampson Esker SAC/pNHA	14.5 km
Pilgrim's Road Esker SAC	3.25 km
Clonfert Cathedral pNHA	3.5 km
Lough Nanag Esker pNHA	4 km
Kilnaborris Bog NHA	6.5 km
Fin Lough (Offaly) SAC/pNHA	7.25 km
Mongan Bog SAC/pNHA	8 km
Mongan Bog SPA	8 km
Clonfinlough Esker pNHA	9 km
Cloonascragh Fen And Black Wood pNHA	9 km

6.5.2 WOP ADF

WOP ADF is located within the Blackwater Bog Bord na Móna property, large areas of which are actively being harvested for peat; bare peat directly abuts the northern boundary of the ADF.

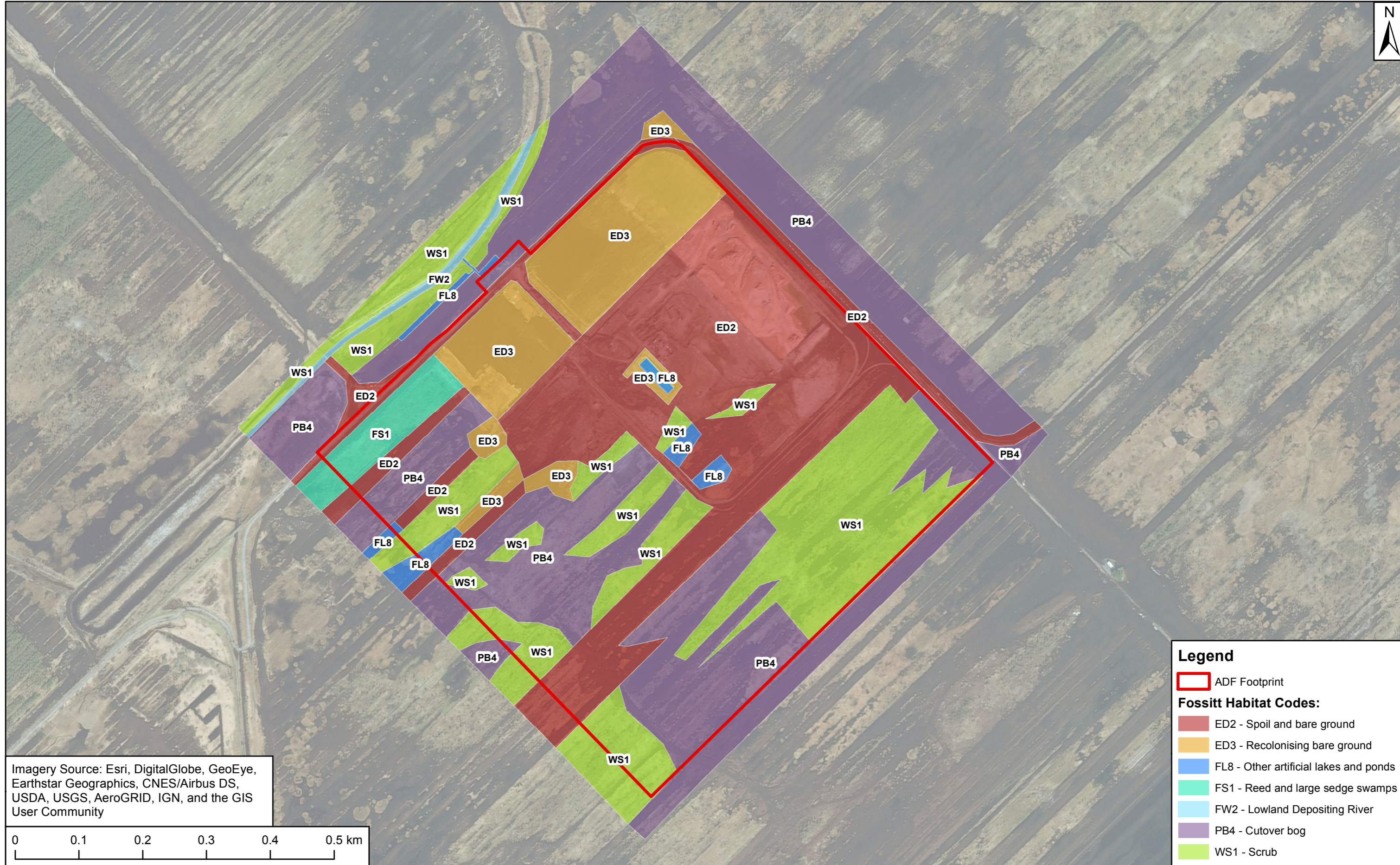
The habitats at the ADF can be broadly delineated into the following main types:

- Active ash deposition cells and works areas with associated areas of artificial and bare ground;
- Filled and capped ash deposition cells with colonising ruderal vegetation;
- Decommissioned harvesting peat fields with colonising ruderal vegetation;
- Intermittent strips of scrub of varying levels of maturity;
- Waterlogged areas and associated colonising reedbed habitat;
- Surrounding areas of active peat harvesting comprising bare peat fields; and
- Standing and running water in leachate lagoon, settlement ponds and site drains.

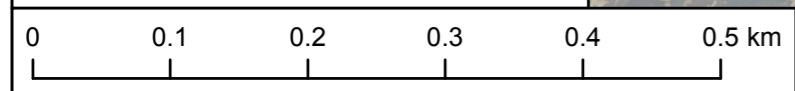
The habitats presently found at the site are further described in Section 6.5.2.1.

6.5.2.1 Habitats









The habitats currently occurring in and around the ADF site are described below and mapped in **Figure 6.3: Habitat Map for ADF**.



Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

-  ADF Footprint
- Fossitt Habitat Codes:**
-  ED2 - Spoil and bare ground
-  ED3 - Recolonising bare ground
-  FL8 - Other artificial lakes and ponds
-  FS1 - Reed and large sedge swamps
-  FW2 - Lowland Depositing River
-  PB4 - Cutover bog
-  WS1 - Scrub

REV	DATE	REVISION DESCRIPTION	DRN	PROD	VER	APP
PURPOSE OF ISSUE - PRELIMINARY UNLESS INDICATED						
CLIENT APPROVAL <input type="checkbox"/> PLANNING <input type="checkbox"/> TENDER <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> AS-BUILT <input type="checkbox"/>						

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PROJECT: **West Offaly Power, Transition to Biomass**

CONTRACT:

DRAWING TITLE: **Figure 6.3- Habitat Map for ADF**

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DRAWING NUMBER QS-000206-01-D460-139				

Spoil and bare ground (ED2)

There are currently extensive areas of spoil and bare ground at the ADF, where active ash deposition is currently underway (see **Plate 6.4**), and in the central area of the ADF around the lagoon where there is regular plant access and earthmoving.

There is minimal vegetation occurring in these areas due the regularity of disturbance, though very occasional single specimens of dock, coltsfoot, Yorkshire fog and cocksfoot grass (*Dactylis glomerata*) do occur.

The access track entering the ADF site from the south comprises compacted hard standing and is also classified as bare ground. This habitat is of **negligible ecological importance**.

Recolonising bare ground (ED3)

Recolonising bare ground (ED3) habitat at the site is predominantly associated with the closed cells in the north-western sector of the ADF (see **Plate 6.5**). These are at varying stages of natural recolonization, occurring in a heterogeneous mosaic with areas of spoil and bare ground. The bounding berms of the ADF also fall under this category. A large proportion of the existing ADF footprint comprises a combination of spoil and bare ground where there is active ash deposition or capping works underway. Re-colonising bare ground also occurs where capping has been completed or where temporary works have led to some clearance of surface vegetation; these latter areas display a heterogeneous coverage of ruderal grasses and low height herbaceous species.

Species occurring are common of recolonizing ruderal vegetation and comprise creeping buttercup (*Ranunculus repens*), coltsfoot (*Tussilago farfara*), creeping thistle (*Cirsium arvense*), cat's ear (*Hypochaeris radicata*), silverweed (*Potentilla anserine*), tormentil (*Potentilla erecta*), ribwort plantain (*Plantago lanceolata*), birds-foot trefoil (*Lotus corniculatus*), yarrow (*Achillea millefolium*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), Yorkshire fog grass (*Holcus lanatus*), bent grasses (*Agrostis* spp.) and smooth sowthistle (*Sonchus oleraceus*).

Vegetation cover varies within the ED3 areas, ranging from 50% to 90%, but the sward height remains relatively low. The broadleaved component of the recolonizing vegetation has some potential in the future to act as a nectar resource for invertebrates, but as the habitat is still at a relatedly early stage of recolonisation. It is currently considered to be of **negligible ecological importance**.

Dry meadows and grassy verges (GS2)

Fragmented strips of grassy habitat have developed around the site (see **Plate 6.6**), predominantly associated with the access track verges and along the rail line which services the ADF (these by their nature have limited spatial extents and are not specifically mapped in **Figure 6.3: Habitat Map for ADF**).

These grassy areas comprise bent grasses, Yorkshire fog and false-oat grass, as well as yarrow, ox-eye daisy (*Leucanthemum vulgare*), clovers, ribwort plantain and cat's ear. This habitat is considered to be of **Local Importance (Lower Value) importance** overall.

Cutover bog (PB4)

The ADF is constructed on a decommissioned peat harvesting field; consequently much of the surrounding habitat comprises topographically flat cutover bog in varying stages of recolonization (see **Plate 6.7**) (also see Scrub WS1 and Reed and large sedge swamps FS1 below). Areas of cutover bog around the periphery of the ADF at the early stages of recolonization (ED3) comprise bare compacted surface peat with patchy swards of common cottongrass (*Eriophorum augustifolium*) with occasional ling heather (*Calluna vulgaris*) and purple moor-grass (*Molinia caerulea*). In its current condition, the habitat is considered to be of **negligible ecological importance** overall, though if left undisturbed it can be expected to transition to other habitats of increased value (e.g. mature scrub, transitional bog woodland).

Scrub (WS1)

Areas of cutover bog which have been out of production for the longest period currently support scrub of varying degrees of maturity. This scrub is dominated by downy birch (*Betula pubescens*) and with interspersed specimens of willow as well as very occasional specimens of Scot's pine (*Pinus sylvestris*). This scrub tends to form strips between areas of less-well colonised cutover bog and bare peat, though a more contiguous area of scrub (circa 7 ha) is located along the north-eastern boundary of the ADF. This habitat is inherently of generally **negligible ecological importance**, and is still relatively immature, though it could be expected to transition to secondary origin bog woodland if undisturbed.

Other artificial lakes and ponds (FL8)

A leachate storage lagoon is located in the centre of the ADF. This is lined with an impermeable membrane and contains standing water which is alkaline in nature. There is no aquatic vegetation. The lagoon has **negligible ecological value**. A linear settlement pond is located adjacent to the Gowlan River to the northeast of the ADF; this is also generally devoid of vegetation and is of **negligible ecological importance**, though it has some potential to be used by breeding amphibians, though none were recorded here during the respective field surveys. Other ephemeral areas of standing water occur around the site where drainage is poor.

Reed and large sedge swamps (FS1)

A reedbed has developed in a permanently waterlogged area adjacent to the western corner of the existing developed footprint of the ADF. Common reed (*Phragmites australis*), reedmace (*Typha latifolia*) and yellow iris are present. As it contributes to local diversity, this area is considered to be of **Local Importance**; however, it is fragmented from a much larger expanse of flooded peatland to the southwest of the ADF where a much more significant area of reedbed is located.

Lowland depositing river (FW2)

The Gowlan River passes adjacent to the north-western boundary of the ADF, flowing south to the Blackwater River. The banks of the river channel are dominated by bracken scrub. As it contributes to local diversity and provides an ecological corridor, this feature is considered to be of **Local Importance**.



Plate 6.4: Spoil and bare ground (ED2) associated with active ash deposition cell



Plate 6.5: Recolonising bare ground (ED3) associated with capped ash deposition cell



Plate 6.6: Dry meadows and grassy verges (GS2) associated with access tracks



Plate 6.7: Cutover bog (PB4) on the periphery of the ADF, with patchy common cottongrass vegetation (ED3) in foreground and immature scrub (WS1) in background

6.5.2.2 Fauna

Terrestrial Mammals

Terrestrial mammal activity in and around the ADF site appears to be minimal. The open areas (bare and recolonising ground) within the site footprint are generally likely to be of low ecological value, but may be used for foraging by Irish hare and fox, which are known to occur at the site; there is the potential for a number of bat species to also occur and feed in this area.

Irish hare was directly observed on areas of recolonising ground during the 2016 and 2017 site visits. Surveys undertaken to inform the Bord na Móna Draft Rehabilitation Plan for Blackwater Bog noted that badger and otter occur in the broader locality, particularly north of the ADF towards Fin Lough, while pine marten and red squirrel were also associated with woodland and mature scrub on the periphery of the overall supply bog property. Overall, the terrestrial fauna assemblage in the vicinity of the ADF site is considered to be of Local Importance.

Bats

Surveys for bat species undertaken on behalf of Bord na Móna at other cutaway bog sites have shown that open areas of bog have low potential to support bats and most records are associated with linear features along the margins including hedgerows and scrub.

In the vicinity of the ADF site, foraging bats could be expected to occur over the areas of bog woodland and transitional scrub as well as along the more open rides between such blocks. Areas of standing water may attract invertebrates and be foraged over by bats. The commonest species recorded in surveys of midland bog habitats are soprano pipistrelle, common pipistrelle and Leisler's bats.

Based on the habitat survey findings, there are no trees within the ADF site with potential to act as bat roosts. Given the relatively low habitat suitability for bats in the vicinity of the ADF site, any bat population occurring will be transient and of low density and consequently is assessed to be of Local Importance.

Amphibians and Reptiles

While no amphibian observations were made during site visits, common frog and smooth newt have the potential to occur in wetter areas and drains around the periphery of the developed ADF site. No reptiles (e.g. common lizard) have been recorded on site. Any amphibian populations in the vicinity of the ADF site are considered to be of Local Importance.

Invertebrates

Grassy and predominantly re-colonised areas provide a minor nectar resource to the local invertebrate population. Surveys undertaken to inform the Bord na Móna Draft Rehabilitation Plan for Blackwater Bog noted the presence of large white and large heath butterflies as well as damselfly species. The invertebrate population occurring in the vicinity of the ADF site is considered to be of Local Importance.

Birds

The bog woodland and associated scrub is likely to provide nesting habitat for a range of passerine bird species. There are no expansive areas of open water in close proximity to the site which may support breeding or wintering waterbirds. Birds of prey may also hunt for small mammals over the ADF. Overall, the bird population occurring in the vicinity of the ADF site is considered to be of Local Importance.

The breeding bird survey undertaken during April 2017 recorded the following species within and adjacent to the ADF site boundary; refer to Table 6-7.

Table 6-7: Records from April 2017 Breeding Bird Survey

Species	Status (BoCCI, EU Birds Directive Annex)	Habitat associated with record
Robin	Amber	Scrub
Wren	Green	Scrub
Pied wagtail	Green	Recolonising ground
Blackbird	Green	Scrub
Rook	Green	Flew over site
Pheasant	Green	Scrub
Chiffchaff	Green	Scrub
Willow warbler	Green	Scrub
Stonechat	Amber	Scrub
Skylark	Amber, Annex II(II)	Over open recolonizing ground
Meadow pipit	Red*	Over open recolonizing ground
Magpie	Green	Scrub
Kestrel	Amber	Over Gowlan River

* The Red-listing of Meadow Pipit was largely a consequence of two extremely cold winters of 2009/10 and 2010/11 where populations throughout Ireland dropped dramatically. Countryside Bird Survey data collected between 2012 and 2014 has indicated a progressive recovery in numbers back to pre-2010 levels and Meadow Pipit is again considered one of the most common upland bird species on the island of Ireland.

The Bord na Móna Rehabilitation plan for the Blackwater Bog group notes that several species of conservation significance use various habitats of the Blackwater Bog group. Hen harrier and marsh harrier (listed in Annex I of the EU Birds Directive) as well as kestrel and merlin were sighted hunting over cutaway and there are several known winter Hen Harrier roosts within sites in or adjacent to the Blackwater Bog group. Curlew (Red-listed breeding bird species) have historically bred at several sites within the Blackwater Bog group particularly on areas being rehabilitated.

The closest European Site designated for birds is Mongan Bog SPA, located approximately 2.5 km to the north of the ADF, while the Middle Shannon Callows SPA is 3.5 km to the west.

The areas of wetland to the southwest of the ADF attract both wintering and breeding birds. Small numbers of Whooper Swan (< 10 individuals) (migratory winter species listed in Annex I of the EU Birds Directive) were observed flying over the site during the winter 2017 survey; there was no evidence of this species resting or foraging in immediate proximity to the ADF. It is known that this species regularly commutes between the areas of open water at Blackwater Bog and the Shannon Callows. Surveys undertaken to inform the Bord na Móna Draft Rehabilitation Plan for Blackwater Bog noted the presence of mallard, teal, tufted duck, little grebe, moorhen, mute swan and grey heron. Snipe also occur in good numbers across the overall site.

6.5.2.3 Protected or Rare Species

Known records of protected or rare species occurring in Irish Grid square N06 were supplied by the NPWS Scientific Unit. There are no known legally protected plant species (Flora (Protection) Order 2015) or Red Data List species (Wyse Jackson et al. 2016) occurring in the locality of the ADF.

6.5.2.4 Designated Sites

The ADF site is not part of any site designated for nature conservation. The closest European Site is Fin Lough (Offaly) SAC, 1 km to the north. The River Shannon Callows SAC and Middle Shannon Callows SPA are hydrologically connected to the ADF site via the Gowlan River.

A standalone AA Screening and Natura Impact Statement has also been produced, in accordance with the requirements of the EU Habitats Directive and the European Communities (Birds and Habitats) Regulations 2011, which considers designated sites within the potential zone of impact of the proposed activities at the ADF site and should be read in conjunction with this EIAR chapter (See **Appendix 6.1**). Designated sites within a 15 km radius of the ADF are presented in **Table 6-8**. The proximity of the ADF to the aforementioned designated sites is mapped in **Figure 6.2 - SACs, SPAs, NHAs & pNHAs within 15 km of WOP station and ADF footprint**.

Table 6-8: Designated Sites within 15 km of WOP ADF (in order of proximity)

Designated site	Distance from ADF
Fin Lough (Offaly) SAC	1 km
Mongan Bog SAC/pNHA	2.75 km
Mongan Bog SPA	2.75 km
Clonfinlough Esker pNHA	3 km
Lough Nanag Esker pNHA	3 km
Middle Shannon Callows SPA	3.5 km
Clonlyon Glebe Bog pNHA	3.5 km
Clorhane Wood pNHA	3.5 km
River Shannon Callows SAC/pNHA	3.7 km
Pilgrim's Road Esker SAC	3.8 km
Moyclare Bog SAC/pNHA	5 km
Suck River Callows NHA	6.5 km
Ferbane Bog SAC/pNHA	7 km
River Suck Callows SPA	7.5 km

Designated site	Distance from ADF
Doon Esker Wood pNHA	7.5 km
Carrickynaghtan Bog NHA	8.5 km
Clonfert Cathedral pNHA	9 km
Banagher (Domestic Dwelling, Occupied) pNHA	10 km
Clonydonnin Bog NHA	10.3 km
Kilnaborris Bog NHA	11 km
Cranberry Lough pNHA	12.5 km
Crosswood Bog SAC	13 km
Crosswood Bog pNHA	13 km
Cloghanbeg pNHA	14.5 km
Lough Ree SPA	14.8 km
Castlesampson Esker SAC	15 km
Lough Coura pNHA	15 km
Cloonascragh Fen And Black Wood pNHA	15 km

6.5.3 WOP supply bogs

Peat supplied to WOP station by Bord na Móna is sourced from a specific number of supply bogs as outlined in Chapter 4. Bord na Móna have prepared land use maps for this suite of bogs which comprise broad habitat associations found at each site.

Peat extraction is carried out under licence from the EPA. All of the supply bogs are currently compliant with the requirements of their respective IPC licences.

A summary of the ecological receptors typically associated with Bord na Móna supply bogs is presented below, based on the desktop review of ecological studies carried out in the respective bog groupings as identified in Section 6.2.2.1.

6.5.3.1 Biodiversity associated with WOP Peat Supply Bogs

Habitats

The respective WOP supply bogs feature a suite of bog types including those currently in full commercial production, recolonising areas on which peat harvesting has ceased and other areas of undisturbed high bog.

The majority of the footprint of most of the supply bogs relates to commercial production and comprises bare peat – classified as Spoil and bare ground ED2. These are generally of low ecological value, but may support some bird species (see below).

Complex mosaics of cutover bog (PB4) occurs on the periphery of most of the active peat harvesting sites and can often be associated with private turf-cutting activities. Areas of unharvested raised bog (PB1) can occur, though these raised bog remnants are often fragmented; some parts can conform to the EU Habitats Directive Annex 1 habitat “Degraded raised bogs still capable of natural regeneration (7120)”. Bord na Móna will not be expanding harvesting activities into these intact or degraded raised bog area.

Recolonising vegetation of varying degrees of maturity occurs on cutaway bog which has been taken out of commercial production; the level of colonisation is dependent on the date

of cessation of harvesting and subsequent water levels at the respective sites. In many areas, recolonizing habitats are primarily made up of birch-dominated scrub (WS1) and pioneering poor fen communities (Poor fen and flush PF2). Such fen communities comprise rushes (*Juncus effusus*, *Juncus bulbosus*), and common cottongrass (*Eriophorum angustifolium*). More permanently waterlogged areas may develop stands of emergent aquatic vegetation (Reed and large sedge swamps, FS1) comprising common reed, bottle sedge (*Carex rostrata*), reedmace and common club-rush (*Schoenoplectus lacustris*). Silt ponds (classified as artificial lakes and ponds FL8) can also develop similar emergent communities.

Grassland communities can develop on areas of cutaway bog, varying from dry (GS1 and GS2) to wet (GS4) grassland. Sweet vernal grass (*Anthoxanthum odoratum*) and cocksfoot grass generally dominate in the former, with the latter being predominantly colonised by purple moorgrass (*Molinia caerulea*) and rushes. Secondary heath communities (Wet heath HH3) develop in drier cutaway areas, with ling heather generally dominant. These cutaway areas progressively transition through scrub (WS1) towards climax vegetation of bog woodland dominated by downy birch and willow, with a varying component of other tree species including ash (*Fraxinus excelsior*), holly, hazel (*Corylus avellana*), rowan, oak and sycamore (*Acer pseudoplatanus*), though Bord na Móna data indicates that these latter component species remain relatively rare on cutaway bogs.

Several Midlands raised bogs that were initially partially drained in the 1980s in anticipation of peat production were identified as having substantial ecological and conservation value, as well as significant bog restoration potential as they still retained natural bog vegetation. Bord na Móna decided to conserve and restore these bogs. These sites now form the core of the Bord na Móna Raised Bog Restoration programme (2009-present). The main objective of the Bord na Móna Raised Bog Restoration programme is to restore raised bog habitats by blocking drains and restoring bog hydrology. Re-wetting the bog can aid the development of Sphagnum-rich plant communities and restore peatland habitat function. The methodology used for bog restoration was developed by the National Parks and Wildlife Service (NPWS) under the Dutch-Irish Restoration programme in the 1990s and has also been used extensively by the NPWS and by Coillte. Drains are blocked using peat dams constructed by a specially modified excavator. Specific habitat condition monitoring at Abbeyleix Bog and Cuckoo Hill Bog has shown there has already been a notable increase in Sphagnum cover in some sites already and there have been increases in 'active' raised bog habitat. Over 1200 ha of raised bog has now been restored by Bord na Móna at 12 different sites so far, and restoration work is expected to continue with a further 1,000 ha of bog targeted through Counties, Roscommon, Westmeath, Longford and Tipperary.

Birds

As noted, bare peat fields associated with the WOP supply bogs are of low ecological value in general, but are known to support roosting or resting Golden Plover (listed on Annex I of the EU Birds Directive).

In some instances, wintering flocks of whooper swan occur on harvesting areas where there are temporary areas of standing water; such occurrence would be periodic through the winter months, with flocks alternating between feeding and roosting sites (Boland et al,

2010). Patches of recolonising vegetation on cutaway fields provide foraging areas while the birds also use the sites for roosting. Such feeding areas of recolonising vegetation would be infrequent and spatially restricted in habitats dominated by bare peat.

Peregrine falcon and Merlin (also Annex I species) also associate with bare peat areas, where they roost or perch on peat piles or tree stumps and may hunt Golden Plover. Wintering hen harrier may roost in the wider Midlands area and potentially hunt over the supply bogs. Sparrowhawk (Amber-listed) is likely to frequent transitional scrub and bog woodland habitats, while kestrel (also Amber-listed) and buzzard which breed in adjacent areas may forage over the bog sites in spring and summer. The bog woodland areas may also provide breeding habitat for woodcock (Red-listed).

The recolonizing habitats associated with areas of cutaway bog provide breeding habitat for a range of bird species, including the ubiquitous passerine species associated with the Irish rural landscape, as well as the Red-listed meadow pipit and the amber-listed, skylark, stonechat, swallow, linnets and sand martin. Red-listed barn owl are also known to breed in sites adjacent to the supply bogs and may hunt over open areas. Breeding wetland birds (e.g. snipe, lapwing, ringed plover, teal, little grebe and mute swan) may also be supported by areas of permanent and ephemeral standing water. There are also records of curlew and redshank, both rare breeding Red-listed species. The Bord na Móna Community Conservation Project at Ballydangan Bog in Co. Roscommon focuses on improving the habitat for red grouse and has also increased the importance of the site to curlew.

Mammals and other species

Several protected mammal species occur regularly at the respective supply bog sites. Irish hare is common at the bog sites, with badger also utilising the mosaic of habitats which occur between the bogs and the surrounding agricultural habitats. Otter is well distributed in the Midlands and can be expected to occur along minor watercourses and possibly drains where it can successfully forage. Pine marten is widespread in the locality and would be expected to occur in association with well-developed bog woodland and adjacent blocks of forestry. Other ubiquitous species such as pygmy shrew, hedgehog and Irish stoat could also be expected to occur.

Surveys for bat species undertaken on behalf of Bord na Móna at cutaway bog sites have shown that open areas of bog have low potential to support bats and most records are associated with linear features along the margins including hedgerows and scrub. A number of species have been recorded in relatively low densities, namely common pipistrelle, soprano pipistrelle, Leisler's bat, Daubenton's bat, brown long-eared bat, Natterer's bat and whiskered/Brandt's bat.

Common lizard, smooth newt and common frog are associated with a number of sites. Invertebrate diversity is variable depending on the levels of recolonizing vegetation or intact bog adjacent to supply bogs, though some rare species do occur (see Section 6.5.3.2).

The Annex II-listed marsh fritillary butterfly has been recorded at a number of the WOP supply bogs (Clongawney & Galros and Killaun), however these records are associated with peripheral habitats where the larval food plant for this species (devil's bit scabious *Succisa*

pratensis) occurs. Such habitats include fen and grassy verges along the railway corridors which are not directly impacted by peat harvesting.

6.5.3.2 Protected or Rare Flora

Known records of protected or rare flora species associated with the grid squares containing the respective WOP supply bogs were supplied by the NPWS Scientific Unit. The Ecological Reports associated with the respective supply bog Draft Rehabilitation Plans and Baseline Ecology Studies produced by and on behalf of Bord na Móna were also reviewed for records of protected or rare flora.

A range of other semi-natural and artificial habitats are also associated with the peat harvesting activities, such as railway embankments composed of hard standing which can provide a dry habitat supporting plants associated with neutral or calcareous soils which are generally rare in the Midlands.

Basil Thyme (*Clinopodium acinos*), listed on the Flora (Protection) Order (2016) and the Ireland Red List No. 10 (Wyse Jackson et al. 2016) was recorded at Mountlucas Bog, along the railway tracks in the northern sector of the Mountlucas wind farm site in 2010/11. The rare (though not currently Red-listed) Blue Fleabane (*Erigeron acer*) occurs at a number of sites where calcareous material has been deposited or exposed, namely Mountlucas, Ballybeg and Derryhinch.

6.5.3.3 Designated sites

Designated sites within a 15 km radius of the peat bogs that supply WOP station are presented in **Table 6-9** and mapped in **Figure 6.4 – NHAs and pNHAs within 15 km of WOP Peat Supply Bogs** and **Figure 6.5 – SACs and SPAs within 15 km of WOP Peat Supply Bogs**. A summary of each site is provided in **Appendix 6.4**.

Table 6-9: Designated Sites within 15 km of WOP supply bogs

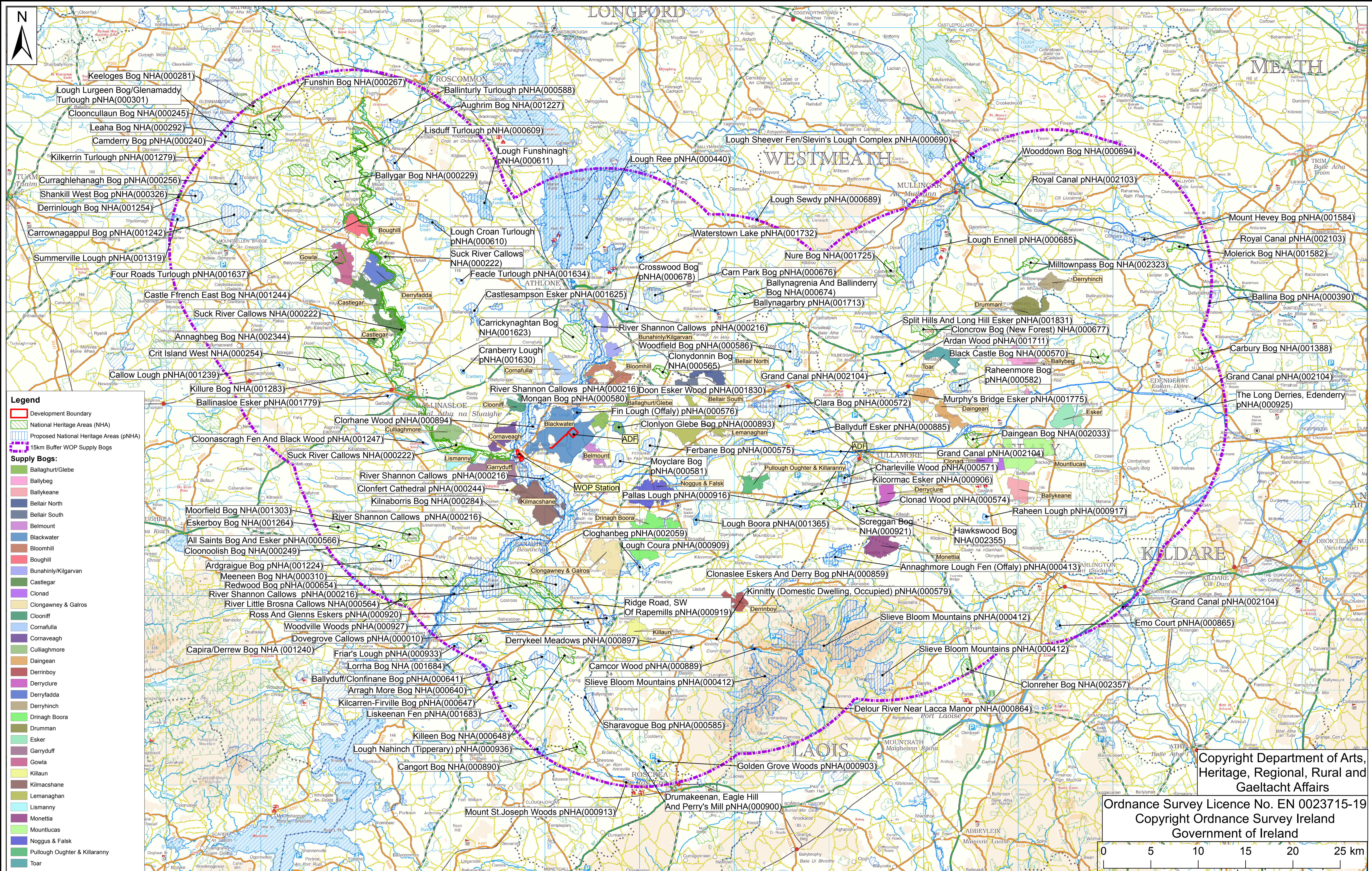
Designated site	Distance from closest supply bog
River Shannon Callows SAC/pNHA	0 km (Kilmacshane/Garryduff/Clooniff/Bloomhill)
Middle Shannon Callows SPA	0 km (Kilmacshane/Garryduff/Clooniff/Bloomhill)
River Suck Callows SPA	0 km (Lismanny/Garryduff/Culliaghmore/Castlegar/Deryfadda)
Suck River Callows NHA	0 km (Lismanny/Garryduff/Culliaghmore/Castlegar/Deryfadda)
Pilgrim's Road Esker SAC/pNHA	0 km (Bloomhill)
Mongan Bog SAC/pNHA	0 km (Bloomhill)
Mongan Bog SPA	0 km (Bloomhill)
Fin Lough (Offaly) SAC/pNHA	0 km (Blackwater)
Annaghbeg Bog NHA	0 km (Castlegar)
Castle Ffrench East Bog NHA	0 km (Gowla)
Clonllyn Glebe Bog pNHA	0 km (Ballaghurt)
Lough Nanag Esker pNHA	0 km (Blackwater)
Lough Coura pNHA	0 km (Drinagh Boora)

Designated site	Distance from closest supply bog
Doon Esker Wood pNHA	0.2 km (Ballaghurt / Glebe)
Clonfert Cathedral pNHA	0.2 km (Kilmacshane)
Clorhane Wood pNHA	0.3 km (Blackwater)
Moyclare Bog SAC/pNHA	0.5 km (Belmount)
Murphy's Bridge Esker pNHA	0.5 km (Daingean)
Rahugh Ridge (Kiltober Esker) pNHA	0.5 km (Daingean)
Castle Ffrench West Bog NHA	0.6 km (Gowla)
Daingean Bog NHA	0.7 km (Daingean)
Hawkswood Bog NHA	0.7 km (Derryclure)
Clonfinlough Esker pNHA	0.8 km (Bloomhill)
Banagher (Domestic Dwelling, Occupied) pNHA	0.8 km (Clongawney & Galros)
Cloonascragh Fen And Black Wood pNHA	0.8 km (Lismanny)
Raheenmore Bog SAC/pNHA	0.8 km (Toar)
Clonydonnin Bog NHA	1 km (Bellair South)
Carrickynaghtan Bog NHA	1 km (Cornafulla)
Murphy's Bridge Esker pNHA	1 km (Daingean)
Crosswood Bog pNHA	1.1 km (Bunahinly / Kilgarvin)
Ferbane Bog pNHA	1.1 km (Lemanaghan)
Annaghmore Lough Fen (Offaly) pNHA	1.2 km (Monettia)
Cloncrow Bog (New Forest) NHA	1.25 km (Toar)
Woodville Woods pNHA	1.3 km (Killaun)
Kilnaborris Bog NHA	1.3 km (Kilmacshane)
Grand Canal pNHA	1.4 km (Daingean)
Lough Boora pNHA	1.4 km (Drinagh Boora)
Milltownpass Bog NHA	1.5 k (Derryhinch)
Split Hills And Long Hill Esker SAC/pNHA	1.75 km (Toar)
Killure Bog NHA	2 km (Castlegar)
Clonad Wood pNHA	2 km (Derryclure)
Bracken's Dwelling, Near Whiteford pNHA	2 km (Killaun)
Ferbane Bog SAC	2.25 km (Ballaghurt/Glebe)
Birr (Domestic Dwelling No. 2, Occupied) pNHA	2.25 km (Killaun)
Kilcormac Esker pNHA	2.25 km (Pullough Oughter & Killaranny)
Ardan Wood pNHA	2.25 km (Toar)
Killeglan Grassland SAC	2.3 km (Derryfadda)
Ballygar Bog NHA	2.5 km (Boughill)
All Saints Bog And Esker SAC/pNHA	2.5 km (Clongawney & Galros)
Birr (Domestic Dwelling No.1, Occupied)	2.5 km (Killaun)

Designated site	Distance from closest supply bog
pNHA	
Raheen Lough pNHA	3 km (Ballykeane)
Four Roads Turlough SAC/pNHA	3 km (Boughill)
Four Roads Turlough SPA	3 km (Boughill)
Charleville Wood SAC/pNHA	3 km (Derryclure)
Clara Bog SAC/pNHA	3.25 km (Bellair North)
Ross And Glens Eskers pNHA	3.25 km (Clongawney & Galros)
Clonaslee Eskers And Derry Bog SAC/pNHA	3.25 km (Derrinboy)
Crit Island West NHA	3.5 km (Castlegar)
Kinnitty (Domestic Dwelling, Occupied) pNHA	3.5 km (Derrinboy)
Crosswood Bog SAC	3.5 km (Kilgarvin)
Dovegrove Callows SPA/pNHA	3.5 km (Killaun)
Lough Ree SAC/pNHA	3.75 km (Bunahinly)
Camcor Wood pNHA	3.75 km (Derrinboy)
Pallas Lough pNHA	3.75 km (Pullough Oughter & Killaranny)
Ridge Road, SW Of Rapemills SAC/pNHA	4 km (Clongawney & Galros)
Screggan Bog NHA	4 km (Derryclure)
Ballyduff/Clonfinane Bog SAC/pNHA	4.0 km (Boughill)
Carn Park Bog SAC/pNHA	4.25 km (Bunahinly / Kilgarvin)
Slieve Bloom Mountains SAC/pNHA	4.25 km (Derrinboy)
Cloghanbeg pNHA	4.25 km (Kilmacshane)
All Saints Bog SPA	4.3 km (Clongawney & Galros)
Ballynagarbry pNHA	4.5 km (Bellair North)
Derrykeel Meadows pNHA	4.5 km (Killaun)
Ballinasloe Esker pNHA	4.75 km (Culliaghmore)
Derrygolan Esker pNHA	4.75 km (Daingean)
Aughrim Bog NHA	4.8 km (Boughill)
Aughrim (Aghrane) Bog SAC	4.8 km (Boughill)
Royal Canal pNHA	5 km (Derryhinch)
Ballygar (Aghrane) Bog SAC	5.0 km (Boughill)
Island Fen SAC	5.0 km (Killaun)
Lough Croan Turlough SAC/pNHA	5.3 km (Boughill)
Black Castle Bog NHA	5.5 km (Ballybeg)
Ballynagrenia And Ballinderry Bog NHA	5.5 km (Bellair North)
Lough Croan Turlough SPA	5.5 km (Boughill)
Cranberry Lough pNHA	5.5 km (Culliaghmore)
Glenloughaun Esker SAC	5.5 km (Culliaghmore)
Killeen Bog NHA	5.5 km (Killaun)
Lisduff Fen SAC	5.5 km (Killaun)

Designated site	Distance from closest supply bog
River Little Brosna Callows NHA	5.5 km (Kilmacshane)
Ballyduff Esker pNHA	5.5 km (Pullough Oughter & Killaranny)
Woodfield Bog pNHA	6 km (Bellair North)
Kilmore Bog NHA	6 km (Boughill)
River Little Brosna Callows SPA	6 km (Clongawney & Galros)
Redwood Bog SAC/pNHA	6 km (Kilmacshane)
Lisduff Turlough SAC/pNHA	6.25 km (Boughill)
Waterstown Lake pNHA	6.25 km (Bunahinly / Kilgarvin)
Dunamase Woods pNHA	6.25 km (Cashel)
Mount Hevey Bog SAC/pNHA	6.5 km (Derryhinch)
Castlesampson Esker SAC/pNHA	6.5 km (Castlegar)
Ballyduff Wood pNHA	6.5 km (Derryclure)
Feacle Turlough pNHA	6.5 km (Derryfadda)
Sharavogue Bog SAC/pNHA	6.5 km (Killaun)
Moorfield Bog NHA	6.75 km (Lismanny)
Lough Ennell SAC/pNHA	6.75 km (Toar)
Lough Ree SPA	7 km (Kilgarvin)
River Barrow And River Nore SAC	7.4 km (Ballykeane)
Carrownagappul Bog SAC	7.4 km (Gowla)
Lough Ennell SPA	7.8 km (Toar)
Carrownagappul Bog pNHA	8 km (Gowla)
Nure Bog NHA	8 km (Toar)
Ballynamona Bog And Corkip Lough SAC	8.3 km (Derryfadda)
The Long Derries, Edenderry SAC/pNHA	8.5 km (Esker)
Callow Lough pNHA	9.25 km (Castlegar)
Ballinturly Turlough SAC/pNHA	9.5 km (Boughill)
Meeneen Bog NHA	9.75 km (Garryduff)
Camderry Bog SAC/pNHA	10 km (Boughill)
Wooddown Bog NHA	10 km (Derryhinch)
Wooddown Bog SAC	10 km (Derryhinch)
Cloonoolish Bog NHA	10 km (Lismanny)
River Boyne And River Blackwater SAC	10 km (Derryhinch)
River Boyne and River Blackwater SPA	10 km (Derryhinch)
Ardgraique Bog pNHA	10.25 km (Lismanny)
Ballymacegan Bog NHA	10.5 km (Garryduff)
Lough Funshinagh SAC/ pNHA	10.75 km (Boughill)
Mountmellick SAC	10.8 km (Ballykeane)
Curraglehanagh Bog SAC/pNHA	11 km (Boughill)
Funshin Bog NHA	11 km (Boughill)
Leaha Bog NHA	11 km (Boughill)

Designated site	Distance from closest supply bog
Molerick Bog NHA	11 km (Derryhinch)
Ardgraique Bog SAC	11 km (Lismanny)
Clooncullaun Bog NHA	12 km (Boughill)
Cangort Bog NHA	12 km (Killaun)
Kilcarren-Firville Bog SAC/pNHA	12 km (Killaun)
Eskerboy Bog NHA	12 km (Lismanny)
Arragh More (Derrybreen) Bog SAC	12 km (Killaun)
Drumakeenan, Eagle Hill And Perry's Mill pNHA	12.25 km (Killaun)
Golden Grove Woods pNHA	12.25 km (Killaun)
Ridge of Portlaoise pNHA	12.5 km (Derrinboy)
Delour River Near Lacca Manor pNHA	12.5 km (Derrinboy)
Lorrha Bog NHA	12.5 km (Kilmacshane)
Emo Court pNHA	12.75 km (Ballykeane)
Shankill West Bog SAC/pNHA	12.75 km (Gowla)
Lough Sheever Fen/Slevin's Lough Complex pNHA	13 km (Derryhinch)
Drumakeenan National School pNHA	13.25 km (Killaun)
Clonreher Bog NHA	13.5 km (Monettia)
Liskeenan Fen SAC/pNHA	13.5 km (Killaun)
Lough Nahinch (Tipperary) pNHA	13.5 km (Killaun)
Capira/Derrew Bog NHA	13.5 km (Lismanny)
Carbury Bog NHA	13.5 km (Toar)
Summerville Lough pNHA	13.75 km (Gowla)
Keeloges Bog NHA	14 km (Boughill)
Mount St. Joseph Woods pNHA	14 km (Killaun)
Lough Lurdeen Bog/Glenamaddy Turlough SAC/pNHA	14.25 km (Boughill)
Ballynabarny Fen pNHA	14.25 km (Derryhinch)
St. Joseph's, Mountheaton pNHA	14.25 km (Killaun)
Slieve Bloom Mountains SPA	14.5 km (Ballykeane)
Derrinlough Bog NHA	14.5 km (Gowla)
Arragh More Bog NHA	14.5 km (Kilmacshane)
Friar's Lough pNHA	14.5 km (Kilmacshane)
Lough Sewdy pNHA	15 km (Bellair North)
Ballina Bog pNHA	15 km (Derryhinch)
Kilkerrin Turlough pNHA	15 km (Gowla & Boughill)



Legend

- Development Boundary
- National Heritage Areas (NHA)
- Proposed National Heritage Areas (pNHA)
- 15km Buffer WOP Supply Bogs

Supply Bogs:

- Ballaghurt/Glebe
- Ballybeg
- Ballykeane
- Bellair North
- Bellair South
- Belmont
- Blackwater
- Bloomhill
- Boughill
- Bunahilly/Kilgarvan
- Castlegar
- Clonad
- Clongawney & Galros
- Clooniff
- Cornafulla
- Cornaveagh
- Cullaghmore
- Daingean
- Derrinboy
- Derryclure
- Derryfadda
- Derryhinch
- Drinagh Boora
- Drumman
- Esker
- Garryduff
- Gowla
- Killaun
- Kilmacshane
- Lemanaghan
- Lismanny
- Monettia
- Mountlucas
- Noggus & Falsk
- Pullough Oughter & Killaranny
- Toar

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CLIENT APPROVAL PLANNING TENDER CONSTRUCTION AS-BUILT

ESB INTERNATIONAL

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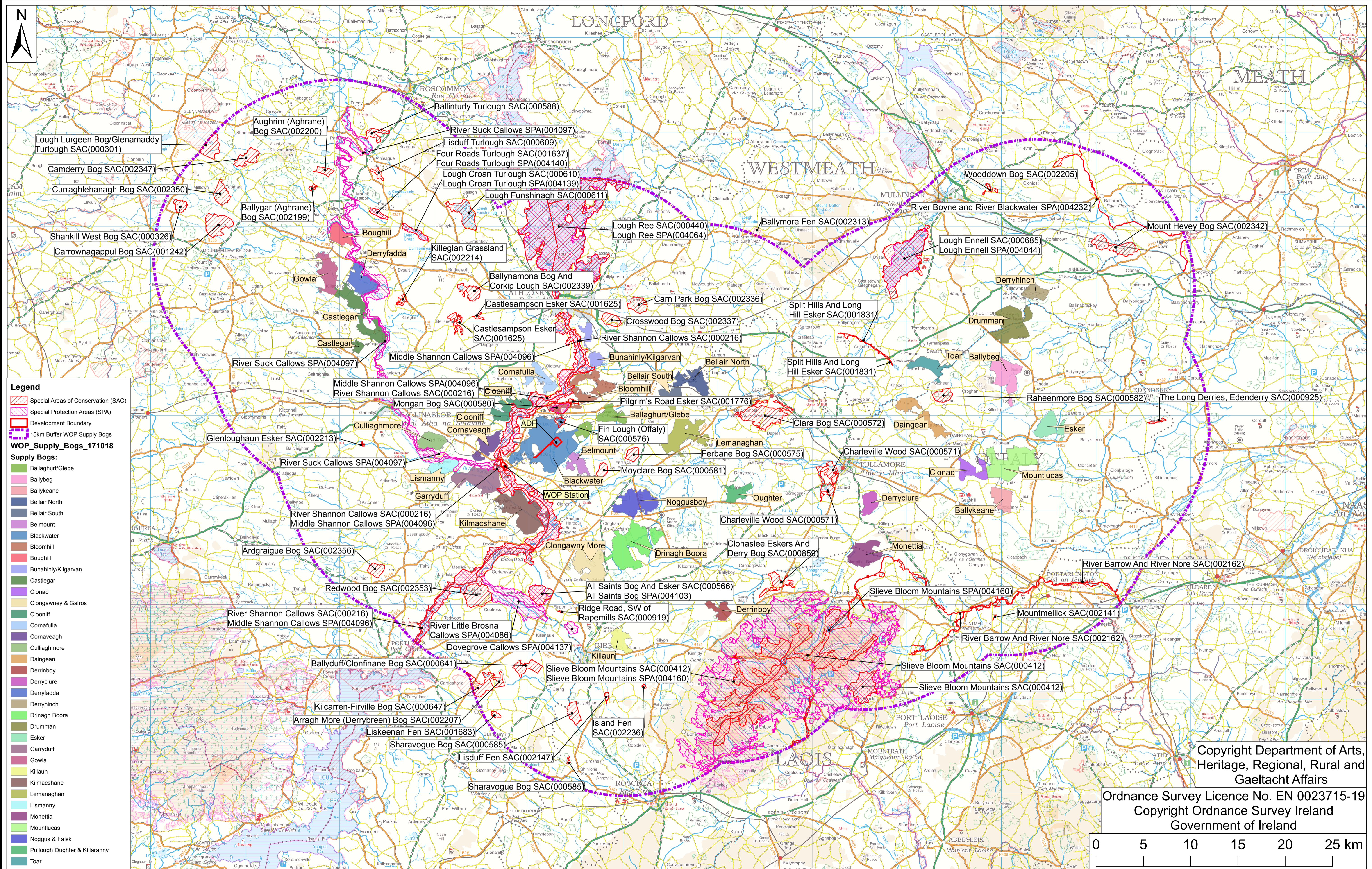
PROJECT: **West Offaly Power,
Transition to Biomass**

CONTRACT: **ESB**

PRODUCTION UNIT: **Civil & Environmental Engineering**

DRAWING TITLE: **Figure 6.4-
NHAs and pNHAs within 15 km
of WOP Peat Supply Bogs**

DRAWN	PRODUCED	VERIFIED	APPROVED	APPROVAL DATE
E.O'Shea	E.O'Shea	G.Hamilton	P.Kavanagh	14/11/2018
CLIENT REF. 00-00		NO. OF SHEETS 1/1		SIZE SCALE A1 1:180,000
DRAWING NUMBER QS-000206-01-D460-140				



Legend

- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Development Boundary
- 15km Buffer WOP Supply Bogs

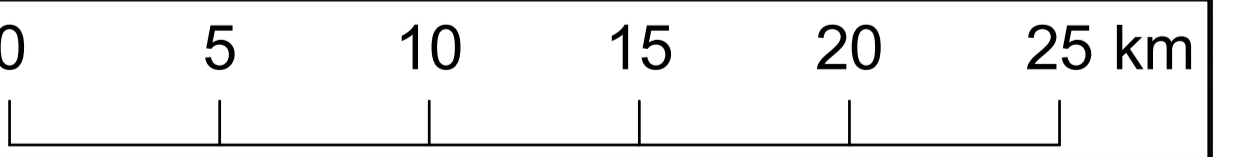
WOP_Supply_Bogs_171018

Supply Bogs:

- Ballaghurt/Glebe
- Ballybeg
- Ballykeane
- Bellair North
- Bellair South
- Belmont
- Blackwater
- Bloomhill
- Boughill
- Bunahinly/Kilgarvan
- Castlegar
- Clonad
- Clongawney & Galros
- Clooniff
- Cornafulla
- Cornaveagh
- Cullaghmore
- Daingean
- Derrinboy
- Derryclure
- Derrifadda
- Derrinhinch
- Drinagh Boora
- Drumman
- Esker
- Garryduff
- Gowla
- Killaun
- Kilmacshane
- Lemanaghan
- Lismanny
- Monettia
- Mountlucas
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CLIENT:	ESB
PROJECT:	West Offaly Power, Transition to Biomass
CONTRACT:	

PRODUCTION UNIT:	Civil & Environmental Engineering
DRAWING TITLE:	Figure 6.5- SACs and SPAs within 15 km of WOP Peat Supply Bogs

DRAWN		PRODUCED		VERIFIED		APPROVED		APPROVAL DATE	
E.O'Shea		E.O'Shea		G.Hamilton		P.Kavanagh		14/11/2018	
CLIENT REF.		NO. OF SHEETS		SIZE		SCALE			
		00-00		1/1		A1		1:180,000	
DRAWING NUMBER									
QS-000206-01-D460-141									

A GIS-based proximity analysis of the respective WOP supply bogs undertaken to inform this EIAR indicated that a number of supply bog IPC licence boundaries overlapped or are adjacent to a number of designated sites; as a result of practical constraints, harvesting of peat does not typically extend to these boundaries, so this is considered a conservative estimate of the extent of the respective active harvesting areas.

The National Raised Bog SAC Management Plan 2017-2022 (DCHG 2017) notes that *“Quantifying the impacts of marginal drains on peat structure proves particularly important for Irish raised bogs as one of the principal threats to their ecology comes from marginal drainage associated with peat cutting. Basic engineering calculations (using the Dupuit-Forcheimer solution for unconfined systems (Forchheimer, 1898)) show that changes in water levels in peat (and the changes they cause to its thickness) depend on how deep a drain has cut into the bog margin. The impact of these changes becomes progressively less moving away from the drain. Critically water levels change by a fixed proportion for each interval of distance. For example, if the water level reaches back to half its original level over 20 m, it will be another quarter, or half of a half, over the next 20 m.”* The plan proceeds to outline empirical data gathered from Fir Bog (part of Lough Ree SAC), which relates organic matter in peat to distance to the closest drain (as the main influence on the change in peat organic matter content is water level changes). It is worth noting that nearly all the data points presented by the model in DCHG (2017) show the majority of the impact relationship occurs within 100 m of the closest drain; a minimal level of impact was noted at a number of locations <10 m from the closest drain, though a very small proportion of data points noted a measureable impact between 150 m and 200 m from the nearest drain.

A 100 m external buffer from the IPC Licence boundaries was utilised for this exercise, however, it should be noted that Bord Na Móna have commenced investigations on a number of sites to determine appropriate buffers between designated sites and actual production area boundaries to mitigate against any potential dust and hydrology impacts. Actual production area boundaries generally have greater separation distance from designated sites when compared to IPC boundaries. The peat production area boundary and up-to-date aerial imagery was also reviewed subsequent to the initial proximity analysis to assess feasible source-receptor pathways at the respective sites.

The following designated sites were identified by this proximity analysis:

- River Shannon Callows SAC/pNHA
- Pilgrim's Road Esker SAC/pNHA
- River Barrow and River Nore SAC
- Fin Lough (Offaly) SAC/pNHA
- Mongan Bog SAC/pNHA
- Mongan Bog SPA
- Middle Shannon Callows SPA
- Suck River Callows SPA
- Suck River Callows NHA

- Castle Ffrench East Bog NHA
- Annaghbeg Bog NHA
- Clonlyon Glebe Bog pNHA
- Lough Coura pNHA
- Lough Nanag Esker pNHA
- Clonfert Cathedral pNHA
- Doon Esker Wood pNHA

6.5.3.4 Aquatic ecology

With regard to aquatic ecology, there are a number of waterbodies associated with these supply bogs as shown in **Figure 8.4** and detailed in **Appendix 8.3**. Water quality status for the water bodies receiving discharges from the peat production bogs have been sourced from the EPA and are tabulated in **Appendix 8.3**. As illustrated in **Appendix 8.3** the majority of the bogs that supply WOP are located in sub-catchments which are of unassigned WFD status and where ecological status is assigned this ranges from bad to high with the majority at poor or good status.

The River Basin Management Plan (RBMP) for Ireland, published in 2018, identified peat extraction as causing a significant risk to ecological status objectives in 119 (8%) of the assessed waterbodies. Additionally, peat extraction is identified as a significant pressure in 16 (13%) high ecological status water bodies. The plan relates environmental impacts to suspended solids, ammonia and hydromorphological alterations (DHPLG, 2017). The RBMP notes that:

“Peat extraction has been identified as causing a significant risk to ecological status in 119 water bodies, which represents 8% of all water bodies that have been identified as At Risk [...] Of these, 115 are rivers, 3 are lakes and 1 is groundwater. The environmental impacts generally relate to suspended solids, ammonia and hydromorphological alterations. There is evidence that high levels of ammonia are being released from peat-extraction activities during the draining process and, along with suspended solids, may be causing ecological impacts in receiving water bodies. The EPA plans to investigate the background concentrations of ammonia in peatlands to determine if they can be a contributory factor in elevated ammonia concentrations in water bodies.”

It should be noted in relation to the above, that high levels of naturally occurring ammonia are known to be released from pristine bogs, bogs where peat extraction has ceased and bog where peat extraction is currently active, though ammonia release from the former tends to be higher than the latter site types.

Section 7.4 of the RBMP also notes that of the 119 river water bodies that are *At Risk* because of activities taking place within peatlands, 46 (39%) of them are in areas that have peatlands owned by Bord na Móna, which has 87 peatlands in these areas. The remaining 73 water bodies are at risk from other activities, such as domestic turf extraction,

unauthorised peat extraction, wind-farm construction, forestry or other commercial peat activities.

There are a number of principle actions proposed in the published RBMP to address these pressures at a strategic scale as follows:

- *The Minister for Housing, Planning, Community and Local Government intends to make regulations in 2017 as soon as possible that will require the EPA to carry out EIA for all existing and new large-scale peat extraction (> 30ha) as part of its examination of IPC license applications for the activity. When these regulations are made, proposals will be developed for public consultation relating to a new regulatory regime that will bring smaller-scale commercial peat extraction (\leq 30ha) under a new local authority licensing system incorporating EIA and AA, as necessary, and enforcement powers.*
- *The DCHG, together with the Peatlands Strategy Implementation Group, will oversee the implementation of the National Peatland Strategy and the first national management plan for Ireland's raised-bog Special Areas of Conservation (SACs) network.*
- *The Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs will oversee the implementation of the Peatland strategy the principal aim of which is to provide a framework for determining and ensuring the most appropriate future use of cutover and cutaway bogs.*
- *Bord na Móna will implement its Sustainability 2030 Strategy and Biodiversity Action Plan 2016-2021 which addresses the long-term rehabilitation of its cutaway bogs.*
- *By 2021, Bord Na Móna will rehabilitate an additional 25 peatlands covering approximately 9,000ha. This is subject to several assumptions, including the availability of cutaway bogs for rehabilitation.*
- *The EPA has identified this priority issue as the subject of a research proposal for inclusion in its 2018 research call. The proposal involves evaluating mitigation strategies for improving water quality from drained peatlands. The project proposal, if selected, is intended to integrate with the ongoing mitigation trials being undertaken by Bord Na Móna.*

As part of the above Bord na Móna, in conjunction with the EPA, are assessing whether peat harvesting gives rise to ammonia release and measures to mitigate the generation and impact of ammonia from their cutaway peatlands if these are required. In addition Bord Na Móna commenced work in 2017 on preparing Environmental Impact Assessments on all of its peatlands including AA, where necessary, in anticipation of the new streamlined licensing system for large-scale peat extraction (> 30ha) that will be operated by the EPA.

The Strategic Environmental Assessment (SEA) undertaken for the RBMP has determined that the above proposed measures will have broadly positive effect on the water environment.

Expected outcome of the RBMP

Bord Na Móna is in the process of phasing out the extraction of peat for energy production by 2028. It expects to rehabilitate 9,000 ha. of cutaway bogs (covering 25 peatlands) by 2021 and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place; this is conditioned under Condition 10 of the relevant IPC Licence. Such measures are the subject of a research proposal for inclusion in the EPA's 2018 research call. The proposal involves evaluating mitigation strategies to improve water quality from drained peatlands.

Of the 119 water bodies where peat extraction and associated drainage works have been identified as a significant pressure, 6 are expected to meet their WFD objectives by 2021; none of these are associated with Bord Na Móna peatlands. A further 62 water bodies are expected to meet their WFD objectives by 2027; of these, 21 are associated with Bord Na Móna peatlands. Another 51 water bodies are expected to meet their WFD objectives after 2027; of these, 25 are associated with Bord Na Móna peatlands.

The Strategic Environmental Assessment (SEA) undertaken for the RBMP has determined that the above proposed measures will have broadly positive effect on the water environment.

6.5.3.5 Bord na Móna Biodiversity Action Plan

The Bord na Móna 2016-2021 *Biodiversity Action Plan* (BAP) is a consultation document outlining an approach to site rehabilitation (as conditioned under Condition of the respective IPC licences) which comprises 5 key objectives (each comprising a suite of actions and key indicators of success), namely:

- Carry out all works in line with best practice guidelines and relevant legislation across all Bord na Móna bogs;
- Monitor biodiversity areas and identify and survey further biodiversity hotspots within Bord na Móna bogs;
- Develop and promote best practice in terms of rehabilitation for all Bord na Móna bogs to stabilise former peat production areas and enhance biodiversity;
- Raise awareness and create and greater appreciation of the biodiversity and natural heritage of Bord na Móna cutaway and associated lands; and
- Monitor the progress of the Bord na Móna Biodiversity Action Plan.

6.5.3.6 Other National Plans relating to peatlands

In addition to the National Peatlands Strategy (DAHG 2015) (as presented in Section 7.4 of the RBMP for Ireland, reproduced above in Section 6.5.3.4), the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017–2022 (DCHG 2017) sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland.

6.5.4 Biomass Supply

The principle source of indigenous fuel will be by-products from the Irish forest sector (brush, thinnings and residues), by-products from Irish sawmills, agricultural by-products and residues and energy crops.

The primary biodiversity issues associated with forestry activity which generates biomass are habitat change arising during afforestation, roading or harvesting and aquatic discharges arising from clear-felling and management activities such as fertilisation.

The exact location of biomass source within Ireland has not been yet been identified but will be a combination of state and privately owned forest estates and agricultural lands generally within a 100 km radius of WOP station.

Under the Forestry Regulations 2017 (S.I. No. 191 of 2017) all applications for licences for afforestation, forest road construction projects, whether grant-aided or not, and for aerial fertilisation and tree felling operations, require the prior written approval from the Minister for Agriculture, Food and the Marine. The activities are as follows;

- **Tree felling** – the uprooting or cutting down of any tree (subject to certain exemptions);
- **Aerial fertilisation** – aircraft application of fertiliser to a forest;
- **Afforestation** – the establishment of a forest or stand of trees in an area where there was no previous tree cover where the area involved is greater than 0.10 hectares (approximately 0.25 acres);
- **Forest road construction** – construction of a forest road.

Before the Minister can grant approval for any of the above activities, they must first determine if the project is likely to have a significant environmental effect. As required under the Habitats Directive and as set out under S.I.477 of 2011 (European Communities (Birds & Natural Habitats) Regulations 2011) and S.I.191 of 2017 (Forestry Regulations 2017), on receipt of an application for a felling licence, the Forest Service must undertake screening to assess whether or not the project is likely to have a significant effect on a SAC or SPA, either individually or in combination with other plans or projects, in view of both the conservation objectives of that Natura site (available at www.npws.ie/protectedsites/) and best scientific knowledge. Details of the Forest Service Appropriate Assessment Procedure (AAP) are set out in the Forestry Standards Manual.

In addition to the above licencing requirements the Forest Biodiversity Guidelines (Forest Service 2000) apply to all grant-aided projects and to all activities associated with a Felling Licence. These guidelines make provisions for the following:

- Site development planning;
- SAC, SPAs and pNHAs/NHAs;
- Local biodiversity factors;
- Species selection and diversity;

- Age and structural diversity;
- Overmature trees and deadwood;
- Biodiversity enhancement;
- Retained habitats;
- Pest management and troublesome species; and
- Machine operations;

These biodiversity guidelines are reflected in the content of the Forestry Standards and Procedures Manual (Forest Service 2015), which also contains specific appendices relating to:

- Natura Impact Statement Guidance and Framework
- Appropriate Assessment Procedure and Hen Harrier
- Appropriate Assessment Procedure and Freshwater Pearl Mussel

Additionally, with regard to aquatic ecology, the River Basin Management Plan for Ireland also acknowledges that the Forest Service is aware of the negative impacts inappropriately sited forests and poorly managed forest operations can give rise to.

In addition, the RBMP acknowledges agriculture as a significant pressure in approximately 53% of At Risk water bodies due to excess nutrients; chemicals, including those used in pesticides; and sediment loss due to poor land management have all been identified as likely pressures in certain water bodies (DHPLG,2018). A number of Principal Actions have been proposed in the 2018 RBMP for Ireland to address these pressures at a strategic level as follows:

Forestry

1 The DAFM will implement the forestry-related regulations, policies and requirements that are being realigned with national water policy.

2 Coillte, which owns over half of Ireland's forested lands, will continue to implement and refine its integrated Environmental Risk Assessment approach to its forestry operations.

3 The DAFM will promote the uptake of the National Woodland Establishment Scheme and the Native Woodland Conservation Scheme, and will finalise and launch the Environmental Enhancement of Forests Scheme.

4 With regard to the protection of Freshwater Pearl Mussel populations from forestry pressures, the DAFM will develop and implement the proposed Plan for Forestry & FMP in Ireland, and will continue its engagement with KerryLIFE, with a view to assessing and adopting appropriate measures for possible wider application.

5 Through the strengthened inter-agency co-operation structures, the DAFM will work with other stakeholders — with local authorities, in particular — to ensure the strategic deployment of forestry measures. Particular focus will be given to the protection of high-status-objective waters and to progressing the other priorities set out in this RBMP.

6 The DAFM and the EPA will continue to undertake forestry and water research to inform future forestry practices, so that they contribute to the protection and enhancement of water quality.

Agriculture

1 The new, strengthened Nitrates Action Programme (2018–2021) will be the key agricultural measure for preventing and reducing water pollution from nutrients (nitrogen and phosphorus) arising from agricultural sources. It will be complimented by other supporting measures listed below.

2 The integrated Governmental approach to the enforcement of the Nitrates Action Programme (2018–2021) will be maintained and strengthened. The inter-agency/inter-departmental Water Quality and Agriculture working group will ensure increased targeting of inspections by local authorities based on water quality results and the outputs of the characterisation process.

3 The Pesticides Regulations and the Agriculture Environmental Impact Assessment Regulations will continue to form a key part of the actions over the second cycle. These will be strengthened by other supporting measures as outlined.

4 A new collaborative initiative between Government and industry called the “Sustainability Support and Advisory Programme” has been put in place for cycle 2 (2018–2021) to support the implementation of best practice (i) in 190 prioritised Areas for Action, to address existing environmental pressures (see Section 10), and (ii) across all dairy farmers through the Dairy Sustainability Initiative. A total of 30 sustainability advisers are being assigned to the programme, 20 of whom will be located in Teagasc, while 10 will operate within the dairy processors’ organisational structures. The objective of the new approach is to encourage and support behavioural change, to facilitate knowledge transfer and to achieve better on-farm environmental outcomes.

5 The Dairy Sustainability Initiative — a joint industry/farmer/government forum, initiated by the Irish Dairy Industry Association — will drive the development and rollout of a targeted knowledge-transfer programme to all 18,000 dairy farms. This will effectively deliver the key lessons from the Agricultural Catchments Programme to dairy farmers. It is envisaged that this will consist of both cooperative-led farm pilot programmes and wider promotion programmes for nutrient management and management of farm pollution point sources.

6 In addition, and to promote the adoption of best environmental practice across different sectors of agriculture, €100 million has been allocated from the RDP for a knowledge-transfer programme with the purpose of upskilling farmers and agricultural advisers. Over the lifetime of the RDP, this programme will, on a voluntary basis, roll out professional advisory and knowledge-transfer services to around 20,000 farmers across all sectors.

7 Teagasc will promote best practice in water-quality protection through its discussion groups and on-farm advisory services. Teagasc will also facilitate the training of non-Teagasc advisers/consultants to facilitate the wider dissemination of water-quality advice to farmers. To further support good nutrient management across the entire country, an online nutrient-management planning system has been launched by Teagasc and made available to all Farm Advisory System (FAS)-approved planners.

Use of this system is mandatory for farmers in GLAS and for derogation farmers — accounting for almost 60,000 farmers.

8 The GLAS Scheme, which is under the RDP, has a budget of €1.4 billion for the period 2014–2020. This period will see 50,000 farmers participating in the scheme and implementing actions to improve the rural environment, including actions to improve water quality. The GLAS Scheme prioritises vulnerable and high-status catchments, and has a strong focus on ensuring that farmers understand the environmental benefits of their actions. Also under the RDP, the TAMS scheme will facilitate total investment of around €500–600 million for better management and storage of animal manures, including more efficient spreading equipment. The “targeting” of these agri-environmental schemes and interventions rolled out by the DAFM will continue, responding to emerging knowledge and evidence (such as catchment characterisation)

9 It is accepted that Ireland faces significant challenges in meeting water quality targets while increasing production in the agricultural sector, and a key recommendation of the Food Wise 2025 strategy is that the environmental impacts of the strategy should be monitored. The DAFM will work closely with relevant agencies to ensure that this monitoring takes place. In particular, the ACP programme will model and monitor the impacts of agricultural development under Food Wise 2025 in specific catchments. The ACP will develop an integrated environmental-economic modelling system to identify the impacts of expansion under Food Wise 2025 and to advise on the overall costs and benefits associated with sustainable intensification practices at field, farm and catchment scales. New targeted initiatives will be developed as necessary to ensure that the sustainability objectives of Food Wise 2025 are met.

The RBMP for Ireland also notes:

“Recent forestry policies have been clearly aligned with the objectives of the WFD. These include changes in relation to replanting policy (as set out in the DAFM’s Felling & Reforestation Policy document) and to the availability of support schemes from the DAFM, which have now been tailored to include water-protection measures. These include the Native Woodland Establishment Scheme, the Native Woodland Conservation Scheme and the Environmental Enhancement of Forests Scheme (the latter is being finalised at the time of publication of this Plan). The mandatory Environmental Requirements for Afforestation, released in December 2016, include enhanced provisions for water protection during afforestation and early forest development. In addition, the Native Woodland Establishment Scheme promotes the establishment of water related ecosystem services produced by a combined water-setback and native-woodland zone. Consideration is being given to how the measures can be targeted and promoted in priority catchments, such as catchments for high status rivers or lakes.”

The SEA undertaken for the RBMP has determined that the above proposed measures will have a broadly positive effect on the water environment.

6.6 Impacts of the Development

This section considers and assesses the impact of the proposed project with regards to biodiversity *in the absence of mitigation*.

6.6.1 West Offaly Power Station

6.6.1.1 Construction

Terrestrial Ecology

The construction period for the proposed development will be up to 6-9 months.

Storage Slab A

As there will be no requirement for any removal or alteration of any ecologically important habitats within the biomass storage development footprint of Storage Slab A, the direct impact of the construction phase will be **Direct, Not Significant, Neutral and Short-term**.

Storage Slab B

The development of Storage Slab B will require the clearance of a 0.25 ha of oak-dominated woodland. This habitat was artificially planted following the development of WOP station and the decommissioning of Shannonbridge Power Station; it has some localised value to breeding birds, though there are larger areas of more mature trees in the immediate vicinity which will be undisturbed by construction. The loss of this habitat is considered to be a **Direct, Slight Negative, Long-term** impact.

The development of Storage Slab B will also impinge on circa 100 m² of crushed aggregate surfacing which supports a low and patchy sward of kidney vetch, the larval food plant of the small blue butterfly; there is a maximum of 20 m² of kidney vetch vegetation which will be permanently lost by the establishment of the biomass slab. Other larger areas of this plant which will not be affected by the slab development are located within 50 m of the affected area. Given the limited range of this species in the Midlands and its red-listed status, the loss of this habitat *in the absence of mitigation* is considered to be a **Direct, Moderate, Long-term Negative** impact.

Pellet Storage Silos

As there will be no requirement for any removal or alteration of any ecologically important habitats within the biomass storage development footprint of the pellet storage silos, the direct impact of the construction phase will be **Direct, Not Significant, Neutral and Short-term**.

Overall WOP site and environs

The construction phase will require a non-significant increase in traffic (construction vehicles) entering and leaving the WOP station site (refer to Chapter 12 – Traffic, which concludes a 1.1% increase in the ratio of flow to capacity on the R357) and daily construction activities within the WOP station site itself. It is also noted that there would be no increase in local

traffic in a no-development scenario, as the construction phase would not occur. Given the industrial nature of the site and the screening provided by the old ash disposal area and its recolonising scrub, indirect disturbance to birds and other species occurring along the River Shannon, River Suck and adjacent callows habitat is envisaged to be negligible. Peregrine falcon, which is expected to be acclimatised to frequent human and vehicular activity on an industrial site is not expected to be directly impacted (the artificial nesting box is installed on the south side of the station, on the opposite side to the proposed biomass storage area). Prey species for peregrine such as jackdaw are also not expected to be significantly affected. The impact of the construction phase on birds using the broader WOP station site will be **Indirect, Negative, Not Significant** and **Short-term**.

Aquatic Ecology

Potential impact pathways to the River Shannon occurring as a result of pollution arising during the construction phase are outlined in Chapter 8 – Surface Water. It is noted that there will be no instream or bankside works required as part of the proposed development.

Any impact associated with increased sediment release or anthropogenic polluting substances during construction could have an impact on the water quality of the River Shannon. In the absence of mitigation, potential impacts on water quality of WB1 from the construction of the proposed development are considered to be **Direct, Significant, Negative** and **Short-term**. This is particularly the case in relation to discharges via PS-SW6.

Designated Sites

The Shannon River Lower (WB1) forms part of the River Shannon Callows SAC/Middle Shannon Callows SPA and is, by definition, a site of International Importance to biodiversity.

Based on the rationale presented in the Aquatic Ecology impact assessment above, any impact associated with increased sediment release or anthropogenic polluting substances during construction could have an impact on the Qualifying Interest/Special Conservation Interest habitats and species of the SAC and SPA respectively. Potential impacts on designated sites from the construction of the proposed development in the absence of mitigation are considered to be **Direct, Significant, Negative** and **Short-term**.

6.6.1.2 Operational Phase

Terrestrial Ecology

Apart from the change in artificial habitats within the WOP station site (hardstanding to concrete aprons with stored biomass and installed silos), there will be no measureable change to the daily operation of the site. There will be no significant increase in noise or atmospheric emissions from the power plant infrastructure at WOP station. It is noted that there will be a progressive increase in truck deliveries to the station to deliver biomass; at peak levels, this will relate to a high of 129 deliveries per day (95 percentile) at a peak rate of 15 deliveries per hour (i.e. 30 movements per hour), with up to 80% approaching the station from the west; there will be no night-time deliveries (it is also noted that the 97.5 percentile is predicted to be 20 HGV deliveries or lower). It is not envisaged that this will lead to any significant increase in disturbance to species occurring in the proximity of Shannonbridge village, specifically along the River Shannon, as such species are acclimated to regular traffic crossing the bridge at this location. Potential impacts arising from the proposed

development (including continued operation) are therefore considered to be **Indirect, Negative, Not Significant** and **Long-term**. The traffic impact assessment (refer to Chapter 12) concludes that a no-development scenario would result in a reduction of approximately 250 vehicle movements per day on the local road network; this would have a **Not significant Positive Impact** on terrestrial ecology receptors around the WOP station site as a consequence of slightly reduced levels of disturbance.

Aquatic ecology

The WOP station will continue to discharge thermal cooling water as currently undertaken under the IE licence with the inherent mitigation specified in Section 6.4.1 in place.

The findings of studies on ecological indicators and physical parameters in the River Shannon upstream and downstream of the cooling water discharge which have been undertaken in recent years are summarised in the Synthesis Report (ESBI 2018) (see **Appendix 6.2**). The main conclusions are summarised below:

River Shannon Temperature Monitoring

Continuous monitoring of temperature in the River Shannon has been undertaken at seven defined sampling points on the eastern and western banks at WOP (Six downstream, one upstream) during 2016 and 2017. Data from the monitoring programme indicates that there is no observable temperature rise at any of the western bank monitoring locations until water levels fall below 2.4 m at the Shannonbridge gauge. OPW records indicate that the 75 percentile level at this gauge is 2.392 m.

At water levels above 2.4 m, the thermal plume tends to flow along the eastern bank of the River Shannon.

From the continuous temperature monitoring at the 6 locations downstream, it is not possible to determine if the thermal plume covers more than 25% of the cross sectional area at any location when levels are above approximately 2.3 m.

There is evidence of the simultaneous presence of thermal plume at all monitoring locations on a number of occasions from May 2017 to August 2017. From the data it can be inferred that with when waters levels at the Shannonbridge gauge falls below 2.3 m the thermal plume extends across the river cross channel. However, it is noted that there is no evidence of a significant environmental impact on aquatic species or habitats in the receiving water (refer to biotic communities and fisheries studies outlined below).

Effects of Cooling Water Discharge on Biotic communities

The West Offaly Power Thermal Discharge Synthesis Report (ESBI/ASU 2018) outlines the findings of a suite of biological studies undertaken from

2014 through 2017 on communities of potential ecological indicators for the River Shannon upstream and downstream of WOP. In summary, the findings were as follows:

- (i) Macrophytes: Transect-based quadrat sampling of macrophytes at a number of sampling sites did not reflect any clear thermal influence on aquatic plant communities. The only exception to this was the presence of the red macro alga (*Thorea hispida*) which was clearly promoted at WOP by the presence of the thermal discharge. The presence of unusual and luxuriant growth forms of freshwater sponge within the thermal discharge was the only other aspect of the macrophyte survey effort that provided evidence of a thermal response. Overall, the general tolerance of the existing plant community combined with the heavy influence of hydromorphology on that community (substrate, flow and depth/light) means that the general macrophyte community at this site, apart from the exceptions referred to above, is unlikely to provide any useful monitoring information.

- (ii) Diatoms: Studies indicated a relationship between increased water temperature downstream of the thermal discharge and decreased ecological status classification according to specific diatom communities. In terms of TDI and hence EQR and WFD Status, sites upstream of the thermal discharge tended to have Good or High Status which dropped to Good or Moderate in the stretch immediately below the thermal discharge before recovering to Good or High Status some distance downstream. The distance downstream required to regain the same Good or High Status as upstream from the discharge varied between years. In 2014, Good Status was regained from between 184 m to 218 m. In 2015 High Status, which was present immediately upstream of the discharge, was regained within about 101m downstream; EQR returned again to High Status 184 m downstream of the discharge. In 2016, High Status, which pertained immediately upstream of the thermal discharge, was regained within 218 m.

In all years therefore, the status pertaining immediately upstream of the thermal discharge in each year was regained at most within 218m downstream of the discharge. This indicates a short zone of influence at WOP. Moreover, it would appear than in the case of diatoms at least, the background (i.e. upstream) quality status tends to be more High than Good at WOP.

- (iii) Macroinvertebrates: The macroinvertebrate community at WOP is characterised by species tolerant or very tolerant of impaired

*water quality. Moreover, the community is overwhelmingly dominated numerically by a small number of invasive species two of which are major ecosystem-altering species namely zebra mussels and Asian clams, the latter only recently arrived and still expanding its range. Like macrophytes, the importance of hydromorphological factors including substrate and flow in particular seems to be the main factors determining the nature of the very patchy invertebrate community at any given site and because of that any thermal effects are either not occurring or are masked by these other factors. Some temperature related trends were noted for species such as the crustacean *Chelicorophium curvispinum* and Zebra mussels but it was not possible to conclusively rule out substrate preferences as factors giving rise to this apparent effect.*

The Synthesis Report concludes that diatoms were the most reliable assessment species relating to potential ecological impacts in the River Shannon at WOP. The subsequent assessment identified that an impact does occur but that this is within the thermal plume actual mixing zone with the river returning to at least Good Status within 200-400 m of the discharge location. The thermal plume impact does not affect the status of the rest of the water body length and is localised in effect.

Effects of Cooling Water Discharge on Fisheries

A Water Framework Directive (WFD) fish monitoring survey was undertaken by IFI on the Shannon in 2010 on the Shannon at Clonmacnoise just upstream of the WOP. Subsequent IFI surveys were undertaken in 2016 (IFI, 2017), which included sites just upstream and downstream of WOP also. Site-specific fisheries studies were also undertaken to survey the area within the plume and external to the plume of the cooling water outfall point located at the WOP station (ESB Fisheries 2016 & 2017). The objective of these studies was to see if there was any difference in fish populations between the warmer water areas below the outfall point and along the thermal plume areas and into the cooler non-thermal plume affected Shannon waters. Any potential barrier effects to fish population migration arising from thermal influences were also considered by these studies.

The fisheries study found perch, roach, bream, roach-bream hybrids, eel, pike, gudgeon and trout in the sampled sites along the River Shannon near WOP. No juvenile nor adult salmon were recorded at any sampling site. This is consistent with the findings of Inland Fisheries Ireland as part of the water framework directive fish assessments carried out in 2010 and also in 2016. The overwhelming numerical dominance of cyprinid fish, as well as the

greater diversity of this group at WOP, indicates that the main channel of the Shannon at this location can be classified as a cyprinid water.

The fisheries study presents an analysis of the River Shannon salmon census data for the 2016/2017 season, which indicates that the vast majority of the wild salmon (n=1,153), which entered the upper Shannon catchment in 2016 do so during the period when the thermal plume is greatest. However, it is noted that the thermal plume at WOP is located in a riverine section of the Shannon whereas it is considered likely that migrating salmon will continue to inhabit the cooler and deeper waters of Lough Derg until late summer before ascending further upstream.

The Thermal Discharge Synthesis Report concludes that overall, based on the data available from the ESB fyke net surveys and the IFI surveys, there is no clear evidence that the thermal discharge is having an adverse impact on the resident fish community at WOP. The report does note the potential for subtle effects at the level of individuals within the population (that for example may be stimulated to spawn earlier or perhaps grow faster) but concludes that such changes would probably not be possible to detect using normal survey methods. This finding is in keeping with the findings of an extensive survey of fish communities in the vicinity of nuclear power stations on French rivers (Daufresne and Boet, 2007) that concluded there was little evidence of a thermal impact at community level.

In summary, the aforementioned ecological studies undertaken between 2014 and 2017 indicate that evidence of effects to ecological indicators are measureable within the thermal mixing zone downstream of WOP; however, WFD status of the receiving waterbody quickly returns to 'Good' and consequently the overall impact is not considered to be significant. The proposed biomass transition will not result in any change to the cooling water discharge to the River Shannon.

Based on the above, potential impacts on the River Shannon arising from the proposed development (including continued operation) are considered to be **Direct, Not significant, Medium-term Negative**.

6.6.2 Ash Disposal Facility

6.6.2.1 Construction

Cell construction is an ongoing activity at the ADF with each cell being developed as another approaches capacity. To date a number of cells have been constructed, filled and capped in accordance with the IE licence. As part of the proposed development additional capacity (in the form of additional cells) will be required at the ADF. These will extend southeast from the existing cells, with some earthworks also possible along the southwestern boundary to facilitate cell construction.

Potential impacts on habitats and species occurring within the ADF site (*in the absence of mitigation*) are described below. In general, it is worth noting that restored landfill sites may provide good examples of semi-natural and diverse habitats (Gilbert & Anderson 1998). Impacts upon the constituent habitats found within the future development footprint of the ADF are presented below.

Scrub (WS1)

Fragmented scrub habitat on the periphery ADF would require clearance to facilitate the development of the new cells; this is of minor value to nesting birds. However, there is already a considerable amount of comparable scrub in the vicinity of the ADF which would be unaffected. Additionally, this habitat would be expected to re-establish rapidly around the peripheries of disturbed areas, and any impact is therefore considered to be **Direct, Long-term** and classed as **Not Significant Negative**.

Spoil and bare ground (ED2)

These habitats are of low ecological value. The bare ground at the active landfill area is by its nature transitional and will naturally recolonize in due course. The more permanent roads on the site will remain in place, and there will be no change to their location. There will be **Direct, Not Significant, Negative, Long-term Impact** on these habitats.

Artificial lakes and ponds (FL8)

The ADF leachate lagoon has minimal ecological value due to the occasional elevated pH of the stored leachate. There will be no alteration to the footprint of the lagoon. The other areas of standing water within the ADF development footprint are ephemeral in nature. Consequently there will be **Direct** and **Indirect Not Significant, Negative, Long-term Impacts** on these habitats. The settlement lagoons to the northwest of the ADF will be unaffected by the future cell construction; an additional leachate lagoon is also proposed as part of the development of the ADF.

Reed and large sedge swamps (FS1)

The reedbed which has developed in a wet area adjacent to the western corner of the ADF may be disturbed at some point in the future as part of earthworks required to construct new cell walls in the east of the ADF development footprint. This habitat is of secondary origin and has arisen from the waterlogging of a section of decommissioned cutover bog. However, much more extensive reed stands are associated with the large restored wetlands in the Bord na Móna biodiversity area 300 m to the west, and the loss of this habitat is therefore not considered significant in a local context. The loss of this habitat is therefore considered to be a **Direct, Not Significant, Negative, Long-term** impact.

Terrestrial mammals

No breeding sites (badger setts, fox dens, tree cavities suitable for pine marten etc.) were recorded within the ADF development footprint. Irish hare occurring in the locality are likely to be acclimatised to ongoing activities and likely to only use the ground within the ADF development footprint for foraging, not breeding. Consequently, impacts to the breeding sites of any terrestrial mammals are predicted to be **Direct, Not significant, Negative** and **Long-term**.

While the construction period may lead to a temporary loss of some areas of cutover bog vegetation, it is expected that the existing ADF cells, once capped and recolonized by vegetation, will also provide a slightly larger foraging resource for Irish hare; this is a **Slight Positive Impact**.

Bats

As previously noted, the proposal would require the removal of a minor amount of scrub which may provide foraging habitat for the local bat population. As such scrub forms part of a dynamic recolonising ecosystem on cutover bog that has been permanently removed from the peat harvesting resource, it is expected that the habitat surrounding the ADF development footprint will continue to transition to scrub and eventually to secondary-origin bog woodland; value to bat populations in the locality will therefore improve in the medium term. There are no suitable bat roosting opportunities of note within the ADF site.

Work will predominantly take place during daylight hours only. Lighting of the ash cells will only be necessary during the winter months, when it will be limited to use between the hours of 4.00 pm and 5.30 pm; bats occurring in the locality can be expected to be in hibernation during the months when any outdoor lighting is utilised.

Consequently, it is considered that there will be a **Neutral Impact** on local bat populations.

Amphibians and Reptiles

The reedbed which has developed in a wet area adjacent to the western corner of the ADF may be disturbed at some point in the future as part of earthworks required to construct new cell walls in the east of the ADF development footprint. This habitat may be of value to breeding amphibians (common frog and smooth newt, which have the potential to occur in this habitat feature). Consequently, it is considered that there will be a **Direct, Slight, Negative, Long-term** impact on local amphibian populations.

Breeding Birds

The scrub habitat around the periphery of the ADF site provides potential breeding habitat for a range of common passerine species. Clearance of any such vegetation within the ADF development footprint will take place outside of the bird breeding season (March 1st to August 31st), consequently there will be no disturbance to breeding birds. As such, impacts to the local breeding bird population are considered to be **Direct, Not Significant, Negative** and **Short-term** in nature.

Additionally, it is expected that the similar (and earlier stage) scrub habitats on the surrounding areas of cutover bog) will develop in the medium term and effectively compensate for the localised loss of such habitat.

By contrast, the progressive recolonisation of the capped ADF cells by grasses and other ruderal vegetation may provide additional breeding habitat for skylark and meadow pipit. Additionally, it is likely to be utilised by small mammals for feeding, in turn providing an improved localised feeding resource for birds of prey such as the amber-listed kestrel. This can be construed as a **Slight Positive Impact**.

Wintering Birds

There is no indication of any significant flocks of wintering birds occurring regularly in the immediate proximity of the ADF site. Wintering golden plover are known to occur regularly in the wider locality, roosting on bare peat fields while whooper swan are known to forage on recolonising cutover bog vegetation. Construction works associated with the development of the ADF will not significantly impinge on such wintering flocks and the potential impact is considered to be **Neutral**.

The loss of relatively small amounts of scrub habitat due to the development would not be expected to have any significant impacts on the populations of any of the resident passerine bird species that occur at the site and all would be expected to retain a presence in the immediate area.

Aquatic Ecology

The main potential risks to aquatic ecology during the construction phase (i.e. cell construction) in relation to the ADF will be suspended solids or accidental spillages being subsequently transferred to local rivers. Surface water runoff from the ADF currently discharges via the onsite drainage system to the Gowlan River north of the site. This ultimately discharges to the River Shannon at Derryholmes via the River Blackwater which forms part of the River Shannon Callows SAC/Middle Shannon Callows SPA.

There are existing measures in place in relation to the ADF cell construction including existing drainage system and monitoring requirements. Prior to discharging to the Gowlan River, runoff is subject to passage through two silt ponds with an associated ELV of 35mg/l for suspended solids at the discharge point (ADF-SW1). Therefore potential impacts on water quality in the Gowlan River and subsequent waterbodies downstream from construction activities at the ADF are considered to be **Direct, Not Significant, Negative and Long Term** due to existing environmental controls in place.

Designated Sites

The ADF development footprint is not within the boundaries of any designated site. Based on the rationale presented in the Aquatic Ecology impact assessment above, indirect impacts to any designated sites via surface water pathways are not envisaged. Potential impacts to any designated sites are therefore considered to be **Indirect, Neutral and Long-term**.

6.6.2.2 Operational Phase

The ADF will continue to discharge as currently undertaken under the IE licence with the embedded mitigation specified in Section 6.4.1 in place.

At present, the drainage network at the ADF collects run-off migrating through the ash and discharges to the leachate lagoon on site. This leachate is used to wet the ash to prevent dust nuisance and help condition the ash. Leachate is also discharged intermittently to the Gowlan River via ADF-SW1, which eventually reaches the River Shannon at Derryholmes via the River Blackwater; such discharge only occurs when the parameters are within the ELVs as set out in the IE licence. Surface run-off that has not come into contact with ash (i.e. from capped cells and other areas) is diverted through the existing silt pond prior to discharge to the Gowlan River.

A review of the compliance monitoring datasets from 2014 onwards indicates that the discharge arising from ADF-SW1 is fully compliant with the requirements of the IEL (ELVs of 6-9 for pH and 35 ppm for suspended solids (SS)). The discharge is mildly alkaline in nature (2017 weekly monitoring indicates a pH range of 7.3 to 8.4); this is within the natural range expected for rivers in Ireland. SS values of the discharged leachate are typically in the order of 10% of the ELV.

The most recent EPA biological sampling of the River Blackwater, 2.5 km downstream of the Gowlan River confluence (Blackwater Bridge - RS25B270200) indicates ongoing good ecological conditions (Q4).

Given that there will be no operational change to the leachate management and discharge at the ADF, the operational period of the ADF is not considered to present a risk to ecological conditions in the respective receiving waters; this is considered to reflect an **Indirect, Medium-term, Not Significant** impact.

Once all cells are developed, there will be no further loss of habitat. During the operational phase, capped cells are expected to be progressively colonised by ruderal grasses and broadleaved vegetation. This in turn may be colonised by willow scrub.

6.6.3 Decommissioning Phase

Decommissioning activities are outlined in Chapter 4 of this EIAR. Potential impacts associated with the decommissioning phase will be similar to the construction phase impacts identified above i.e. suspended solids and/or polluting substances entering the adjacent waterbodies. Upon the cessation of power generation and ash disposal activities, the closure requirements outlined in the prevailing planning and licensing consents, and as required by the EPA, will be adhered to. Specifically, the EPA approved Decommissioning Management Plan (DMP) and Closure, Restoration and Aftercare Management Plan (CRAMP) as required by Section 10.2 of the current IE Licence and any future licence requirements will be implemented. Natural and semi-natural habitats (and any species associated with such habitats) found at both the WOP station and ADF sites will not be affected by any decommissioning activities.

6.6.4 Peat Supply to West Offaly Power Station

Habitats and species

It is proposed to generate electricity at WOP station from both peat and biomass with peat firing occurring when market conditions allow. Hence peat extraction from BnM supply bogs will continue from the respective supply bogs as described in **Chapter 4**.

For the purpose of peat supply to WOP station during the transition period, there will be ongoing peat harvesting activities at the supply bogs listed in **Table 4-12**.

Bord na Móna will not be expanding harvesting activities into the intact or degraded raised bog area. Consequently there will be no direct impact to any currently undisturbed raised bog habitats. By restricting future works to areas in current production and production related

sectors, direct impacts on the main ecological interests within the sites will be avoided. Furthermore, during the transition period, peat harvesting operations are predicted to sequentially reduce as the biomass component of the WOP fuel supply increases.

The habitats affected by the future extraction of peat comprise mainly bare peat in fields which are in current production and localised areas of pioneering cutaway habitats in areas recently out of production. The pioneering habitats are generally dominated by poor fen communities with rushes (*Juncus effusus*) and bog cotton (*Eriophorum angustifolium*) or drier areas (typically former peat ridges) comprising developing stands of birch scrub. Bare peat and pioneer vegetation cutaway habitats are widespread habitats and are rated, at most, as **Local Importance (lower value)**. The impact by continued peat extraction in these habitats is rated as **Direct, Not Significant, Negative** and **Medium-term**, as following cessation of harvesting, similar habitats can be expected to re-establish naturally or as a result of specific measures implemented under rehabilitation plans.

Activities associated with peat supply can generate noise via the operation of mobile machinery comprising harvesters, tractors and staff vehicles, as well as the operation of the narrow gauge railway network with associated small diesel locomotives and wagons. Peat extraction typically only occurs during daylight hours, without any artificial lighting other than vehicular lights and minimal lighting at staff workshops. Noise emissions during peat extraction are limited by the respective IPC licensing regimes. In respect of the above, no SACs or SPAs are considered to be within the Zone of Influence of noise or lighting at the respective supply bogs.

Peat harvesting areas within the Bord na Móna estate are of low ecological value in general, but are known to support a number of Annex 1 bird species which are Special Conservation Interests of a number of SPA and NHA sites in the Midlands. Golden plover may roost or rest on bare peat fields. Wintering flocks of whooper swan may occur on harvesting areas where there are temporary areas of standing water found in association with recolonizing surface vegetation upon which the flocks forage. Peregrine falcon and merlin also associate with bare peat areas, where they roost or perch on peat piles or tree stumps and may hunt golden plover. Ongoing peat harvesting is considered to have a **Neutral Impact** upon these bird species.

The progressive reduction in the peat harvesting operations will facilitate widespread natural vegetative recolonization of large expanses of cutover bog (outside the targeted rehabilitation measures prescribed in the Bord na Móna rehabilitation plans for the respective bog groupings) which will lead to the development of a mosaic of habitats with increased ecological value compared to the extant bare peat fields.

Aquatic ecology

Potential indirect impacts also arise as a result of ongoing drainage and discharges occurring at each supply bog. The majority of the bogs that supply WOP are located within water body catchment areas of Moderate / Poor Status. The Ireland River Basin Management Plan 2018 – 2021 notes that “*Peat extraction has been identified as causing a significant risk to ecological status in 119 water bodies, which represents 8% of all water bodies that have been identified as At Risk [...] Of these, 115 are rivers, 3 are lakes and 1 is groundwater. The environmental impacts generally relate to suspended solids, ammonia and*

hydromorphological alterations. There is evidence that high levels of ammonia are being released from peat-extraction activities during the draining process and, along with suspended solids, may be causing ecological impacts in receiving water bodies”

A review of the Bord na Móna AERs and EPA Inspection Report for the period 2015-2017 indicates that the majority of sites reported no breaches with suspended solids Emission Limit Values (ELV) and compliance with Threshold Limit Values (TLV) for ammonia over this period. In addition all sites related to peat supply for WOP have been subject to EPA inspection over the last two years with corrective actions identified as required. Monitoring data collected by Bord na Móna at a number of supply bogs in recent years indicates a downward trend in ammonia concentrations as peat extraction continues, and this is in-line with downwards trends previously submitted to the EPA in 2013. The monitoring has established that the most relevant influencing variable on Ammonia is rainfall and the trend analysis indicates linkage between high rainfall events and ammonia concentrations. In this scenario, it is expected that the assimilative capacity of the respective receiving waters will be increased during these periods of high rainfall.

Impacts on aquatic ecology as a result of water quality pressures from the continued operation of the WOP supply bogs *in the absence of mitigation* are considered to be **Indirect Moderate Negative** and **Medium-term**.

Designated sites

Potential indirect impacts to designated sites occurring as a result of the ongoing extraction of peat from the respective WOP supply bogs are determined as:

- Hydrological impacts on Qualifying Interest habitats due to ongoing drainage required to facilitate peat harvesting activities.
- Impacts on water quality (due to silt and ammonia release to surface waters) arising as a result of peat harvesting activities.
- Under certain conditions, peat supply activities have the capacity to generate airborne dust. Harvesting is typically the stage wherein most dust is generated. Deposition of peat dust on adjacent sensitive habitats is considered to be a potential impact.

A GIS-based proximity analysis of the respective WOP supply bogs undertaken to inform this assessment indicated that a number of supply bog IPC licence boundaries overlap or are adjacent to a number of designated sites; as a result of practical constraints, harvesting of peat does not typically extend to these boundaries, so this is considered a conservative estimate of the extent of the respective active harvesting areas. A 100 m external buffer from the IPC boundaries was utilised for this exercise (rationale presented in **Section 6.5.3.3**), however, it should be noted that Bord na Mona have commenced investigations on a number of sites to determine appropriate buffers between designated sites and actual production area boundaries to mitigate against any potential dust and hydrology impacts. Actual production area boundaries generally have greater separation distance from designated sites when compared to IPC boundaries. In relation to potential for impacts

arising from dust generation, transferral and deposition into European Sites, a buffer of 1.5 km from the respective supply bogs was considered.

Additionally, the following European Sites have a direct hydrological connection to at least one WOP supply bog discharge point:

- River Shannon Callows SAC
- River Barrow and River Nore SAC
- River Boyne and River Blackwater SAC

Peat extraction has the potential to release silt particles and potentially aqueous ammonia to surface waters under typical rainfall conditions and drainage regimes; these inputs have the potential to negatively impact upon the ecology of receiving waterbodies as a consequence of increased turbidity, sediment deposition and chemical change.

A number of designated sites were identified by the above analyses, and are presented in **Table 6.10** below.

Table 6-10: Potential impacts upon Designated Sites

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
<p>River Shannon Callows SAC</p>	<p>Close spatial proximity and direct hydrological connection between SAC and Bord na Móna peat supply bog(s) ((Kilmacshane/ Garryduff/ Clooniff/ Bloomhill discharges and drainage)</p>	<p>Potential impacts on the designated site may arise as a result of:</p> <ul style="list-style-type: none"> • Emissions to surface waters leading to impacts on water quality within or upstream of the River Shannon Callows SAC. • Excavation of peat leading to hydrological impacts on adjacent habitats within the River Shannon Callows SAC. • Dust generated during peat harvesting may be deposited inside the River Shannon Callows SAC. <p>Hydrological influence on callow habitats is dominated by River Shannon; localised drainage associated with peat supply bogs is not expected to affect the callows habitat distribution along the river. Vegetation structure and composition of callows habitat has the capacity to be influenced by organic enrichment of underlying soils which may occur as a result of peat sediment entering the Shannon catchment and being deposited on areas of callows grassland distributed throughout its floodplain. The NPWS Site Synopsis notes that <i>“Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition...However, none</i></p>

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
		<p><i>of these damaging activities can yet be said to be having a serious impact.”</i> In the absence of mitigation, this is considered to be a Moderate Indirect Medium-term Negative impact.</p> <p>Additionally, deposition of dust arising from peat harvesting activities has some potential to alter vegetation composition and structure. Broadleaf species may be more susceptible to inhibitive mechanisms such as reduction in light absorption and stomatal blocking, when compared to grasses. Localised succession pressure towards rank grassland may occur as a result. However, this effect is not anticipated to be a significant issue with regard to the Shannon callows as heavier dust particles will drop out close to source and will not be carried in sufficient quantities into such habitats. Furthermore, it is anticipated that finer peat dust which may carry further will be readily washed off plants during rainfall without causing significant deleterious effects. This is considered to be a Negligible Indirect Medium-term Negative impact.</p> <p>Aquatic discharges from the respective supply bogs in the Shannon catchment have the potential to reduce fish biomass as a result of siltation and chemical content (i.e. Ammonia). In the absence of mitigation, this could have an effect on the broader otter population in the catchment. In the absence of mitigation, this is considered to be a Moderate Indirect Medium-term Negative impact.</p>
<p>Middle Shannon Callows SPA</p>	<p>Close spatial proximity and direct hydrological connection between SAC and Bord na Móna peat supply bog(s) ((Kilmacshane/ Garryduff/Clooniff/ Bloomhill discharges and drainage)</p>	<p>Potential impacts on the designated site may arise as a result of:</p> <ul style="list-style-type: none"> • Excavation of peat leading to hydrological impacts on adjacent habitats within the Middle Shannon Callows SPA. • Emissions to surface waters leading to impacts on water quality within or upstream of the Middle Shannon Callows SPA. <p>Aquatic discharges from the respective supply bogs in the Shannon catchment have the potential to reduce foraging resources for bird</p>

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
		<p>flocks as a result of increased turbidity leading to lower aquatic vegetation productivity. Similarly, fish biomass in the Shannon catchment may also be negatively affected by siltation and ammonia inputs; this may impact upon piscivorous species. In the absence of mitigation, this could have an effect on population numbers and distribution of bird species associated with the SPA. In the absence of mitigation, this is considered to be a Moderate Indirect Medium-term Negative impact.</p> <p>Ongoing peat harvesting has the potential to lead to drying of peripheral remnant bog habitats as a result of localised drainage and the resultant localised fall in the water table in such areas. Drying out of such peripheral habitats has the potential to reduce the suitability and availability of such habitat to species associated with the SPA, such as Golden Plover. A review of aerial imagery of these intercepts indicate that only a very minor proportion relate to peripheral areas of remnant bog between the existing peat harvesting areas and the aforementioned callows habitats. The NPWS Natura 2000 data form notes that 5% of the SPA coverage relates to bog habitat. The aforementioned intercept areas form a non-significant proportion of this 5% bog area. Additionally, several areas are adjacent to peat harvesting fields recently or soon to be taken out of production and are in the process of (or will be) recolonising as cutaway bog habitats that may be utilised by bird flocks associated with the SPA such as golden plover whooper swan. Consequently, ongoing peat harvesting activities are considered to result in a Negligible Indirect Medium-term Negative impact.</p>
<p>Suck River Callows SPA</p>	<p>Close spatial proximity and direct hydrological connection between SPA and Bord na Móna peat supply bog(s) ((Lismanny/Garryduff/</p>	<p>Potential impacts on the designated site may arise as a result of:</p> <ul style="list-style-type: none"> • Excavation of peat leading to hydrological impacts on adjacent habitats within the Suck River Callows SPA.

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
	<p>Culliaghmore/Castlegar/ Deryfadda discharges and drainage)</p>	<ul style="list-style-type: none"> • Emissions to surface waters leading to impacts on water quality within or upstream of the Suck River Callows SPA. <p>Aquatic discharges from the respective supply bogs in the Shannon catchment have the potential to reduce foraging resources for bird flocks as a result of increased turbidity leading to lower aquatic vegetation productivity. Similarly, fish biomass in the Suck catchment may also be negatively affected by siltation and ammonia inputs; this may impact upon piscivorous species. In the absence of mitigation, this could have an effect on population numbers and distribution of bird species associated with the SPA. In the absence of mitigation, this is considered to be a Moderate Indirect Medium-term Negative impact.</p> <p>Ongoing peat harvesting has the potential to lead to drying of peripheral remnant bog habitats as a result of localised drainage and the resultant localised fall in the water table in such areas. Drying out of such peripheral habitats has the potential to reduce the suitability and availability of such habitat to species associated with the SPA, such as Golden Plover. A review of aerial imagery of these intercepts indicate that only a very minor proportion relate to peripheral areas of remnant bog between the existing peat harvesting areas and the aforementioned callows habitats. The NPWS Natura 2000 data form notes that 5% of the SPA coverage relates to bog habitat. The aforementioned intercept areas form a non-significant proportion of this 5% bog area. Additionally, several areas are adjacent to peat harvesting fields recently or soon to be taken out of production and are in the process of (or will be) recolonising as cutaway bog habitats that may be utilised by bird flocks associated with the SPA such as golden plover whooper swan. Consequently, ongoing peat harvesting activities are considered to result in a Negligible Indirect Medium-term Negative impact.</p>

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
<p>Fin Lough (Offaly) SAC</p>	<p>Close spatial proximity and potential hydrological connection between SAC and Bord na Móna peat supply bog (Blackwater drainage)</p>	<p>Potential impacts on the designated site may arise as a result of:</p> <ul style="list-style-type: none"> • Excavation of peat leading to hydrological impacts on adjacent habitats within the Fin Lough (Offaly) SAC. <p>Historic peat milling activities along the western SAC boundary noted in the NPWS site synopsis have now ceased; based on data supplied by Bord na Móna, the active harvesting area currently in operation is now located 750 m southwest of the SAC. The intervening habitat comprises decommissioned cutaway and biodiversity area which is progressively recolonising with scrub.</p> <p>Consequently, it is envisaged that ongoing peat extraction within the active harvesting area of Blackwater Bog will not significantly further affect the existing hydrological regime in Fin Lough (Offaly) SAC. Bord na Móna have confirmed that there will be no northward expansion of the harvesting area towards Fin Lough. Consequently, ongoing peat harvesting activities Blackwater Bog are outside the Zone of Influence for Fin Lough SAC are considered to result in a Medium-term Neutral impact.</p>
<p>Pilgrim's Road Esker SAC</p>	<p>Close spatial proximity between SAC and Bord na Móna peat supply bog(s) (Bloomhill)</p>	<p>Potential impacts on the designated site may arise as a result of:</p> <ul style="list-style-type: none"> • Dust generated during peat harvesting at Bloomhill Bog may be deposited inside the River Pilgrim's Road Esker SAC. <p>The eastern boundary of the SAC is within 150 m of the active harvesting area of Bloomhill Bog. Significant volumes of dust being carried into the esker grasslands are not envisaged due to prevailing winds from the west carrying dust away from the SAC and the fact that heavier dust particles are expected drop out close to source and will not be carried in significant quantities into such habitats. However, under certain climatic conditions, finer dust may be deposited within the SAC. Nevertheless, it is anticipated that the majority of finer peat dust which may carry further will be readily washed</p>

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
		<p>off plants during rainfall without causing significant deleterious effects.</p> <p>Broadleaf species may be more susceptible to inhibitive mechanisms such as reduction in light absorption and stomatal blocking, when compared to grasses. Deposition of dust arising from peat harvesting activities therefore has some potential to alter vegetation composition and structure, though the localised influences on such deposition discussed above should be noted. In the absence of mitigation, this is considered to be a Slight Indirect Medium-term Negative impact.</p>
River Boyne and River Blackwater SAC	<p>Direct hydrological connection between SAC and Bord na Móna peat supply bog (Derryhinch discharge)</p>	<p>Potential impacts on the respective Qualifying Interests may arise as a result of:</p> <ul style="list-style-type: none"> • Emissions to surface waters leading to impacts on water quality in the surface water catchment of the River Boyne and River Blackwater SAC. <p>There is potential for surface water run-off from Derryhinch bog to the Yellow River to result in negative impacts on lamprey, salmon and otter occurring within the River Boyne and River Blackwater SAC as a consequence of reductions in water quality. In the absence of mitigation, this is considered to be a Moderate Indirect Medium-term Negative impact.</p>
River Barrow and River Nore SAC	<p>Close spatial proximity and direct hydrological connection between SAC and Bord na Móna peat supply bog (Monettia discharge)</p>	<p>Potential impacts on the respective Qualifying Interests may arise as a result of:</p> <ul style="list-style-type: none"> • Emissions to surface waters leading to impacts on water quality in the River Barrow and River Nore SAC. <p>There is potential for surface water run-off from Monettia bog to the River Barrow to result in negative impacts upon lamprey, salmon, crayfish and otter occurring within the River Barrow and River Nore SAC as a consequence of reductions in water quality. In the absence of mitigation, this is considered to be a Moderate Indirect Medium-term Negative impact.</p>
Suck River Callows NHA	<p>Close spatial proximity and direct hydrological</p>	<p>The NPWS site synopsis for the NHA notes that “<i>There are extensive areas of peat-cutting by</i></p>

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
	<p>connection between NHA and Bord na Móna peat supply bog(s): Garryduff, Culliaghmore, Lismanny, Castlegar, Derryfadda, Boughill) (drainage)</p>	<p><i>Bord na Móna along the boundaries of the site and a large area of callow and esker has been recently planted with forestry. Damaging activities associated with these landuses include habitat loss and drainage throughout the site and burning of the high bog. These activities have all resulted in the loss of habitat and damage to the hydrological status of the raised bog, and pose a continuing threat to its viability</i>". In the absence of mitigation, ongoing peat harvesting along the periphery of this NHA is expected to constitute a Moderate Indirect Medium-term Negative impact.</p>
<p>Annaghbeg Bog NHA</p>	<p>Close spatial proximity and direct hydrological connection between NHA and Bord na Móna peat supply bog (Castlegar) (drainage)</p>	<p>The NPWS site synopsis for the NHA notes "<i>Damaging activities associated with these landuses include drainage throughout the site and burning of the high bog. All these activities have resulted in the loss of habitat, damage to the hydrological status of the site, and pose a continuing threat to its viability</i>". In the absence of mitigation, ongoing peat harvesting along the periphery of this NHA is expected to constitute a Moderate Indirect Medium-term Negative impact.</p>
<p>Castle French East Bog NHA</p>	<p>Close spatial proximity and direct hydrological connection between NHA and Bord na Móna peat supply bog (Gowla) (drainage)</p>	<p>The NPWS site synopsis for the NHA notes that "<i>Current landuse on the site consists of agriculture and mechanical peat-cutting to the north and north-west. Damaging activities associated with these landuses include drainage and burning. There is very little new drainage on the high bog, but large portions of the bog are being burnt at regular intervals with dead hummocks and burnt Ling Heather evident. These activities have resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability. However the site is quite wet and some bog moss (Sphagnum spp.) regeneration is occurring and this will probably improve if burning stops</i>". The synopsis also highlights the fact that the raised bog habitats on site are showing signs of active regeneration. Given the apparent absence of impacts to the site from current peat harvesting activities, it is envisaged that such activities through the transition period</p>

Designated Site	Proximity to impact sources & potential impact pathway	Impact Assessment
		will have a Slight Indirect Negative Medium-term impact.

Two further overlapping European Sites (Mongan Bog SAC and Mongan Bog SPA) were also identified by the GIS proximity analysis. However, Mongan Bog, whilst within the Bord na Móna IPC licence boundary for the Blackwater Bog grouping, is mostly publicly owned; An Taisce own an 119 hectare section of the site, which is a designated Nature Reserve. Consequently, it is not a commercial Bord na Móna production site and will not be developed as such in the future. Various bog restoration works have been carried out at the site over the past 30 years, with the most recent being the active LIFE project which aims to block over 1,400 m of drains on the high bog.

A number of pNHAs in close proximity to the respective supply bogs were also identified, the majority of which have a superseding SAC designation. Of the remainder, the following assessments apply:

- Clonfert Cathedral pNHA will be unaffected by peat harvesting as it relates to a brown long-eared bat roost.
- Clonlonyon Glebe Bog pNHA relates to a small raised bog near Ferbane that has been subject to significant drainage and considered in the 2009 NPWS synopsis to be unlikely to recover.
- Lough Coura pNHA is an in-filled lake habitat between Kilcormac and Banagher; the 2009 NPWS site synopsis notes that the site remains predominantly unchanged since the early 1970s.
- Lough Nanag Esker pNHA comprises an area of species-rich calcareous grassland and a small acidic peatland lake. The 2009 NPWS site synopsis considers the site to be vulnerable to drainage.
- Doon Esker Wood pNHA is a regenerating deciduous woodland along an esker ridge 8 km east of Clonmacnoise. This site is not considered likely to be affected by ongoing peat harvesting.

Supply bog impact assessment and licensing

It is of key significance that Bord na Móna is currently undertaking Environmental Impact Assessments for its respective supply bog groupings as part of the proposed new EPA licensing process for peat harvesting in these areas. It is expected that as part of this EIA and licensing process, site-specific measures for each supply bog will be developed to further reduce the potential for ecological impact of ongoing peat harvesting, in respect to both local habitats of ecological importance (e.g. raised bog remnants) and designated sites within the Zones of Influence of the respective supply bogs. Supply bogs which are not licensed by the EPA will not be utilised as fuel sources for WOP station as all Bord na Móna

production bogs are licensed. Consequently, potential ecological impacts arising from peat supply to WOP station will be effectively minimised through the EPA licensing process.

6.6.5 Biomass Supply to West Offaly Power Station

The principle source of indigenous fuel will be by-products from the Irish forest sector (brash, thinnings, and residues) and residues and by-products from Irish sawmills and agriculture. Biomass may also be supplied from agricultural energy crops.

Potential impacts associated with biomass production are habitat change arising during afforestation or harvesting and aquatic discharges arising from clear-felling and management activities such as fertilisation.

There are a number of other biodiversity requirements and measures in existence in relation to the forestry sector as outlined in the Forest Biodiversity Guidelines (Forest Service 2000) and Forestry Standards and Procedures Manual (Forest Service 2015); refer to Section 6.5.4. In relation to the development of energy crops within the agriculture sector (such as Short Rotation Coppice (SRC) of willow), environmental protection will be facilitated through the implementation of cross-compliance and agri-environmental schemes (e.g. GLAS) under the Common Agricultural Policy, the application of measures under the Nitrates Action Programme (as required under the EU Nitrates Directive (91/676/EEC)) and the ongoing employment of the The European Communities (Environmental Impact Assessment) (Agriculture) Regulations 2011 (as amended).

In addition, improvements in surface water quality with cascading benefits for aquatic ecology are likely over the next few years as a result of the on-going implementation of EU legislation such as the WFD and the IE Directives. As outlined in Chapter 8 a number of principal actions have been proposed as part of the RBMP.

Biomass will be sourced Internationally on a commercial basis in accordance with the ESB sustainability criteria as outlined in **Section 4.4.3.1**.

Consequently, impacts on biodiversity resulting from the biomass supply to WOP station as a result of the proposed development are considered to be **Indirect, Long-term, Non-significant and Neutral**.

6.6.6 Do-Nothing Scenario Impact

The “do nothing” scenario is the outcome that would be achieved if the proposed biomass transition was not carried out. In this case, WOP station would cease to operate in 2020 and all associated fuel harvesting for energy purposes and discharges would cease; Bord na Móna Draft Rehabilitation Plans could be initiated earlier than scheduled at present if alternate extraction uses, other than energy, did not occur. It is envisaged that depending on site-specific rehabilitation measures the respective supply bogs would recolonise with successional vegetation, eventually climaxing with closed canopy bog woodland or would revert to extensive wetlands with associated reedbed vegetation.

In the absence of the cooling water discharge to the River Shannon, it is envisaged that there would be a measureable, but non-significant positive change in the key ecological indicators downstream of the discharge. However, local feeding and reproductive conditions for cyprinid fish may also be reduced in the absence of a thermal discharge due to the overall lower water temperatures immediately downstream of WOP station as a result. Similarly, a negligible positive improvement may occur in the Gowlan River, to which the ADF discharges.

Peat extraction to supply WOP for energy purposes would also cease and if no other peat extraction purpose is envisaged for these bogs they would likely be rehabilitated earlier than currently anticipated with reduced potential for sediment generation, pollutant release and water quality impact. However it is noted that these are currently strictly controlled under the IPC licensing regime for the sites. Supply bog rehabilitation would have subsequent positive effects through the creation of wetlands contributing to climate change resilience as well as providing supporting habitat in maintaining the overall coherence of the Natura 2000 network such as SACs and the SCIs of nearby SPAs. Consequently potential positive impacts from the do-nothing scenario would be **long-term slight positive**.

6.7 Mitigation

6.7.1 Construction Phase Mitigation

6.7.1.1 WOP station

Measures are hereby outlined which mitigate against the aforementioned local impacts to habitats and specific species; no additional mitigation measures specifically relating to designated sites or habitats and species protected under the Habitats and Birds Directives respectively are proposed.

Habitats and species

Felling of the woodland compartment within the footprint of Storage Slab B will take place during September to February inclusive (outside the bird breeding season) to avoid disturbance to birds using this habitat for nesting. Pre-construction surveys will also be carried out to confirm the continued absence of any badger sett(s) within this wooded area.

Impacts to small blue butterfly will be mitigated against via the following approach, which will be monitored by an ecologist:

- Transplant of existing substrate containing kidney vetch plants from the existing central area of the proposed storage slab footprint ('donor site') to the open un-vegetated area to the north of the existing storage building ('receiver site'). This will be facilitated using a large turving bucket to ensure the physical integrity of the translocated material and will be carried out in winter/early spring. This area will be fenced off during subsequent construction activities and maintained without strimming or herbicides during the summer months.
- Develop an area under the OHL wayleave to the northeast of the proposed storage slab as additional habitat; this will involve the seeding and/or plug-planting of kidney vetch over an area of 50-100 m² under the OHL.

- Sensitive future management of road verge outside eastern fenceline, wherein vetch will be allowed to flower through the small blue breeding season. This area will be maintained through the avoidance of the use of strimming or herbicides during the summer months, subject to consultation between ESB and Offaly County Council.

Aquatic Ecology

Best practice and site-specific mitigation relating to surface water protection during the construction phase are presented in Chapter 8 – Surface Water. These measures also ensure water-dependent ecological receptors are not negatively impacted by the construction and operational phases.

6.7.1.2 WOP ADF

The primary potential impacts of the future development and operation of the ADF are considered to be local in nature and are identified above as;

- Loss of nesting habitat to birds (with gain for some species);
- Loss of foraging habitat for mammals and other terrestrial species (with gain for some species); and
- Temporary disturbance or displacement of species such as birds and bats.

Measures are hereby outlined which mitigate against the aforementioned local impacts; no additional mitigation measures specifically relating to designated sites or habitats and species protected under the Habitats and Birds Directives respectively are proposed.

The ADF will continue to fully comply with the requirements of its IE Licence (P0611-02). Current operational landfill methods will continue including wetting of material as ash is landfilled, working one cell at a time.

Mitigation measures for habitats on site are as follows:

- No vegetation outside the ADF planning boundary will be removed or disturbed as part of the proposed works;
- Any scrub clearance to develop the remaining cells will take place during September to February inclusive (outside the bird breeding season) to avoid disturbance to birds using this habitat for nesting;
- Should the period between scrub clearance and the construction of the new cell (surface stripping, berm construction etc.) facilitate the colonisation of the site by ruderal vegetation, the area will be surveyed in advance of cell construction to confirm the absence of ground-nesting birds; and
- The overall extent of low ecological value bare ground will be minimised by the successive opening and capping of cells within the ADF only as they become necessary.

The mitigation measures outlined above will ensure that habitats outside the ADF boundary (e.g. Bord na Móna Biodiversity Areas) will not be affected by the ADF development.

Additionally, to minimize impacts to any mammals occurring in the locality of the ADF, the following measures will be implemented.

- Mammal-proof fencing around the existing leachate lagoon will be maintained during construction and operations to ensure exclusion of animals; this will be extended to encompass the additional leachate lagoon(s).

6.7.2 Operation Phase Mitigation

6.7.2.1 WOP station

Beyond the inherent environmental protection measures as conditioned by the existing IE licence and described in Section 6.4.1, no additional mitigation is proposed.

6.7.2.2 WOP ADF

The WOP ADF operates to a its IE Licence requirements and specifically to an EPA approved Landfill Operational Plan. Additionally, measures to attenuate and treat the runoff have been incorporated into the drainage design of the proposed development. No further mitigation is proposed above that outlined in Section 6.4.1.

Overall, there will be no net increase of operational activities at the site (the north and east sector of the ADF will become progressively less active as the ash infilling progresses towards the southeast boundary). No specific additional mitigation measures are therefore proposed.

6.7.2.3 Peat Supply Bogs

A broad series of existing environmental protection measures are provisioned by the IPC licencing regime for the respective supply bog groupings, as regulated by the EPA. These are presented in **Table 6-11** below:

Table 6-11: Existing environmental protection measures are provisioned by the IPC licencing regime for the respective supply bog groupings

Measure	Mechanism by which water quality is protected
All drainage water from all boglands in the licensed area are discharged via an appropriately designed silt pond treatment arrangement	Silt ponds facilitate settlement of peat particles in suspension, prior to discharging of drainage water to surface water catchment. Silt content of discharge is significantly reduced.
Silt ponds serving operational bogs are cleaned at a minimum twice a year, once before ditching and once before harvesting, and more frequently as inspections may dictate. The outlet of the silt pond is controlled during cleaning operations to prevent release of sediment during cleaning.	Removal of settled peat silt which has accumulated in silt ponds ensures maximum efficiency of pond operation.
Drainage manholes are protected and	Combined implementation of these four

Measure	Mechanism by which water quality is protected
maintained free of excessive peat	measures ensure that localised high volumes of milled peat do not directly enter the drainage system (such as during periods of heavy rainfall).
Headlands are kept clean and free of excessive loose peat	
All new manholes and outfalls are set well back from turning grounds, drivers of bog plant do not turn short (over drains) at headlands	
Harrows, millers, ridgers do not drag loose peat onto manholes or into drains, outside harrow spoons are directed away from drains	
Silt run-off is minimised by blocking the silt pond outlet while piping or ditching	Settled peat silt which is disturbed during cleaning of silt pond is not permitted to escape pond prior to re-settlement.
Outfalls are controlled to minimise silt discharge during cleaning operations	
Drains are ditched in dry weather	Loose peat on sides and base of drains will remain in-situ and will not be readily transported to silt ponds during dry weather.
While ditching, outfalls are blocked and ditch towards outfall	
Outlets from stockpile field drains are blocked during stockpile loading	Blocked drains provide additional settlement time for peat silt during stockpile loading, prior to discharge to settlement ponds.
Field drains adjacent to stockpiles are cleaned as soon as practicable after stockpile loading	Settled peat silt which is deposited in drains during stockpile loading is not permitted to escape to silt pond.
Adequate room is allowed for rail beds beside Peco stockpiles	Avoids disturbance of loose peat on Peco stockpiles .
All fields that have been milled are ridged at the end of the production season	Ridging of milled peat minimises run-off of peat particles to drains.
All fields liable to winter flooding are cleared of milled peat or re-compacted at the end of the production season	Minimises suspension and subsequent discharge of peat particles during periods of flooding.
All silt ponds prone to flooding are de-silted by 1st November of each year. Excavated sludge is removed for disposal to a location outside the flood plain.	Removal of settled peat silt which has accumulated in silt ponds ensures maximum efficiency of pond operation.
<p>All silt ponds serving operational bogs achieve the following minimum performance criteria (flood periods excepted):</p> <ul style="list-style-type: none"> - Maximum flow velocity < 10 cms⁻¹ - Silt design capacity of lagoons, minimum 50m³ per nett ha of bog 	<p>Minimum criteria for silt pond capacity ensures maximum efficiency of pond operation in relation to scale of area of bog drained.</p> <p>Maximum flow velocity ensures optimum deposition of suspended peat particles prior to pond discharge.</p>

Measure	Mechanism by which water quality is protected
serviced	

The implementation and ongoing review of the above measures at the supply bogs is a condition of the respective licenses.

In addition, Bord na Móna is currently implementing a programme of measures as outlined below, across their operations to mitigate against adverse impacts on water quality.

Bord na Móna have an on-going silt pond maintenance programme. These silt ponds are currently being surveyed in order to identify silt ponds that may require extensions and other improvements in capacity as a result of changes to drainage catchments or impending peat regulations. Changes to drainage catchments are due to the extent of resource extraction since the silt ponds were originally developed as well as changes to internal outfalls and drainage regimes.

BNM have prepared and submitted all the required draft Rehabilitation Plans for the peatlands supplying WOP, with updates provided periodically and in the Annual Environmental Report. A number of bogs within the IPC Licensed peatlands have already been decommissioned and rehabilitated as required by the licence. The rewetting of former peat production areas and the development of wetland habitats will inevitably reduce potential for loss of suspended solids to the drainage network and ultimately to the Shannon river system, Boyne river system and Barrow river system.

In addition, the National Peatlands Strategy sets out high level actions to be undertaken to ensure peat production does not have a detrimental impact on water quality, and to ensure that peatlands can contribute positively to achieving the objectives of the WFD. These actions are:

- *“For all peatland related activities, it should be demonstrated that they do not, either individually or in-combination with other activities, adversely impact on the environmental objectives of the WFD, associated daughter Directives and national regulations.*
- *Peatland related activities should not significantly alter the environmental supporting conditions for Natura 2000 sites such that these cause a failure of the conservation objective for that designated habitat and by inference cause a risk of the WFD environmental objectives relating to protected areas not being met.”*

These actions are subsequently noted in the RBMP for Ireland, which identifies the following principal actions to address potential impacts on water caused by peatland harvesting:

- *The Minister for Housing, Planning and Local Government intends to make regulations as soon as possible that will require the EPA to carry out EIA for all existing and new large-scale peat extraction (> 30ha) as part of its examination of*

IPC license applications for the activity. When these regulations are made, proposals will be developed for public consultation relating to a new regulatory regime that will bring smaller-scale commercial peat extraction (≤ 30 ha) under a new local authority licensing system incorporating EIA and AA, as necessary, and enforcement powers.

- *The DCHG, together with the Peatlands Strategy Implementation Group, will oversee the implementation of the National Peatland Strategy and the first national management plan for Ireland's raised-bog Special Areas of Conservation (SACs) network. The principal aims of these are:*
 - *To provide a long-term framework within which all of the peatlands in the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations*
 - *In the case of the National Raised Bog Special Areas of Conservation Management Plan 2017–2022, to specifically set out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland*
- *Bord Na Móna will implement its Sustainability 2030 Strategy and Biodiversity Action Plan 2016–2021, which addresses the long-term rehabilitation of its cutaway bogs.*
- *By 2021, Bord Na Móna will rehabilitate an additional 25 peatlands covering approximately 9,000ha. This is subject to several assumptions, including the availability of cutaway bogs for rehabilitation.*
- *The EPA has identified this priority issue as the subject of a research proposal for inclusion in its 2018 research call. The proposal involves evaluating mitigation strategies for improving water quality from drained peatlands. The project proposal, if selected, is intended to integrate with the ongoing mitigation trials being undertaken by Bord Na Móna.*

Furthermore, Bord Na Móna has set out action plans for the long-term rehabilitation of cutaway bogs, acknowledging obligations under the Water Framework Directive and the Habitats and Birds Directives. The Bord Na Móna Sustainability 2030 Strategy and Biodiversity Action Plan 2016-2021 are built around the commitment from Bord Na Móna to cease harvesting energy peat by 2030. Some Key Action Areas under this Biodiversity Action Plan include:

- Developing a map of ecosystem goods and services for Bord Na Móna lands;
- Adding to the raised bog network under the Bord Na Móna Raised Bog Restoration programme;
- Assimilation of the outcomes relating to rehabilitation and restoration on Bord na Móna bog areas to develop best practice guidelines that can be translated to a range of peatland types
- Continuing with the long term rehabilitation of the cutaway bogs; and
- Control and monitoring of invasive species.

6.7.2.4 Monitoring During Operation

Water quality monitoring will be undertaken as indicated in the IE Licence as agreed by the EPA and supported by the existing on site certified EMS system. No further monitoring is proposed above IE licence requirements.

6.8 Difficulties Encountered in Compiling Information

No difficulties were encountered during the assessment.

6.9 Residual Impacts

Residual impacts are defined as those remaining after mitigation measures have been implemented. Generally, a proposed development adequately considers the ecological issues into its design, so that its impacts on the existing environment are minimised to an acceptable level of slight residual impacts. Occasionally, where significant impacts cannot be avoided or reduced, the consequences of significant residual impacts in light of planning policies and legislation should be considered. Significant residual environmental effects may be offset by appropriate compensatory measures nearby/elsewhere (IEEM, 2006).

Based on a review of the proposed mitigation measures described above, it is concluded that the proposed development (including continued operation) will have no residual negative impacts.

6.10 Cumulative Impacts

The cumulative impact of the proposed development and other existing and approved developments in the area was assessed by taking into account the existing baseline environment and the predicted impacts of this and other approved developments in the area.

With regard to potential impacts to biodiversity arising from the proposed development at WOP station and ADF, together with peat harvesting and supply activities to WOP station, the following cumulative pathways have been identified as a consequence of overlap in the respective Zones of Influence of the potential impacts in isolation:

- Discharges from WOP station and ADF to the same surface water catchments as supply bogs; and
- Disturbance arising as a result of other developments or activities in the immediate vicinities of WOP station and ADF.

Several of the bogs which supply fuel peat to WOP station also supply LRP station, which also receives peat exclusively from a number of other supply bogs in the region. EPL station is also supplied by Bord na Móna bogs, predominantly in the east midlands. Bord na Móna also harvests peat for other end uses (e.g. horticulture) on a suite of sites around the midlands, within the same surface water catchments as the WOP supply bogs. These other bogs are also subject to IPC licencing and associated conditioned water quality protection

measures. Based on the assessment of impacts for the directly comparable WOP supply bogs presented in Sections 6.6.1, 6.6.2 and 6.6.4, and the respective licensing regimes which are implemented for each site/activity, impacts arising from the proposed development at WOP station and ADF, cumulatively with other peat harvesting activities are considered to be negligible.

With regard to the potential cumulative impacts of other developments in the immediate vicinity of WOP station and ADF, there is a permitted energy storage facility (Lumcloon Energy Limited), to be located in a field immediately south of proposed Storage Slab B; this project was subject to an Ecological Impact Assessment and an AA Screening was also submitted as part of the planning application; these concluded no significant impacts to habitats, flora, fauna or European Sites. Given the contained nature of the battery storage development and the absence of any impacts arising therefrom, cumulative impacts with the proposed development at WOP station and ADF are considered to be negligible.

The ESB-owned Lough Ree Power (LRP) station in Lanesborough also discharges cooling water to the River Shannon immediately upstream of Lough Ree, approximately 50 km upstream of WOP station; there is no spatial overlap in the thermal influence of the discharges of WOP and LRP stations. The Bord na Móna-owned Edenderry Power Limited (EPL) power station is also supplied by Bord na Móna bogs Edenderry Power Limited (EPL) station discharges a combined wastewater stream (including cooling water) through a settlement lagoon to the Figile River, a tributary of the River Barrow. Consequently both LRP and EPL station are considered to be outside the potential Zone of Influence of WOP station and ADF and cumulative impacts arising from the operation of the respective power stations are therefore ruled out on the basis of physical separation and absence of hydrological connections.

Third-party harvesting of peat also occurs on bogs throughout the Midlands, ranging from small scale turbary for domestic fuel to commercial scale peat removal for horticultural purposes. Several of these are located in close proximity to Bord na Móna properties and drains from these sites discharge to the same receiving waterbodies via sediment control systems of varying scales. Impacts arising from the proposed development at WOP station and ADF, cumulatively with these third-party peat harvesting activities are considered to be negligible.

6.11 References

- Bang, P. & Dahlstrom, P. (2006) Tracks and signs. Oxford University Press, UK.
- Bat Eco Services (2016) Bat Survey: West Offaly Power Plant, Shannonbridge, County Offaly.
- BirdWatch Ireland/NPWS (2012) Guidelines for Countryside Bird Survey participants.
- Bord Na Móna (2015) Sustainability 2030 Strategy.
- Bord na Móna (2016) Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane.
- Bord na Móna (2017) Allen Bog Group Draft Rehabilitation Plan - A document to detail the rehabilitation and aspects of decommissioning of the Bord na Móna Allen Bog Group in compliance with Condition 10 of IPC Licence Ref. No. P0503-01.
- Bord na Móna (2017) Blackwater Bog Group Draft Rehabilitation Plan - A document to detail the rehabilitation and aspects of decommissioning of the Bord na Móna Allen Bog Group in compliance with Condition 10 of IPC Licence Ref. No. P0503-01.
- Bord na Móna (2017) Boora Bog Group Draft Rehabilitation Plan - A document to detail the rehabilitation and aspects of decommissioning of the Bord na Móna Allen Bog Group in compliance with Condition 10 of IPC Licence Ref. No. P0503-01.
- Bord na Móna (2017) Derrygreenagh Bog Group Draft Rehabilitation Plan - A document to detail the rehabilitation and aspects of decommissioning of the Bord na Móna Allen Bog Group in compliance with Condition 10 of IPC Licence Ref. No. P0503-01.
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
- Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523-544.
- DAFM (2017) Nitrates Explanatory Handbook for Good Agricultural Practice for the Protection of Waters Regulations 2018.
- DCCAE (2017) National Mitigation Plan. Department of Communications, Climate Action and Environment.
- DHCLG (2017) National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017–2022.
- DHCLG (2018) The River Basin Management Plan for Ireland 2018-2021. Department of Housing, Planning and Local Government.
- EirGrid (2012) Ecology Guidelines for Electricity Transmission Projects: A Standard Approach to Ecological Impact Assessment of High Voltage Transmission Projects.
- EPA (2002) EPA Guidelines on the Information to be Contained in Environmental Impact Statements (and revised draft guidelines 2017). Environmental Protection Agency.
- EPA (2003) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements'
- EPA (2015) Advice Notes for Preparing Environmental Impact Statements (Draft).

- EPA (2011) Inspector's Report: Application for a Waste Water Discharge Authorisation from Offaly Re: County Council, for the agglomeration named Shannonbridge, Reg. No. A0171-01.
- ESB (2001) ESB Shannonbridge New Peat Power Station Project - Environmental Impact Statement (EIS)
- ESBI/ASU (2018) West Offaly Power Thermal Discharge Synthesis Report. Jointly prepared by ESBI and Aquatic Services Unit, Cork.
- European Union (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.
- Forest Service (2000) Forest Biodiversity Guidelines. Department of Agriculture and Food.
- Forest Service (2000) Forestry and Water Quality Guidelines. Department of Agriculture and Food.
- Forest Service (2015) Forestry Programme 2014 – 2020. Submitted in accordance with European Union Guidelines on State aid for agriculture and forestry and in rural areas 2014 to 2020. Department of Agriculture, Food and the Marine.
- Forest Service (2015) Forestry Standards and Procedures Manual. Department of Agriculture, Food and the Marine.
- Forest Service (2017) Felling and Reforestation Policy. Department of Agriculture Food and the Marine.
- Fossitt, J. (2000) A Guide to Habitats in Ireland. Heritage Council, Kilkenny;
- IEEM (2006) Guidelines for Ecological Impact Assessment. Institute of Ecology and Environmental Management
- Kelly, F.L., Matson, R., Delanty, K., Connor, L., O'Briain, R., Gordon, P., Corcoran, W., McLoone, P., Connor, L., Coyne, J., Morrissey, E., Cierpal, D., Rocks, K., Buckley, S., Kelly, K., McWeeney, D. and Puttharee, D. (2017) Sampling Fish in Rivers 2016. National Research Survey Programme. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland
- Mott MacDonald (2016) Revised Natura Impact Statement (NIS) Edenderry Power Plant. Report on behalf of Bord na Mona.
- Mott MacDonald (2016) Revised Screening for Appropriate Assessment Edenderry Power Plant. Report on behalf of Bord na Mona.
- Mott MacDonald (2016) Terrestrial Ecological Baseline Evaluation - Bord na Móna Peat Fuel Supply Bogs. Report on behalf of Bord na Mona.
- Mullarney, K., Svensson, L, Zetterstorm, D. and Grant, P. J. (1999) The Collins Bird Guide. The most complete field guide to the birds of Britian and Europe. Collins, UK.
- NPWS (2008) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS (2012) Site Synopsis: Middle Shannon Callows SPA 004096. Department of Arts, Heritage and the Gaeltacht.
- NPWS (2013) Site Synopsis: River Shannon Callows SAC 000216. Department of Arts, Heritage and the Gaeltacht.

- NPWS (2018) Conservation objectives for Middle Shannon Callows SPA 004096. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.
- NPWS (2018) Conservation objectives for River Shannon Callows SAC 000216. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.
- NPWS (2013) The Status of Protected EU Habitats and Species in Ireland. Overview Volume 1. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht.
- NPWS (2015) National Peatlands Strategy. Department of Arts, Heritage and the Gaeltacht.
- NPWS (2017) National Biodiversity Plan 2017 – 2021. Department of Culture, Heritage and the Gaeltacht.
- NRA (2006) Environmental Assessment and Construction Guidelines.
- NRA (2006) Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes. National Roads Authority.
- NRA (2006) Guidelines for the Treatment of Bats during the Construction of National Roads Schemes. National Roads Authority.
- NRA (2006) Guidelines for the Treatment of Otters prior to the Construction of National Roads Schemes. National Roads Authority.
- NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority.
- NRA (2009) Environmental Impact Assessment of National Road Schemes – A Practical Guide.
- Offaly County Council (2014) Offaly County Development Plan 2014-2020.
- Preston, C. D., Pearman D.A. and Dines, T.D. (2002) New Atlas of British and Irish Flora. Oxford University Press.
- Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) Ireland Red List No. 4 – Butterflies. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.
- Smith, G. F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011) Habitat Survey Guidelines: A Standard Methodology for Habitat Survey and Mapping in Ireland. Heritage Council, Kilkenny.
- Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service.