

# **Curraghinalt Project County Tyrone**

Prepared for Dalradian Gold Limited

**Environmental Statement - Volume 3**

**C9 Ecological Mitigation and  
Management Plan**

November 2017

**DALRADIAN**  
**GOLD**

# CURRAGHINALT GOLD PROJECT, COUNTY TYRONE, NORTHERN IRELAND

**Ecological Mitigation and Management Plan**  
Prepared for: Dalradian Gold Development

**DALRADIAN**  
**GOLD**

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## 1.0 INTRODUCTION

### 1.1 Background

Dalradian Gold Limited (DGL) is proposing to develop and operate an underground gold mine as part of the Curraghinalt Project in County Tyrone.

SLR Consulting Ireland (SLR) was appointed by SRK Consulting (UK) Limited (SRK) on behalf of DGL to undertake an Ecological Impact Assessment (EcIA) to inform the wider Environmental Impact Assessment (EIA) process and production of an Environmental Statement (ES), as part of the planning submission for the proposed gold mine development as part of the Curraghinalt Project.

This document provides an Ecological Mitigation and Management Plan (EcMMP) that outlines the proposed measures to prevent, reduce or offset the predicted impacts on important ecological features from the proposed gold mine development as part of the Curraghinalt Project.

The EcMMP also provides information on the compensation measures proposed where it is deemed mitigation is not possible and where it is assessed that the gold mine development is likely to have a significant residual impact on any particular important ecological feature by mitigating the impacts reducing the severity of the impact.

This document should be read in conjunction with the EcIA that was carried out by SLR and the ES produced by SRK which provide an assessment of the ecological effects from the proposed gold mine development as part of the Curraghinalt Project.

### 1.2 Location and Setting

The Curraghinalt gold deposit is located in the South Sperrin Mountains approximately 7.5km east of the village of Gortin, and between the settlements of Rouskey and Greencastle, County Tyrone (Figure 1.1).

The application area has five component project sites (Figure 1.2) that include:

- i. **Proposed Infrastructure Site (Area A).** The site where the process plant and dry stack facility (DSF) will be located and includes the proposed access road of from the Crockanboy Road.
- ii. **Proposed Mineral Extraction Area (Area B).** The area where the mineral deposit is known to occur and the maximum extent of the underground mine workings.
- iii. **The Existing Surface Infrastructure Site (Area C).** The existing surface infrastructure that was developed for the underground exploration programme that will be retained for use as an early works base and for underground development and future training.
- iv. **Passing Bays on Camcosy Road and a Proposed Turning Point for Heavy Goods Vehicles off Lenagh Road (Area D).** The existing passing bays developed for the Curraghinalt Underground Exploration Programme and proposed turning point for heavy goods vehicles during the construction phase of the development.
- v. **Proposed Mineral Exploration Area (Area E).** The target area for future exploration of the Curraghinalt deposit by means of underground drifts (essentially exploration tunnels). All tunnels will be more than 100 m below the surface.

The surrounding landscape is dominated by the river valleys of the Owenkillew and Owenreagh Rivers that are separated by the broad ridge of Crocknamoghil that rises to a height of 335m above sea level. The valley slopes are deeply undulated and dissected by numerous tributary burns, typically with stoney substrates and lined with trees.

The river floodplains and the lower slopes of the valley comprise a patchwork of small fields predominantly under improved and semi-improved grassland and typically bounded by hedgerows. Scattered throughout the

lower slopes are a number of small copses and semi-natural broadleaved woodlands, the most notable being Drumlea and Mullan Woods, that are predominantly found on areas of glacial deposits forming mounds or terraces typically with rocky outcrops, poor substrates and/or drainage. Small blocks of coniferous plantation woodland are also present.

On the upper slopes, the fields gradually become less intensively managed pastures with remnant stone walls, earthbanks and gorse dominated hedgerows forming the field boundaries. Fields with poor drainage and low grazing are typically dominated by rushes. At about 200m, the upper slopes open out into open moorland that extends over the tops of the mountain ridges where blanket bog is the dominated habitat-type.

The villages of Gortin, Greencastle and Rouskey are the largest population centres in the local area, but numerous small farmsteads are distributed throughout the localised area along the roads that run along the northern and southern sides of the Owenkillew River, the Owenreagh River valley and along some of the small interconnecting tributary valleys leading up to peatland areas.

### 1.3 Overview of the Proposed Scheme

The Curraghinalt gold deposit comprises a high-grade gold mineralisation vein system. The Curraghinalt Project aims to extract these veins through the development of a proposed gold mine.

The proposed project has the following components:

- an underground mine containing a secure explosives store, fuelling and small service maintenance facilities, refuge stations and ancillary infrastructure, mine workings and associated exploration activities;
- a decline, a sloping shaft/tunnel that will be developed as the main access to the mineral deposit, extending from a portal at surface and near to the mineral process plant;
- an existing adit, a horizontal tunnel that provides access to the mineral deposit, originally developed for exploration of the deposit that will be retained to provide initial access for mine development and secondary/safety access to the mine workings in the operational phase;
- retention of existing surface developments around the existing adit and upgrade of water treatment facilities at this site;
- three ventilation raises that will be used to ventilate the mine workings, one of these exists having been developed as part of the underground exploration programme;
- a mineral processing plant including a crusher building, covered coarse ore stockpile and process plant building;
- a DSF for storage of dry stack tailings and waste rock that will contain some of the flotation tailings from the plant, after they have been dewatered (85 % of water removed) by means of a filtration process, and some waste rock from development of the mine workings;
- paste backfill placed in the mine workings, this cement bound material will be produced at a paste backfill plant underground and will provide support in the workings. It will be derived from tailings from the plant, specifically a portion of the tailings from the flotation process and all of the tailings from the cyanide leaching process, mixed with binders;
- ancillary infrastructure and services required to support the activities (administrative buildings, mobile maintenance shop, warehouse facilities, chemical and explosive stores, a mine dry, parking, site roads, water supply and water treatment);
- connections, to offsite infrastructure including the Northern Ireland road network and the electrical grid; and

- passing bays on the Camcosy Road developed for the underground exploration programme and to be retained for the proposed mine development.

Ecological impacts, in the absence of mitigation, on important ecological features will predominantly occur during the construction phase of the mine development and in the proposed infrastructure site for which mitigation and compensation measures will be necessary. However, long-term management of parts proposed infrastructure site and any compensation areas will be required throughout the lifetime of the operational phase of the mine development.

## 1.4 Purpose of the Ecological Mitigation and Management Plan

The EcMMP is principally intended to provide an agreement on the details of the proposed mitigation measures and management of important ecological features with the potential to be affected during the development of the gold mine and its operation as part of the Curraghinalt Project. This document aims to:

- provide outline method statements on the individual mitigation / compensation strategies to be implemented to prevent, reduce or offset predicted adverse effects on important ecological features identified in baseline studies, including habitats and protected and notable species occurring;
- outline the legal requirements for mitigation and compensation with respect to statutory protected species;
- detail compensation measures to make up for significant residual impacts identified for any particular important ecological feature to ensure any such measures provide similar ecological functions of those ecological features that will be lost through the gold mine development;
- provide a framework for the development of a long-term management plan, that should be conditioned as part of any planning consent, and setting of biodiversity management objectives and targets to enhance key areas within DGL's landholding and to integrate biodiversity management into the gold mining operations at Curraghinalt; and
- establish a programme for monitoring and review.

This EcMMP is intended to be a working document that deals with individual mitigation strategies proposed for each of the important ecological features identified as requiring appropriate measures to be implemented to minimise the potential effects from the gold mine development as part of the Curraghinalt Project and in order to comply with current wildlife legislation and in regards to relevant planning policies.

## 1.5 Implementation of the Plan

The EcMMP will be implemented by DGL with assistance and support from ecologists and other technical specialists where necessary.

DGL will retain overall control of the ecological mitigation / compensation strategies, but it is anticipated that an Ecological Clerk of Works (ECoW) will be appointed to implement the measures outlined in this document and provide appropriate guidance and support to DGL during the gold mine development and throughout its operational lifetime.

## 1.6 Important Ecological Features Requiring Mitigation and Compensation

The EclA, carried as part of the wider EIA for the proposed gold mine development, identified a number of important ecological features with the potential to be adversely affected at the site of the proposed above ground infrastructure.

This EcMMP provides specific mitigation strategies for the following important ecological features:

- habitats:
  - peatland habitats.
- species:
  - badger (*Meles meles*);
  - bats (all species)
  - breeding birds (all species);
  - common lizard (*Zootoca vivipara*);
  - smooth newt (*Lissotriton vulgaris*);
  - common frog (*Rana temporaria*); and
  - non-native invasive species.

The EcMMP is split into two main parts that details the mitigation, enhancement and compensation measures relating to the identified important ecological features, including timescales, locations, responsible parties for all elements of the measures proposed, monitoring programmes and a long-term management plan for key ecological features as following:

- Part I - Habitat Mitigation, Enhancement and Compensation; and
- Part II - Species Mitigation and Compensation.

## **PART I – HABITAT MITIGATION, ENHANCEMENT & COMPENSATION**

## 2.0 HABITAT MITIGATION, ENHANCEMENT & COMPENSATION OVERVIEW

### 2.1 Introduction

The gold mine development will result in the direct loss of existing habitats present within parts of the proposed infrastructure site (Area A). Figure 2.1 shows the extent of above ground development at the proposed infrastructure site. Table 2-1 provides a summary of predicted habitat loss and the level of ecological value of these habitats within the proposed infrastructure site and whether the habitats have been identified as important ecological features.

**Table 2-1: Predicted Habitat Loss at the Proposed Infrastructure Site**

Habitat Classification <sup>1</sup>	Extent of Existing Habitats	Predicted Habitat Loss	Level of Ecological Value	Specific Mitigation / Compensation Proposed
A1.1.1 Woodland - broadleaved – semi-natural	0.80 ha	-	Local (Higher)	No
A1.1.2 Woodland – broadleaved – plantation	0.23 ha	0.20 ha	Local (Lower)	No
A1.2.2 Woodland - coniferous – plantation	4.83 ha	3.92 ha	Local (Higher)	No
A1.3.2 Woodland - mixed – plantation	0.08 ha	0.08 ha	Local (Lower)	No
A2.1 Scrub – dense/continuous	0.78 ha	0.12 ha	Local (Lower)	No
B1.2 Acid grassland – semi-improved	8.02 ha	0.14 ha	Local (Lower)	No
B2.2 Neutral grassland – semi-improved	0.10 ha	0.08 ha	Local (Lower)	No
B4 Improved grassland	28.63 ha	20.88 ha	Local (Lower)	No
B5 Marsh/marshy grassland	37.30 ha	0.80 ha	Local (Higher)	Yes
		9.81 ha	Local (Lower)	No
B6 Poor semi-improved grassland	14.56 ha	6.00 ha	Local (Lower)	No
D6 Wet heath/acid grassland mosaic	2.86 ha	2.62 ha	County	Yes
E1.7 Bog – wet modified / E1.8 Bog – dry modified (blanket bog)	33.49 ha	9.05 ha	County	Yes
E1.7 Bog – wet modified / E1.8 Bog – dry modified (isolated remnant deep peat areas)			Local (Higher)	Yes
E1.7 Bog – wet modified / E1.8 Bog – dry modified (small isolated remnant deep peat areas)			Local (Lower)	Yes
E2.1 Flush spring - acid / neutral flush	0.26 ha	0.03 ha	Local (Higher)	No

<sup>1</sup> Nature Conservancy Council (1990). *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit, 2003 reprint*. JNCC, Peterborough.

Habitat Classification <sup>1</sup>	Extent of Existing Habitats	Predicted Habitat Loss	Level of Ecological Value	Specific Mitigation / Compensation Proposed
E3.1 Fen – valley mire	7.94 ha	7.94 ha	County	Yes
G1.4 Standing water – dystrophic	0.15 ha	0.15 ha	County	No (but covered under smooth newts)
G2 Running water (streams)	3332 m	975 m	Local (Higher)	No
G2 Running water (all other small watercourses and wet ditches)		735 m	Local (Lower)	No
J2.1.1 Boundaries – hedges – intact – species-rich	105m	-	Local (Higher)	No
J2.1.2 Boundaries – hedges – intact – species-poor	2340 m	878 m	Local (Lower)	No
J2.2.2 Boundaries – hedges – defunct – species-poor	1291 m	428 m	Local (Lower)	No
J2.3.2 Boundaries – hedges – with trees – species-poor	520 m	408 m	Local (Lower)	No
J2.5 Boundaries - wall	91 m	91 m	Local (Lower)	No
J2.6 Boundaries – dry ditch	10712 m	3578 m	Local (Lower)	No
J2.8 Boundaries – earth bank	4320 m	1045 m	Local (Lower)	No
J3.6 Built-up areas - buildings	0.17 ha	Pollan Rua Holiday cottage	Local (Higher)	No (but covered under bats)
J3.6 Built-up areas - buildings		All other buildings	Local (Lower)	No
J4 Bare ground	0.08 ha	0.08 ha	Local (Lower)	No

## 2.2 EcMMP Priority Habitats

The habitats which form the priorities for the EcMMP have been determined through consideration of the relative importance of the ecological features, i.e. habitats listed in Annex I of the EU Habitats Directive and/or Northern Ireland Priority Habitats.

Table 2-2 provides a summary of the EcMMP priority habitats which will be significantly affected by the proposed gold mine development and where mitigation, enhancement and/or compensation is deemed necessary to offset any potential residual impact as a direct result of the gold mine development.

**Table 2-2: EcMMP Priority Habitats and Corresponding Phase 1 Habitat Classifications**

EcMMP Priority Habitat	Phase 1 Habitat Classification
Peatland Habitats that includes: <ul style="list-style-type: none"> <li>• Annex I Habitats:                             <ul style="list-style-type: none"> <li>○ 4010 Northern Atlantic Wet Heaths with <i>Erica tetralix</i>;</li> <li>○ 7130 Blanket Bogs;</li> </ul> </li> <li>• Northern Ireland Priority Habitats:                             <ul style="list-style-type: none"> <li>○ Blanket Bog;</li> <li>○ Lowland Heathland;</li> <li>○ Purple Moor-grass and Rush Pastures;</li> <li>○ Upland Flushes, Fens and Swamps;</li> <li>○ Ponds.</li> </ul> </li> </ul>	B5 Marsh/marshy grassland (where present on peat or peat derived soils and with affinities to National Vegetation Classification (NVC) M23a <i>Juncus effusus/acutiflorus-Galium palustre</i> rush pasture <i>Juncus acutiflorus</i> sub-community and M25a <i>Molinia caerulea-Potentilla erecta</i> mire <i>Erica tetralix</i> sub-community); D6 Wet heath/acid grassland mosaic; E1.7 Bog – wet modified; E1.8 Bog – dry modified; E2.1 Flush spring – acid / neutral flush; E3.1 Fen – valley mire; G1.4 Standing water – dystrophic.

The predicted loss of habitats assessed as likely fulfilling the criteria and constitutes EU Habitats Directive Annex I Habitats and Northern Ireland Priority Habitats is detailed in Table 2-3.

**Table 2-3: EcMMP Priority Habitats and Corresponding Phase 1 Habitat Classifications**

Annex I Habitat		NI Priority Habitat	
Habitat	Area	Habitat	Area
4010 Northern Atlantic Wet Heaths with <i>Erica tetralix</i> ;	1.57 ha	Lowland Heathland	1.57 ha
7130 Blanket Bogs (priority) <sup>2</sup>	9.05 ha	Blanket Bog	9.05 ha
		Purple Moor-grass and Rush Pastures	5.25 ha
		Upland Flushes, Fens and Swamps	3.49 ha
		Ponds	0.15 ha

In terms of all other habitats with the potential to be affected by the gold mine development, in most cases habitat enhancement and creation will form part of the overall mitigation strategies for protected species and as such are not specifically covered in this section of the EcMMP, for example the loss of standing water in terms of smooth newt and the loss of the Pollan Rua Holiday cottage in terms of bats. However, any such habitat enhancement and creation will have benefits on the overall biodiversity impact of the gold mine development and to demonstrate no net loss of biodiversity and which is taken into account in the Biodiversity Impact Statement in Chapter 4.0.

Please note that the phased restoration of the site and any associated habitat creation as part of the mine closure is not covered in the EcMMP as these works are subject to a separate restoration plan.

Biodiversity gain has been calculated using a modified version of the Biodiversity Impact Assessment metric, as recommended by Department of Environment Food and Rural Affairs (DEFRA)<sup>3</sup>, to quantify the value of

<sup>2</sup> In this case all 7130 Blanket Bogs Annex I Habitats is considered as Priority with all peat in individual peat hydrological units assessed as being 'active'.

biodiversity at the site and to assess the level of residual biodiversity impact as used in determining the requirements of Biodiversity Offsetting to demonstrate no net loss of biodiversity. These calculations have excluded any phased restoration of the DSF during the operation of the mine and any final restoration of the site on cessation of mining operations due to the timescale that these are likely to be over.

The EcMMP does not take into consideration any agri-environmental schemes or associated payments which may be applicable to DGL as part of any future management of land within their landholding. Therefore the measures proposed are solely related to the development of the gold mine and not reliant on any future agri-environmental scheme.

It is proposed that once the principles of the proposed strategy and outline management actions have been agreed that a formal Draft Management Plan will be produced. The Draft Management Plan will be strategic working document that sets out over the lifetime of the gold mine site specific biodiversity management objectives and targets to enhance key areas within DGL's landholding and to integrate biodiversity management into the gold mining operations at Curraghinalt. It is envisaged that any Draft Management Plan will be based initially over a five-year period that will be formally reviewed at the end of this five year period, allowing additional or revised targets to be set as appropriate, for the subsequent five year period and so forth during the operational lifetime of the gold mine.

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<sup>3</sup> DEFRA (2012). *Biodiversity Offsetting Pilots – Technical Paper: The Metric for the Biodiversity Offsetting Pilot in England*. Department of Environment, Farming and Rural Affairs, London.

## 3.0 PEATLAND HABITATS

### 3.1 Introduction

Peatland habitats is a generic term used for a wide range of habitat-types on peat, or peat derived soils that in terms of the proposed infrastructure site includes all the habitat-types as listed in Table 2-2.

The gold mine development is predicted to result in the direct and indirect loss of 9.05 ha of bog communities, 7.94 ha of fen valley mire communities, 2.62 ha of wet heath / acid grassland communities and 6.20 ha of marsh / marshy grassland communities where present on peat, or peat derived soils, that includes 0.80 ha of species rich marsh / marshy grassland with affinities to NVC M23a *Juncus effusus/acutiflorus-Galium palustre* rush pasture *Juncus acutiflorus* sub-community.

This section should be read in conjunction with the Peat Management Plan produced as part of the overall EIA process and which outlines the methodologies for the excavation, storage and handling of peat during the construction works and its re-use where possible.

### 3.2 Strategy Summary Overview

Under Policy NH5 of Planning Policy Statement 2 (PPS2): Natural Heritage, planning permission will only be granted for a development proposal which is not likely to result in the unacceptable adverse impact on, or damage to known:

- priority habitats;
- priority species;
- active peatland;
- ancient and long-established woodland;
- features of earth science conservation importance;
- features of the landscape which are of major importance for wild flora and fauna;
- rare or threatened native species;
- wetlands (includes river corridors); or
- other natural heritage features worthy of protection.

A development proposal which is likely to result in an unacceptable adverse impact on, or damage to, habitats or features may only be permitted where the benefits of the proposed development outweigh the value of the habitat, species or feature. In such cases, appropriate mitigation and/or compensatory measures will be required.

The strategy for the identified peatland habitats has been developed taking into account the requirements of PPS2 and is based on four standard and accepted ecological principles:

- i. **Protection of retained peatland habitats.** Retained peatland habitats will be protected during the construction phase of the gold mine within the overall proposed infrastructure site (Area A).
- ii. **Habitat creation.** New peatland habitats will be created within parts of the proposed infrastructure site (Area A) through the re-use of peat overburden arising during the construction works.
- iii. **Restoration and enhancement of retained peatland habitats.** During the development and operation of the gold mine retained peatland habitats within the proposed infrastructure site (Area A) will be restored and enhanced.

- iv. **Compensation.** The management of land outside the proposed infrastructure site, but within the overall application, through the restoration / enhancement of existing peatland habitats that are largely comparable, and with the same ecological functionality, to the peatland habitats being lost, or permanently damaged where any residual impact cannot be avoided or mitigated.

In particular, the ecological strategy aims to demonstrate that through the initial management prescriptions, as presented in this EcMMP, and proposed development of a long-term management plan, conditioned through any planning consent, the compensatory measures proposed are sufficient to offset the loss of priority habitats and active peatland from the mine development as part of the Curraghinalt Project.

### 3.3 Rationale

Blanket bog and wet heath are listed under Annex I of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive), transposed into law in Northern Ireland by the Conservation (Natural Habitats, etc.) Regulations 1995 (as amended). Where blanket bog is 'active' it is a priority habitat under the Habitats Directive.

Blanket bog and wet heath are also listed as Northern Ireland Priority Habitats under the Northern Ireland Biodiversity Strategy (NIBS). In addition, the valley mire communities and species-rich marsh/marshy grassland communities identified as being important ecological features are also likely to qualify as Northern Ireland Priority Habitats.

Under the relevant Northern Ireland Habitat Action Plans the main aims for Priority Habitats are to:

- maintain the current extent and overall distribution of Priority Habitats;
- improve the condition of degraded Priority Habitats; and
- introduce management regimes to improve the condition of Priority Habitats.

In respect to blanket bog the Northern Ireland Habitat Action Plan promotes the restoration of blanket bog habitats that encompasses all types of active and inactive blanket bog.

The Northern Ireland Habitat Action Plan targets, for the relevant peatland habitats, have been taken into consideration as part of this EcMMP.

## 3.4 Protection and Restoration of Retained Peatland Habitats at the Proposed Infrastructure Site

### 3.4.1 Identification of Restoration and Management Units

Figure 3.1 shows the current extent of the peatland within the proposed infrastructure site. The areas of peatland habitat to be retained have been divided into a number of management units for the purpose of this plan as shown in Figure 3.2. A total of seven management units have been identified that include five areas of existing peatland habitat that will be retained within the proposed infrastructure site and two areas where it is proposed to re-use peat overburden for the creation of habitat.

**Table 3-1: Summary of Management Units**

Management Unit (MU)	Area (ha)	Broad Habitat-Types Present
MU1	18.34	Blanket bog
MU2	2.49	Mosaic of wet and dry modified bog, flush, conifer plantation, acid grassland, improved and semi-improved grasslands
MU3	9.27	Blanket bog, and wet heath / acid grassland mosaic
MU4	3.10	Acid and semi-improved grasslands
MU5	2.33	Mosaics of acid, marshy and semi-improved grasslands
MU6	1.56	Mire, wet heath and marshy grassland mosaic
MU7	0.37	Mire, rush pasture

An overview of the proposed initial management prescriptions for each of seven management units is presented in Figure 3.3 and which are discussed in more detail below for each of these individual units.

As far as practically possible each management unit has been based on the anticipated hydrological peat units following the gold mine development.

Objectives and management prescriptions for each of management units are provided below. Whilst the aim is to restore the peatland communities so that they become active, it is acknowledge that in practice this may not always be possible. Therefore specific objectives and management prescriptions relate primarily to processes rather than specific outcomes.

The general principles behind the restoration/enhancement of these areas, summarised below, have been taken from a number of sources, including PUBDG (2010)<sup>4</sup>, Lunt (2010)<sup>5</sup>, Holden (2009)<sup>6</sup> and TPCP (2008)<sup>7</sup>. The selection of precise locations within these areas to be subject to restoration will be determined post consent, based on a more detailed survey and consultation with specialist contractors. Outline details of proposed restoration measures for each area are described below.

The full results of the Phase 1 Habitat Survey and Phase 2 Vegetation Survey are provided in ES Technical Annex C to the EclA. However, a summary for each management unit is provided under each relevant section below.

### 3.4.2 Management Unit 1

#### Existing Site Conditions

##### Vegetation Communities

MU1 predominantly comprises blanket bog habitat underlain by peats of various depths ranging from <0.5 to 1.5 m. Although the peats in places are not of sufficient depths which fall under the criteria for blanket bog,

<sup>4</sup> PUBDG (2010) *Guidelines for Peatland Restoration*. Peatlands and Uplands Biodiversity Delivery Group, Biodiversity Northern Ireland.

<sup>5</sup> Lunt, P. et al (2010) *Peatland Restoration*. Commissioned by the IUCN Peatland programme's Commission of Inquiry on Peatlands.

<sup>6</sup> Holden, J. 2009. *A Grip Blocking Overview*. Report for the Environment Agency. Project 30254994.

<sup>7</sup> TPCP (2008) *The Peat Compendium Project - A compendium of UK peat restoration and management projects*, Appendices to SID5.

i.e. >0.5m, the dominant vegetation community across this management unit is M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire under the NVC classification system, but with M17 *Scirpus cespitosus-Eriophorum vaginatum* blanket mire also present on the eastern side of MU1.

Throughout MU1 there are a number of very small temporary shallow pools supporting M1 *Sphagnum auriculatum* bog pool communities and some runnels and other drainage channels that typically support M2 *Sphagnum cuspidatum/recurvum* bog pool communities.

Although other vegetation communities which are not typical of natural blanket bog are present, including: M15 *Scirpus cespitosus-Erica tetralix* wet heath; M23 *Juncus effusus/acutiflorus-Galium palustre* rush pasture; and U2 *Deschampsia flexuosa* grassland, these are either characteristic in Northern Ireland of blanket bog which has been subject varying degrees of disturbance, or are considered to cover a small enough area that they form part of the overall blanket bog community. Given that the transition between these communities are not clearly defined it is considered that the habitat can be termed as being 'blanket bog' based on the Northern Ireland Environment Agency's (NIEA) interpretation of blanket bog formed from a mosaic of habitats within any given hydrological peat unit.

### Management Unit 1 Condition

The blanket bog within MU1 is largely degraded. It would appear that the whole of MU1 has been historically cutover that has removed in the region of 1 m of peat, as evident by the level of peat adjacent the northern boundary of the site and by small remnant areas of elevated peat with vertical banks. Further degradation of the peatland habitats have occurred through drainage and over-grazing by livestock.

As a hydrological peat unit, it is assessed that the peat in MU1 is largely 'active' based on internal guidance produced by NIEA<sup>8</sup> for assessing peatlands in relation to Planning Policy Statement 18: Renewable Energy (PPS18).

It is assessed that overall the condition of the blanket bog habitat in MU1 is moderate, based on the criteria in the Farm Environmental Plan (FEP) Manual<sup>9</sup>, for which the pilot scheme developed by the Department of Environment Food and Rural Affairs (DEFRA) and which has been used in the Biodiversity Impact Assessment at Chapter 5.

### Management Aims

The principle management aim for MU1 is to:

- restore up to 18.34 ha of retained blanket bog habitat.

### Management Prescriptions

Table 3-2 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU1 over the lifetime of the gold mine development.

<sup>8</sup> NIEA, Natural Heritage, Development Management Team Advice Note Active Peatland and PPS18 dated 21<sup>st</sup> November 2012.

<sup>9</sup> Natural England (2010). *Higher Level Stewardship Farm Environmental Plan (FEP) Manual – Technical Guidance on the Completion of the FEP and Identification, Condition Assessment and Recording of HLS FEP Features*. 3<sup>rd</sup> Edition. Natural England, Peterborough.

**Table 3-2: Management Prescriptions for MU1**

Objective	Management Prescriptions	Provisional Timings of Works
<p>MU1.1 Drain blocking to re-wet the peat</p>	<p>Four main drainage channels currently flow through MU1. It is proposed that all of these drains are blocked at key points along their lengths. This will allow water to be held back and the localised water table elevated providing a mechanism to reduce the rate of drying out of adjacent peats during periods of low rainfall. This should attest the grassland and rush development that has occurred and continues to occur along these features.</p> <p>As all the drains are shallow and on shallow slopes with low flows of water it is proposed to use consolidated and highly humified peat, arising from the stripping of peat within development footprint, that will be placed in situ by a low pressure tracked excavator to create peat dams as part of the blocking of these drains. The constructed peat dams will be sufficiently compacted and topped with vegetated turf, sourced from blanket bog habitat within the development footprint in close proximity to MU1.</p> <p>A detailed method statement will be prepared by the appointed contractor and approved by the ECoW prior to commencing works.</p>	<p>Summer of Year 1</p>
<p>MU1.2 Blocking of other preferential water shedding features</p>	<p>Other preferential drainage pathways within MU1 are created from two access tracks that have been historically stripped of peat. As these will be made redundant by the development of mine it is proposed that peat overburden excavated from the blanket bog area downslope of MU1 within the development footprint is used to infill these areas up to the height of the existing adjacent ground levels.</p> <p>Where the depth of material will exceed 1 m, humified catotelm will be used and will be compacted using an excavator over which turves, sourced from blanket bog habitat within the development footprint to the south will be placed on top so that there is no bare peat left exposed.</p> <p>Where the deemed necessary, due to the gradient of the existing tracks, berms will be constructed from other sub-soil materials (i.e. non-peat) across the road which will allow the containment of peat to prevent and minimise the risk of peat landslide.</p> <p>A detailed method statement will be prepared by the appointed contractor and approved by the ECoW prior to commencing works.</p>	<p>Summer of Year 1</p>
<p>MU1.3 Grazing control</p>	<p>Grazing is assessed as having a significant detrimental effect on the blanket bog in MU1. It is proposed therefore that, at the onset of construction works, there is a cessation of grazing in MU1 and this will continue for a period of up to five years. This will allow time for some natural recovery of the blanket bog habitat.</p> <p>Adequate stock proof fencing will need to be maintained and secured at all times.</p>	<p>Spring of Year 1</p>

## Monitoring and Surveillance

Table 3-3 provides a summary of the proposed monitoring and surveillance to be carried out in MU1. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-3: Proposed Monitoring and Surveillance at MU1**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	<p>Given the likely timescale to the onset of any construction works associated with the gold mine development, MU1 will be re-surveyed and the vegetation communities mapped based on the NVC classification system.</p> <p>A series of fixed point quadrats (2 m x 2 m) and photography locations will be established to monitor any changes in vegetation and condition of the blanket bog habitat.</p> <p>A fixed transect will be established along the line of and offset from the security fence monitor any changes in vegetation and condition of the blanket bog habitat which may be subject to edge effects from the development. This will be used to inform any future management actions to prevent any edge effects to the areas of retained blanket bog in this unit.</p>	Prior to the onset of construction works
Vegetation monitoring	<p>Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time.</p> <p>A condition assessment will be made based on the guidance for Common Standards Monitoring (CSM) for upland habitats<sup>10</sup> (or where updated), that includes blanket bog, and will allow the future measurement of any set performance indicators.</p>	Annually
Integrity of any peat dams	Visual inspection and repairs will be made or dams replaced where necessary.	Annually
Monitoring of water levels	<p>Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers (divers), but also along the diversion berm leading to the freshwater pond to measure the rate of water loss from the blanket bog following any rainfall event.</p> <p>A rain gauge will be installed as part of weather station at the site of the proposed gold mine infrastructure.</p>	Permanently and at regular intervals with data collected every three to four months.

<sup>10</sup> JNCC (2009). *Common Standards Monitoring Guidance for Upland Habitats*. Joint Nature Conservation Committee, Peterborough.

### 3.4.3 Management Unit 2

#### Existing Site Conditions

##### Vegetation Communities

MU2 comprises small remnant peatland areas (peat depths of <0.5 to 2 m) comprising of wet and dry modified bog supporting M15 wet heath and M19 blanket mire communities respectively, an area historically cutover supporting a M6 *Carex echinata-Sphagnum recurvum/auriculatum* mire community, U4 – *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland and some coniferous plantation woodland on peat. Within the areas of wet modified bog M1 bog pool communities are present in some pools and runnels.

The other main vegetation community present within agricultural fields is MG6 *Lolium perenne-Cynosurus cristatus* grassland but which has some affinities to calcifugous grassland due to the underlying peat derived soils.

##### Management Unit 2 Condition

The peatland areas within MU2 are largely degraded having been cutover. Where the original peat has been left in-situ these areas now support dry modified bog that has lost connectivity with the surrounding land and resulting in the drying out of the peat or which have been in places have been planted with conifers.

As a hydrological unit, it is assessed that the peat in MU2 is largely ‘active’ where wet modified bog and flush vegetation is present but ‘inactive’ in other peatland habitat areas.

It is assessed that overall the peatland habitats in MU2 are of moderate condition, whilst the semi-improved grassland is assessed as being of poor condition, based on the criteria in the FEP Manual.

#### Management Aims

The principle management aim for MU2 is to:

- create 1.43 ha of peatland habitat through the importation and re-use of peat stripped from the area where the freshwater pond will be constructed; and
- restore 0.68 ha of retained blanket bog.

#### Management Prescriptions

Table 3-4 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU2 over the lifetime of the gold mine development.

**Table 3-4: Management Prescriptions for MU2**

Objective	Management Prescriptions	Provisional Timings of Works
MU2.1 Creation of 1.43 ha peatland habitat through the re-use of excavated peat overburden	<p>It is proposed that peat overburden excavated during the construction of the freshwater pond (Phase 3 construction works) to the east of MU2 is re-used to create peatland habitat over areas of improved / semi-improved grasslands and which will form an extension to existing peatland habitats in MU2.</p> <p>An engineered bunded cell will be designed and constructed to ensure the stability of peat to be contained within this area, and in accordance with any waste management requirements to hold a depth of peat of up 1.5 m of peat.</p> <p>Internal partitions using sub-soil materials at a lower level than the external containment bund will be considered where</p>	Year 1

Objective	Management Prescriptions	Provisional Timings of Works
	<p>necessary for stability purposes. These where constructed will be no greater than 0.5 m in height. When overlaid with peat this will give the maximum possible extent of surface for the creation of peatland habitat within the cell.</p> <p>The internal partitions will be created either by stripping existing shallow soils within the existing fields in MU2, or by the importation of material excavated as part of the construction works associated with the gold mine infrastructure.</p> <p>Drainage will be provided by a number of below ground pipes that will pass under the external containment bund which will allow drainage of water at a controlled rate towards the freshwater pond.</p> <p>An existing track leading to the site of the cell will be modified as part of construction activities to all access for the transportation of peat.</p> <p>At the freshwater pond, suitable turves for translocation will be cut and stored, in an appropriate manner to ensure their integrity and prevent drying out. Any turves containing soft rush (<i>Juncus effusus</i>) will not be used for habitat creation.</p> <p>Once sufficient turves have been cut and stored, the underlying peats will be stripped for use in the for habitat creation.</p> <p>A layer of humified catotelm peat will be used to fill the cells to the required depth and will be compacted using an excavator bucket and tied-in with the existing peatland habitats to the north and east of these works.</p> <p>The catotelm peat will then be overlaid by the turves sourced and cut from the site of the freshwater pond.</p> <p>A detailed method statement will be prepared by the appointed contractor and approved by the ECoW prior to commencing works.</p>	
<p>MU2.2 Re-profiling of banks created through historical cutover of the peats</p>	<p>Vertical banks left from historical cutting of peat will be modified using a low pressure tracked excavator to scrape back peat from the bank into the lower lying cutover areas to create gentle sloping edges and less uniform straight lines to allow the development of vegetation and reduce the current edge effects and drying out of the peats.</p> <p>A detailed method statement will be provided within any draft Management Plan.</p>	<p>Year 1</p>
<p>MU2.3 Removal of conifer trees</p>	<p>The small line of conifers along the northern boundary of MU2 along the edge of blanket bog habitat will be removed with all arisings removed from site prior to any works required under Objective MU2.1.</p> <p>There are no current plans to remove the belt of conifer plantation woodland running through MU2 along the edge of the peatland habitats that will be retained for landscape purposes.</p>	<p>Year 1</p>

## Monitoring and Surveillance

Table 3-5 provides a summary of the proposed monitoring and surveillance to be carried out in MU2. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-5: Proposed Monitoring and Surveillance at MU2**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	Given the likely timescale to the onset of any construction works associated with the gold mine development, the peatland areas in MU2 will be re-surveyed and the vegetation communities mapped based on the NVC classification system. A series of fixed point quadrats (2 m x 2m) and photography locations will be established to monitor any changes in vegetation and condition of the existing blanket bog habitat in MU2. At the site of the freshwater pond, suitable areas will be identified and marked out where donor turves will be cut for translocation to the peatland creation area.	Prior to the onset of construction works
Vegetation monitoring	Following the completion of the habitat creation works a series of fixed point quadrats (2 m x 2 m) and photography locations will be established within the engineered bunded cell to monitor the development and changes of vegetation over time. At each fixed point quadrat established at the existing peatland habitats the vegetation will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time.	Annually
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently and at regular intervals with data collected downloaded every three to four months.

### 3.4.1 Management Unit 3

#### Existing Site Conditions

##### Vegetation Communities

MU3 comprises a mosaic of peatland habitats (peat depths varying from <0.5 m to 2 m). The eastern half of the management unit is dominated by wet modified bog comprising M19 blanket mire but with some wet heath / acid grassland mosaic (M15 wet heath / U2 grassland) in places and a band of M23 rush pasture that extends along its southern boundary. The western half of the management unit is dominated by acid grassland comprising U2 grassland, U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland and U6 *Juncus squarrosus-Festuca ovina* grassland communities but with some patches of M17 blanket mire also present.

##### Management Unit 3 Condition

The peatland within MU3 is heavily degraded. Similar to MU1, this area would appear to have been historically cutover and the majority of its peat removed. Further degradation of the peatland habitats have occurred through drainage and over-grazing by livestock.

As a hydrological unit, it is assessed that the peat in MU3 is largely '*inactive but capable of regeneration*'.

It is assessed that overall the peatland habitats in MU3 are of poor condition, based on the criteria in the FEP Manual.

### Management Aims

The principle management aims for MU3 are to:

- restore up to 4.52 ha of retained blanket bog habitat; and
- restore up to 3.96 ha of acid grassland and wet heath / acid grassland mosaic to wet heath.

### Management Prescriptions

Table 3-6 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU3 over the lifetime of the gold mine development.

**Table 3-6: Management Prescriptions for MU3**

Objective	Management Prescriptions	Provisional Timings of Works
<p>MU3.1 Drain blocking to re-wet the peat</p>	<p>It is proposed that the main drain flowing along the southern boundary of MU3 and other smaller drains flowing through MU3 are blocked at key points along their lengths. This will allow water to be held back and the localised water table is elevated providing a mechanism to reduce the rate of drying out of adjacent peats during periods of low rainfall. This should attest the grassland and rush development that has occurred and continues to occur along the main drain and rewet area of acid grassland in the west of the management unit to aid the restoration of wet heath.</p> <p>Given the depth of the main drain along the southern boundary of the site consideration will be made to backfill this drain using peats scraped from the adjacent north bank supporting marshy grassland habitat following the removal of any temporary access required for the peatland habitat creation in MU4 and MU5. Consideration will be made overlay peat overburden from other parts of the development footprint to assist in the rehabilitation of any disturbed areas.</p> <p>As all the other internal drains are shallow and on shallow slopes with low flows of water it is proposed to use consolidated and highly humified peat, arising from the stripping of peat within development footprint, that will be placed in situ by a low pressure tracked excavator to create peat dams as part of the blocking of these drains. The constructed peat dams will be sufficiently compacted and topped with vegetated turf, sourced from blanket bog habitat within the development footprint in close proximity to MU3.</p> <p>A detailed method statement will be prepared by the appointed contractor and approved by the ECoW prior to commencing works.</p>	<p>Summer of Year 1</p>

Objective	Management Prescriptions	Provisional Timings of Works
M3.2 Grazing control	<p>Grazing is assessed as having a significant detrimental effect on the peatland habitats in MU3. It is proposed therefore that, at the onset of construction works, there is a cessation of grazing in MU3 and this will continue for a period of up to five years. This will allow time for some natural recovery of the peatland habitats.</p> <p>Adequate stock proof fencing will need to be maintained and secured at all times.</p>	Spring of Year 1

### Monitoring and Surveillance

Table 3-7 provides a summary of the proposed monitoring and surveillance to be carried out in MU3. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-7: Proposed Monitoring and Surveillance at MU3**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	<p>Given the likely timescale to the onset of any construction works associated with the gold mine development MU3 will be re-surveyed and the vegetation communities mapped based on the NVC classification system.</p> <p>A series of fixed point quadrats (2 m x 2 m) and photography locations will be established to monitor any changes in vegetation and condition of the peatland habitats in this unit.</p>	Prior to the onset of construction works
Vegetation monitoring	<p>Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time.</p> <p>A condition assessment will be made based on the CSM guidance upland habitats (or where updated) that includes blanket bog and which will allow future measurement of any set performance indicators.</p>	Annually
Integrity of any peat dams	Visual inspection and repairs will be made or dams replaced where necessary.	Annually
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently and at regular intervals with data collected every three to four months.

### 3.4.1 Management Unit 4

#### Existing Site Conditions

##### Vegetation Communities

MU4 currently comprises U4 and MG6 grassland communities on shallow soils to the west of an un-named tributary of the Owenreagh River. Some peat up to 1 m in depth supporting M23 and M6 mire communities is located along the eastern boundary of the management unit.

##### Management Unit 4 Condition

The peat where present is largely ‘inactive’ except in the location of the M6 mire.

It is assessed that the semi-improved grasslands are assessed as being of poor condition, based on the criteria in the FEP Manual.

#### Management Aims

The principle management aim for MU4 is to:

- create up to 2.99 ha of peatland habitat through the importation and re-use of peat stripped from peatland areas within the development footprint.

#### Management Prescriptions

Table 3-8 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU4 over the lifetime of the gold mine development.

**Table 3-8: Management Prescriptions for MU4**

Objective	Management Prescriptions	Provisional Timings of Works
MU4.1 Creation of 2.99 ha peatland habitat through the re-use of excavated peat overburden	<p>It is proposed that peat overburden excavated during the Phase 2 construction works associated with the portal and associated access road and other construction activities within the valley mire area is re-used to create peatland habitat over areas of semi-improved grassland and marshy grassland. Any turves translocated will only be used where these are considered to be similar in species composition to the areas of blanket bog to the north east of this management unit.</p> <p>An engineered bunded cell, or cells, will be designed and constructed to ensure the stability of peat to be contained within this area, and in accordance with any waste management requirements to hold a depth of peat of up to 1.5 m of peat.</p> <p>Internal partitions using sub-soil materials at a lower level than the external containment bund will be considered where necessary for stability purposes. These where constructed will be no greater than 0.5 m in height. When overlaid with peat this will give the maximum possible extent of surface for the creation of peatland habitat within the cell, or cells.</p> <p>The internal partitions will be created either by stripping existing shallow soils within the existing fields in MU4, or by the importation of material excavated as part of the construction works associated with the gold mine infrastructure.</p>	Year 1

Objective	Management Prescriptions	Provisional Timings of Works
	<p>It may be necessary to strip vegetation and soils in areas where soft rush is dominant and all arisings moved from the management unit to minimise the risk that this species will re-colonise and become dominant in the newly created habitat.</p> <p>Drainage will be provided by a number of below ground pipes that will pass under the external containment bund and into and existing drain running along the southern boundary of MU4 and in parallel to the access lane before flowing beneath this feature to the drainage system serving the fields to the south.</p> <p>A minimum stand-off distance of 30 m will be maintained between the un-named tributary stream of the Owenreagh River and any works associated with the construction of any containment bunds and the depositing of peat in the constructed cells.</p> <p>Temporary access will be constructed along the southern boundary of MU3 to allow the transportation to and the deposition of peats to the engineered cell. Any temporary access is likely to be constructed from a geotextile membrane overlaid with hard-core material. On completion of works the temporary access will be removed.</p> <p>At any identified donor sites, suitable turves for translocation will be cut and stored, in an appropriate manner to ensure their integrity and prevent drying out. Any turves containing soft rush (<i>Juncus effusus</i>) will not be used for habitat creation.</p> <p>Once sufficient turves have been cut and stored, the underlying peats will be stripped for use in the for habitat creation.</p> <p>A layer of humified catotelm peat sourced from the valley mire will be used to fill the cells to the required depth and which will be compacted using an excavator bucket and tied-in with the existing landform the to the north west and east of the management unit. The catotelm peat will then be overlaid by turves.</p> <p>A detailed method statement will be prepared by the appointed contractor and approved by the ECoW prior to commencing works.</p>	

**Monitoring and Surveillance**

Table 3-9 provides a summary of the proposed monitoring and surveillance to be carried out in MU4. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-9: Proposed Monitoring and Surveillance at MU4**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	Donor areas will be identified and marked out from within the development footprint where suitable turves will be cut for translocation to the peatland creation area.	Prior to the onset of construction works
Vegetation monitoring	Following the completion of the habitat creation works a series of fixed point quadrats (2 m x 2 m) and photography locations will be established to monitor the development and changes of vegetation.  At each fixed point quadrat established at the existing peatland habitats will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time.	Annually
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently and at regular intervals with data collected every three to four months.

### 3.4.1 Management Unit 5

#### Existing Site Conditions

##### Vegetation Communities

MU5 currently comprises a mosaic of grassland (U4 and MG6) and mire communities including M23 mire and M25 *Molinia caerulea-Potentilla erecta* mire the later of which has developed in furrows extending in a downhill direction in peat (<0.5 m in depth) that appear to have been excavated in an attempt to improve drainage.

##### Management Unit 5 Condition

The peat where present is largely ‘inactive’ but there is often an abundance of Sphagnum in the furrows that are typically devoid of peat.

It is assessed that the mire habitats on peat and the semi-improved grasslands are assessed as being of poor condition, based on the criteria in the FEP Manual.

#### Management Aims

The principle management aim for MU5 is to:

- create up to 2.43 ha of peatland habitat through the importation and re-use of peat stripped from peatland areas within the development footprint.

#### Management Prescriptions

Table 3-10 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU5 over the lifetime of the gold mine development.

**Table 3-10: Management Prescriptions for MU5**

Objective	Management Prescriptions	Provisional Timings of Works
<p>MU5.1 Creation of 2.43 ha peatland habitat through the re-use of excavated peat overburden</p>	<p>It is proposed that peat overburden excavated during the construction works associated with the portal and associated access road and other construction activities within the valley mire area (Phase 1 construction works) is re-used to create peatland habitat over areas semi-improved grassland. Any turves translocated will only be used where these are considered to be similar in species composition to the areas of blanket bog to the north east of this management unit.</p> <p>An engineered bunded cell, or cells, will be designed and constructed to ensure the stability of peat to be contained within this area, and in accordance with any waste management requirements to hold a depth of peat of up 1.5 m of peat.</p> <p>Internal partitions using sub-soil materials at a lower level than the external containment bund will be considered where necessary for stability purposes. These where constructed will be no greater than 0.5 m in height. When overlaid with peat this will give the maximum possible extent of surface for the creation of peatland habitat within the cell, or cells.</p> <p>The internal partitions will be created either by stripping existing shallow soils within the existing fields in MU5, or by the importation of material excavated as part of the construction works associated with the gold mine infrastructure.</p> <p>It may be necessary to strip vegetation and soils in areas where soft rush is dominant and all arisings moved from the management unit to minimise the risk that this species will re-colonise and become dominant in the newly created habitat.</p> <p>Drainage will be provided by a number of below ground pipes that will pass under the external containment bund in the eastern half of the management unit and into an existing drain running along the part of the southern boundary of MU5 and in parallel to the access lane before flowing beneath this feature to the drainage system serving the fields to the south.</p> <p>Drainage to the western half will be provided by below ground pipes passing through the internal bunds directly flows to the cells in the eastern half of the management unit.</p> <p>A minimum stand-off distance of 30 m will be maintained between the un-named tributary stream of the Owenreagh River and any works associated with the construction of any containment bunds and the depositing of peat in the constructed cells.</p> <p>Temporary access will be constructed along the southern boundary of MU3 and across the land drain to allow the transportation to and the deposition of peats at the engineered cell. Any temporary access is likely to be constructed from a geotextile membrane overlaid with hard-core material. On completion of works the temporary access will be removed.</p>	<p>Year 1</p>

Objective	Management Prescriptions	Provisional Timings of Works
	<p>At any identified donor sites, suitable turves for translocation will be cut and stored, in an appropriate manner to ensure their integrity and prevent drying out. Any turves containing soft rush (<i>Juncus effusus</i>) will not be used for habitat creation.</p> <p>Once sufficient turves have been cut and stored, the underlying peats will be stripped for use in the for habitat creation.</p> <p>A layer of humified catotelm peat sourced from the valley mire will be used to fill the cells to the required depth and which will be compacted using an excavator bucket and tied-in with the existing landform the to the north west and east of the management unit. The catotelm peat will then be overlaid by turves.</p> <p>A detailed method statement will be prepared by the appointed contractor and approved by the ECoW prior to commencing works.</p>	

### Monitoring and Surveillance

Table 3-11 provides a summary of the proposed monitoring and surveillance to be carried out in MU5. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-11: Proposed Monitoring and Surveillance at MU5**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	Donor areas will be identified and marked out from within the development footprint where suitable turves will be cut for translocation to the peatland creation area.	Prior to the onset of construction works
Vegetation monitoring	<p>Following the completion of the habitat creation works a series of fixed point quadrats (2 m x 2m) and photography locations will be established to monitor the development and changes of vegetation.</p> <p>At each fixed point quadrat established at the existing peatland habitats will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time.</p>	Annually
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently and at regular intervals with data collected downloaded every three to four months.

### 3.4.1 Management Unit 6

#### Existing Site Conditions

##### Vegetation Communities

MU6 comprises a mosaic of peatland habitats (peat depths varying from <0.5 m to 1.5 m). The northern half of the management unit is dominated by mire habitats on deeper peats comprising M25 mire and M15 wet heath drained by a number of ditches cut into the peat. The southern half of the management unit is largely dominated by M23 mire but also supports a small but distinctive area of M15 wet heath centrally located in this area.

##### Management Unit 6 Condition

The peatland areas within MU6 are largely degraded through drainage and from selective grazing by livestock. Evidence of encroachment by bramble (*Rubus fruticosus* agg.) across part of the northern half of the management unit will indicate excessive drying-out of the peats due primarily to the drainage ditches that cross this part of the site.

As a hydrological unit, it is assessed that the peat in MU6 is largely ‘inactive but capable of regeneration’ with the exception of the M15 wet heath located in the southern half of the management unit that is assessed as being ‘active’.

It is assessed that overall the peatland habitats in MU6 are of poor to moderate condition, based on the criteria in the FEP Manual.

#### Management Aims

The principle management aims for MU6 are to:

- enhance up to 1.4 ha of retained mire habitats through appropriate management actions to improve the overall condition of the peatland habitats in this management unit.

#### Management Prescriptions

Table 3-12 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU6 over the lifetime of the gold mine development.

**Table 3-12: Management Prescriptions for MU6**

Objective	Management Prescriptions	Provisional Timings of Works
MU6.1 Feasibility study into re-wetting of peat	An investigation will be undertaken to identify the source of water flowing through the drains in the northern part of MU6 to assess the feasibility of drain blocking or other options, i.e. piping of the drain, to allow for the potential re-wetting of the peat without compromising the access road into the infrastructure site.	Summer Year 1
MU6.2 Scrub control	Patches of scrub will be removed by hand with all arisings removed from site and appropriately disposed, i.e. chipped or burnt. Where deemed appropriate any stumps will be treated with an appropriate herbicide to prevent regrowth.	Autumn Year 1

Objective	Management Prescriptions	Provisional Timings of Works
M6.3 Grazing control	<p>Selective grazing is currently assessed as having a significant detrimental effect on the peatland habitats in MU6. It is proposed that cattle are allowed to graze this area based on a level of 0.25 livestock units (LU) per hectare, i.e. 2.5 cattle per ha based on wet heath habitat<sup>11</sup> between June and August. Cattle will be less selective than sheep which currently graze this area. The installation of stock proof fencing around any areas deemed sensitive to trampling, i.e. the M15 wet heath located in the central part of the site, will allow for these areas to be protected.</p> <p>In the event that agreement with a grazier is not forthcoming, consideration will be made to do some cutting / strimming of areas by hand with all arisings removed and disposed in an appropriate manner.</p> <p>Adequate stock proof fencing will need to be maintained and secured at all times.</p>	Summer Year 1

### Monitoring and Surveillance

Table 3-13 provides a summary of the proposed monitoring and surveillance to be carried out in MU6. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-13: Proposed Monitoring and Surveillance at MU6**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	<p>Given the likely timescale to the onset of any construction works associated with the gold mine development MU6 will be re-surveyed and the vegetation communities mapped based on the NVC classification system.</p> <p>A series of fixed point quadrats (2 m x 2m) and photography locations will be established to monitor any changes in vegetation and condition of the peatland habitats.</p>	Prior to the onset of construction works
Vegetation monitoring	Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time in response to any alteration to the grazing regime or hand cutting / strimming operations.	Annually
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently and at regular intervals with data collected downloaded every three to four months.

<sup>11</sup> DARD (undated). *Heather Moorland. Countryside Management Publications*. Department of Agriculture and Rural Development Northern Ireland.

### 3.4.1 Management Unit 7

#### Existing Site Conditions

##### Vegetation Communities

MU7 comprises a small field supporting a species-rich M23 mire community notable by an abundance of devil’s-bit-scabious (*Succisa pratensis*) in the sward overlying peat. MU7 is dissected by a small ditch.

##### Management Unit 6 Condition

M23 mire habitat in MU7 does not appear to be adversely affected by grazing or from the drainage ditch that runs along part of the north western and the entire north eastern boundaries of the site.

As a hydrological unit, it is assessed that the peat in MU7 is largely ‘inactive but capable of regeneration’.

It is assessed that overall the peatland habitat in MU7 is of good condition, based on the criteria in the FEP Manual.

#### Management Aims

The principle management aims for MU7 are to:

- manage 0.37 ha of mire habitats to maintain the diversity of plant species and the extent of devil’s-bit scabious with the potential to support a colony of marsh fritillary butterfly (*Euphydryas aurina*).

#### Management Prescriptions

Table 3-14 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for MU7 over the lifetime of the gold mine development.

**Table 3-14: Management Prescriptions for MU7**

Objective	Management Prescriptions	Provisional Timings of Works
M7.1 Grazing control	It is proposed to maintain the current grazing regime at this site using a mixture of sheep and cattle and in agreement with the current grazier.  Adequate stock proof fencing will need to be installed along the route of the access road of the Crockanboy Road. All other stock fencing will need to be maintained and secured at all times.	Summer Year 1
M7.2 Extension of MU7	Investigate the possible inclusion of adjacent habitat areas to the northwest and which can be actively managed and improve the environmental conditions at this site and which will facilitate the spread of devil’s-bit scabious.	Summer Year 1

#### Monitoring and Surveillance

Table 3-15 provides a summary of the proposed monitoring and surveillance to be carried out in MU7. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-15: Proposed Monitoring and Surveillance at MU7**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	Given the likely timescale to the onset of any construction works associated with the gold mine development MU1 will be re-surveyed and the vegetation communities mapped based on the NVC classification system. A series of fixed point quadrats (2 m x 2m) and photography locations will be established to monitor any changes in vegetation and condition of the peatland habitats.	Prior to the onset of construction works
Vegetation monitoring	Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes.	Annually
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently and at regular intervals with data collected every three to four months.
Surveillance for marsh fritillary butterfly	Monitoring of the field for any butterflies in flight in summer and larval webs in autumn.	Annually starting in Autumn 2017.

### 3.5 Proposed Compensation for the Loss of Peatland Habitats

#### 3.5.1 Areas Identified and Available for Compensation

DGL has secured an additional three parcels of land within the overall application site to provide compensation for the loss of peatland habitats within the proposed infrastructure site (Area A). These compensation areas cover an area of 52.73 ha. Figure 3.4 shows the location of the three compensation areas in relation to the proposed infrastructure site.

Table 3-16 provides a summary of the compensation areas as they stand at this current time. Please note that the references given to each compensation area may change as part of any formulation of a draft Management Plan

**Table 3-16: Summary of Compensation Areas**

Compensation Area (CA)	Area (ha)	Broad Habitat-Types Present
CA1	32.45	Blanket bog, wet heath / acid grassland mosaic, acid grassland and marshy grassland
CA2	14.59	Blanket bog and wet heath / acid grassland mosaic
CA3	5.69	Blanket bog, wet heath / acid grassland mosaic and marshy grassland

Figure 3.5 shows the areas and depths of peat within the compensation areas.

The compensation areas did not form part of the detailed survey work carried out to inform the EclA but were subject to a walkover survey by SLR on 11<sup>th</sup> May 2017. During this survey a number of quadrats (2 m x 2 m) were taken in homogenous stands vegetation to provide an indication of the vegetation communities present

and to inform the potential opportunities for management for the restoration of peatland habitats within each of these compartment areas. A summary of the quadrat data is provided at Appendix 01.

It is recognised that further detailed survey and investigations will be required to be undertaken and which has been taken into account as part of the proposed monitoring and surveillance detailed for each of the compensation areas. It is also likely that following any further investigations that all the compensation areas will combine into one area based on the hydrological peat unit in this location.

### 3.5.1 Compensation Area 1

#### Existing Site Conditions

##### Vegetation Communities

CA1 is a large area consisting predominantly of blanket bog habitat with M19 blanket mire the dominant vegetation community but possibly with some transitional zones with M17 blanket mire and M20 blanket and raised mire.

The north eastern quarter of the compensation area comprises of large stands of M23 rush pasture as well as patches of wet heath and acid grassland mosaic likely to be M15 wet heath / U2 acid grassland with the possibility of other acid grassland communities also present in the part of the site.

Throughout there are a number of drainage ditches and grips that support M1 *Sphagnum auriculatum* bog pool and M2 *Sphagnum cuspidatum/recurvum* bog pool communities.

The grips are typically 0.3 m wide and up to 0.5 m in depth. Most of the grips are obscured by surface vegetation however, where inspected water flows at the time of the walkover survey were negligible, unlike the major drains and headwater tributaries of the Curraghinalt Burn.

##### Compensation Area 1 Condition

The blanket bog has been heavily modified with a large band along the southern boundary historically cutover and the remaining areas having an abundance of grips cut into the peat (typically 0.4 to 0.5 m in depth) and which predominantly drain towards the Curraghinalt Burn and its associated headwater tributaries. These grips together with the Curraghinalt Burn and its associated headwater tributaries as well as a drain running along the northern boundary of the compensation area are likely to be having a negative and adverse effect on the blanket bog habitat in this compensation area.

Grazing by sheep does not appear to be having a detrimental effect on the blanket bog habitat with animals tending to preferentially graze areas of acid grassland in the north eastern quarter of the compensation area. However, this selective grazing has allowed dense stands of soft rush to development across quite a larger part of this part of the site in-combination of improved drainage.

As a hydrological peat unit, it is assessed that the peat in CA1 is largely 'active' or where currently not active is 'inactive but capable of regeneration'

It is assessed that overall the condition of the blanket bog habitat in CA1 is moderate, based on the criteria in the FEP Manual.

#### Management Aims

The principle management aim for CA1 is to:

- restore up to 32.45 ha of blanket bog habitat; and
- create a feature beneficial for waders.

## Management Prescriptions

Table 3-17 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for CA1 over the lifetime of the gold mine development.

**Table 3-17: Management Prescriptions for CA1**

Objective	Management Prescriptions	Provisional Timings of Works
<p>CA1.1 Drain blocking to re-wet the peat</p>	<p>It is proposed that all of the grips are blocked at key points along their lengths. This will allow water to be held back and the localised water table elevated providing a mechanism to reduce the rate of drying out of adjacent peats during periods of low rainfall.</p> <p>As all the grips are shallow and on shallow slopes with low flows of water and peat bottoms there are a number of options which could be used to block these drains including:</p> <ul style="list-style-type: none"> <li>• construction of peat dams using hand tools and peat from adjacent areas of blanket bog; or</li> <li>• plastic sheet piles that could be carried on a quad bike or similar and pushed into position by hand to create dams.</li> </ul> <p>Further survey and assessment of the grips will be required before any preferred option or a combination of options and locations of drain blocking is undertaken.</p> <p>The drain running along the northern boundary of the will be infilled using peats and soils excavated from the marshy grassland area in the north east corner of the site carried out as part of the scrape creation at this location (see Objective CA1.2) with any additional material required sourced and transported from the proposed infrastructure site.</p> <p>A detailed method statement will be provided within any draft Management Plan that will include all the compensation areas.</p>	<p>Year 2</p>
<p>CA1.2 Creation of a scrape for waders.</p>	<p>There is little value currently provided by the marshy grassland dominated by dense stands of soft rush in the north east corner of the CA1. It is proposed that this will be used to create a scrape for waders whilst providing peat and soils to achieve Objective CA1.1.</p> <p>The scrape design and its location will be based on further ground investigations and feasibility study to determine the size and depth of any scrape within this part of the compensation area.</p> <p>A detailed method statement will be provided within any draft Management Plan where it is identified scrape construction is feasible.</p>	<p>Year 2</p>

Objective	Management Prescriptions	Provisional Timings of Works
<p>CA1.3 Re-profiling of banks created through historical cutover of the peats</p>	<p>Where historically the peat has been cut, particularly in the southern section of CA1, this has left vertical banks of peat typically 1 to 1.25 m in height some of which have bare exposed peat.</p> <p>These vertical bank faces will tend to cause the rapid drying out of the peats on the top of the banks during dry periods. It is proposed that some of these banks are modified using a low pressure tracked excavator to scrape back peat from the bank into the lower lying cutover areas to create gentle sloping edges and less uniform straight lines to allow the development of vegetation and reduce the current edge effects and drying out of the peats.</p> <p>Careful consideration will have to be given to access in and out of CA1 and any working within or adjacent the areas historically cutover to minimised damage. Bog mats will be used where it is identified there is a risk of damage to peat and its supporting vegetation.</p> <p>A detailed method statement will be provided within any draft Management Plan.</p>	<p>Year 2</p>
<p>CA1.4 Grazing control</p>	<p>Livestock do not appear to be having a detrimental effect on the areas of blanket bog and which tend to selectively graze areas of acid grassland in the north eastern quarter of the compensation area. It is considered therefore that there is no reason why low intensity grazing by sheep at appropriate times of the year cannot continue within this compensation area in the short-term.</p> <p>Adequate stock proof fencing will need to be maintained and secured at all times. In addition new fencing will be required around any constructed scrape including an appropriate buffer to allow any vegetation to develop and prevent poaching of the exposed peat / soils.</p>	<p>Year 1</p>

### Monitoring and Surveillance

Table 3-18 provides a summary of the proposed monitoring and surveillance to be carried out in CA1. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-18: Proposed Monitoring and Surveillance at CA1**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	CA1 will be re-surveyed and the vegetation communities mapped based on the NVC classification system. A series of fixed point quadrats (2 m x 2 m) and photography locations will be established to monitor any changes in vegetation and condition of the blanket bog habitat.	Year 1
Hydrological investigation	Detailed survey and mapping of the drains and grips will be undertaken to map and analyse these features to allow a detailed assessment to be made of any drain blocking and to establish the most appropriate locations for any dams to be constructed.	Year 1
Vegetation monitoring	Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time. A condition assessment will be made based on the CSM guidance for upland habitats (or where updated) that includes blanket bog and which will allow future measurement of any set performance indicators.	Annually from Year 1
Integrity of any peat dams	Visual inspection and repairs will be made or dams replaced where necessary.	Annually and after any major rainfall event (1 in 100 year storm event) after installation.
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers to measure the rate of water loss from the blanket bog following any rainfall event. A rain gauge is currently installed as part of weather station on this side of the ridge operated by DGL.	Permanently from spring 2020 and at regular intervals with data collected every three to four months.

### 3.5.2 Compensation Area 2

#### Existing Site Conditions

##### Vegetation Communities

CA2 predominantly comprises a complex mosaic of blanket bog and wet heath / acid grassland mosaic. M19 blanket mire is the dominant vegetation community from the quadrat data taken within this compensation area but with U2 grassland and possible M15 wet heath present.

Throughout there are a number of runnels and other drainage channels that typically support a M2 *Sphagnum cuspidatum/recurvum* bog pool community.

##### Compensation Area 2 Condition

The peats in CA2 appear to have historically been cutover that has removed in the region of 1m depth of peat. Further degradation has occurred through drainage with the cutting of a number of runnels and drains across this site and which drain towards a main drain running along the northern boundary of CA2 and which eventually joins the Curraghinalt Burn.

Grazing by sheep does not appear to be having a detrimental effect on the blanket bog habitat.

As a hydrological peat unit, it is assessed that the peat in CA2 is largely ‘active’ but under stress and where currently not active is ‘inactive but capable of regeneration’.

It is assessed that overall the condition of the blanket bog habitat in CA2 is moderate, based on the criteria in the FEP Manual.

### Management Aims

The principle management aim for CA2 is to:

- restore up to 14.59 ha of blanket bog habitat.

### Management Prescriptions

Table 3-19 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for CA2 over the lifetime of the gold mine development.

**Table 3-19: Management Prescriptions for CA2**

Objective	Management Prescriptions	Provisional Timings of Works
CA2.1 Drain blocking to re-wet the peat	<p>It is proposed that the drains are blocked at key points along their lengths. This will allow water to be held back and the localised water table elevated providing a mechanism to reduce the rate of drying out of adjacent peats during periods of low rainfall.</p> <p>As all the drains are shallow and gently sloping with low flows of water and peat bottoms there are a number of options which could be used to block these drains including:</p> <ul style="list-style-type: none"> <li>• construction of peat dams using hand tools and peat from adjacent areas of blanket bog; or</li> <li>• plastic sheet piles that could be carried on a quad bike or similar and pushed into position by hand to create dams.</li> </ul> <p>Further survey and assessment of the drains will be required before any preferred option or a combination of options and locations of drain blocking is undertaken.</p> <p>A detailed method statement will be provided within any draft Management Plan that will include all the compensation areas.</p>	Year 2
CA2.2 Grazing control	<p>Livestock does not appear to be having a detrimental effect on the areas of blanket bog and which tend to selectively graze areas of acid grassland in the north eastern quarter of the compensation area. It is considered therefore that there is no reason why low intensity grazing by sheep at appropriate times of the year cannot continue within this compensation area in the short-term.</p> <p>Adequate stock proof fencing will need to be maintained and secured at all times.</p>	Year 1

## Monitoring and Surveillance

Table 3-20 provides a summary of the proposed monitoring and surveillance to be carried out in CA2. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-20: Proposed Monitoring and Surveillance at CA2**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	CA2 will be re-surveyed and the vegetation communities mapped based on the NVC classification system. A series of fixed point quadrats (2 m x 2m) and photography locations will be established to monitor any changes in vegetation and condition of the blanket bog habitat.	Year 1
Hydrological investigation	Detailed survey and mapping of the drains and grips will be undertaken to map and analyse these features to allow a detailed assessment to be made of any drain blocking and to establish the most appropriate locations for any dams to be constructed.	Year 1
Vegetation monitoring	Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time. A condition assessment will be made based on the CSM guidance for upland habitats (or where updated) that includes blanket bog and which will allow future measurement of any set performance indicators.	Annually from Year 1
Integrity of any peat dams	Visual inspection and repairs will be made or dams replaced where necessary.	Annually and after any major rainfall event (1 in 100 year storm event) after installation.
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently from spring 2020 and at regular intervals with data collected downloaded every three to four months.

### 3.5.3 Compensation Area 3

#### Existing Site Conditions

##### Vegetation Communities

CA3 predominantly comprises a complex mosaic of blanket bog, wet heath / acid grassland and marshy grassland mosaic on in places steeply sloping ground leading down the narrow valley of the Curraghinalt Burn. M19 blanket mire is the dominant vegetation community from the quadrat data taken within this compensation area but with M23 mire and possible M15 wet heath / U2 grassland also present.

Throughout there are a number of runnels and other drainage channels some of which support a M2 *Sphagnum cuspidatum/recurvum* bog pool community.

### Compensation Area 3 Condition

The peatland habitats in CA3 are very degraded predominantly through drainage with the cutting of a number of drains across the site and which drain to the Curraghinalt Burn, from the drainage effect of the Curraghinalt Burn itself and from the grazing of livestock. An access track also runs along the eastern boundary of the compensation area.

Grazing by sheep does not appear to be having a detrimental effect on the blanket bog habitat.

As a hydrological peat unit, it is assessed that the peat in CA3 is largely '*inactive but capable of regeneration*'.

It is assessed that overall the condition of the peatland habitats in CA3 is poor, based on the criteria in the FEP Manual.

### Management Aims

The principle management aim for CA3 is to:

- restore up to 5.69 ha of blanket bog habitat.

### Management Prescriptions

Table 3-21 outlines the initial management prescriptions that are considered appropriate to achieve the management aims for CA3 over the lifetime of the gold mine development.

**Table 3-21: Management Prescriptions for CA3**

Objective	Management Prescriptions	Provisional Timings of Works
CA3.1 Drain blocking to re-wet the peat	<p>It is proposed that the drains are blocked at key points along their lengths. This will allow water to be held back and the localised water table elevated providing a mechanism to reduce the rate of drying out of adjacent peats during periods of low rainfall.</p> <p>As all the drains are shallow and gently sloping with low flows of water and peat bottoms there are a number of options which could be used to block these drains including:</p> <ul style="list-style-type: none"> <li>• construction of peat dams using hand tools and peat from adjacent areas of blanket bog; or</li> <li>• plastic sheet piles that could be carried on a quad bike or similar and pushed into position by hand to create dams.</li> </ul> <p>Further survey and assessment of the drains will be required before any preferred option or a combination of options and locations of drain blocking is undertaken.</p> <p>A detailed method statement will be provided within any draft Management Plan that will include all the compensation areas.</p>	Year 2
CA3.2 Grazing control	<p>Grazing is currently assessed as having a significant detrimental effect on the blanket bog in CA3. It is proposed therefore that this compensation area is taken out of grazing for at least three years to allow the blanket bog to recover and to assess the response of soft rush.</p> <p>Adequate stock proof fencing will need to be maintained and secured at all times.</p>	Year 1

## Monitoring and Surveillance

Table 3-22 provides a summary of the proposed monitoring and surveillance to be carried out in CA3. It is envisaged that the monitoring and surveillance requirements will be reviewed periodically during the lifetime of the gold mine as part of any Management Plan review.

**Table 3-22: Proposed Monitoring and Surveillance at CA3**

Monitoring Parameter	Methodology	Monitoring Period
Recording and analysis of vegetation	CA3 will be re-surveyed and the vegetation communities mapped based on the NVC classification system. A series of fixed point quadrats (2 m x 2 m) and photography locations will be established to monitor any changes in vegetation and condition of the blanket bog habitat.	Summer 2020
Hydrological investigation	Detailed survey and mapping of the drains will be undertaken to map and analyse these features to allow a detailed assessment to be made of any drain blocking and to establish the most appropriate locations for any dams to be constructed.	Summer 2020
Vegetation monitoring	Each fixed point quadrat and transect will be monitored to assess the vegetation composition and structure at these locations and to measure any changes over time. A condition assessment will be made based on the CSM guidance for upland habitats (or where updated) that includes blanket bog and which will allow future measurement of any set performance indicators.	Annually
Integrity of any peat dams	Visual inspection and repairs will be made or dams replaced where necessary.	Annually and after any major rainfall event (1 in 100 year storm event) after installation.
Monitoring of water levels	Dipwells will be installed to measure water levels in targeted peat areas by the use of automated dataloggers.	Permanently from spring 2020 and at regular intervals with data collected every three to four months.

## 4.0 BIODIVERSITY IMPACT STATEMENT

Calculations using a Biodiversity Impact Assessment metric, based on the pilot scheme developed DEFRA, would indicate that the areas of above ground development including the proposed infrastructure site (Area A), the existing surface infrastructure site (Area C) and the site of the proposed ventilation raises in (Area B) has an existing biodiversity value of 1570.96 (habitat areas + linear habitats).

The gold mine development is anticipated to have net loss in biodiversity value of 138.11 at the proposed infrastructure site and proposed ventilation raises (Table 4-1). This figure takes into account habitat creation and enhancement measures proposed at the proposed infrastructure site, as described in Part I and Part II of the EcMMP, as well as for the landscaping proposals as detailed on the Landscape Plan submitted as part of the Environmental Statement. Habitat enhancement (as referenced as HE) as part of species mitigation / compensation are covered in more detail in Part II of the EcMMP. Figure 4.1 provides an overview of the habitat creation and habitat enhancement areas.

Copies of the calculation sheets used in the Biodiversity Impact Assessment are provided at Appendix 02.

Please note that none of the infrastructure features, for example the surface water attenuation ponds and diversion berms have been included as part of assessing the Biodiversity Impact Scores as their primary function is to provide services to the mine and not biodiversity. Neither does the Biodiversity Impact Assessment take into account any restoration proposals following the closure of the mine, given the timeframe upon which these are likely to occur, or the phased restoration of the DSF throughout the operational phase as these are deemed not applicable in the context of this assessment.

**Table 4-1: Biodiversity Impact Statement without Compensation**

Habitats	Area (ha)	Habitat Biodiversity Value
Total existing area onsite	145.99	1469.48
Habitats negatively impacted by development Habitat Impact Score	74.28	693.46
On site habitat mitigation Habitat Mitigation Score	75.79	561.70
Biodiversity loss still requiring compensation <b>Habitat Biodiversity Impact Score</b>		<b>-131.76</b>
Percentage of biodiversity impact		19.00
Linear Habitats	Length (km)	Habitat Biodiversity Value
Total existing length onsite	22.71	101.48
Linear features negatively impacted by development Linear Impact Score	8.14	40.78
On site linear mitigation Linear Mitigation Score	2.26	34.43
Linear biodiversity loss still requiring compensation <b>Linear Biodiversity Impact Score</b>		<b>-6.35</b>
Percentage of linear biodiversity impact		15.57

Table 4-1 demonstrates that compensation is required outside the proposed infrastructure site to be able to demonstrate no net loss of biodiversity and in particular to offset the loss of peatland habitats.

DGL have managed to secure 52.73 ha of land comprising predominantly of blanket bog but with some wet heath / acid grassland mosaic and marsh / marshy grassland on peat. The ratio of peatland habitat compensation (52.73 ha) to the area of peatland habitat loss to the gold mine development (24.98 ha comprising blanket bog, valley mire communities, wet heath / acid grassland mosaic and marshy / marshy grassland on peat or peat derived soils) is approximately 2:1.

This demonstrates that through the provision of the compensation areas that the mine development will have an overall net gain for biodiversity of 82.42 (Table 4-2).

**Table 4-2: Biodiversity Impact Statement with Proposed Compensation**

Habitats	Area (ha)	Habitat Biodiversity Value
Total existing area onsite	145.99	1469.48
Habitats negatively impacted by development Habitat Impact Score	74.28	693.46
On site habitat mitigation and compensation Habitat Mitigation Score	128.53	782.23
Biodiversity gain Habitat Biodiversity Impact Score		88.77
Percentage of biodiversity impact		
Linear Habitats	Length (km)	Habitat Biodiversity Value
Total existing length onsite	22.71	101.48
Linear features negatively impacted by development Linear Impact Score	8.14	40.78
On site linear mitigation Linear Mitigation Score	2.26	34.43
Linear biodiversity loss Linear Biodiversity Impact Score		-6.35
Percentage of linear biodiversity impact		15.57

## PART II – SPECIES MITIGATION AND COMPENSATION

## 5.0 BADGER

### 5.1 Introduction

#### 5.1.1 Baseline Summary

Badger surveys conducted in 2015/16 at the proposed infrastructure site (Area A) of the gold mine development for the Curraghinalt Project recorded a total of five setts. Of these five setts, three were considered to be active, including one main sett.

A further and separate badger clan is present to the north of the existing surface infrastructure site (Area B) where a main sett exists to the north of this site.

#### 5.1.2 Legislative Context

The badger (*Meles meles*) and its setts are afforded full protection under The Wildlife (Northern Ireland) Order 1985 (as amended) which, amongst other actions, makes it an offence to intentionally or recklessly:

- kill, injure, take or possess a badger;
- damage, destroy or obstruct access to any structure or place that a badger uses for shelter or protection;
- damage or destroy anything which conceals or protect any structure or place that a badger uses; and
- disturb a badger whilst it is occupying a structure or place which it uses for shelter or protection.

Planning Policy Statement 2 (PPS2): Natural Heritage, published in July 2013 states that planning permission will only be granted for a development proposal that is not likely to harm a statutorily protected species, that includes the badger, and which can be adequately mitigated or compensated against.

#### 5.1.3 Summary of Potential Impacts

Based on current badger activity, the proposed gold mine development has the potential to result in the direct loss of one active main sett and in the loss of generally poor foraging habitat with the risk of causing disturbance to individual animals. Therefore appropriate mitigation and/or compensation measures will need to be implemented to ensure any development can proceed in compliance with current wildlife legislation and planning policies relating to the protection of badgers. Where there is a risk of an offence being committed under the Wildlife (Northern Ireland) Order 1985 (as amended) through approved development it is likely any mitigation / compensation works in respect to badgers will have to be carried out under a derogation licence issued by Northern Ireland Environment Agency (NIEA) Wildlife Licensing Team.

Table 5-1 summarises the anticipated direct impacts of the development of the gold mine on badgers present at the site of the proposed infrastructure site, in the absence of mitigation.

**Table 5-1: Anticipated Direct Impacts of the Gold Mine Development on Badgers**

Sett No.	Class	No. of Entrances	Activity Level	Sett Location	Impact of Development
1	Main	1	Very High	On site	Direct loss of sett
2	Main	3	Inactive	On site	Disturbance if sett becomes re-occupied before the onset of development works
3	Outlier	1	Low	On site	Disturbance
4	Outlier	1	Moderate	On site	Disturbance
5	Outlier	1	Inactive	On site	Disturbance if sett becomes re-occupied before the onset of development works

The loss of potential foraging habitat within the proposed infrastructure site is considered highly unlikely to be critical to the maintenance of the local badger population. The arable fields that dominate the site provide poor quality foraging habitat with very few field signs indicative of foraging activity occurring.

Some connectivity through the landscape particularly to the north will be lost but given that the lands north of the proposed infrastructure site is blanket bog providing very poor habitat for badgers due to the waterlogged peats it is considered not likely to result in significant fragmentation of territory. Badgers will continue to have habitat connectivity to fields in all other directions.

The badger clan present in proximity to the Owenkillew River, which includes a main sett located directly to the north of the existing surface infrastructure site (Area B), will not be directly or indirectly impacted by the gold mine development and therefore no mitigation / compensation measures are deemed necessary. However, where underground blasting will take place within 100m of this sett consideration will be made for any such event to take place under an appropriate licence where this may be deemed necessary by the EcOW.

## 5.2 Mitigation Strategy Overview

The mitigation strategy for badgers is designed to mitigate and compensate for the loss of a main sett (Sett 1) and minimise disturbance of all retained setts during the development of the above ground infrastructure associated with the gold mine. It will also ensure the protection of this species by avoiding badgers from being killed or injured and ensuring the local population status of this species is not affected through the gold mine development.

Due to the legal protection afforded to the badger, it is anticipated that the details of the mitigation strategy presented below will form part of a formal Method Statement to support any derogation licence application to NIEA Wildlife Licensing Team to permit actions that will otherwise be illegal.

## 5.3 Draft Method Statement

Prior to the commencement of any site preparation / construction works an inspection will be made of all areas to be disturbed and within a 50m radius of these areas for any signs of badger activity.

Where a sett, or setts are found to be within the footprint of the proposed construction works or activities and a sett cannot be avoided a licensed closure will be undertaken between July to November, inclusive.

For any badger sett found in a given working area or adjacent a working area, the mitigation process will be as following:

- i. Assessment as to whether or not the sett can be retained, and/or disturbance minimised.
- ii. Where a sett is considered to be at high risk of damage, but not necessarily from destruction, and will not be fragmented by the installation of security fencing consideration will be given to temporary exclusion of the sett, with the exclusion measures being removed post construction works and the badgers being allowed to re-colonise any such sett;
- iii. Where sett closure is unavoidable, the activity level of the sett and the sett's relative importance to the local badger population will be re-appraised in order to determine whether the construction of an artificial replacement sett is required. As a minimum, an artificial sett will be constructed to replace the lost of a main, i.e. breeding sett. Any artificial sett will be constructed as close to the original sett location as possible using proven construction methods and badgers encouraged to investigate the artificial sett using bait.
- iv. Any construction works or activities within 30m of a sett will be subject to a specific working method, agreed with the EcOW and under an appropriate NIEA disturbance licence (if considered necessary). Where above ground blasting is required as part of any cut and fill earthworks consideration will be made to obtain a licence where any such blasting event will take place within 100m of any active badger sett.
- v. Instruction will be provided to site staff on the appearance of badger setts and the action to take if a suspected mammal burrow is discovered.

### 5.3.1 Construction of Artificial Setts

Based on the current baseline conditions, it is proposed to construct one artificial sett to provide a compensatory sett to the main sett (Sett 1) that will be lost as a direct result of the gold mine development.

Figure 5-1 shows the location of the proposed artificial sett. This location has been chosen as this lies on an existing pathway used by badgers in the main sett and therefore any new artificial sett will be easy to find for these animals.

The artificial sett will be constructed as soon as possible on confirmation of any planning consent and prior to the receipt of any NIEA licence for the closure of Sett 1 in order to give it the maximum available time to establish prior to the exclusion of the badgers from this main sett that will be lost to the development, and also to maximise the time available for the badgers to find the artificial sett.

To encourage the badgers to find and use the artificial sett, it will be baited with peanuts or another suitable food. This will include food beneath a heavy object that only a badger will have the strength to displace, confirming that it is the result of badger activity, and not another animal.

The artificial sett will be designed taking into account topography, soil depth and ground conditions. The sett will be designed to be built at ground level and then covered over, rather than excavating directly into the ground, due to the shallow soils and risk of waterlogging.

The artificial sett will be designed with the following features:

- the artificial sett will be a minimum size of 5 m x 5 m and the covered to allow a minimum 0.5 m depth of soil over the each chamber;

- chambers of 50 cm diameter (small chambers are favoured);
- tunnels made from rigid slotted drainage pipe with an internal diameter of 300mm;
- at least one chamber that is a dead end, with no through passage;
- at least two blind ending tunnels to allow for the badgers to extend the setts themselves; and
- entrances at different heights to encourage air flow through the sett, although draught free chambers will also be present.

Following the construction of the artificial sett, the semi-improved grassland at HE1 (0.41 ha) will be enhanced through the sowing of commercially available, or bespoke wildflower seed-mix locally sourced, for example from Ecoseeds in County Down, and which is suitable for the soil-types within this area.

### 5.3.2 Sett Exclusion

Each sett scheduled for exclusion and destruction (currently Sett 1 only) will have exclusion measures fitted to it as soon as a licence is received. This will involve one-way exclusion gates and installation of ground armouring with weld mesh and stakes to prevent the badgers from digging around the gates. The weld mesh used will have a minimum wire diameter of 2 mm.

From the start of the exclusion exercise the gates will be set to allow passage out of the sett only. The lack of a period of two-way access is to prevent any badgers from getting used to entering the sett through the gate as prior experience has indicated that this results in a higher frequency of badgers attacking the ground armouring and gate, and consequently a higher incidence of badgers managing to regain access to excluded setts.

The one-way gates will, however, be propped slightly open on a trip pin for the first three days, to ensure that they realise that exit is possible. The trip pin will be a short length of stick against the gate frame propping the flap slightly open. If a badger passes through the gate, the pin will fall and the gate will close behind the badger. The set up will be carefully arranged so that the dropping pin does not accidentally hold the gate open.

Once the exclusion measures are in place, the sett will be monitored every three days (as a minimum) for signs of badger activity. Markers will be placed both in front of each sett entrance and inside each tunnel. The markers inside the tunnels will be used to detect whether there are any animals approaching the sett entrance from inside, but not passing through the gate. The markers will typically be twigs that will be brushed aside by the passage of a badger, and they will be carefully placed to ensure that they do not obstruct the closing gate.

Once 21 days with no activity have passed, the sett will be dug out using a combination of hand tools and a JCB / excavator, then back filled. An excavator with an un-toothed bucket will be used to remove large volumes of overburden and the tunnels will be opened with hand tools. The tunnels will be followed to the end to confirm that there are no animals remaining, where this is possible.

## 5.4 Monitoring and Surveillance

### 5.4.1 Pre-construction Works

The existing badger setts within the proposed infrastructure site will be periodically inspected until such time as any planning permission for the gold mine development is granted. This will involve an inspection of all previously recorded setts and to record any changes in their status as well to identify any new setts that may have been established at and within 30 m of the proposed infrastructure site.

### 5.4.2 Sett Exclusion

As described in Section 5.3.2, during the 21 day exclusion period the setts will be monitored every three days which will include checking of any external markers.

The disturbance of the markers inside or in front of the entrances to the sett will be noted, as will any attempts by badgers to tunnel around the gates or otherwise gain re-entry. Should badgers regain access during the exclusion period, the breach will be made sound, then the exclusion period recommenced for a further 21 days.

### 5.4.3 During Construction

The development site will be monitored for evidence of badger re-colonisation on a daily basis by the site manager and site staff (training on this issue will be provided) and in the event of a new mammal burrow being identified, work will stop in a 20 m radius of the hole and the EcOW (expected to be the licensee) will be contacted without delay.

All site staff will be briefed on required actions to minimise the risk to badgers during construction works by means of a pre-commencement tool box talk. This will include details such as ensuring trenches or ditches have a sloped end to allow badgers to escape, the identification of mammal holes and what to do if a suspect mammal burrow is identified etc.

Clearance of dense areas of vegetation will be ongoing and this will help minimise the risk of badgers excavating new setts within the development footprint. It will be requested that any licence also covers the exclusion and destruction of any new setts that may be created by displaced badgers where these may occur within the development and construction works footprint.

Post any exclusion any newly created sett will be monitored on a regular basis throughout the duration of construction activities.

### 5.4.4 Post Construction and Operational Phase

Any newly created artificial sett will be monitored annually for two years on the completion of all construction activities to assess its usage by badgers. All other setts will also be inspected during this period and inspection made for any other setts within the site of the infrastructure site to monitor the status of the local badger population.

## 5.5 Provisional Work Schedule

The construction works for the proposed above ground infrastructure are anticipated to start in Spring 2020 but which is dependent upon the granting of planning consent and any other licences and consents required for the operation of the gold mine. Based on this date the following provisional work schedule for badger mitigation is presented in Table 5-2. This provisional work schedule takes into account when it is acceptable to close any sett between July and November.

**Table 5-2: Provisional Work Schedule for Badger Mitigation and Compensation**

Task	Description	Responsibility and Key Personnel	Provisional Timing
1	Monitoring of badgers to inspect all previously recorded setts and record any changes in their status and identify any new setts that may have been established.	Ecologist in collaboration with DGL.	Autumn 2017 and then annually in until the onset of construction works
2	Obtain agreement from NIEA on the proposed mitigation strategy and detailed method statement	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
3	Creation of one artificial sett	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
4	Grassland enhancement (HE1)	Ecologist in collaboration with DGL.	On completion of new artificial sett
5	Baiting of food at the newly created artificial sett	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
6	Application for an appropriate licence from NIEA for the exclusion and closure of Sett 1.	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
7	Exclusion of Sett 1 including installation of one-way gates and mesh fencing	Ecologist in collaboration with DGL	Year 1 (July to November only)
8	Destruction of Sett 1 using a JCB excavator and hand tools	Ecologist in collaboration with DGL.	Year 1 (August to November only)
9	Monitoring of badgers	Ecologist in collaboration with DGL.	Regular intervals during the construction phase and then annually for two years post construction phase

## 6.0 BATS

### 6.1 Introduction

#### 6.1.1 Baseline Summary

The proposed infrastructure site is known to be used by at least six species of bat, with at least three of these species, namely common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat (*Plecotus auritus*) recorded as roosting at Pollan Rua holiday cottage. Based on the number of bats observed and timing of their use of the Pollan Rua holiday cottage, it is considered that this building is used as a maternity roost by common pipistrelle and soprano pipistrelle and as a hibernation roost by common pipistrelle.

#### 6.1.2 Legislative Context

All native UK species of bat are listed on Annex II and IV of the EEC Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. This Directive is transposed into Northern Ireland law through The Conservation (Natural Habitats etc.) Regulations (Northern Ireland) 1995 as amended. In brief, this legislation makes it an offence to:

- deliberately to capture, injure or kill a bat;
- deliberately to disturb a bat while it is occupying a structure or place which it uses for shelter or protection;
- deliberately to disturb a bat in such a way as to be likely to:
  - affect the local distribution or abundance of the species;
  - impair its ability to survive, breed or reproduce, or rear or care for its young; or
  - impair its ability to migrate.
- deliberately to obstruct access to a breeding site or resting place of a bat; or
- to damage or destroy a breeding site or resting place of a bat.

Planning Policy Statement 2 (PPS2): Natural Heritage, published in July 2013 states that planning permission will only be granted for a development proposal that is not likely to harm a statutorily protected species, that includes all bat species, and which can be adequately mitigated or compensated against.

Three species of bats are also identified as a priority species in Northern Ireland including Nathusius' pipistrelle (*Pipistrellus nathusii*), soprano pipistrelle and brown long-eared bat with all species of bat identified in the Draft Fermanagh & Omagh Local Biodiversity Action Plan 2016-2020 as priority species for conservation action.

### 6.2 Summary of Potential Impacts

The proposed gold mine development will result in the direct loss of a confirmed roosting site, Pollan Rua Holiday cottage, used by at least three species of bat along with foraging and commuting habitat. Therefore appropriate mitigation and/or compensation measures will need to be implemented to ensure any development can proceed in compliance with current wildlife legislation and planning policies relating to the protection of bats. Where there is a risk of an offence being committed under Conservation (Natural Habitats etc.) Regulations (Northern Ireland) 1995 as amended through approved development it is likely any mitigation / compensation works in respect to bats will have to be carried out under a European Protected Species (EPS) licence issued by NIEA Wildlife Licensing.

## 6.3 Mitigation Strategy Overview

The mitigation strategy for bats is designed to ensure the local population status of any bat species is not adversely affected from the development of the gold mine, in particular:

- to ensure no physical harm comes to bats during the demolition of the Pollan Rua Holiday cottage;
- to ensure no net loss of roost, or roosting potential for bat species recorded within the proposed infrastructure site through the provision of alternative roosting sites; and
- to enhance foraging and commuting habitats for bats in parts of the proposed infrastructure site (Area A) not impacted by construction activities, or through the operation of the gold mine.

An overview of the proposed mitigation / compensation measures for bats is presented in Figure 6.1.

## 6.4 Draft Method Statement

### 6.4.1 New Roost Creation

The design of the gold mine development will not allow for the retention of the Pollan Rua holiday cottage that is used by at least three species of bats for roosting purposes, predicted to be demolished in Year 6. To compensate for the loss of this feature used by roosting bats it is proposed that a new purpose-built building (bat house) will be constructed and completed before any construction activities in proximity to and prior to the demolition of the Pollan Rua holiday cottage.

It is envisaged that the new bat house will be constructed well in advance of any commencement of the gold mine construction activities to give it a suitable establishment period.

Figure 6.1 shows the proposed location of the new bat house. This location has been selected on the basis that:

- it is of sufficient distance from any gold mine infrastructure structure that will minimise disturbance of any resident bats that may be caused by the operation of the gold mine;
- it is relatively close to the existing roost within the Pollan Rua holiday cottage;
- it is close to another existing disused farmhouse building confirmed as being used by roosting bats;
- it is adjacent to the Pollanroe Burn and its associated woodland which provides a suitable dark commuting corridor and foraging opportunities for bats;
- it is located in an area where the new bat house will be safe from the gold mine development, or from any future potential development.

The bat house will be orientated east/west direction to maximise the effects of solar warming for the benefit of bats, particularly for young developing bats.

The bat house will be constructed to provide similar roost features present in the Pollan Rua holiday cottage for the three key species of common pipistrelle, soprano pipistrelle and brown long-eared bat but which could also be utilised by other species of bats. The bat house is intended to be used by common and soprano pipistrelles as a maternity roost and by brown long-eared bats as a summer non-breeding roost. The building will also have the potential to be used as a hibernation roost and therefore could be in permanent all-year use by bats.

The proposed bat house will be a single storey building, minimum dimensions of 8 m long, 5 m wide and at least 5 m in height measured to the ground to the apex of the roof, that will be constructed using stone obtained as far as practically possible on site from existing stone walls and derelict buildings which will be lost to the gold mine development and where bats have not been confirmed as roosting. Further stone may be

brought in where necessary. The walls will be a minimum 1 m wide with an internal cavity of 0.3 m that will be filled with large irregular shaped rubble to leave gaps within the cavity area. Up to four access bricks will be incorporated on each outer facing wall as well as internally on the inner facing walls to allow bat access into the cavity wall.

The roof will be pitched at a minimum 42 degrees with gable ends and to a minimum height to the apex of the roof of 2.2 m. The roof will be designed to provide a large unobstructed void area to maximise flying space within the roof space.

The roof will be covered with dark coloured tiles on the northern and southern elevations supported by untreated rough wooden rafters and battens. Overlapping traditional bitumen material that will provide openings to allow access for bats will line the roof.

Bat access to the roof void will be provided at the gable ends of the buildings by leaving a small gaps (30 to 40 mm) in the stone leading directly to the roof void and/or in similar gaps beneath the eaves of the roof. In addition two bat access tiles will be incorporated at different heights in each of the roof elevations.

A solar powered heated bat box will also be provided in the roof void area along with one Schwegler 1FW Woodcrete Hibernation Box.

The roof void will be separated from the main part of the building by a wooden weight bearing boarded floor supported by rough cut wooden joists. A small hatch will provide access to the roof space for any further monitoring of bats.

The internal floor of the bat house will be left as compacted earth that should naturally regulate humidity levels within the building.

The building will have a single entry doorway to allow for any internal inspection for bats. The door will be a reinforced security door located on the northern facing wall. The door will be draft-proofed to maintain internal temperatures.

No lighting will be installed at or in proximity to the bat house.

Supplementary to the above, and prior to the onset of any construction activities a number of bat boxes shall be placed on suitable trees and/or pole mounted within DGL's landholding away from potential disturbance and artificial lighting. At least eight (exact number to be agreed) bat boxes will be attached to trees and to the existing nearby disused farmhouse building comprising a mixture of woodcrete bats boxes (four Schwegler 2F and four Schwegler 2F-DFD). In addition and one pole mounted large colony bat box will also be installed near a conifer plantation to the west of the DSF.

#### **6.4.2 Enhancement of Commuting and Foraging Habitat**

Existing remnant hedgerows running along the southern boundary of the field where the new bat house is proposed and in the adjacent field to the south will be supplementary planted which will provide suitable commuting and foraging corridors connecting the new bat house to the Pollanroe Burn, the other existing disused farmhouse building.

A total length of 1870 m of new and supplementary hedgerow planting is proposed. This is additional to the hedgerow / tree planting proposed for landscaping purposes.

All new and supplementary hedgerow planting will be predominantly planted with hawthorn but will incorporate at least other four tree / shrub species per five metre linear length and consist of a staggered double row of trees / shrubs spaced at 30 - 45 cm apart in each row and a space of 45 cm between each row.

**Table 6-1: Proposed Hedgerow Supplementary Planting**

Hedgerow Type	Species	Estimated Numbers of Plants per 5m Double Hedgerow
Conservation Hedgerow	Hawthorn ( <i>Crataegus monogyna</i> )	10
	Blackthorn ( <i>Prunus spinosa</i> )	5
	Hazel ( <i>Corylus avellana</i> )	4
	Rowan ( <i>Sorbus aucuparia</i> )	2
	Downy Birch ( <i>Betula pubescens</i> )	2
	Crab Apple ( <i>Malus sylvestris</i> )	1
	Honeysuckle ( <i>Lonicera periclymenum</i> )	1

To facilitate the planting of new hedgerow where shallow soils are present consideration will be made to use blended soils and subsoils arising from the construction of the access road of the Crockanboy Road to create low banks (<1 m in height) upon which trees and shrubs can be planted. The banks would be seeded using a commercially available or bespoke native wildflower seed-mix and native woodland bulbs locally sourced in Northern Ireland.

Broadleaved woodland (4.44 ha) will be planted, as part of the landscaping proposals of the site, that will complement the existing woodland along the Pollanroe Burn comprising of ash (*Fraxinus excelsior*), downy birch, rowan and goat willow (*Salix caprea*) in addition to landscape planting of woodland to screen the proposed above ground infrastructure (please refer to the Landscape Plan submitted with the Environmental Statement).

It is also proposed to enhance a number of grassland fields including: 5.61 ha of marsh / marshy grassland (HE2); 3.50 ha of improved grassland (HE3); and 1.72 ha of semi-improved grassland (HE4).

The semi-improved grasslands in the field where the new bat house is proposed and in the adjacent field to the south will be enhanced through the sowing of a commercially available or bespoke wildflower seed-mix locally sourced in Northern Ireland, for example from Ecoseeds in County Down, and which are suitable for the soil-type within these areas.

Details on the preparation of a site for any habitat creation and / or enhancement and the management of these habitats during the operational lifetime of the gold mine will be detailed in a Management Plan for the long-term management of the site for bats.

### 6.4.3 Capture and Exclusion of Bats from Buildings Proposed to be Demolished

Once an appropriate NIEA licence is in place, the new bat house has been constructed and suitably established and the other bat boxed installed, all features on the buildings confirmed as supporting a roost or assessed as being of moderate potential or better (Pollan Rua holiday cottage) will be excluded, entailing a detailed inspection of all potential roosting features. Where a comprehensive inspection is possible and no bats are present the feature will be blocked or removed. Where this is not possible or bats are present a one way exclusion device will be installed over the features allowing any bats to leave but not return. These devices will be left in situ for five nights of good weather conditions (night time temperatures above 10 °C with no rain). All exclusion works will be undertaken from scaffolding or a cherry picker.

Buildings of low/negligible roosting potential (all other buildings) will be demolished following a sensitive demolition protocol, entailing the removal of potential roosting features by hand before demolition is completed. This would include the derelict buildings where stone is proposed to be sourced in the building of the new bat house.

The demolition contractors will be provided with a tool box talk to ensure the safety of any bats and the workforce before the start of work and will also identify any potential roosting features in the low suitability building to be stripped.

Once the exclusion devices have been in situ for five nights of good weather the roof of the Pollan Rua holiday cottage will be stripped by hand, under the supervision of the licenced EcOW. Any bats found at this point that can be captured by hand, will be removed and kept in a secure holding box until all features capable of supporting roosting bats have been removed or excluded. The captured bats will then be released at the new bat house. No bats will be kept for longer than two days before being released.

Once the roof of the building has been removed a further inspection of any newly exposed or created roosting features will be undertaken, sealing or excluding as appropriate, with one way devices again being left in situ for a further five nights of good weather conditions. After this time the buildings will not contain any features considered suitable for roosting bats and the fabric of the building can then be demolished.

All exclusion and demolition works will be scheduled to avoid the core hibernation period which extends between mid-November and March to prevent the disturbance of hibernating bats.

## 6.5 Monitoring and Surveillance

### 6.5.1 Pre-construction Works

Surveillance of the Pollan Rua holiday cottage will be carried out on a seasonal basis when bats are active (spring, summer and autumn) by a dusk emergence / dawn re-entry surveys to ensure information on the usage of this building by bats is kept up to date and which will be used to inform any NIEA licence application.

In addition, an automated hibernation surveillance programme will be carried out by monitoring bat activity at this building for a minimum two week period every month from December to February inclusive. This will allow a determination to be made if the status of the roost changes between the planning application and the NIEA licence application.

Finally, automated surveys will be carried out over a period of five consecutive nights at key locations within the proposed infrastructure site on a seasonal basis when bats are active (spring, summer and autumn).

### 6.5.2 Construction, Post-construction and Operational Phases

The new bat house and the bat boxes will be checked on a seasonal basis during the two years of the construction activities and two years post-construction activities. The monitoring will involve an inspection of the bat house and bat boxes for signs of use by bats and the undertaking an evening emergence bat detector survey. This work shall be timed to take place between May – August. A short report detailing the results of the annual monitoring will be sent to NIEA, the licensing office.

## 6.6 Provisional Work Schedule

The construction works for the proposed above ground infrastructure are anticipated to start in Spring 2020 but which is dependent upon the granting of planning consent and any other licences and consents required for the operation of the gold mine. Based on this date the following provisional work schedule for bats mitigation is presented in Table 6-2. However, wherever practically possible a separate planning application for the new bat house will be submitted prior to any decision for the gold mine development.

**Table 6-2: Provisional Work Schedule for Bat Mitigation and Compensation**

Task	Description	Responsibility and Key Personnel	Provisional Timing
1	Monitoring of bats at Pollan Rua Holiday cottage and in the proposed infrastructure site.	Ecologist in collaboration with DGL.	Dusk emergence and dawn re-entry surveys at Pollan Rua Holiday cottage seasonally from Autumn 2017 and then annually in until the onset of construction works Automated hibernation survey at Pollan Rua Holiday cottage two weeks each month December to February annually until the onset of construction works. Automated detector surveys within key area of the proposed infrastructure site seasonally from Autumn 2017 to the onset of construction works.
2	Obtain agreement from NIEA on the proposed mitigation strategy and detailed method statements and bat house designs.	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
3	Construction of new bat house	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
4	Habitat enhancement grassland in the vicinity of the new bat house (HE2, HE3 and HE4).	Ecologist in collaboration with DGL.	On approval of planning permission and before the onset of construction works
5	Supplementary hedgerow planting and planting of other trees	Ecologist in collaboration with DGL	Year 1
6	Application for an appropriate licence from NIEA the demolition of the Pollan Rua Holiday cottage.	Ecologist in collaboration with DGL.	Year 1
7	Exclusion of bats from the Pollan Rua holiday cottage and bat worker on site during its demolition to capture any bats which may still be present.	Ecologist in collaboration with DGL (	Year 1 / Year 2
8	Monitoring of the new bat house and all bat boxes during and post construction activities.	Ecologist in collaboration with DGL (	Annually (between May and August) for four years (2 years during construction activities and 2 years post construction activities)

Task	Description	Responsibility and Key Personnel	Provisional Timing
9	Monitoring of bats.	Ecologist in collaboration with DGL.	Regular intervals during the construction phase and then annually for two years post construction phase

## 7.0 BIRDS

### 7.1 Introduction

#### 7.1.1 Baseline Summary

The proposed infrastructure site provides suitable breeding and foraging habitat for a range of bird species typically associated with upland habitats including blanket bog, farmland and coniferous woodland.

Breeding bird surveys carried out in 2015 and 2016 recorded a total of 38 bird species within the proposed infrastructure site and its immediate surrounding area. This included: one species listed in Annex I of the EU Birds Directive (2009/147/EC); five species that are identified as being red<sup>12</sup> listed and 10 amber listed<sup>13</sup> Birds of Conservation Concern in Ireland (BoCCI)<sup>14</sup>; and 13 species listed as Priority Species in Northern Ireland.

#### 7.1.2 Legislation Context

Under the Wildlife (Northern Ireland) Order 1985 (as amended), the nests, eggs and young of wild bird species are protected from deliberate damage or disturbance during the bird breeding season with Schedule 1 listed species protected by special penalties.

#### 7.1.3 Summary of Potential Impacts

The proposed gold mine development will result in the direct loss of potential breeding and foraging habitat for a number of bird species confirmed as present within the proposed infrastructure site. The loss of 74.3 ha of habitat will also impact upon the carrying capacity of this land for the local birds assemblage evaluated as being of Local (higher) value.

#### 7.1.4 Mitigation Strategy Overview

The mitigation strategy for birds will be to ensure protection to nesting birds during and site preparation and construction works as well as habitat creation and enhancement of retained habitats for birds.

## 7.2 Method Statement

### 7.2.1 Protection of Nesting Birds

Where construction works and activities require vegetation clearance with the potential to be used by nesting birds this will be removed outside the breeding season (i.e. removal permitted from beginning of September through to February inclusive) as far as practically possible. If however, any clearance or removal of features offering potential nesting sites (i.e. trees, hedgerows or ponds) is necessary during the bird breeding season this will only be permitted immediately following a check for nesting birds by a suitably qualified ecologist. Any nests found to be in current use will be left and an appropriate buffer zone maintained around such a nest until such time as any young have fledged. The size of any buffer zone will be based specifically on the species

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<sup>12</sup> Red list species are those that are Globally Threatened according to IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recovery.

<sup>13</sup> Amber list species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose populations has declined historically but made a substantial recovery; rare breeders; and those with international important or localised populations.

<sup>14</sup> Colhoun, K. & Cummins, S. (2013). *Birds of Conservation Concern 2014-2019*. Irish Birds, 9: 523-544.

found to be nesting within any given area and the nature of the proposed construction works and activities in proximity to the nest site.

Minimising impacts to breeding ground-nesting birds will require careful consideration. The timing of preparation of the site will become an important issue as their breeding habitat cannot be easily removed through vegetation stripping alone. Whilst vegetation stripping should ideally be undertaken outside the bird breeding season even where this can be achieved, or where this cannot be avoided consideration will be made to provide additional methods to deter birds from specific areas (i.e. use of bunting). If any nests are found within the bird breeding season an appropriate sized exclusion zone around all such nest sites will be established and no works within this zone will be allowed until such time as the young have fledged.

## **7.2.2 Habitat Creation and Enhancement**

Consideration will be made to erect a range of different type of bird boxes (number to be agreed) within the retained woodlands and hedgerows that potentially will be used by various passerine species.

It is anticipated that habitat creation and enhancement as part of mitigation and compensation proposals for other species will also have benefits over time for a range of bird species for a wide range of bird species. In addition, the implementation of low-intensity agricultural management across DGL's landholding and the long-term management of habitats, for example blanket bog, will also provide a degree of compensation to the habitats lost through the gold mine development.

## **7.3 Monitoring and Surveillance**

### **7.3.1 Pre-construction Works**

It is considered that the environmental conditions for birds within the proposed infrastructure site are not likely to significantly change from the date of the baseline surveys, including the breeding bird surveys (2015 and 2016) and wintering bird survey (2015/16), to the anticipated onset of construction works and activities in early 2020. Therefore it is not proposed to carry out any pre-construction monitoring of individual bird species and the use of the proposed infrastructure site by birds.

### **7.3.2 During Construction Works**

No specific monitoring programme for birds will be carried out at the proposed infrastructure site during the construction phase with the exception of any nesting checks in any bird boxes erected within the infrastructure site.

The usage of the site by birds may also be recorded on an ad hoc basis during other monitoring programmes for other key species.

### **7.3.3 Post-construction Works and during the Operation of Gold Mine**

The long-term management of blanket bog areas will be implemented through a separate Management Plan for these areas that will include management prescriptions and performance indicators for key species of birds associated with this habitat-type.

No other specific monitoring programme for birds is proposed at the proposed infrastructure site during the operation of the gold mine, with the exception of inspection of any erected bird boxes and their replacement where these may become damaged.

## 7.4 Provisional Work Schedule

Any stripping of ground vegetation will be dependent upon other mitigation and compensation strategies in particular for common lizard and smooth newt.

The installation of bird boxes will commence at the earliest opportunity prior to the onset of construction works and activities.

## 8.0 COMMON LIZARD

### 8.1 Introduction

#### 8.1.1 Baseline Summary

A survey for common lizard carried out in 2016 confirmed the presence of this species within a wide range of habitat-types, including mire, marshy grassland, dry acid grassland and on an earth bank within the proposed infrastructure site. It is likely that this species is widely distributed throughout all suitable habitat areas within the proposed infrastructure site even where animals were not recorded during the survey.

Based on a peak count of two individuals, recorded on 31<sup>st</sup> May 2016, the proposed infrastructure site is considered to support a low population size class of common lizard.

#### 8.1.2 Legislative Context

The common lizard (*Zootoca vivipara*) is afforded protection under Schedules 5, 6 and 7 of the Wildlife (Northern Ireland) Order 1985 (as amended) that fully protects this species and its habitat, that amongst other actions, makes it an offence to intentionally or recklessly:

- kill, injure or take a common lizard;
- damage, destroy or obstruct access to any structure or place that a common lizard uses for shelter or protection;
- damage or destroy anything which conceals or protect any structure or place that a common lizard uses; and
- disturb a common lizard whilst it is occupying a structure or place which it uses for shelter or protection.

Planning Policy Statement 2 (PPS2): Natural Heritage, published in July 2013 states that planning permission will only be granted for a development proposal that is not likely to harm a statutorily protected species, that includes the common lizard, and which can be adequately mitigated or compensated against.

The common lizard is listed as a Northern Ireland Priority Species.

#### 8.1.3 Summary of Potential Impacts

The proposed gold mine development will result in the direct loss of habitat confirmed as supporting a low population size class of common lizard. In the absence of mitigation and compensation measures, there is a risk of direct injury or mortality to individual animals which is likely to have a significant effect on the local population status of this species evaluated as being of Local (higher) value.

## 8.2 Mitigation Strategy Overview

The mitigation strategy for common lizard is designed to ensure that all reasonable efforts are taken to mitigate and compensate for the loss of habitat confirmed as supporting, or which is likely to support common lizard in order to:

- ensure the protection of individual animals from being killed or injured during construction works and activities; and
- to ensure there is no net reduction in the conservation status of the local common lizard population in the medium to long-term as a result of the gold mine development through the capture and removal of animals from within the development footprint area to an alternative safe area that provides suitable

habitat that is of a sufficient size with adequate carrying capacity for the anticipated number of animals to be relocated, and with connectivity to other suitable habitat for common lizard.

An overview of the proposed mitigation actions detailed below including areas to be to be excluded and cleared of common lizards are presented in Figure 8.1.

## 8.3 Draft Method Statement

In order to protect common lizards from harm during construction works and activities, current best practice guidelines for example in the Herpetofauna Workers Manual<sup>15</sup> will be followed to exclude and capture animals from within the footprint of the development and translocate all capture animals to a safe area within another part of the proposed infrastructure site.

It is proposed that the works to exclude, capture and translocate common lizard will be largely undertaken in conjunction with the mitigation / compensation works required for the smooth newt as described in Chapter 9.0 of this EcMMP.

### 8.3.1 Selection of Receptor Site

The location of the proposed receptor site is proposed to be a series of fields lying to the west of the proposed DSF that will retained as part of the gold mine development (Figure 8.1). This area will be enhanced, maintained and managed as safe area for common lizard throughout the construction and operation of the gold mine.

The receptor site has been selected on the basis that released lizards will be within the natural range of the existing population at this site, it provides an area of sufficient size with existing suitable habitat and/or opportunities to enhance existing habitat for common lizard, provides opportunities to create new habitat features in order to increase the carrying capacity of this areas for common lizard prior to the release of any animals, and will be safe from future development activities. The habitats that are currently present in these areas are considered to be largely suitable for common lizard without the need for any large scale and significant enhancement programme but it is proposed that features are created for the benefit of this species.

Although the receptor site may already support common lizard, it is considered that there will be sufficient carrying capacity at this site and with opportunities for common lizards to expand into other areas including any peatland habitats that are proposed to be created to the north of the receptor site..

No construction works or activities associated with the gold mine development will take place within the defined receptor site.

A temporary barrier to prevent the movement of common lizard from the receptor site to the lands to the north, proposed for peatland habitat creation, will be installed (see fencing specification detailed below). This fencing would remain in-situ only until such time as these habitat creation works have been completed. Following the removal of any temporary fencing there will be no barrier to the movement of common lizards to and from the receptor site with any release animal able to move freely throughout the wider surrounding countryside.

It will be not be necessary to install any other temporary barriers at the receptor site that would prevent the movement of common lizards.

There will be no grazing of the receptor site during the construction phase of the gold mine and will only be re-introduce on a low-density basis after a minimum of one year on completion of all construction works.

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<sup>15</sup> Froglife (1999). Common lizard Survey: An Introductin to Planning, Conducting and Interpreting Surveys for Snakes and Lizard Conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

### 8.3.2 Preparation of the Receptor Site for Common lizards

Prior to the onset of any site preparation or construction works and ideally at least one growing season, the retained grassland fields will be managed to create a largely rank sward with some variation in structure suitable to receive common lizard.

This will be achieved through the cessation of any grazing and exclusion of livestock. Some areas of the fields will be subject to a cutting regime (leaving an average sward height of 20 cm) whilst other areas will be left alone (i.e. field edges) to allow the development of a variable sward across all fields and in order to provide suitable conditions for common lizard based on their habitat preferences.

The grassland swards will be enhanced at HE7 (6.53 ha) will be enhanced through the sowing of a commercially available or bespoke wildflower seed-mix locally sourced in Northern Ireland which is suitable for the soil-type within these areas. Consideration will be given for the inclusion of ling in the seed mix, or through the collection of seed from adjacent areas supporting blanket bog or wet heath habitat. The aim will be to encourage the succession away from marsh / marshy grassland back to acid grassland or heath.

Hibernacula (minimum of three) will be constructed at key locations that will be constructed using stones and other materials sourced within the proposed infrastructure site that will be covered with stripped earth and turves leaving open the base of the pile. The constructed hibernaculum will be of a minimum dimension of 6 m long, 2 m wide and 1 m high and will be constructed prior to any capture and release of common lizards. Consideration will be made to construct further hibernacula at the receptor site during the clearance of common lizard from the areas to be affected by construction activities with an additional hibernacula constructed if >50 individual animals have been captured.

The receptor site will be actively managed for common lizards during the lifetime of gold mine either by rotational cutting of areas of vegetation or through restricted and low intensity grazing in order to maintain a variable sward structure and height across these fields which will be suitable for common lizard.

### 8.3.3 Minimising the Risk of Common lizards being Killed or Injured

A comprehensive capture and removal strategy will be employed in areas where construction activities are proposed and where there is a risk of common lizard being present.

This is necessary in order to minimise the risk of common lizards being killed or injured during the construction activities associated with the gold mine development. This work will be carried out in conjunction with and using similar techniques as for the capture and removal of smooth newts described in Chapter 9.0 as the habitat occupied by these species are similar.

The exclusion of common lizard from areas of habitat that will be affected by construction activities will be achieved through the use of temporary or semi-permanent reptile proof fencing. The fencing design will be in line with current standard guidelines for amphibian fencing<sup>16</sup> and will consist of 1 m wide polythene with a high resistance to ultra-violet light degradation supported with wooden stakes at approximately 1.2 m intervals. The fence will form a barrier standing approximately 600 mm above ground, with up to 300 mm buried vertically below ground, and the 100 mm forming an overlap on top of the fence facing away from the area to be cleared to prevent animals climbing over and back into the excluded area. Special consideration will be given to ensure surface water run-off is not allowed to back up behind any fence to minimise the risk of localised inundation of habitats and prevent damage to the fencing.

<sup>16</sup> English Nature, (2001). *Smooth newt Mitigation Guidelines*. English Nature, Peterborough.

All temporary and semi-permanent exclusion and drift fencing will be inspected and maintained weekly by the licence holder or appointed ECoW during periods when common lizards are most likely to be active (February to October inclusive) and monthly outside this timeframe throughout any NIEA licence period.

Prior to installation of fencing, areas of thick vegetation, which will be disturbed during the installation process and which could provide cover for common lizard will be strimmed / brush-cut several days in advance to 'displace' animals. Likewise, hand searches of potential areas of refuge will also be undertaken to prevent harm to any animals seeking shelter in these areas.

Artificial refugia (typically 1 m x 1m in size) comprising of carpet tiles and/or sheets of roofing felt will be set out within any exclusion compartment to be cleared, exceeding the minimum recommended density of 50 refuges / ha, to aid the capture of animals by hand.

Based on low common lizard populations, the capture scheme will run for a minimum of 30 visits, followed by a minimum of five clear visits with no common lizards being captured when common lizards are active and during suitable weather conditions. Please note that visits do not have to be on successive days to reduce the chances of unsuitable weather conditions during the capture exercise.

Following five clear visits at the end of the 30 day captured period the exclusion compartment will be considered clear of common lizards.

During the capture scheme, habitats within each compartment may be strimmed of tall grass and other existing refugia removed to provide fewer areas for common lizards to seek shelter and therefore allowing capture effort to be concentrated in smaller areas. This will increase the habitat *area:capture* effort ratio.

Habitats cleared of common lizard will be removed or modified by vegetation stripping immediately after clearance, subject to requirements of the smooth newt mitigation, to reduce the risk of common lizards re-colonising cleared areas.

The receptor site for any captured common lizards will be adjacent and similar as the receptor site for smooth newt. It has been selected on the basis that it will be within the natural range of the population at the proposed infrastructure site and that it will provide suitable and safe habitat for this species in the long term.

All captured common lizards will be transported to and released at the receptor site in proximity to one of the hibernacula and released as soon as is practically possible following capture.

Wherever practically possible all exclusion fencing around the perimeter of the development site will be left in-situ until the completion of all construction activities to minimise the risk of common lizards re-colonising the areas cleared.

## 8.4 Monitoring and Surveillance

### 8.4.1 Pre-construction Works

It is considered that the environmental conditions for common lizards within the proposed infrastructure site are not likely to significantly change from the baseline survey carried out in 2016 to the anticipated onset of construction works and activities in early 2020. Therefore it is not proposed to carry out any further pre-construction monitoring of common lizard at the proposed infrastructure site.

### 8.4.1 Construction, Post-construction and Operational Phases

Annual monitoring surveys will be carried out on the receptor site over a five-year period, considered best practice by Herpetofauna Groups of Britain & Ireland (HGBI)<sup>17</sup>. The surveys will comprise of seven one-day visits each year between April and September, in accordance with published best practice guidelines<sup>18</sup> and commence the year following the successful clearance of all habitats within the development footprint of the gold mine development.

A series of artificial refuges will be placed on site in the first year and which will be maintained on site through the duration of the monitoring period at a density of 10 per ha. The monitoring would start in the year following the clearance of all areas with the development footprint of the gold mine development.

A short report detailing the results of the annual monitoring will be sent to NIEA, the licensing office.

## 8.5 Provisional Work Schedule

The construction works for the proposed above ground infrastructure are anticipated to start in Spring 2020 but which is dependent upon the granting of planning consent and any other licences and consents required for the operation of the gold mine. Based on this date the following provisional work schedule for common lizard mitigation / compensation is presented in Table 8-1. This provisional work schedule takes into account when common lizards are likely to be active (February to October).

**Table 8-1: Provisional Work Schedule for Common Lizard Mitigation and Compensation**

Task	Description	Responsibility and Key Personnel	Provisional Timing
1	Cessation of grazing at the proposed receptor site	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
2	Obtain agreement from NIEA on the proposed mitigation strategy and detailed method statement	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
3	Application for an appropriate licence from NIEA	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
4	Cutting of vegetation to create a variation in the sward	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
5	Creation of artificial hibernacula	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
6	Enhancement of grassland through the sowing of a wildflower seed mix	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works

<sup>17</sup> HGBI (1998). *Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practise and Lawful Standards*. HGBI advisory notes for Amphibian and Common lizards Groups (ARGs), HGBI, c/c/ Froglife, Halesworth, Ullapool.

<sup>18</sup> Froglife (1999) *Common lizard Survey: An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation*. Froglife, Oxford.

Task	Description	Responsibility and Key Personnel	Provisional Timing
7	Installation of common lizard exclusion fencing, habitat manipulation in the areas to be cleared and laying of artificial refugia	Ecologist in collaboration with DGL	Year 1
8	Start of common lizard capture and clearance from areas of construction activities and release of any capture animals at the receptor site	Ecologist in collaboration with DGL	Year 1 / Year 2
9	Monitoring of common lizard population at receptor site	Ecologist in collaboration with DGL	Annually (between April and September) for five years post translocation

## 9.0 SMOOTH NEWT

### 9.1 Introduction

#### 9.1.1 Baseline Summary

A survey for smooth newt carried out in 2015 recorded smooth newts using two ponds within the proposed infrastructure site for breeding purposes. The artificial refugia laid as part of the common lizard survey in 2016 was also used to survey the terrestrial habitats around these ponds for smooth newts.

Based on the peak number of 42 adults recorded on 7<sup>th</sup> July 2016 under artificial refuges laid as part of a smooth newt survey, it is considered that the Ponds 1 and 2 and the surrounding terrestrial habitats support a good population size class of smooth newts that is evaluated as being of County value.

Common frog, evaluated as being of Local (higher) value, is present and widely distributed across the proposed infrastructure site found in all types of habitats and breeding in most of all the ditches and other water filled depressions across this entire site.

#### 9.1.2 Legislative Context

##### Smooth Newt

The smooth newt (*Lissotriton vulgaris*) is afforded protection under Schedules 5, 6 and 7 of the Wildlife (Northern Ireland) Order 1985 (as amended) that fully protects this species and its habitat, that amongst other actions, makes it an offence to intentionally or recklessly:

- kill, injure or take a newt;
- damage, destroy or obstruct access to any structure or place that a newt uses for shelter or protection;
- damage or destroy anything which conceals or protect any structure or place that a newt uses; and
- disturb a newt whilst it is occupying a structure or place which it uses for shelter or protection.

Planning Policy Statement 2 (PPS2): Natural Heritage, published in July 2013 states that planning permission will only be granted for a development proposal that is not likely to harm a statutorily protected species, that includes the smooth newt, and which can be adequately mitigated or compensated against.

The smooth newt is a priority species as listed in the Draft Fermanagh & Omagh Local Biodiversity Action Plan 2016-2020.

##### Other Amphibian Species

The common frog (*Rana temporaria*) receives limited protection under Schedule 7 of Wildlife (Northern Ireland) Order 1985 (as amended) from its sale, barter, exchange, transporting for sale and advertising to sell or to buy.

The common frog is a priority species listed in the Draft Fermanagh & Omagh Local Biodiversity Action Plan 2016-2020.

#### 9.1.3 Summary of Potential Impacts

The proposed gold mine development will result in the direct loss of the two confirmed breeding ponds and associated terrestrial habitat used by smooth newts, as well as common frog. This will require appropriate compensation measures to be implemented to ensure any development can proceed in compliance with current wildlife legislation and planning policies relating to the protection of smooth newts. Where there is a risk of an offence being committed under the Wildlife (Northern Ireland) Order 1985 (as amended) through

approved development there will be a requirement for any compensation works in respect to smooth newts to be carried out under a derogation licence issued by NIEA Wildlife Licensing.

## 9.2 Mitigation Strategy Overview

The mitigation strategy is designed to mitigate and compensate for the loss smooth newt breeding and terrestrial habitat during gold mine development. It will also ensure the protection of this species by avoiding smooth newts being killed or injured and ensuring there is not net reduction in the population to maintain the favourable conservation status of this species in a local, regional and national context in the medium to long-term.

Due to the legal protection of smooth newts, it is expected that the details of mitigation scheme presented here will be prepared as a formal Method Statement to support any NIEA licence and is based upon the following mitigation and compensation measures:

- to avoid smooth newts from being killed or injured by the use of a capture and removal strategy from areas of the site likely to contain smooth newts prior to areas being release for construction works;
- By ensuring there is no net reduction in the population size class within the site in the medium and long-term by retaining the population in the local vicinity by providing alternative breeding ponds, enhancement of retained terrestrial habitat and creation of features (i.e. providing artificial refuges and hibernacula close to newly created ponds) for smooth newts.

An overview of the proposed mitigation actions detailed below including areas to be to be excluded and cleared of smooth newts and the location of new pond are presented in Figure 9.1.

## 9.3 Draft Method Statement

The mitigation measures for smooth newts set out below is based on the presence of a good population confirmed as present and breeding two ponds with the proposed infrastructure site and for areas where construction works have the potential to result in the loss and disturbance of suitable terrestrial habitat for smooth newts within the intermediate terrestrial habitat and beyond (estimated up to a distance of 700m) these breeding ponds to ensure no animals are harmed and there is no net reduction in the local smooth newt population caused through construction activities.

This will require the capture and removal of animals from habitats to be lost and disturbed through the gold mine development under an appropriate NIEA licence and relocation to a safe area. The receptor site would be enhanced through appropriate management actions in order to provide maintain suitable breeding habitat and terrestrial habitats prior to the release of any animals.

A full and detailed method statement will be produced as part of any NIEA licence application. An overview of the proposed mitigation actions detailed below.

### 9.3.1 Receptor Site Selection

The location of the proposed receptor site will be a series of fields lying to the west of the proposed DSFy that will be retained as part of the gold mine development (Figure 9.1). These areas will be enhanced, maintained and managed as a safe area for smooth newts throughout the construction and operation of the gold mine. There is a degree of crossover between the receptor site proposed for smooth newts and the receptor site for common lizard. However, this will not result in any conflicts between these two species.

The receptor site chosen to receive any captured smooth newts has been selected on the basis that it will be within the natural range of the population at the proposed infrastructure site, it provides suitable terrestrial habitat for smooth newts and provides the potential for the creation of breeding habitat.

The existing habitats in the receptor site are considered to be largely suitable for smooth newts, but it is proposed to enhance the grasslands to improve the biodiversity value of these fields along with some other features proposed for the benefit of this species.

Although these terrestrial areas may already support smooth newts it is considered likely that these will form part of the same population breeding within the proposed infrastructure site given the lack of ponds in the wider surrounding area and that there will be sufficient carrying capacity at this site. The surrounding terrestrial habitats outside DGL's landholding are also considered suitable for smooth newt as will be the peatland habitats that are proposed to be created to the north of the receptor site.

No construction works or activities associated with the gold mine development will take place within the defined receptor site.

A temporary barrier to prevent the movement of smooth newts from the receptor site to the lands to the north, proposed for peatland habitat creation, will be installed (see fencing specification detailed below). This fencing would remain in-situ only until such time as these habitat creation works have been completed. Following the removal of any temporary fencing there will be no barrier to the movement of smooth newts to and from the receptor site with any release animal able to move freely throughout the wider surrounding countryside.

It is considered that low-density grazing of the receptor site will continue both pre-construction and throughout the duration of the construction phase of the gold mine development.

### 9.3.2 Pond Creation

It is proposed that two ponds will be created within the receptor site and one pond created outside but in close proximity to the receptor site within the area proposed to be used as the receptor site for common lizard.

These proposed pond locations are within areas of marshy grassland and where tests carried out have indicated the ponds are likely to hold water. The existing topology of this area will also ensure that the localised drainage will be towards the newly constructed ponds. However, due to the variability of soil depths it may be necessary to excavate into subsoil material and the ponds lined to ensure they remain wet.

The profile of the ponds will be designed for the benefit of amphibians; with shallow, gently sloping sides with occasional shelved areas to provide growing platforms for submerged and emergent plants. The pond will have a central deep section of up to 1.5m deep that will be designed to remain free of vegetation and provide open water for courtship displaying.

The marginal zone will be planted with a mixture of aquatic and wetland species suitable for the pond conditions and from local provenance stock, or the use of pre-planted coir rolls.

The bare areas of the upper banks will be seeded with tussock forming grasses and wetland wildflower seed-mix to rapidly stabilise these area; preventing erosion and encouraging the development of well vegetated banks. The area around the ponds will have temporary stock proof fencing installed until such time as the bankside and marginal vegetation has fully developed.

All ponds will be constructed, planted and given time to establish prior to any capture of smooth newts from areas within the footprint of construction activities and release at the receptor site.

### 9.3.3 Terrestrial Habitat Creation and Enhancement

The existing habitats present in the receptor site are considered largely suitable habitat for smooth newt that apart from marshy grassland includes. Although the existing habitats in the receptor site, comprising of marsh / marshy grassland, a block of conifer plantation woodland, semi-improved grassland and earth stone / banks and are considered to be largely suitable for smooth newts, it is proposed to enhance the grasslands to improve the biodiversity value of these fields. Enhancement is proposed to: 1.23 ha of semi-improved

grassland at HE5; and 5.13 ha of marsh / marshy grassland at HE6 through either the sowing of a commercially available or bespoke wildflower seed-mixes locally sourced in Northern Ireland which are suitable for the soil-type within these areas and differentiated between damp and drier areas.

Consideration will be made to translocate some species-rich turves from area supporting M23a mire habitat within the footprint of the construction activities to part of the receptor site where conditions are favourable and in areas where soft rush forms dense stands of vegetation, or through the collection of seed from these areas to be used as part of the enhancement works.

Excavated material from the pond construction would be used to create a dry raised platform to minimise the risk of flooding adjacent to each pond that would be used as the base for the construction of hibernacula. The hibernacula will be constructed using stones, logs and other materials sourced within the proposed infrastructure site that will be covered with stripped earth and turves leaving open the base of the pile. Each hibernacula will be of a minimum dimension of 3 m long, 2 m wide and 1 m high and will be constructed prior to any capture and release of smooth newts.

### 9.3.4 Capture, Exclusion and Transportation

A comprehensive capture and removal strategy will be employed in areas where construction activities are proposed and where there is a risk of smooth newts being present.

The exclusion of smooth newt from the development footprint supporting suitable habitat for this species will be achieved through the use of temporary or semi-permanent amphibian proof fencing. The fencing design will be broadly in line with current standard guidelines and will be of the same type proposed for common lizard consisting of 1 m wide polythene with a high resistance to ultra-violet light degradation supported with wooden stakes at approximately 1.2 m intervals. The fence will form a barrier standing approximately 600 mm above ground, with up to 300 mm buried vertically below ground depending on soil depths, and the 100 mm forming an overlap on top of the fence facing away from the area to be cleared to prevent animals climbing over. Where there is a risk of ponding forming behind any fencing, consideration will be made to install sections of permeable fencing with a fine mesh or other means of allowing water to flow out of such areas to minimise the risk of flooding in areas to be cleared and damage to any fencing.

All temporary and semi-permanent exclusion and drift fencing will be inspected and maintained weekly by the licence holder or appointed ECoW during periods when smooth newts are most likely to be active (February to October inclusive) and monthly outside this timeframe throughout any NIEA licence period.

Prior to installation of fencing, areas of thick vegetation, which will be disturbed during the installation process and which could provide cover will be strimmed / brush-cut several days in advance to 'displace' animals. Likewise, hand searches of potential areas of refuge will also be undertaken to prevent harm to any animals seeking shelter in these areas.

Smooth newts will be captured by a combination of methods including pitfall trapping, hand searches of placed artificial refuges, hand searches of terrestrial habitat, netting of ponds and the destructive searching of terrestrial and aquatic habitats.

Pitfall traps will be installed at strategic locations along exclusion and drift fences. The pitfall traps will be comprised of plastic buckets with snap-on lids and with a minimum depth of 300 mm. Pitfall traps will be buried into the ground so that the top of the bucket is just above ground level (up to 20 mm) to prevent any bucket filling with water. Soil, subsoil or sand will be placed around the edge of the bucket to create a ramp around bucket rim and the surrounding land. The lids will be propped open above the buckets to minimise the amount of rainfall entering the bucket. Each bucket will have some fresh vegetation covering its base to avoid the desiccation, or predation of captured animals as well as a suitable 'mammal ladder' such as a stick or garden cane to allow any small mammals an escape mechanism. Due to the localised climate and ground conditions especially in peat any buckets found to be containing water would be emptied as part of the check for any captured amphibians.

Where the depth of soils will prevent the use of conventional pitfall traps, it is proposed that sections of modified plastic piping with a broadly C-shaped cross section will be used to create linear pitfall traps across these areas. These shall be laid down on the ground, with soil piled either side to form ramps (raised trenches) leading up to the opening at the top that would capture any newts falling into these open channels. The plastic piping will be at least 150 mm in depth with overhanging ledges on both sides to prevent newts from climbing the walls and escaping. Each end of the pipe will also be blocked to prevent newts from exiting at either end once they have fallen in such a trap. Consideration will be made to provide a cover of these traps to prevent these from filling with water during rainfall events.

The above methods for the capture of smooth newts will also be used for the capture of common frogs.

All traps left open overnight will be checked each following morning. If pitfall traps are not to be in operation for any period of time they will be closed by means of the snap-on lids.

As a supplementary technique to pitfall trapping, artificial refuges consisting of carpet tiles, roofing felt or similar materials will be placed within the areas to be cleared. Refuges will be searched by hand and any newts found removed.

Any captured amphibians will be transported to the receptor site as soon as practically possible. All animals will be transported in suitable plastic containers which will provide an adequate air supply and protection from the elements and containing damp vegetation. All species of captured amphibian will be transported to the receptor site in different containers. All animals will be released at pre-defined areas within the receptor site.

Where animals are captured in aquatic habitats, these will be transported to the receptor site in containers along with water from where they were taken. Adults, juveniles and larvae will be transported in separate containers with the larvae additionally separated into large and small size classes to minimise the risk of cannibalism during the period held. Amphibians captured in water will be released directly into one or more of the existing ponds at the receptor site.

All captured amphibians will be handled with wet hands. Additional precautions will be taken to prevent the spread of amphibian related diseases (i.e. disinfecting of equipment and boots).

Based on the assessment of a good population size class of smooth newt, the habitats at the site and the proposed rate of trapping it is considered that a minimum capture period of 30 suitable days during the active season is suitable at the proposed infrastructure site. At the end of the 30 suitable days (i.e. night temperature  $>5^{\circ}\text{C}$  and where ground conditions remain damp) no further capture effort will be deemed necessary when there has been at least 5 suitable capture days with no smooth newts being found during this period. It is anticipated the same timeframe will be suitable to ensure any common frog population is captured and removed.

Following an appropriate level of search effort by means of pitfall trapping, refuge searching and other supplementary techniques areas of terrestrial habitat may be subject to hand and destructive searches prior to the release of an area of the site to construction activities. Destructive searches will include the stripping of vegetation, removal of materials and other debris, excavation of mammal burrows and the draining of ponds and searches made of vegetation and silt.

Wherever practically possible all exclusion fencing around the perimeter of the construction site will be left in situ until the completion of all construction activities to minimise the risk of smooth newts re-colonising the areas cleared.

## 9.4 Monitoring and Surveillance

### 9.4.1 Pre-construction Works

It is considered that the environmental conditions for smooth newts within the proposed infrastructure site are not likely to significantly change from the baseline survey carried out in 2015/16 to the anticipated onset of construction works and activities in early 2020. Therefore it is not proposed to carry out any further pre-construction monitoring of smooth newts at the proposed infrastructure site.

### 9.4.2 Construction, Post-construction and Operational Phases

Annual monitoring surveys will be carried out at the receptor site over a four year period based on the population size class. The monitoring programme will be based on at least two survey visits to the receptor site during the breeding season (i.e. end of February to mid-June) and in suitable weather conditions to confirm, wherever practically possible, evidence of breeding activity and to estimate the population size class of smooth newt and common frog through direct counts of adults or in the case of common frog through the number of spawn clumps found. An assessment would also be made of each breeding pond to inform where further management is likely to be required to maintain optimum breeding habitat at these features.

A short report detailing the results of the annual monitoring will be sent to NIEA, the licensing office.

## 9.5 Provisional Work Schedule

The construction works for the proposed above ground infrastructure are anticipated to start in Spring 2020 but which is dependent upon the granting of planning consent and any other licences and consents required for the operation of the gold mine. Based on this date the following provisional work schedule for smooth newt mitigation / compensation is presented in Table 9-1. This provisional work schedule takes into account when smooth newts are likely to be active (February to October).

**Table 9-1: Provisional Work Schedule for Smooth Newt Mitigation and Compensation**

Task	Description	Responsibility and Key Personnel	Provisional Timing
1	Obtain agreement from NIEA on the proposed mitigation strategy and detailed method statement	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
2	Application for an appropriate licence from NIEA	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
3	Pond creation and construction of artificial hibernacula	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
4	Supplementary planting of aquatic and wetland species and sowing of banks	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works
5	Enhancement of grassland through the sowing of a wildflower seed mix	Ecologist in collaboration with DGL	On approval of planning permission and before the onset of construction works

Task	Description	Responsibility and Key Personnel	Provisional Timing
6	Installation of amphibian exclusion fencing, habitat manipulation in the areas to be cleared and laying of artificial refugia	Ecologist in collaboration with DGL	Year 1
7	Start of amphibian capture and clearance from areas of construction activities and release of any capture animals at the receptor site	Ecologist in collaboration with DGL	Year 1 / Year 2
8	Translocation of turves from areas supporting species-rich M23a vegetation communities	Ecologist in collaboration with DGL	On clearance of smooth newts from habitat areas
9	Monitoring of smooth newt population at receptor site	Ecologist in collaboration with DGL	Annually for four years post translocation

## 10.0 NON-NATIVE INVASIVE PLANT SPECIES

### 10.1 Introduction

#### 10.1.1 Baseline Summary

A small stand of Himalayan balsam (*Impatiens glandulifera*) is present within the proposed infrastructure site outside the proposed gold mine development footprint.

#### 10.1.2 Legislative Context

The Wildlife (Northern Ireland) Order 1985 (as amended) contains measures for preventing the establishment of species not native to Northern Ireland and which may be detrimental to native wildlife. It prohibits the release of animals and the planting of plants listed on Schedule 9 of the Order. Himalayan balsam is one of the species listed on Schedule 9.

#### 10.1.3 Mitigation Strategy Overview

The mitigation strategy for Himalayan balsam is to eradicate this species from the proposed infrastructure site as well as keep all other areas of DGL's landholding free of this species and other invasive non-native species throughout the lifetime of the gold mine.

### 10.2 Method Statement

Prior to any site preparation and construction works being undertaken at any location within the application site an inspection will be made for any evidence of non-native invasive species of flora.

Where any non-native invasive species are recorded these will be appropriately treated to ensure their eradication prior to any construction works taking place.

#### 10.2.1 Himalayan Balsam

The existing stand of Himalayan balsam in the proposed infrastructure site will be treated through hand-pulling of individual plant at regular intervals from the submission of the planning application and until such time that this plant is deemed to have been eradicated.

All hand-pulling of plants will take place before any individual plant has the chance to flower and set seed.

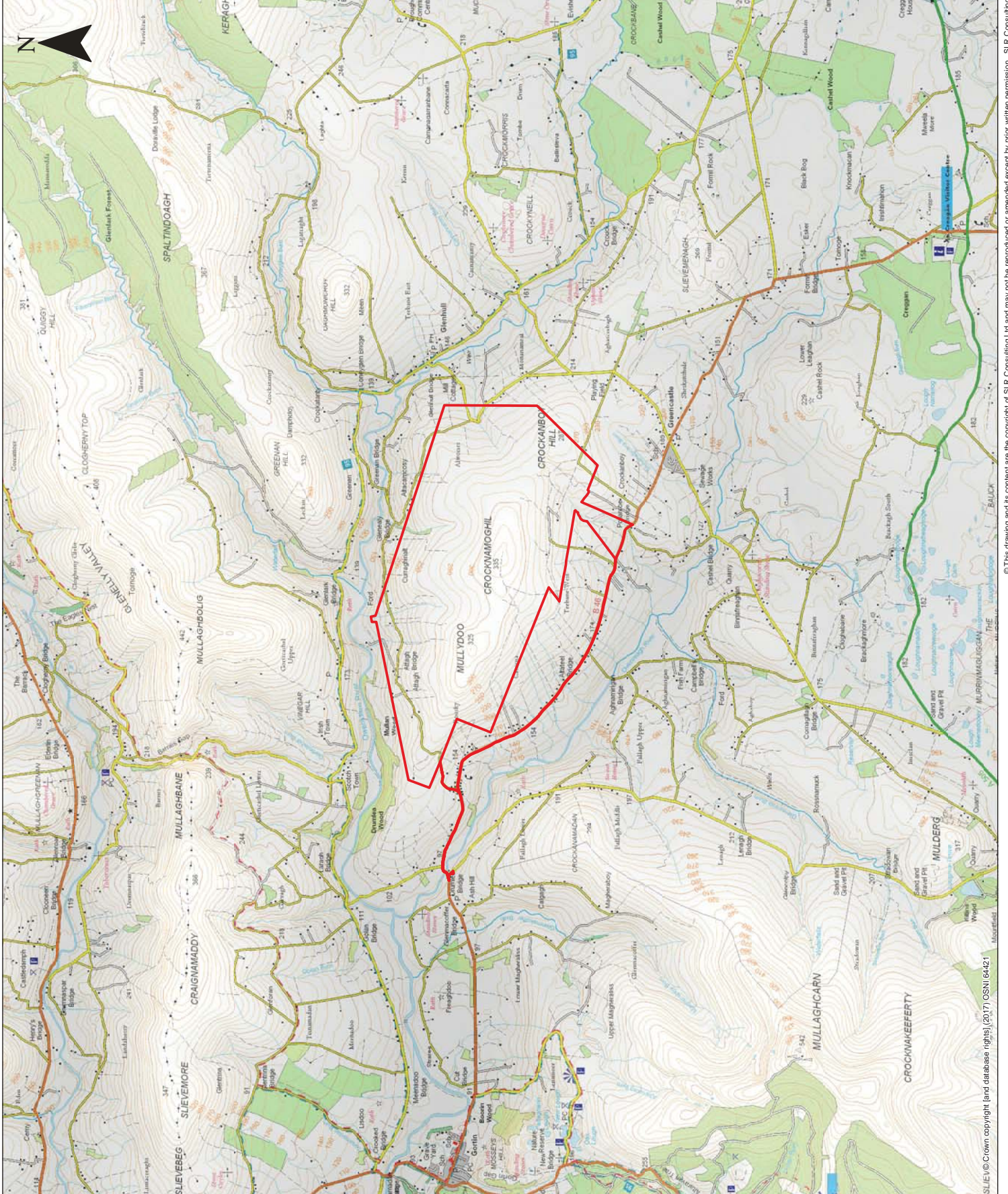
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## FIGURES

LEGEND



APPLICATION BOUNDARY



# DALRADIAN GOLD



46 LOCHSIDE VIEW  
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CURRAGHINALT GOLD PROJECT,  
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ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN

LOCATION OF THE  
CURRAGHINALT PROJECT

FIGURE 1.1

Scale 1:50,000 @ A3 Date SEPTEMBER 2017

LEGEND



# DALRADIAN GOLD

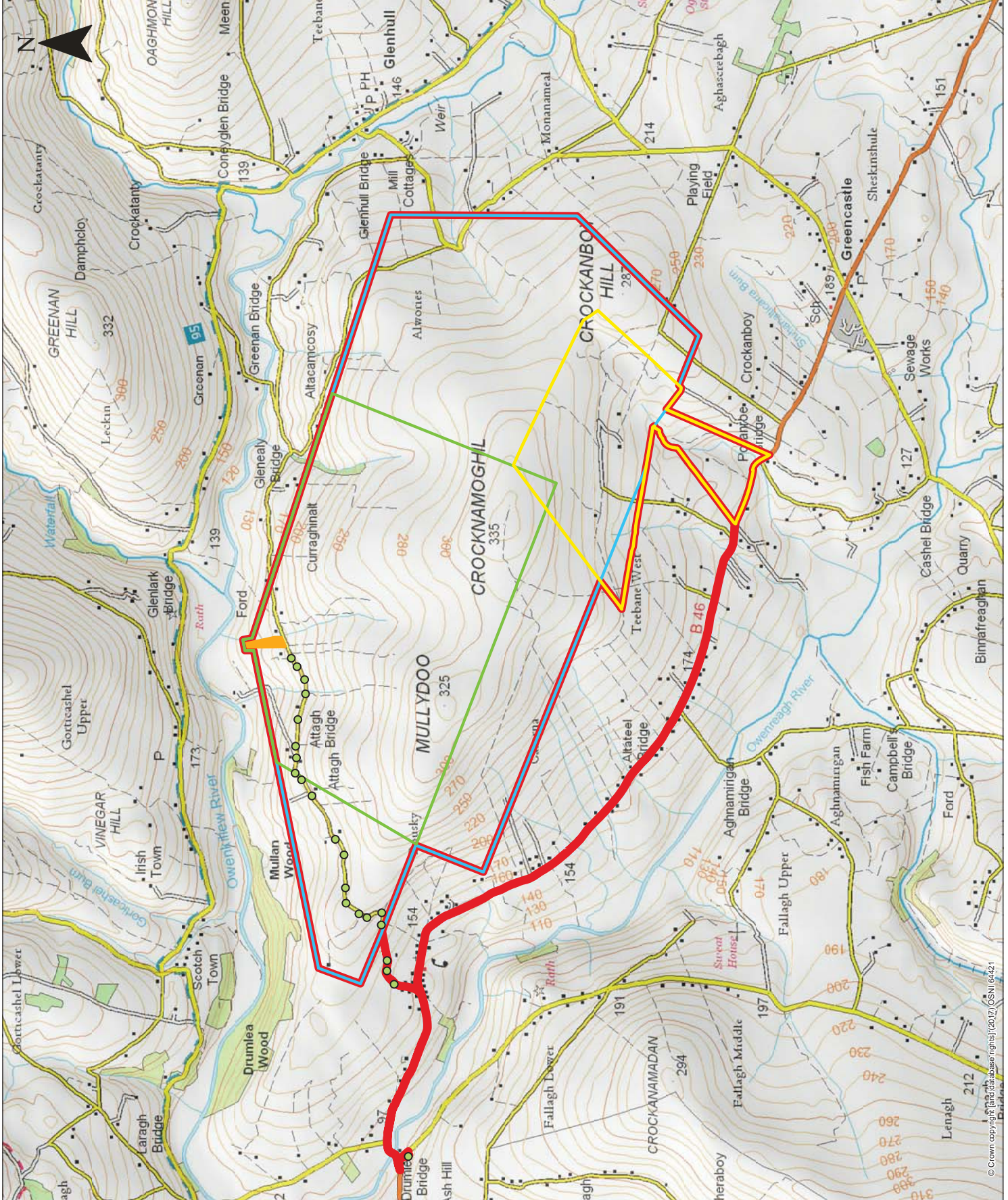


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COMPONENT PROJECT  
SITES

FIGURE 1.2

Scale 1:25,000 @ A3 Date SEPTEMBER 2017



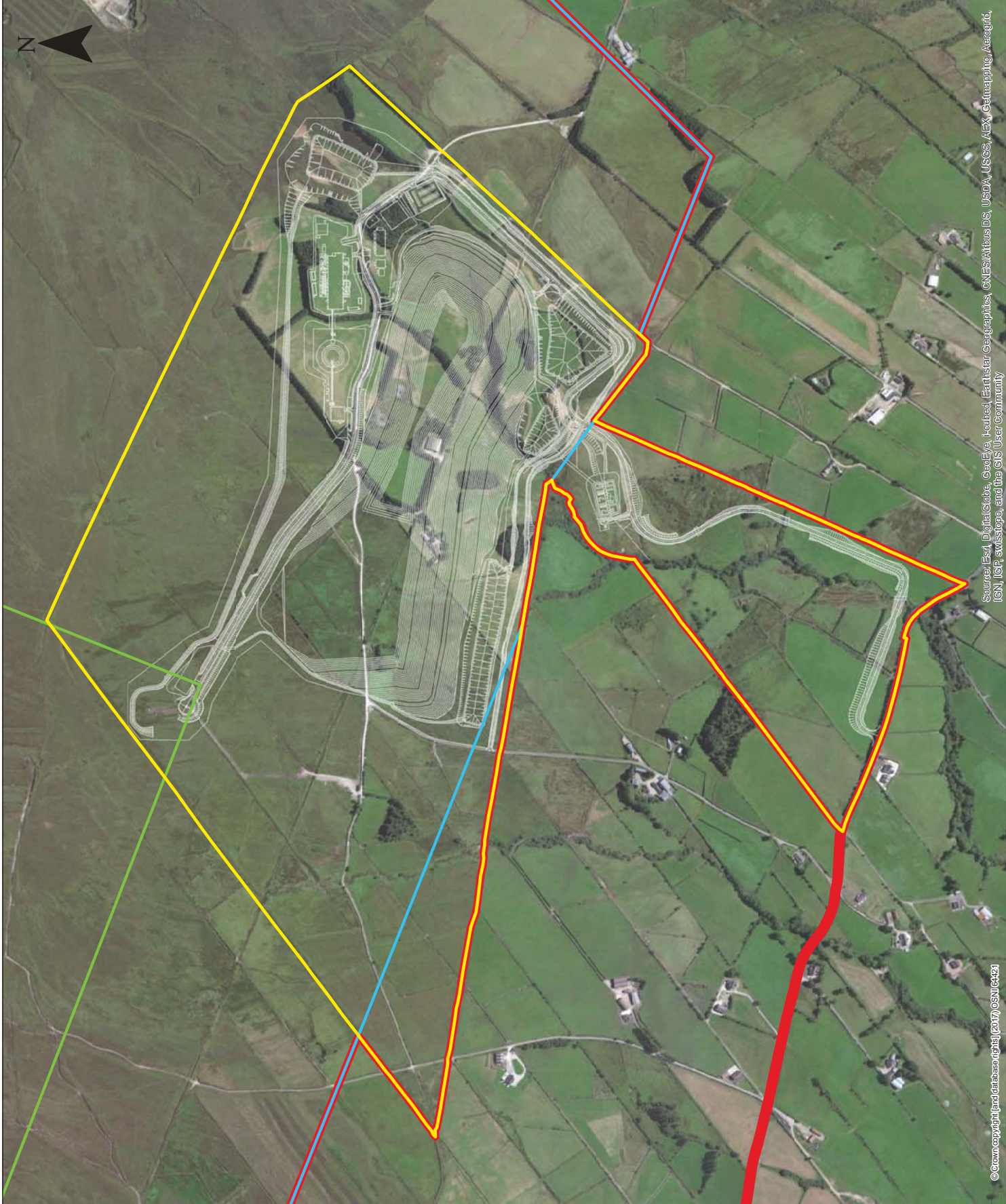
2036.00379 Fig 1 Location of Study Area and Waterbodies Surveyed

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 PROPOSED INFRASTRUCTURE SITE (AREA A)  
 PROPOSED MINERAL EXTRACTION AREA (AREA B)  
 PROPOSED MINERAL EXPLORATION AREA (AREA E)  
 SURFACE INFRASTRUCTURE LAYOUT



**DALRADIAN**  
**GOLD**



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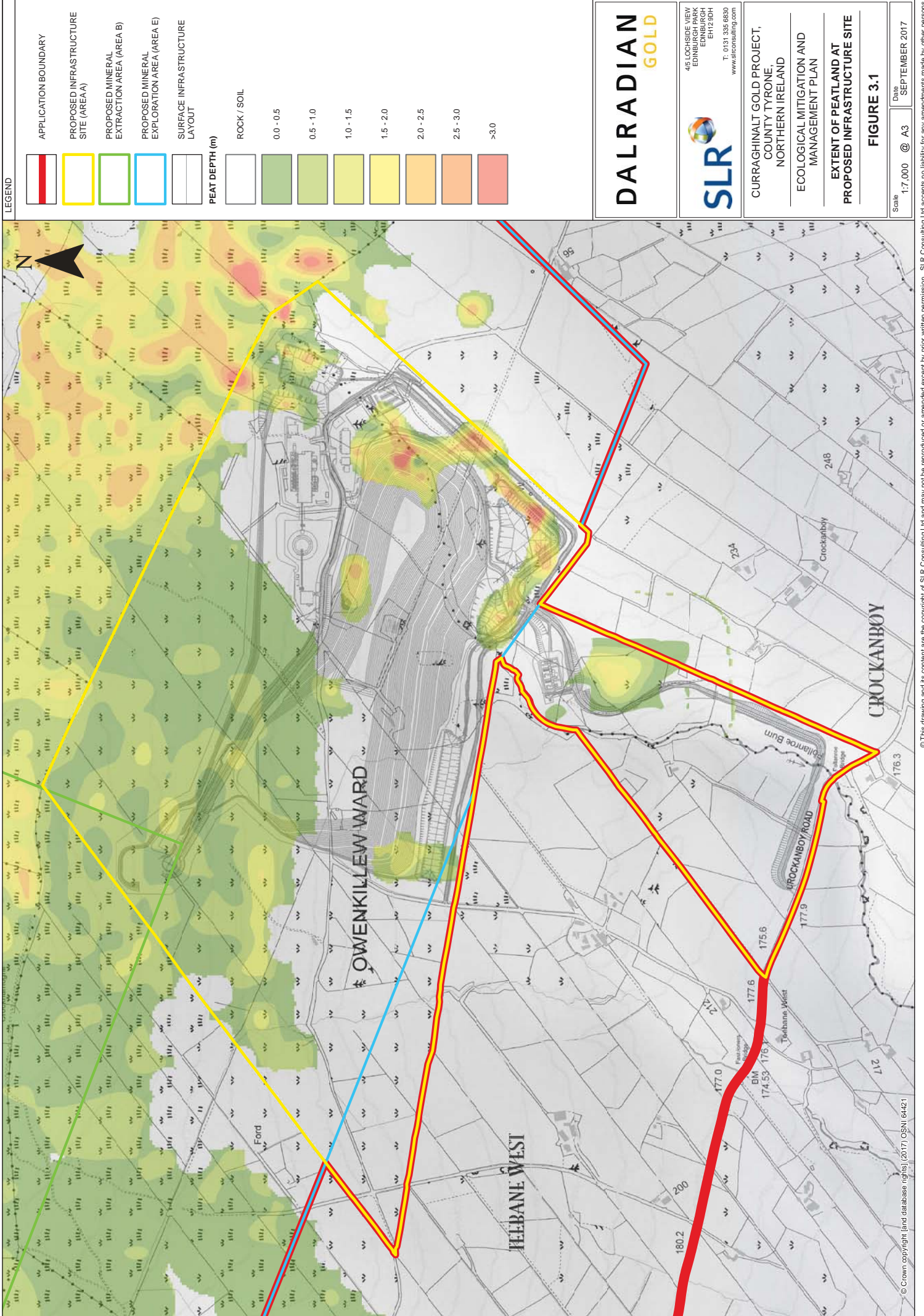
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 ECOLOGICAL MITIGATION AND  
 MANAGEMENT PLAN

**ABOVE GROUND DEVELOPMENT AT  
 THE PROPOSED INFRASTRUCTURE SITE**

**FIGURE 2.1**

Scale 1:7,000 @ A3  
 Date SEPTEMBER 2017

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**LEGEND**

- APPLICATION BOUNDARY
  - PROPOSED INFRASTRUCTURE SITE (AREA A)
  - PROPOSED MINERAL EXTRACTION AREA (AREA B)
  - PROPOSED MINERAL EXPLORATION AREA (AREA E)
  - SURFACE INFRASTRUCTURE LAYOUT
- PEAT DEPTH (m)**
- 0.0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 1.5
  - 1.5 - 2.0
  - 2.0 - 2.5
  - 2.5 - 3.0
  - >3.0
- ROCK / SOIL**
- 0.0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 1.5
  - 1.5 - 2.0
  - 2.0 - 2.5
  - 2.5 - 3.0
  - >3.0

**DALRADIAN GOLD**

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ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN

EXTENT OF PEATLAND AT  
PROPOSED INFRASTRUCTURE SITE

**FIGURE 3.1**

Scale 1:7,000 @ A3 Date SEPTEMBER 2017

**LEGEND**

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- PROPOSED MINERAL EXTRACTION AREA (AREA B)
- PROPOSED MINERAL EXPLORATION AREA (AREA E)
- SURFACE INFRASTRUCTURE LAYOUT
- PROPOSED MANAGEMENT UNIT

**PEAT DEPTH (m)**

- ROCK / SOIL
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- >3.0

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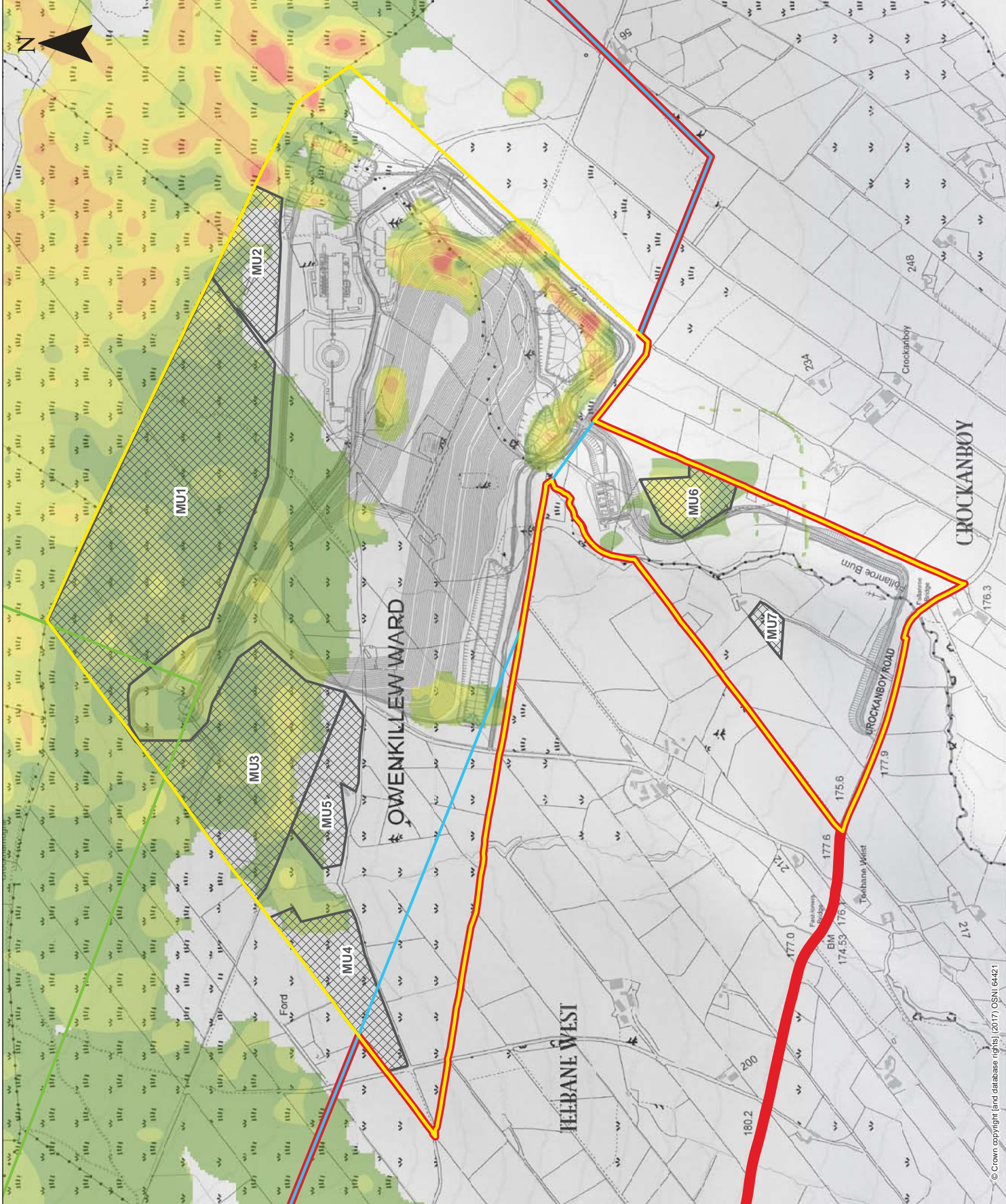
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ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN

**PEATLAND MANAGEMENT  
UNITS**

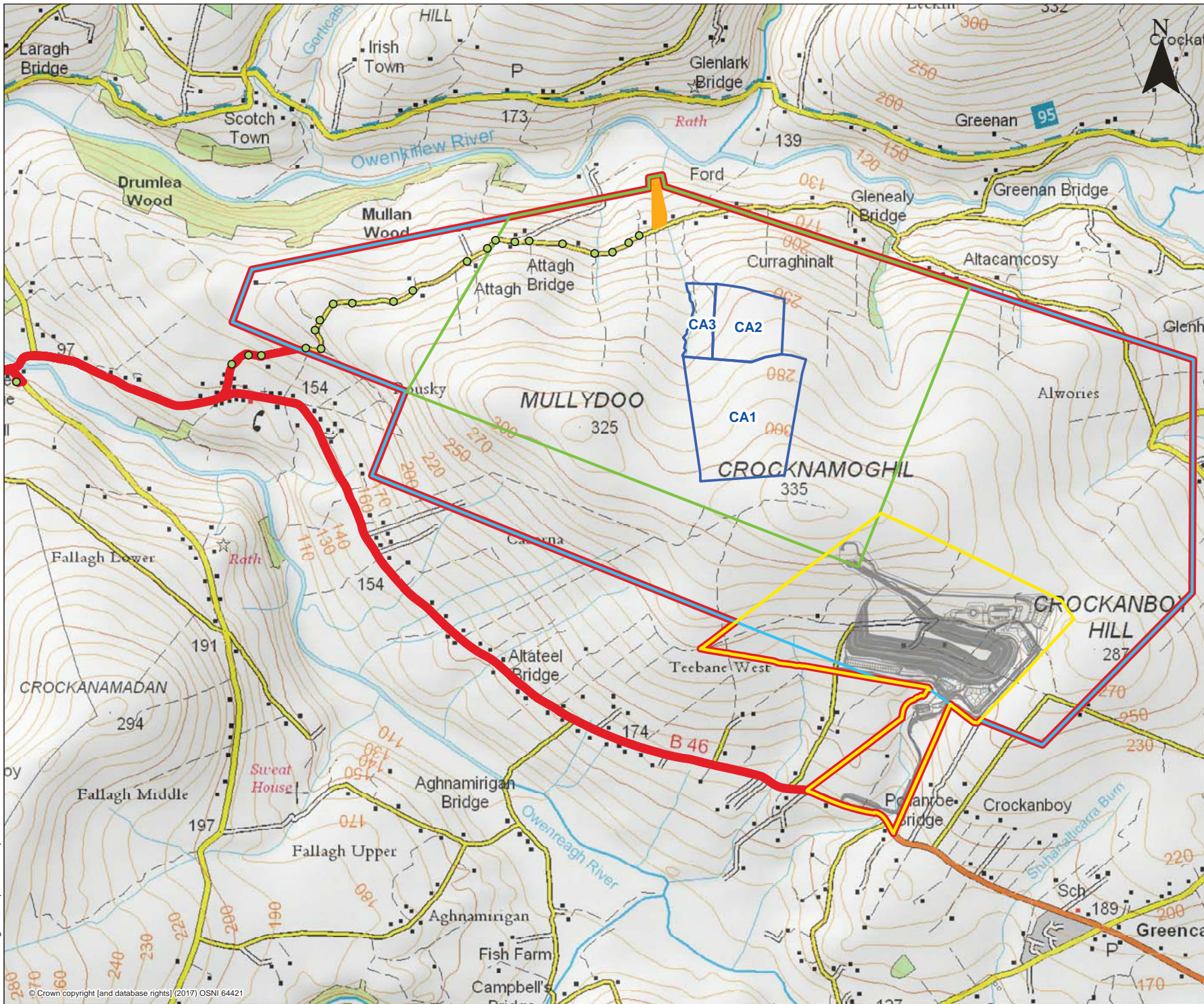
**FIGURE 3.2**

Scale 1:7,000 @ A3 Date SEPTEMBER 2017



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**LEGEND**

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- PROPOSED MINERAL EXTRACTION AREA (AREA B)
- PROPOSED MINERAL EXPLORATION AREA (AREA E)
- PASSING BAYS ON CAMCOSY ROAD AND TURNING POINT ON LENAGH ROAD (AREA D)
- SURFACE INFRASTRUCTURE LAYOUT
- PROPOSED COMPENSATION AREA

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**PROPOSED COMPENSATION  
AREAS**

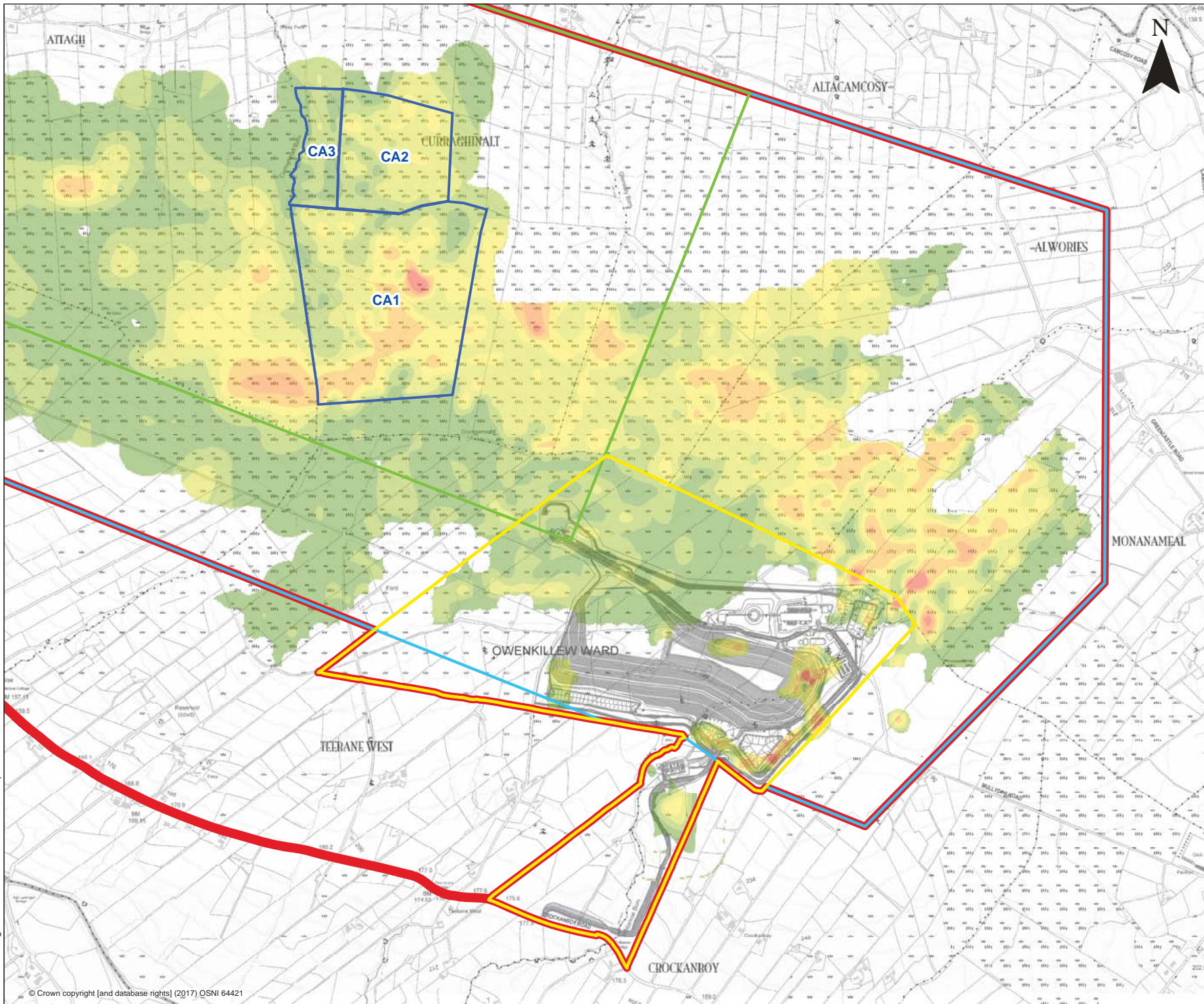
**FIGURE 3.3**

Scale: 1:20,000 @ A3      Date: SEPTEMBER 2017







2036.00379 Fig. 3.3 Proposed Compensation Areas

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-  APPLICATION BOUNDARY
-  PROPOSED INFRASTRUCTURE SITE (AREA A)
-  PROPOSED MINERAL EXTRACTION AREA (AREA B)
-  PROPOSED MINERAL EXPLORATION AREA (AREA E)
-  SURFACE INFRASTRUCTURE LAYOUT
-  PROPOSED COMPENSATION AREA

**PEAT DEPTH (m)**

-  ROCK / SOIL
-  0.0 - 0.5
-  0.5 - 1.0
-  1.0 - 1.5
-  1.5 - 2.0
-  2.0 - 2.5
-  2.5 - 3.0
-  >3.0

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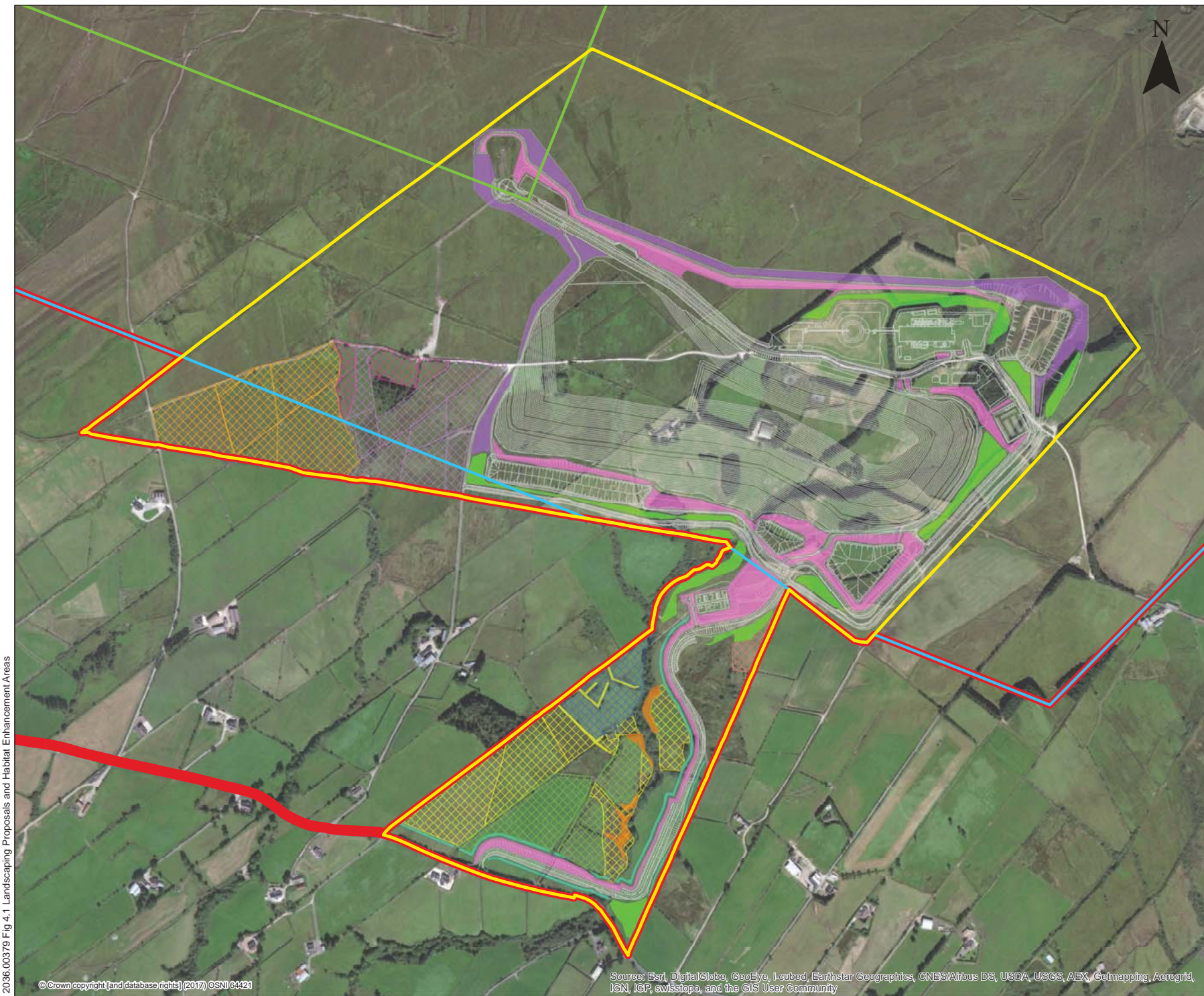
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MANAGEMENT PLAN

**EXTENT OF PEATLAND AT  
THE COMPENSATION AREAS**

**FIGURE 3.4**

Scale: 1:12,500 @ A3 Date: SEPTEMBER 2017

2036.00379 Fig. 3.4 Extent of Peatland at the Compensation Areas



**LEGEND**

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- PROPOSED MINERAL EXTRACTION AREA (AREA B)
- PROPOSED MINERAL EXPLORATION AREA (AREA E)
- SURFACE INFRASTRUCTURE LAYOUT

**LANDSCAPING PROPOSALS**

- ASH WOODLAND
- LANDSCAPE WOODLAND
- NEW DOUBLE HEDGEROW
- SUPPLEMENTARY HEDGEROW PLANTING
- SEED MIX 1
- SEED MIX 2

**HABITAT ENHANCEMENT AREAS - ENHANCEMENT OF GRASSLAND HABITAT**

- HE1
- HE2
- HE3
- HE4
- HE5
- HE6
- HE7

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ECOLOGICAL MITIGATION AND  
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**LANDSCAPING PROPOSALS AND  
HABITAT ENHANCEMENT AREAS**

**FIGURE 4.1**

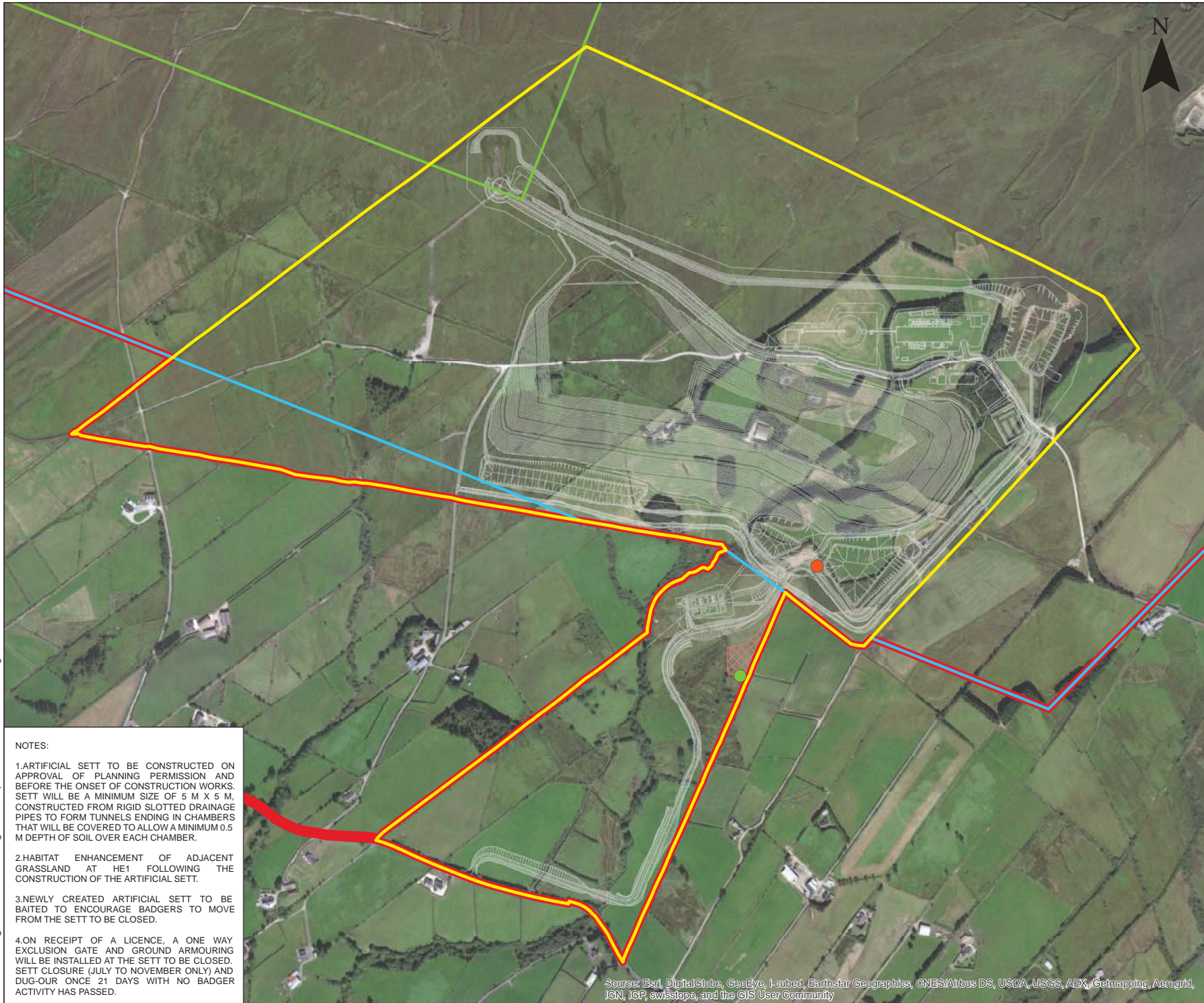
Scale 1:7,000 @ A3	Date SEPTEMBER 2017
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2036.00379 Fig 4.1 Landscaping Proposals and Habitat Enhancement Areas






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-  APPLICATION BOUNDARY
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-  PROPOSED MINERAL EXTRACTION AREA (AREA B)
-  PROPOSED MINERAL EXPLORATION AREA (AREA E)
-  SURFACE INFRASTRUCTURE LAYOUT

**HABITAT ENHANCEMENT AREAS - ENHANCEMENT OF GRASSLAND HABITAT**

-  HE1


**BADGER SETT**

-  EXISTING MAIN SETT TO BE EXCLUDED AND CLOSED
-  PROPOSED NEW ARTIFICIAL SETT

**NOTES:**

1. ARTIFICIAL SETT TO BE CONSTRUCTED ON APPROVAL OF PLANNING PERMISSION AND BEFORE THE ONSET OF CONSTRUCTION WORKS. SETT WILL BE A MINIMUM SIZE OF 5 M X 5 M, CONSTRUCTED FROM RIGID SLOTTED DRAINAGE PIPES TO FORM TUNNELS ENDING IN CHAMBERS THAT WILL BE COVERED TO ALLOW A MINIMUM 0.5 M DEPTH OF SOIL OVER EACH CHAMBER.
2. HABITAT ENHANCEMENT OF ADJACENT GRASSLAND AT HE1 FOLLOWING THE CONSTRUCTION OF THE ARTIFICIAL SETT.
3. NEWLY CREATED ARTIFICIAL SETT TO BE BAITED TO ENCOURAGE BADGERS TO MOVE FROM THE SETT TO BE CLOSED.
4. ON RECEIPT OF A LICENCE, A ONE WAY EXCLUSION GATE AND GROUND ARMOURING WILL BE INSTALLED AT THE SETT TO BE CLOSED. SETT CLOSURE (JULY TO NOVEMBER ONLY) AND DUG-OUR ONCE 21 DAYS WITH NO BADGER ACTIVITY HAS PASSED.

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**ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN**

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**OVERVIEW OF  
MITIGATION / COMPENSATION  
MEASURES FOR BADGERS**

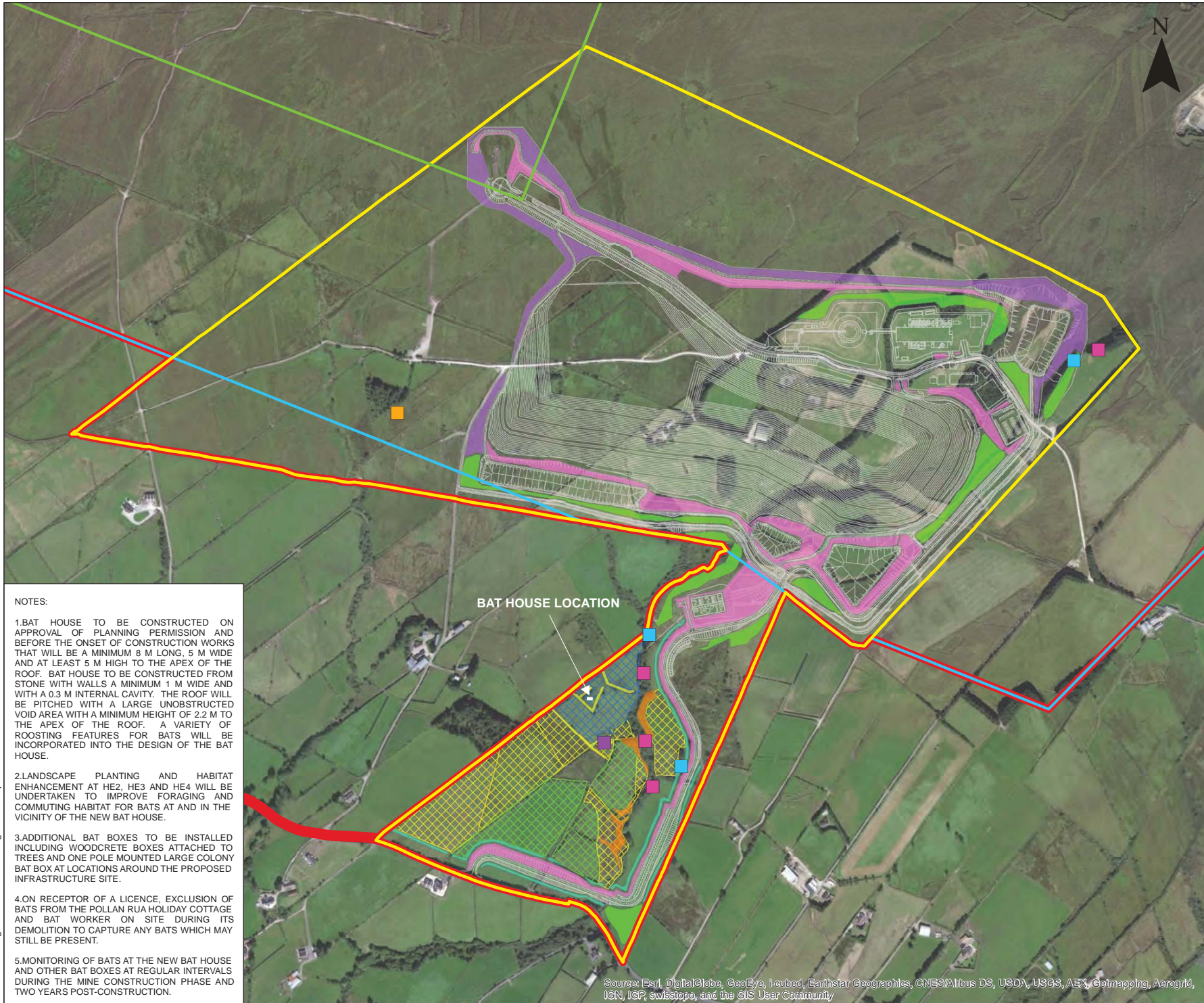
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**FIGURE 5.1**

Scale 1:7,000 @ A3	Date SEPTEMBER 2017
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2036.00379 Fig 5.1 Overview of Mitigation Compensation Measures for Badgers

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



**LEGEND**

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- PROPOSED MINERAL EXTRACTION AREA (AREA B)
- PROPOSED MINERAL EXPLORATION AREA (AREA E)
- SURFACE INFRASTRUCTURE LAYOUT

**LANDSCAPING PROPOSALS**

- ASH WOODLAND
- LANDSCAPE WOODLAND
- NEW DOUBLE HEDGEROW
- SUPPLEMENTARY HEDGEROW PLANTING
- SEED MIX 1
- SEED MIX 2

**HABITAT ENHANCEMENT AREAS - ENHANCEMENT OF GRASSLAND HABITAT**

- HE2
- HE3
- HE4

**BAT BOXES**

- POLE MOUNTED LARGE COLONY BAT BOX
- SCHWEGLER 2 F / SCHWEGLER 2F-DFD
- WOODCRETE BAT BOX
- WOODCRETE BAT BOX / SCHWEGLER 2 F

**NOTES:**

1. BAT HOUSE TO BE CONSTRUCTED ON APPROVAL OF PLANNING PERMISSION AND BEFORE THE ONSET OF CONSTRUCTION WORKS THAT WILL BE A MINIMUM 8 M LONG, 5 M WIDE AND AT LEAST 5 M HIGH TO THE APEX OF THE ROOF. BAT HOUSE TO BE CONSTRUCTED FROM STONE WITH WALLS A MINIMUM 1 M WIDE AND WITH A 0.3 M INTERNAL CAVITY. THE ROOF WILL BE PITCHED WITH A LARGE UNOBSTRUCTED VOID AREA WITH A MINIMUM HEIGHT OF 2.2 M TO THE APEX OF THE ROOF. A VARIETY OF ROOSTING FEATURES FOR BATS WILL BE INCORPORATED INTO THE DESIGN OF THE BAT HOUSE.
2. LANDSCAPE PLANTING AND HABITAT ENHANCEMENT AT HE2, HE3 AND HE4 WILL BE UNDERTAKEN TO IMPROVE FORAGING AND COMMUTING HABITAT FOR BATS AT AND IN THE VICINITY OF THE NEW BAT HOUSE.
3. ADDITIONAL BAT BOXES TO BE INSTALLED INCLUDING WOODCRETE BOXES ATTACHED TO TREES AND ONE POLE MOUNTED LARGE COLONY BAT BOX AT LOCATIONS AROUND THE PROPOSED INFRASTRUCTURE SITE.
4. ON RECEIPT OF A LICENCE, EXCLUSION OF BATS FROM THE POLLAN RUA HOLIDAY COTTAGE AND BAT WORKER ON SITE DURING ITS DEMOLITION TO CAPTURE ANY BATS WHICH MAY STILL BE PRESENT.
5. MONITORING OF BATS AT THE NEW BAT HOUSE AND OTHER BAT BOXES AT REGULAR INTERVALS DURING THE MINE CONSTRUCTION PHASE AND TWO YEARS POST-CONSTRUCTION.

**BAT HOUSE LOCATION**

# DALRADIAN

## GOLD

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CURRAGHINALT GOLD PROJECT,  
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NORTHERN IRELAND

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ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN

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**OVERVIEW OF  
MITIGATION / COMPENSATION  
MEASURES FOR BATS**

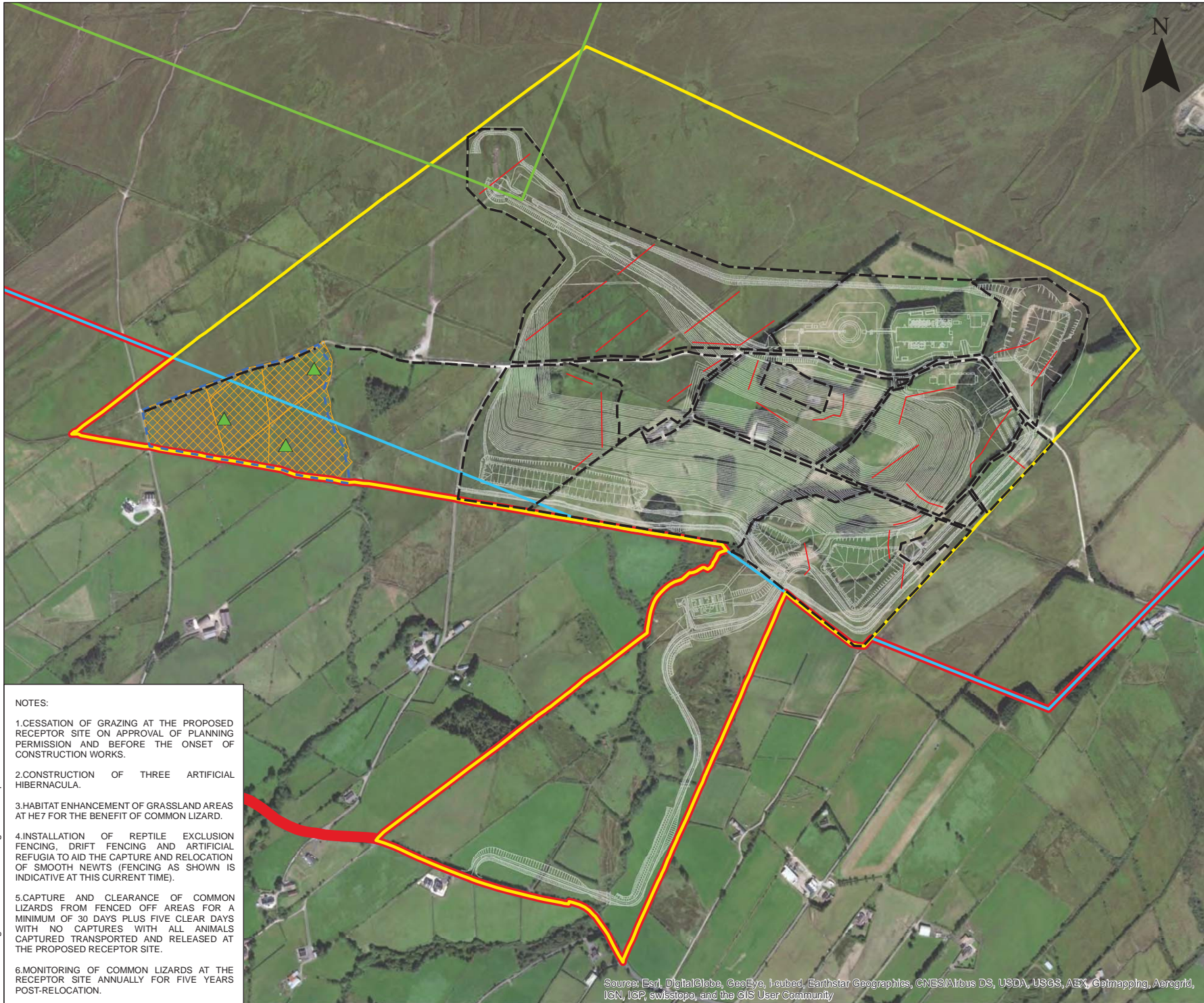
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**FIGURE 6.1**












Scale: 1:7,000 @ A3	Date: SEPTEMBER 2017
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, @satmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

2036.00379 Fig.6.1 Overview of Mitigation/Compensation Measures for Bats



**LEGEND**

-  APPLICATION BOUNDARY
-  PROPOSED INFRASTRUCTURE SITE (AREA A)
-  PROPOSED MINERAL EXTRACTION AREA (AREA B)
-  PROPOSED MINERAL EXPLORATION AREA (AREA E)
-  SURFACE INFRASTRUCTURE LAYOUT
-  RECEPTOR SITE
-  HABITAT ENHANCEMENT AREAS - ENHANCEMENT OF GRASSLAND HABITAT
-  HE7
-  HIBERNACULA
- CLEARANCE AREAS**
-  DRIFT FENCING
-  TEMPORARY EXCLUSION FENCING

- NOTES:**
1. CESSATION OF GRAZING AT THE PROPOSED RECEPTOR SITE ON APPROVAL OF PLANNING PERMISSION AND BEFORE THE ONSET OF CONSTRUCTION WORKS.
  2. CONSTRUCTION OF THREE ARTIFICIAL HIBERNACULA.
  3. HABITAT ENHANCEMENT OF GRASSLAND AREAS AT HE7 FOR THE BENEFIT OF COMMON LIZARD.
  4. INSTALLATION OF REPTILE EXCLUSION FENCING, DRIFT FENCING AND ARTIFICIAL REFUGIA TO AID THE CAPTURE AND RELOCATION OF SMOOTH NEWTS (FENCING AS SHOWN IS INDICATIVE AT THIS CURRENT TIME).
  5. CAPTURE AND CLEARANCE OF COMMON LIZARDS FROM FENCED OFF AREAS FOR A MINIMUM OF 30 DAYS PLUS FIVE CLEAR DAYS WITH NO CAPTURES WITH ALL ANIMALS CAPTURED TRANSPORTED AND RELEASED AT THE PROPOSED RECEPTOR SITE.
  6. MONITORING OF COMMON LIZARDS AT THE RECEPTOR SITE ANNUALLY FOR FIVE YEARS POST-RELOCATION.

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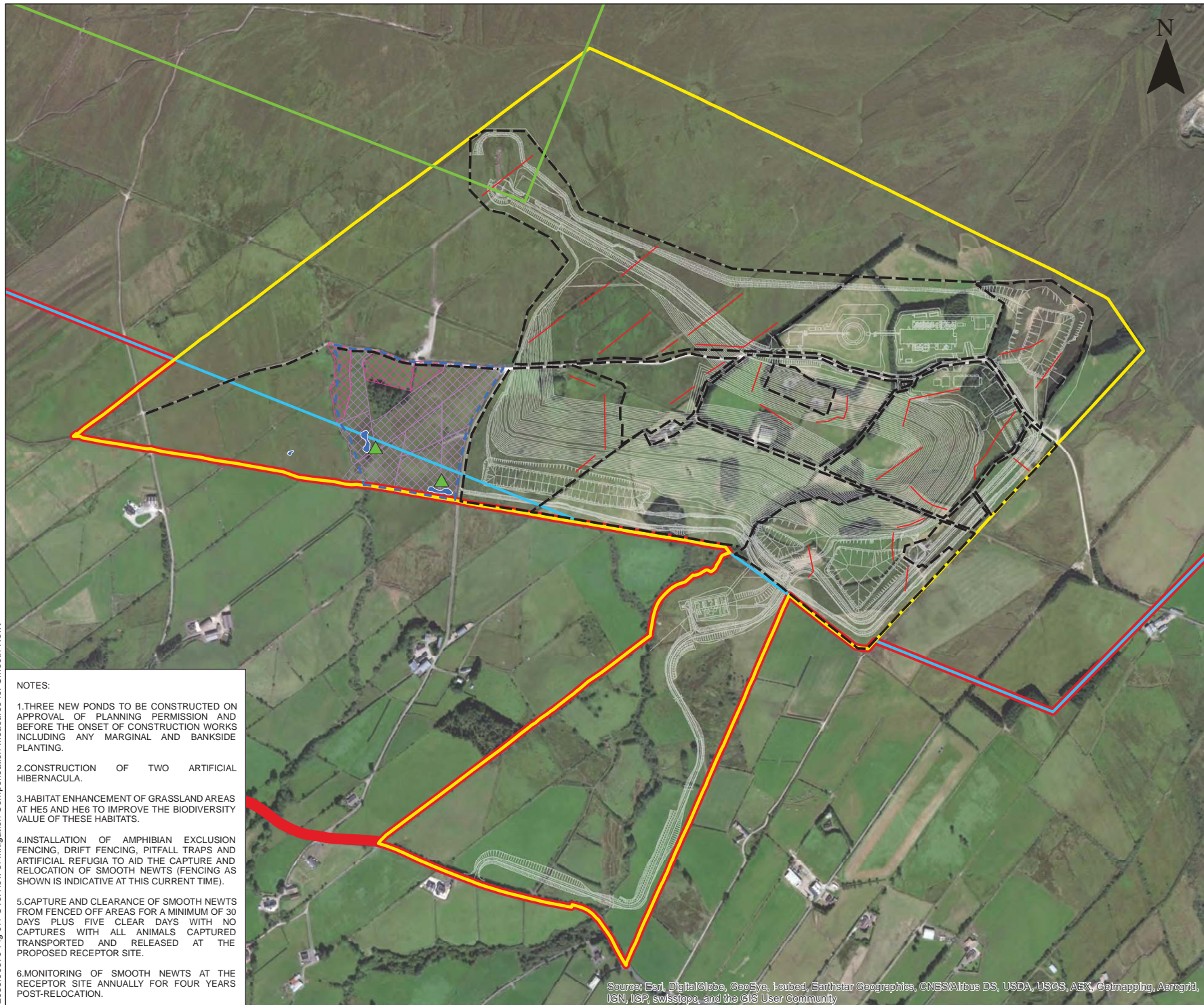
ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN

**OVERVIEW OF  
MITIGATION / COMPENSATION  
MEASURES FOR COMMON LIZARD**

**FIGURE 8.1**

Scale: 1:7,000 @ A3 Date: SEPTEMBER 2017

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



LEGEND	
	APPLICATION BOUNDARY
	PROPOSED INFRASTRUCTURE SITE (AREA A)
	PROPOSED MINERAL EXTRACTION AREA (AREA B)
	PROPOSED MINERAL EXPLORATION AREA (AREA E)
	SURFACE INFRASTRUCTURE LAYOUT
	RECEPTOR SITE
	PROPOSED PONDS
HABITAT ENHANCEMENT AREAS - ENHANCEMENT OF GRASSLAND HABITAT	
	HE5
	HE6
	HIBERNACULA
CLEARANCE AREAS	
	DRIFT FENCING
	TEMPORARY EXCLUSION FENCING

**NOTES:**

1. THREE NEW PONDS TO BE CONSTRUCTED ON APPROVAL OF PLANNING PERMISSION AND BEFORE THE ONSET OF CONSTRUCTION WORKS INCLUDING ANY MARGINAL AND BANKSIDE PLANTING.
2. CONSTRUCTION OF TWO ARTIFICIAL HIBERNACULA.
3. HABITAT ENHANCEMENT OF GRASSLAND AREAS AT HE5 AND HE6 TO IMPROVE THE BIODIVERSITY VALUE OF THESE HABITATS.
4. INSTALLATION OF AMPHIBIAN EXCLUSION FENCING, DRIFT FENCING, PITFALL TRAPS AND ARTIFICIAL REFUGIA TO AID THE CAPTURE AND RELOCATION OF SMOOTH NEWTS (FENCING AS SHOWN IS INDICATIVE AT THIS CURRENT TIME).
5. CAPTURE AND CLEARANCE OF SMOOTH NEWTS FROM FENCED OFF AREAS FOR A MINIMUM OF 30 DAYS PLUS FIVE CLEAR DAYS WITH NO CAPTURES WITH ALL ANIMALS CAPTURED TRANSPORTED AND RELEASED AT THE PROPOSED RECEPTOR SITE.
6. MONITORING OF SMOOTH NEWTS AT THE RECEPTOR SITE ANNUALLY FOR FOUR YEARS POST-RELOCATION.

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ECOLOGICAL MITIGATION AND  
MANAGEMENT PLAN

OVERVIEW OF  
MITIGATION / COMPENSATION  
MEASURES FOR SMOOTH NEWT

**FIGURE 9.1**

Scale 1:7,000 @ A3	Date SEPTEMBER 2017
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2036.00379 Fig 9.1 Overview of Mitigation Compensation Measures for Smooth Newt

Source: Esri, DigitalGlobe, GeoEye, Irbid, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, @satmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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## APPENDIX 01

### Quadrat Data for the Compensation Areas

## Compensation Area 1

Botanical Species List		Quadrat / Domin Score				
Scientific Name	Common Name	Q1.1	Q1.2	Q1.3	Q1.4	Q1.5
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	-	-	-	-	3
<i>Calluna vulgaris</i>	Ling	7	7	5	5	4
<i>Deschampsia flexuosa</i>	Wavy Hair-grass	3	-	3	-	-
<i>Erica tetralix</i>	Cross-leaved Heath	3	4	4	4	2
<i>Eriophorum angustifolium</i>	Common Cotton-sedge	2	2	-	-	-
<i>Eriophorum vaginatum</i>	Hare's-tail Cotton-sedge	5	4	4	5	6
<i>Galium saxatile</i>	Heath Bedstraw	-	-	-	-	-
<i>Juncus effusus</i>	Soft Rush	-	-	-	-	2
<i>Juncus squarrosus</i>	Heath Rush	-	-	-	-	-
<i>Molinia caerulea</i>	Purple Moor-grass	-	-	-	-	-
<i>Narthecium ossifragum</i>	Bog Asphodel	-	-	-	-	-
<i>Potentilla erecta</i>	Tormentil	-	-	-	-	-
<i>Trichophorum germanicum</i>	Deergrass	-	-	-	-	4
<i>Vaccinium myrtillus</i>	Bilberry	-	-	3	2	-
<i>Dicranum scoparium</i>	Broom Fork-moss	-	2	-	2	-
<i>Hypnum jutlandicum</i>	Heath Plait-moss	-	-	-	2	-
<i>Pleurozium schreberi</i>	Red-stemmed Feather-moss	-	-	-	-	-
<i>Polytrichum commune</i>	Common Haircap	-	3	-	2	2
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	-	-	3	2	-
<i>Rhytidiadelphus squarrosus</i>	Springy Turf-moss	-	-	-	-	-
<i>Sphagnum capillifolium</i>	Red Bog-moss	5	8	4	6	-
<i>Sphagnum compactum</i>	Compact Bog-moss	-	-	-	-	-
<i>Sphagnum cuspidatum</i>	Feathery Bog-moss	-	-	-	-	3
<i>Sphagnum fallax</i>	Flat-topped Bog-moss	-	-	2	-	5
<i>Sphagnum palustre</i>	Blunt-leaved Bog-moss	-	-	-	-	-
NVC Assessment		M19a	M19a	M19a	M19a	M19a

Botanical Species List		Quadrat / Domin Score				
Scientific Name	Common Name	Q1.6	Q1.7	Q1.8	Q1.9	Q1.10
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	-	4	-	-	-
<i>Calluna vulgaris</i>	Ling	5	2	3	4	7
<i>Deschampsia flexuosa</i>	Wavy Hair-grass	2	2	-	-	-
<i>Erica tetralix</i>	Cross-leaved Heath	3	1	-	-	2
<i>Eriophorum angustifolium</i>	Common Cotton-sedge	-	1	-	2	-
<i>Eriophorum vaginatum</i>	Hare's-tail Cotton-sedge	5	5	7	7	4
<i>Galium saxatile</i>	Heath Bedstraw	-	-	-	-	-
<i>Juncus effusus</i>	Soft Rush	-	3	-	-	-
<i>Juncus squarrosus</i>	Heath Rush	-	-	-	2	-
<i>Molinia caerulea</i>	Purple Moor-grass	-	-	-	-	4
<i>Narthecium ossifragum</i>	Bog Asphodel	-	-	-	3	-
<i>Potentilla erecta</i>	Tormentil	-	-	-	-	-
<i>Trichophorum germanicum</i>	Deergrass	4	2	5	2	2
<i>Vaccinium myrtillus</i>	Bilberry	-	-	-	-	-
<i>Dicranum scoparium</i>	Broom Fork-moss	-	-	3	-	2
<i>Hypnum jutlandicum</i>	Heath Plait-moss	3	-	-	-	3
<i>Pleurozium schreberi</i>	Red-stemmed Feather-moss	-	2	-	-	-
<i>Polytrichum commune</i>	Common Haircap	-	4	-	-	-
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	-	3	-	-	3
<i>Rhytidiadelphus squarrosus</i>	Springy Turf-moss	-	2	-	-	-
<i>Sphagnum capillifolium</i>	Red Bog-moss	5	5	7	3	7
<i>Sphagnum compactum</i>	Compact Bog-moss	-	-	3	3	-
<i>Sphagnum cuspidatum</i>	Feathery Bog-moss	-	-	-	-	=
<i>Sphagnum fallax</i>	Flat-topped Bog-moss	3	-	-	-	-
<i>Sphagnum palustre</i>	Blunt-leaved Bog-moss	-	-	-	-	-
NVC Assessment		M19a	M19	M19a	M20	M19a

Botanical Species List		Quadrat / Domin Score			
Scientific Name	Common Name	Q1.11	Q1.12	Q1.13	Q1.14
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	5	5	4	5
<i>Calluna vulgaris</i>	Ling	4	5	3	-
<i>Deschampsia flexuosa</i>	Wavy Hair-grass	-	-	-	-
<i>Erica tetralix</i>	Cross-leaved Heath	-	-	-	-
<i>Eriophorum angustifolium</i>	Common Cotton-sedge	-	2	-	-
<i>Eriophorum vaginatum</i>	Hare's-tail Cotton-sedge	-	-	5	-
<i>Galium saxatile</i>	Heath Bedstraw	2	-	-	-
<i>Juncus effusus</i>	Soft Rush	2	4	-	6
<i>Juncus squarrosus</i>	Heath Rush	-	-	-	-
<i>Molinia caerulea</i>	Purple Moor-grass	-	-	2	-
<i>Narthecium ossifragum</i>	Bog Asphodel	-	-	-	-
<i>Potentilla erecta</i>	Tormentil	-	2	-	2
<i>Trichophorum germanicum</i>	Deergrass	-	-	-	-
<i>Vaccinium myrtillus</i>	Bilberry	2	-	-	2
<i>Dicranum scoparium</i>	Broom Fork-moss	-	-	-	-
<i>Hypnum jutlandicum</i>	Heath Plait-moss	-	-	-	-
<i>Pleurozium schreberi</i>	Red-stemmed Feather-moss	3	-	-	-
<i>Polytrichum commune</i>	Common Haircap	4	3	2	5
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	4	7	4	-
<i>Rhytidiadelphus squarrosus</i>	Springy Turf-moss	2	-	-	4
<i>Sphagnum capillifolium</i>	Red Bog-moss	6	6	7	5
<i>Sphagnum compactum</i>	Compact Bog-moss	-	-	-	-
<i>Sphagnum cuspidatum</i>	Feathery Bog-moss	-	-	-	-
<i>Sphagnum fallax</i>	Flat-topped Bog-moss	4	-	-	-
<i>Sphagnum palustre</i>	Blunt-leaved Bog-moss	2	-	2	-
NVC Assessment		M19	M19	M19	M6

## Compensation Area 2

Botanical Species List		Quadrat / Domin Score					
Scientific Name	Common Name	Q2.1	Q2.2	Q2.3	Q2.4	Q2.5	Q2.6
<i>Calluna vulgaris</i>	Ling	8	6	7	7	7	7
<i>Erica tetralix</i>	Cross-leaved Heath	4	2	2	2	4	2
<i>Eriophorum angustifolium</i>	Common Cotton-sedge	-	2	-	-	-	-
<i>Eriophorum vaginatum</i>	Hare's-tail Cotton-sedge	6	6	5	6	6	6
<i>Potentilla erecta</i>	Tormentil	-	-	2	-	-	-
<i>Vaccinium myrtillus</i>	Bilberry	2	2	3	2	2	4
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	-	4	5	-	-	4
<i>Sphagnum capillifolium</i>	Red Bog-moss	7	4	2	4	4	4
NVC Assessment		M19a	M19a	M19a	M19a	M19a	M19a

## Compensation Area 3

Botanical Species List		Quadrat / Domin Score				
Scientific Name	Common Name	Q3.1	Q3.2	Q3.3	Q3.4	Q3.5
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	2	4	-	-	2
<i>Calluna vulgaris</i>	Ling	7	5	5	6	7
<i>Erica tetralix</i>	Cross-leaved Heath	-	2	4	4	2
<i>Eriophorum vaginatum</i>	Hare's-tail Cotton-sedge	6	6	6	5	6
<i>Galium saxatile</i>	Heath Bedstraw	2	-	-	-	-
<i>Juncus effusus</i>	Soft Rush	-	-	-	-	2
<i>Juncus squarrosus</i>	Heath Rush	-	-	-	5	5
<i>Luzula campestris</i>	Field Wood-rush	-	2	-	-	-
<i>Potentilla erecta</i>	Tormentil	-	2	2	2	-
<i>Trichophorum germanicum</i>	Deergrass	3	2	4	3	2
<i>Vaccinium myrtillus</i>	Bilberry	2	2	2	-	-
<i>Polytrichum commune</i>	Common Haircap	-	-	3	-	-
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	5	5	-	4	5
<i>Sphagnum capillifolium</i>	Red Bog-moss	3	3	6	3	4
<i>Sphagnum compactum</i>	Compact Bog-moss	-	4	-	-	-
NVC Assessment		M19a	M19	M19a	M20	M19a

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## APPENDIX 02

### Biodiversity Impact Assessment Calculation Sheets



Code	Proposed Habitats on Site		Habitat Area (ha)	Target habitat distinctiveness		Target habitat condition		Time till target condition		Difficulty of creation / restoration		Habitat Biodiversity Value	Notes
	Habitat Creation	Phase 1 Habitat		Distinctiveness	Score	Condition	Score	Time (years)	Score	Difficulty	Score		
Landscaping	Woodland: Broad-leaved plantation		3.98	Medium	4	Mod/raile	2	20	2	Medium	1.5	10.61	Landscape broadleaved woodland
Landscaping	Woodland: Broad-leaved plantation		0.46	Medium	4	Mod/raile	2	25	2.4	Medium	1.5	1.02	Landscape broadleaved woodland (Ash Woodland)
Landscaping	Grassland: Semi-improved acidic grassland		6.70	High	6	Good	3	5	1.2	Medium	1.5	67.00	Landscape Seed Mix 2 acid grassland
Landscaping	Heathland: Wet heath / Acid grassland mosaic		4.30	High	6	Good	3	10	1.4	Medium	1.5	36.88	Landscape Seed Mix 1 heath scribe with anticipated some nature acid grassland
MU2	Wetland: Sphagnum bog		1.43	High	6	Good	3	5	1.2	High	3	7.15	Habitat creation not designed to create blanket bog but rather a peatland habitat that is active.
MU4	Wetland: Sphagnum bog		2.99	High	6	Good	3	5	1.2	High	3	14.95	Habitat creation not designed to create blanket bog but rather a peatland habitat that is active.
MU5	Wetland: Sphagnum bog		2.43	High	6	Good	3	5	1.2	High	3	12.15	Habitat creation not designed to create blanket bog but rather a peatland habitat that is active.
Smooth Newt	Wetland: Standing water		0.09	High	6	Good	3	5	1.2	Medium	1.5	0.89	New ponds created for smooth newts
<b>Existing Value S(F)</b>													
<b>Habitat Enhancement</b>													
MU1	Wetland: Sphagnum bog		18.34	High	6	Good	3	10	1.4	High	3	78.12	
MU2	Wetland: Sphagnum bog		0.66	High	6	Good	3	10	1.4	High	3	2.44	
MU3	Heathland: Wet heath / Acid grassland mosaic		3.96	High	6	Good	3	10	1.4	Medium	1	56.20	Restoration of acid grassland to wet heath / acid grassland mosaic
MU3	Wetland: Sphagnum bog		4.52	High	6	Good	3	15	1.7	High	3	15.76	
MU6	Wetland: Fen and mire		1.40	High	6	Good	3	10	1.4	Medium	1.5	11.52	Includes restoration of 0.53 ha of marsh / mainly grassland to Sphagnum bog
MU7	Wetland: Fen and mire		0.37	High	6	Good	3	5	1.4	Medium	1.5	1.74	Includes restoration of 0.25 ha of marsh / mainly grassland to Sphagnum bog
HE1	Grassland: Poor semi-improved grassland		0.42	Medium	4	Good	3	5	1.2	Low	1	3.37	Enhancement of existing grassland for bogifer
HE2	Grassland: Marsh / Marshy grassland		5.61	High	6	Good	3	5	1.2	Medium	1.5	55.54	Enhancement of existing grassland to improved habitat for foodsource for bats
HE3	Grassland: Improved grassland		3.50	Low	2	Good	3	5	1.2	Low	1	16.67	Enhancement of existing grassland to improved habitat for foodsource for bats
HE4	Grassland: Poor semi-improved grassland		1.72	Medium	4	Good	3	5	1.2	Low	1	16.37	Enhancement of existing grassland to improved habitat for foodsource for bats
HE5	Grassland: Poor semi-improved grassland		1.23	Medium	4	Good	3	5	1.2	Low	1	11.47	Enhancement of existing grassland for smooth newts
HE6	Grassland: Marsh / Marshy grassland		5.13	High	6	Good	3	5	1.2	Medium	1.5	50.74	Enhancement of existing grassland for smooth newts
HE7	Grassland: Marsh / Marshy grassland		6.53	High	6	Good	3	5	1.2	Low	1	97.12	Enhancement of existing grassland for common lizard
<b>Total</b>													
53.41													

Trading Down Correction Value	0.00
Habitat Mitigation Score (HMS)	563.27
Habitat Biodiversity Impact Score (HMS - HIS)	-131.76
Percentage of Biodiversity Impact Loss	19.00



**Biodiversity Impact Assessment Summary (Without Compensation)**

Site name:	Curraghinalt Project		
Planning reference number:			
<b>Habitats</b>	<b>Area (ha)</b>	<b>Habitat Biodiversity Value</b>	
Total existing area onsite	145.99	1469.48	
Habitats negatively impacted by development Impact Score	74.28	693.46	
On site habitat mitigation Mitigation Score	75.79	561.70	
<b>Biodiversity loss still requiring compensation Biodiversity Impact Score</b>		<b>-131.76</b>	
Percentage of biodiversity impact		<b>19.00</b>	
<b>Linear features</b>	<b>Length (km)</b>	<b>Linear Biodiversity Value</b>	
Total existing length onsite	22.71	101.48	
Linear features negatively impacted by development Linear Impact Score	8.14	40.78	
On site linear mitigation <b>Linear Mitigation Score</b>	2.26	34.43	
Linear biodiversity loss still requiring compensation <b>Linear Biodiversity Impact Score</b>		<b>-6.35</b>	
Percentage of linear biodiversity impact		<b>15.57</b>	

Infrastructure Development	Footprint Area (ha)	Code	Existing habitats on site		Habitat distinctiveness		Habitat condition		Habitats to be retained with no change within development		Habitat Biodiversity Value		Habitats to be lost within development		Notes		
			Phase 1 Habitat	Habitat Area (ha)	Distinctiveness	Score	Condition	Score	Area (ha)	Existing value	Area (ha)	Existing value	Area (ha)	Existing value		Area (ha)	Existing value
Proposed Infrastructure Site	143.78		Woodland: Broad-leaved semi-natural woodland	0.8	High	6	Moderate	2	0.80	0	0	0	0	0.20	0.80		
			Woodland: Broad-leaved plantation	0.23	Medium	4	Poor	1	0.03	0.12	0	0	0	0	3.92	23.52	
			Woodland: Coniferous plantation	4.83	Low	2	Good	3	0.91	5.46	0	0	0	0	0.08	0.64	
			Woodland: Mixed plantation	0.08	Medium	4	Poor	2	0.00	0	0	0	0	0	0.12	0.96	
			Woodland: Dense coniferous scrub	0.78	Medium	4	Moderate	2	0.66	5.28	0	0	0	0	7.62	91.44	7.48 ha of acid grassland to be lost through peatland creation and wet heath restoration
			Grassland: Semi-improved acidic grassland	8.02	High	6	Moderate	2	0.40	4.8	0	0	0	0	0.08	0.32	
			Grassland: Improved grassland	0.10	Medium	4	Poor	1	0.02	0.08	0	0	0	0	21.71	86.84	0.83 ha to be lost through peatland creation
			Grassland: Marsh / Marshy grassland	26.63	Low	2	Moderate	2	3.42	13.68	3.50	14	17.27	202.24	10.61	127.32	4.06 ha to be lost through restoration of peatland habitats and 1.07 ha lost through peatland creation
			Grassland: Marsh / Marshy grassland	37.30	High	6	Moderate	2	9.42	113.04	17.27	60.00	3.37	40.44	6.00	72.00	1.49 ha to be lost through peatland creation
			Grassland: Poor semi-improved grassland	14.56	High	6	Moderate	2	5.19	62.28	2	2.88	0	0	2.02	31.44	Figures do not include the restoration of wet heath / acid grassland mosaic as detailed for Habitat Enhancement in MLI3
			Heathland: Wet heath / Acid grassland mosaic	2.86	High	6	Moderate	2	0.24	2.88	2	10.8	23.54	232.49	9.05	106.60	Figures do not include the restoration of marsh / marshy grassland to Sphagnum bog in MLI6 and MLI7
			Wetland: Sphagnum bog	33.49	High	6	Moderate	2	0.90	10.8	2	2.76	0	0	0.03	0.36	
			Wetland: Acid/neutral flush	0.26	High	6	Moderate	2	0.23	2.76	0	0	0	0	7.94	142.92	
			Wetland: Fen and mire	7.94	High	6	Good	3	0.00	0	0	0	0	0	0.15	2.70	
			Wetland: Standing water	0.15	High	6	Good	3	0.00	0	0	0	0	0	3.75	0.00	
Bull Environment: Buildings/hedgerow	3.75	None	0	Moderate	2	0.00	0	0	0	0	0	0.20	1.20				
Heathland: Wet heath / Acid grassland mosaic	0.20	High	6	Poor	1	0.00	0	0	0	0	0	0.20	2.40				
Wetland: Sphagnum bog	0.20	High	6	Moderate	2	0.00	0	0	0	0	0	0.20	2.40				
Grassland: Improved grassland	0.20	Low	2	Poor	1	0.20	0.4	0	0	0	0	0	0	0			
Grassland: Marsh / Marshy grassland	0.02	High	6	Poor	1	0.02	0.12	0	0	0	0	0	0	0			
Grassland: Poor semi-improved grassland	0.14	Medium	4	Poor	1	0.14	0.56	0	0	0	0	0	0	0			
Wetland: Standing water	0.04	None	0	Poor	1	0.04	0	0	0	0	0	0	0	0			
Other: Bare ground	0.42	None	0	Poor	1	0.42	0	0	0	0	0	0	0	0			
Other: Bare ground	0.45	None	0	Poor	1	0.45	0	0	0	0	0	0	0	0			
Bull Environment: Buildings/hedgerow	0.54	None	0	Poor	1	0.54	0	0	0	0	0	0	0	0			
<b>Total</b>	<b>143.78</b>		<b>143.78</b>		<b>24.03</b>	<b>231.86</b>	<b>47.68</b>	<b>541.16</b>	<b>74.28</b>	<b>693.46</b>	<b>1469.46</b>						
<b>Total</b>												<b>693.46</b>	<b>1469.46</b>				
<b>Indirect Impacts Including Off-Site Habitats</b>												<b>Site Habitat Biodiversity Value (J)</b>					
Before																	
Alter																	
Before																	
Alter																	
Before																	
Alter																	
Before																	
Alter																	
<b>Total</b>																	
<b>Total</b>												<b>Habitat Impact Score (HIS)</b>	<b>HIS - J + M</b>				
<b>Total</b>												<b>0</b>	<b>693.46</b>				

Code	Proposed Habitats on Site		Habitat Area (ha)	Target habitat distinctiveness		Target habitat condition		Time till target condition		Difficulty	Score	Habitat Biodiversity Value	Notes
	Habitat Creation	Phase 1 Habitat		Distinctiveness	Score	Condition	Score	Time (years)	Score				
Landscaping	Woodland: Broad-leaved plantation		3.98	Medium	4	Moderate	2	20	2	Medium	1.5	10.61	Landscape broadleaved woodland
Landscaping	Woodland: Broad-leaved plantation		0.46	Medium	4	Moderate	2	25	2.4	Medium	1.5	1.02	Landscape broadleaved woodland (Ash Woodland)
Landscaping	Grassland: Semi-improved acidic grassland		6.70	High	6	Good	3	5	1.2	Medium	1.5	67.00	Landscape Seed Mix 2 acid grassland
Landscaping	Heathland: Wet heath / Acid grassland mosaic		4.30	High	6	Good	3	10	1.4	Medium	1.5	36.86	Landscape Seed Mix 1 heath scribe with anticipated some natural acid grassland
MU2	Wetland: Sphagnum bog		1.43	High	6	Good	3	5	1.2	High	3	7.15	Habitat creation not designed to create blanket bog but rather a peatland habitat that is active.
MU4	Wetland: Sphagnum bog		2.99	High	6	Good	3	5	1.2	High	3	14.95	Habitat creation not designed to create blanket bog but rather a peatland habitat that is active.
MU5	Wetland: Sphagnum bog		2.43	High	6	Good	3	5	1.2	High	3	12.15	Habitat creation not designed to create blanket bog but rather a peatland habitat that is active.
Smooth New	Wetland: Standing water		0.09	High	6	Good	3	5	1.2	Medium	1.5	0.89	New ponds created for smooth newts
<b>Existing Value</b>													
<b>(N x O x P) / Q x R</b>													
<b>Habitat Enhancement</b>													
MU1	Wetland: Sphagnum bog		18.34	High	6	Good	3	10	1.4	High	3	76.12	
MU2	Wetland: Sphagnum bog		0.66	High	6	Good	3	10	1.4	High	3	2.44	
MU3	Heathland: Wet heath / Acid grassland mosaic		3.96	High	6	Good	3	10	1.4	Medium	1	56.20	Restoration of acid grassland to wet heath / acid grassland mosaic
MU3	Wetland: Sphagnum bog		4.52	High	6	Good	3	15	1.7	High	3	15.76	
MU6	Wetland: Fen and mire		1.40	High	6	Good	3	10	1.4	Medium	1.5	11.52	Includes restoration of 0.33 ha of marsh / mainly grassland to Sphagnum bog
MU7	Wetland: Fen and mire		0.37	High	6	Good	3	5	1.4	Medium	1.5	1.74	Includes restoration of 0.25 ha of marsh / mainly grassland to Sphagnum bog
HE1	Grassland: Poor semi-improved grassland		0.42	Medium	4	Good	3	5	1.2	Low	1	3.37	Enhancement of existing grassland for bog
HE2	Grassland: Marsh / Marshy grassland		5.61	High	6	Good	3	5	1.2	Medium	1.5	55.54	Enhancement of existing grassland to improved habitat for foodsource for bats
HE3	Grassland: Improved grassland		3.50	Low	2	Good	3	5	1.2	Low	1	16.67	Enhancement of existing grassland to improved habitat for foodsource for bats
HE4	Grassland: Poor semi-improved grassland		1.72	Medium	4	Good	3	5	1.2	Low	1	16.37	Enhancement of existing grassland to improved habitat for foodsource for bats
HE5	Grassland: Poor semi-improved grassland		1.23	Medium	4	Good	3	5	1.2	Low	1	11.47	Enhancement of existing grassland for smooth newts
HE6	Grassland: Marsh / Marshy grassland		5.13	High	6	Good	3	5	1.2	Medium	1.5	50.74	Enhancement of existing grassland for smooth newts
HE7	Grassland: Marsh / Marshy grassland		6.53	High	6	Good	3	5	1.2	Low	1	97.12	Enhancement of existing grassland for smooth newts
CA1	Wetland: Sphagnum bog		32.45	High	6	Good	3	10	1.4	High	3	138.60	Enhancement of existing grassland for common lizard
CA2	Wetland: Sphagnum bog		14.59	High	6	Good	3	10	1.4	High	3	62.05	
CA3	Wetland: Sphagnum bog		5.69	High	6	Good	3	15	1.7	High	3	19.89	
<b>Total</b>													
308.14													

<b>Trading Down Correction Value</b>												
0.00												
<b>Habitat Mitigation Score (HMS)</b>												
752.23												
<b>Habitat Biodiversity Impact Score (HMS - HIS)</b>												
89.77												
<b>Percentage of Biodiversity Impact Loss</b>												



**Biodiversity Impact Assessment Summary (With Offsite Compensation)**

Site name:	Curraghinalt Project		
Planning reference number:			
<b>Habitats</b>	<b>Area (ha)</b>	<b>Habitat Biodiversity Value</b>	
Total existing area onsite	145.99	1469.48	
Habitats negatively impacted by development Impact Score	74.28	693.46	
On site habitat mitigation and compensation Habitat Mitigation Score	128.52	782.23	
Biodiversity gain <b>Biodiversity Impact Score</b>		<b>88.77</b>	
Percentage of biodiversity impact			
<b>Linear features</b>	<b>Length (km)</b>	<b>Linear Biodiversity Value</b>	
Total existing length onsite	22.71	101.48	
Linear features negatively impacted by development Linear Impact Score	8.14	40.78	
On site linear mitigation <b>Linear Mitigation Score</b>	2.26	34.43	
Linear biodiversity loss <b>Biodiversity Impact Score</b>		<b>-6.35</b>	
Percentage of linear biodiversity impact		<b>15.57</b>	

Phase 1 Habitat Description		Phase 1 Habitat Code		Distinctiveness		Difficulty of Creation		Difficulty of Restoration	
Built Environment: Buildings/hardstanding	n/a	None	0	Low	1	Low	1		
Built Environment: Gardens (lawn and planting)	n/a	Low	2	Low	1	Low	1		
Woodland: Broad-leaved semi-natural woodland	A111	High	6	n/a	-	Low	1		
Woodland: Broad-leaved plantation	A112	Medium	4	Medium	1.5	Low	1		
Woodland: Coniferous semi-natural woodland	A121	Medium	4	n/a	-	Low	1		
Woodland: Coniferous plantation	A122	Low	2	Medium	1.5	Low	1		
Woodland: Mixed semi-natural woodland	A131	Medium	4	n/a	-	Low	1		
Woodland: Mixed plantation	A132	Low	2	Medium	1.5	Low	1		
Woodland: Wet woodland	n/a	High	6	Medium	1.5	Medium	1.5		
Woodland: Dense continuous scrub	A21	Medium	4	Low	1	Low	1		
Woodland: Scattered scrub	A22	Medium	4	Low	1	Low	1		
Woodland: Broad-leaved parkland / Scattered trees	A31	High	6	Medium	1.5	Low	1		
Woodland: Coniferous parkland / Scattered trees	A32	Medium	4	Medium	1.5	Low	1		
Woodland: Recently felled woodland	A33	Medium	4	Medium	1.5	Low	1		
Woodland: Orchard	A4	Low	2	n/a	-	n/a	-		
Woodland: Wet woodland	A5	High	6	Low	1	Low	1		
Grassland: Unimproved acidic grassland	B11	High	6	Medium	1.5	Low	1		
Grassland: Semi-improved acidic grassland	B12	High	6	Medium	1.5	Low	1		
Grassland: Unimproved neutral grassland	B21	High	6	Medium	1.5	Low	1		
Grassland: Semi-improved neutral grassland	B22	Medium	4	Medium	1.5	Low	1		
Grassland: Unimproved calcareous grassland	B31	High	6	Medium	1.5	Low	1		
Grassland: Semi-improved calcareous grassland	B32	High	6	Medium	1.5	Low	1		
Grassland: Poor semi-improved grassland	B6	Medium	4	Medium	1.5	Low	1		
Grassland: Improved grassland	B4	Low	2	n/a	-	Low	1		
Grassland: Marsh / Marshy grassland	B5	High	6	High	3	Medium	1.5		
Grassland: Set-aside / Arable field margins	J113	High	6	Low	1	Low	1		
Grassland: Amenity grassland	J12	Low	2	Low	1	Low	1		
Heathland: Dry dwarf shrub heath	D1	High	6	Medium	1.5	Medium	-0.5		
Heathland: Wet dwarf shrub heath	D2	High	6	Medium	1.5	Medium	0.5		
Heathland: Dry heath / Acid grassland mosaic	D5	High	6	Medium	1.5	Medium	1.5		
Heathland: Wet heath / Acid grassland mosaic	D6	High	6	Medium	1.5	Medium	1.5		
Wetland: Standing water	G1	High	6	Medium	1.5	Medium	1.5		
Wetland: Running water	G2	High	6	Medium	1.5	Medium	1.5		
Wetland: Reedbed	n/a	High	6	Low	1	Low	1		
Wetland: Sphagnum bog	E1	High	6	Very High	10	High	3		
Wetland: Acid/neutral flush	E2	High	6	High	3	Medium	1.5		
Wetland: Fen and mire	E3	High	6	High	3	Medium	1.5		
Wetland: Swamp	F1	High	6	High	3	Medium	1.5		
Wetland: Inundation	F2	High	6	Low	1	Low	1		
Other: Arable	J11	Low	2	n/a	-	Low	1		
Other: Continuous track	C11	Low	2	Low	1	Low	1		
Other: Tall ruderal	C31	Low	2	Low	1	Low	1		
Other: Non-ruderal	C32	Medium	4	Low	1	Low	1		
Other: Ephemeral/short perennial	J13	Low	2	Low	1	Low	1		
Other: Quarry (active)	I21	None	0	Low	1	Low	1		
Other: Quarry (disused)	I22	Low	2	Low	1	Low	1		
Other: Spill	I24	Low	2	Low	1	Low	1		
Other: Refuse tip	J14	Low	2	Low	1	Low	1		
Other: Introduced shrub	J4	Low	2	Low	1	Low	1		
Other: Bare ground	J4	Low	2	Low	1	Low	1		
<b>Linear Features</b>									
Hedges: Intact hedge	J21	High	6	Low	1	Low	1		
Hedges: Native species-rich intact hedge	J211	Very High	8	Low	1	Low	1		
Hedges: Hedge with trees	J23	Very High	8	Low	1	Low	1		
Hedges: Native species-rich intact hedge with trees	J231	Very High	8	Low	1	Low	1		
Hedges: Defunct hedge	J22	Medium	4	n/a	-	Low	1		
Hedges: Linear scrub	J21	Medium	4	Low	1	Low	1		
Hedges: Linear trees	A3	Medium	4	Low	1	Low	1		
Hedges: Introduced scrub	J14	Low	2	Low	1	Low	1		
Wetland: Running water	G2	High	6	Medium	2	Low	1		
Ditches: Standing water	G1	High	6	Medium	2	Low	1		
Ditches: Running water	G2	High	6	Medium	2	Low	1		
Ditches: Dry ditch	J26	Low	2	Low	1	Low	1		
Boundaries: Wall	J25	Low	2	Low	1	Low	1		
Boundaries: Dry stone wall	J25	Medium	4	Low	1	Low	1		
Other: Inland cliff	I1	Medium	4	Low	1	Low	1		
Other: Earth bank	J28	Low	2	Low	1	Low	1		
<b>EU Annex I Habitats</b>									
Blanket Bogs (priority where active*)	7130*	High	6	Very High	10	High	3		
Northern Atlantic wet heaths with Erica tetralix	4010	High	6	Medium	1.5	Medium	0.5		
Meadow meadows on calcareous, peaty or clayey/silt-laden soils	6410	High	6	High	3	Medium	1.5		
<b>NI Priority Habitats</b>									
Blanket bog	BB	High	6	Very High	10	High	3		
Lowland heathland	LH	High	6	Medium	1.5	Medium	1.5		
Purple moor-grass and rush pastures	PR	High	6	High	3	Medium	1.5		
Upland Flushes, Fens and Swamps	UF	High	6	High	3	Medium	1.5		
Ponds	P	High	6	Low	1	Low	1		
Mixed Ashwoods	MA	High	6	Medium	1.5	Low	1		

Distinctiveness	
Very high	8
High	6
Medium	4
Low	2
None	0

Condition	
Good	3
Moderate	2
Poor	1

Time	
5 years	1.2
10 years	1.4
15 years	1.7
20 years	2
25 years	2.4
30 years	2.8
32+ years	3

Difficulty	
Very high	10
High	3
Medium	1.5
Low	1
None	0

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