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ECOLOGICAL IMPACT ASSESSMENT

At

Cae'r Glaw Quarry – Proposed Extension Area

Holyhead Road

Gwalchmai

Anglesey

LL65 4PW

NGR: SH 38512 77319

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A handwritten signature in black ink that reads 'K James'.

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EXECUTIVE SUMMARY

United Environmental Services Ltd (UES) was commissioned by Hogan Holdings Ltd and Caer Glaw Ltd to carry out an Ecological Impact Assessment (EclA) of a parcel of land at Cae'r Glaw Quarry, Holyhead Road, Gwalchmai, Anglesey. The proposed development is for the extension of the existing granite quarry, together with the consolidation of this new extraction area with the extant mineral planning permission in force on the wider quarry area. The proposed extension has an area of 6.89ha and will be undertaken in six phases. The proposed extension boundary has been amended on a number of occasions, in some cases to reduce impacts on ecological receptors. As such, the area surveyed to inform this application covers a greater area than is to be quarried.

A desk study and preliminary ecological appraisal (PEA) survey were undertaken on the 9th June and 12th July 2021, and various other Phase 2 ecological surveys were undertaken following the findings of the PEA. These surveys have informed the EclA. The habitats on site were mapped and assessed in accordance with the phase 1 habitat survey technique, which is a system for environmental audit widely used within the environmental consultancy field. Potentially sensitive ecological features which could be impacted by the proposed development were highlighted by the PEA.

The proposed extension area comprises a mosaic of sheep-grazed semi-improved acid grassland, continuous bracken *Pteridium aquilinum*, exposed rock, dense gorse *Ulex spp.* scrub and some areas of neutral / acidic flush. In addition, a drystone wall with some scattered hawthorn *Crataegus monogyna* scrub runs north to south within the western section. The wider survey boundary contains areas of purple moor-grass *Molinia caerulea* marshy grassland, valley mire fen and a small area of modified bog.

The EclA has identified various impacts up to a county level due to the presence, or potential presence, of protected species / habitats of principal importance within the site boundary or the surrounding area.

Mitigation and compensation measures are provided within section 7 of this report in order to reduce the impacts to insignificant levels. Furthermore, recommendations for enhancements are provided, which could improve the habitats locally following the development, resulting in a minor positive outcome for some habitats and species.

The measures required to protect the identified ecological receptors from impacts are fully detailed in an Ecological Design Strategy (EDS) which site staff can work to (see report reference UES02936/07). Similarly, the landscaping and habitat provisions are fully detailed in a Landscape and Ecological Management Plan (LEMP) (see report reference UES02936/06). These documents also include details of habitat management, timings, responsibilities, monitoring and contingency plans.

Provided that the measures within this report are followed, it is considered that the proposed development will be compliant with all relevant legislation and planning policy and that the aforementioned ecological receptors will not be significantly negatively impacted.

This report should be read with appendices 1 to 11, which provide GIS mapping, and key results of the protected species, habitat and botanical surveys. Full details of the phase 2 survey results and methodologies are available within the respective ecological reports.

This EclA should also be read in conjunction with the following reports:



- Preliminary Ecological Appraisal V2 (reference UES02936/01).
- Reptile Population Size Class Assessment (reference UES02936/02)
- Great Crested Newt (GCN) Impact Assessment (reference UES02936/03)
- National Vegetation Classification Survey (reference UES02936/04)
- Landscape & Ecology Management Plan V4 (reference UES02936/06)
- Ecological Design Strategy V4 (reference UES02936/07)
- Ecological Impact Assessment (reference UES02936/08)
- Invertebrate Survey Report

1 INTRODUCTION

1.1 Author, surveyors and qualifications

This report is written by Tom Kenwright BSc MSc, UES Senior Ecologist. Tom holds a level 5 Botanical Society for Britain and Ireland (BSBI) field identification skills certificate (FISC), which certifies him as competent to undertake phase 1 habitat and national vegetation classification (NVC) surveys. Tom is licensed by Natural Resources Wales (NRW) to disturb, take and handle great crested newts *Triturus cristatus* under licence number S091022/1. Tom is named as an accredited agent on the NRW bat survey licence of Toby Hart (see below) and has been deemed competent and capable by the licence holder to disturb bats through observation, to handle bats and to undertake tree and building inspections using a torch and endoscope.

This report has been verified by Kathryn James BSc MRes MCIEEM, UES Ecology Project Manager. Kathryn holds a level 4 BSBI FISC, which certifies her as competent to undertake phase 1 habitat and NVC surveys. Kathryn is licensed by NRW to disturb, take and handle GCNs under licence number S091414/1. Kathryn is licensed by NRW to disturb, take and handle all species of bat other than greater horseshoe *Rhinolophus ferrumequinum* or lesser horseshoe *Rhinolophus hipposideros*, under licence number S091413/1.

Additional surveyors discussed within this document and their qualifications include:

- Toby Hart BSc MCIEEM PIEMA, UES Managing Director. Toby holds a level 6 BSBI FISC, which certifies him as competent to undertake phase 1 habitat and NVC surveys. Toby is licensed by NRW to disturb, take and handle GCNs under licence number S086784/1. Toby is licensed by NRW to disturb, take and handle all species of bat other than greater horseshoe or lesser horseshoe under licence number S086508/01.
- Alasdair Grubb BSc ACIEEM, UES Ecologist. Alasdair holds a level 5 BSBI FISC, which certifies him as competent to undertake phase 1 habitat and NVC surveys. Alasdair is licensed by NRW to disturb, take and handle GCNs under licence number S090926/1. Alasdair is licensed by NRW to survey and monitor barn owl *Tyto alba* nest sites, for the purposes of monitoring the presence of the species and effectiveness of conservation efforts, including surveying sites to inform future development proposals under licence number S091016/1. Alasdair is named as an accredited agent on the NRW bat survey licence of Toby Hart and has been deemed competent and capable by the licence holder to disturb bats through observation, to handle bats and to undertake tree and building inspections using a torch and endoscope.
- Mark Halliwell MBiol, UES Ecologist. Mark holds a level 4 BSBI FISC, which certifies him as competent to undertake phase 1 habitat and NVC surveys. Mark is trained in tree climbing and aerial rescue to CS38 Level. Mark is named as an accredited agent on the NRW bat survey licence of Toby Hart and has been deemed competent and capable by the licence holder to disturb bats through observation, to handle bats and to undertake tree and building inspections using a torch and endoscope.
- Daniel Smith BSc MScRes, UES Ecologist. Daniel holds a level 3 BSBI FISC, which certifies him as competent to undertake phase 1 habitat surveys. Daniel is trained in tree climbing and aerial rescue to CS38 Level. Daniel is named as an accredited agent on the NRW bat survey licence of Toby Hart and has been deemed competent and

capable by the licence holder to disturb bats through observation, to handle bats and to undertake tree and building inspections using a torch and endoscope.

- Paul Cassidy ACIEEM, UES Sub-contractor. Paul is licensed by NRW to disturb, take and handle all species of bats except greater and lesser horseshoes under licence number S088256/1. Paul is also licensed by NRW to disturb, take and handle GCNs under licence number S088257/1.
- Dr Keith Alexander CEnv MCIEEM, UES Sub-contractor. Keith is a nationally recognised invertebrate expert.
- Amanda Beck, UES Assistant Ecologist.
- Abigail Miller BSc, UES Assistant Ecologist.
- Sarah McClaren BSc, UES Graduate / Assistant Ecologist.
- James Hudak BSc, UES Graduate Ecologist.

1.2 Report objectives and scope of study area

The report provides an assessment of the potential ecological impacts associated with the proposed development of a parcel of land known as the proposed extension area at Cae'r Glaw Quarry, Holyhead Road, Gwalchmai, Anglesey. The zone of influence considered within the scope of the survey includes all land within the red line boundary. Where relevant, other ecological resources, receptors and important habitats which are spatially separate from the site are considered.

UES was commissioned to conduct an EclA for the proposed development. This was completed in order to:

- Establish the baseline conditions likely to be present on site at the time of the proposed development, by collecting information on the ecological resources or features which could be affected.
- Identify possible impacts to any habitats, species and protected sites, which may arise as a result of implementing the construction and operational phases of the proposed development.
- Assess the ecological / nature conservation importance of these resources and features, as well as assessing the significance of the identified impacts on them.
- Identify potential requirement for mitigation or compensation, to ensure the safeguarding and / or conservation status of these resources or features.
- Assess the importance and significance of residual effects associated with the mitigated and compensated development.

1.3 Proposed development and previous survey information

The proposals are for the extension of the existing granite quarry, to allow mineral extraction from an area to the north of the existing quarry, together with the consolidation of this new extraction area with the extant mineral planning permission in force on the wider quarry area. The proposed extension area is approximately 6.89ha in size, which will be quarried in six phases over a period of more than 10 years.

A suite of ecological surveys has been undertaken of the proposed extension area to inform the planning application. The proposed extension area boundary has been amended on a number of occasions, in some cases to reduce impacts on ecological receptors. As such, the area surveyed to inform this application covers a greater area than is to be quarried. Surveys undertaken by UES of the proposed extension include:

- Preliminary ecological appraisal – June 2021
- Reptile population size class assessment – May to October 2021
- GCN impact assessment and eDNA survey – May & June 2021
- NVC survey – June & July 2021
- Terrestrial invertebrate scoping survey – July 2021

The detailed habitat, botanical and protected species surveys required were informed by the initial PEA of the proposed extension area. In addition, baseline information from the wider quarry and surrounding areas was also already available following a full suite of surveys that UES undertook to inform a planning application for an alternative proposed extension area that lies immediately adjacent to the current proposed extension area (see Zone B at Appendix 4). This area will no longer be quarried despite planning permission being granted by Anglesey Council in December 2019 (planning reference 48C79J).

Ecological surveys undertaken of the previous ecological extension area by UES included:

- PEA – January 2016
- GCN impact assessment and population size class assessment – March to June 2016
- NVC survey – July 2016
- Reptile presence / absence and population size class assessment survey – April to October 2016
- Bat activity survey – May to August 2016
- Terrestrial invertebrate survey – August 2016

In addition to the surveys of the proposed extension area, PEA surveys were undertaken of the proposed compensation area (Zone C), Zone E and restoration areas (Zones D, F and G) within the existing quarry in December 2017. These surveys were undertaken to assess the baseline value of these areas and to identify opportunities for habitat creation and management works to compensate for the loss of habitats associated with the previous extension. Reptile population size class assessment surveys were also undertaken of the compensation and restoration areas to inform the suitability for the translocation of reptiles from the previous extension area.

Following the surveys of the consented extension area, compensation area and restoration area, a reptile mitigation strategy, LEMP and EDS were prepared to support the application. These reports were prepared to detail the mitigation and compensation measures due to be undertaken as part of the previous extension. A large quantity of the proposed compensatory habitat creation works have already undertaken, despite the consented extension not being

quarried and the permission being relinquished following the granting of the new application for the alternative extension area. Given the similarities and close proximity of the previous and proposed extension areas, the habitat creation and enhancement works that have already been undertaken within the compensation and restoration areas will be linked with this new application. The baseline survey data of these areas has been used to prepare new documents which have been amended where conditions have changed, as identified when UES ecologists have visited the site to oversee these works or to undertake GCN monitoring surveys as detailed below.

Due to the presence of GCNs within ponds within the wider quarry, ongoing works within the wider quarry have been registered under a GCN European protected species (EPS) mitigation licence. GCN monitoring surveys of these ponds are currently ongoing, with surveys having been completed in 2020, 2021 and 2022.

1.4 Structure of the report

This report describes the methods used to assess the existing baseline ecological conditions at the site and surroundings, the potential direct and indirect impacts of the development, the mitigation measures required to prevent, reduce or offset the impacts, and the residual impacts after the development.

This report should be read with appendices 1 to 11, which provide GIS mapping, and key results of the protected species, habitat and botanical surveys. Full details of the phase 2 survey results and methodologies are available within the respective ecological reports.

This EclA should also be read in conjunction with the following reports:

- Preliminary Ecological Appraisal V2 (reference UES02936/01).
- Reptile Population Size Class Assessment (reference UES02936/02)
- Great Crested Newt Impact Assessment (reference UES02936/03)
- National Vegetation Classification Survey (reference UES02936/04)
- Landscape & Ecology Management Plan V4 (reference UES02936/06)
- Ecological Design Strategy V4 (reference UES02936/07)
- Ecological Impact Assessment (reference UES02936/08)
- Invertebrate Survey Report

2 LEGISLATION

Of relevance to this EclA are the provisions of the following Statutory Instruments and Acts of Parliament:

- Abandonment of Animals Act 1960;
- Countryside and Rights of Way (CRoW) Act 2000;
- Environment (Wales) Act 2016
- Habitats Directive 1992;
- Hedgerow Regulations 1997;
- Protection of Animals Act 1911;
- The Conservation of Habitats and Species Regulations 2017;
- The Protection of Badgers Act 1992;
- Wildlife and Countryside Act 1981 (as amended);
- Invasive Alien Species (Enforcement and Permitting) Order 2019

The sections and outcomes of the above articles of legislation are detailed below for each species or habitat that is relevant to the scope of this assessment.

2.1 Habitats and species of principal importance

Section 6 of the Environment (Wales) Act 2016 places a legal obligation on public bodies in Wales to 'maintain and enhance biodiversity' whilst carrying out their functions. Section 7 of the act places a duty on Welsh Ministers to publish, review and revise lists of types of habitats and species in Wales which they consider are of key significance to sustain and improve biodiversity. The Welsh Ministers must also take all reasonable steps to maintain and enhance the habitats published in these lists, and encourage others to take such steps. Habitats of principal importance are material planning considerations that must be taken into account when local planning authorities are reviewing and determining planning applications.

2.2 Protected plant species

Schedule 8 of the Wildlife & Countryside Act 1981 (as amended) lists a number of plant species which are protected under Section 13 of the same legislation. As such, it is an offence to:

- Intentionally or recklessly pick, uproot or destroy a plant, or any seeds or spores attached to it, which is listed on Schedule 8
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead wild plant on Schedule 8, any part of the plant or anything derived from the plant

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

The Conservation of Habitats and Species Regulations 2017 extends European legislative protection to a further subset of plants. It is therefore an offence to pick, collect, cut, uproot, destroy or trade any plant listed in Schedule 4 of these Regulations, unless the appropriate licence is first obtained.

A large number of species of vascular plants, lichens, algae, fungi, mosses, stoneworts and liverworts are also protected through planning policy as species of principal importance, as required under Section 7 of the Environment Act (Wales) 2016.

2.3 Amphibians

2.3.1 Great crested newts

GCNs and their habitat (aquatic and terrestrial) are afforded full protection by the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. If both national and international legislation are taken together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture GCNs
- Deliberately, intentionally or recklessly disturb GCNs in such a way to be likely to significantly affect:
 - their ability to survive, breed, reproduce, rear or nurture their young
 - their ability to hibernate or migrate
 - their local distribution or abundance
- Deliberately, intentionally or recklessly take or destroy the eggs of GCNs
- Damage or destroy breeding sites or resting places of GCNs
- Intentionally or recklessly disturb sheltering GCNs, or obstruct access to their resting place
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead GCN, any part of GCN or anything derived from GCNs

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

GCNs are also protected by the Protection of Animals Act 1911, which prohibits cruelty and mistreatment. Releasing a GCN in such a way as to cause undue suffering may be an offence under the Abandonment of Animals Act 1960.

In addition to the above, there are various statutory provisions relating to the transport of animals, designed to ensure their welfare.

GCNs are also listed as a species of principal importance under Section 7 of the Environment (Wales) Act 2016.

2.3.2 Other amphibians

More common British amphibians, such as common frog *Rana temporaria*, common toad *Bufo bufo*, smooth newt *Lissotriton vulgaris* and palmate newt *Lissotriton helveticus* are protected only by Section 9(5) of the Wildlife and Countryside Act 1981 (as amended). This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy.

The above common amphibian species are also listed as UK Species of Conservation Concern. Due to general declines in most British amphibian species in recent years, many local authorities require amphibian surveys as a planning condition, or as part of environmental

information submitted as part of a planning application, even where the presence of GCN is ruled out.

Natterjack toad *Epidalea calamita* and pool frog *Pelophylax lessonae* are also offered the same level of protection as GCNs, through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017.

Natterjack and common toad are also listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016.

Waterbodies that support all five common species of British amphibians in high numbers, may be afforded protection in local plans, as Sites of Importance for Nature Conservation (SINC), or a similar equivalent, for sites of local importance. A site may require statutory protection as a Site of Special Scientific Interest (SSSI).

2.4 Reptiles

Common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix natrix* and adder *Vipera berus* are protected under the Wildlife and Countryside Act 1981 (as amended). They are listed as a Schedule 5 species therefore part of Section 9(1) and section 9(5) apply. The Countryside and Rights of Way Act 2000 also strengthens their protection. It is offence to:

- Intentionally or recklessly kill or injure any of the species listed above
- Sell, offer, advertise or transport for sale a live or dead animal of the species listed above

If a proposed development is likely to have an impact on these reptiles the local statutory nature conservation organisation must be consulted.

Sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca* receive full protection under the Wildlife and Countryside Act 1981 (as amended) and Conservation of Habitats and Species Regulations 2017. Read together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture any sand lizards or smooth snakes
- Deliberately, intentionally or recklessly disturb sand lizards or smooth snakes in such a way to be likely to significantly affect:
 - their ability to survive, breed, reproduce, rear or nurture their young
 - their ability to hibernate or migrate
 - their local distribution or abundance
- Deliberately, intentionally or recklessly take or destroy the eggs of such an animal
- Damage or destroy breeding sites or resting places of such animals
- Intentionally or recklessly disturb sheltering sand lizards or smooth snakes, or obstruct access to their resting place
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead sand lizards or smooth snakes, any part of such an animal or anything derived from such an animal

Penalties for offences include fines of up to £5000, plus up to six months imprisonment, for each offence committed.

All reptile species (except for smooth snake) are also listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016.

2.5 Badgers

European badgers *Meles meles* and their habitat are protected under The Protection of Badgers Act 1992 and are also included on Schedule 6 of the Wildlife and Countryside Act 1981, and Appendix III of the Bern Convention. The legislation affords badgers protection against deliberate harm or injury making it an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat a badger (or attempt to do so)
- To interfere with a sett by damaging or destroying it
- To obstruct access to, or entrance of, a badger sett
- To disturb a badger whilst it is occupying a sett

Penalties for offences include fines of up to £5000, plus up to six months imprisonment, for each offence committed.

Works that disturb badgers whilst they are occupying a sett are illegal without a licence. Disturbance can occur even without direct interference or damage to the sett in question. In general, the following activities are likely to require a licence:

- Use of heavy machinery or significant earth moving within 30m of a sett
- Use of lighter machinery (usually any wheeled vehicles) within 20m of a sett
- Any digging, chain saw use or scrub clearance within 10m of a sett

2.6 Bats

In the United Kingdom, all species of bat and their roosts are afforded full protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (known as the “Habitats Regulations”). If both national and international legislation are taken together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture a bat
- Deliberately, intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection
- Deliberately, intentionally or recklessly damage, destroy or obstruct access to any place that a bat uses for shelter or protection (even if the bat is not present at the time)
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead bat, any part of a bat or anything derived from a bat

Under UK law, a bat roost is *any structure or place which any wild [bat] ... uses for shelter or protection*. As bats often reuse the same roosts, legal opinion is that a roost is protected whether or not the bats are present at the time of the activity taking place.

Penalties for offences include unlimited fines, plus up to six months imprisonment, for each offence committed.

The following bat species are listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016:

- Barbastelle *Barbastella barbastellus*
- Bechstein's bat *Myotis bechsteinii*
- Noctule *Nyctalus noctula*
- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Brown long-eared bat *Plecotus auritus*
- Greater horseshoe
- Lesser horseshoe

2.7 Breeding birds

All wild birds, their nests and young are protected throughout England and Wales by the Wildlife & Countryside Act 1981 (as amended). It is illegal to kill, injure or take any wild bird, or damage or destroy the nest or eggs of breeding birds. The legislation applies to all bird species, common and rare.

In addition to the protection afforded to all wild birds, more vulnerable species listed on Schedule 1 of the Act receive enhanced protection when breeding. Schedule 1 species, including their dependent young, are protected from intentional or reckless disturbance whilst at or near the nest, in addition to the protection afforded the more common species.

The Environment (Wales) Act 2006 offers further protection to the nests of some species that regularly re-use their nests, even when the nests are not in use.

The leading governmental and non-governmental conservation organisations in the UK have reviewed the population status of 244 UK bird species. "Birds of Conservation Concern 5: the Red List for Birds" is the most recent publication summarising their findings. Three lists, Red, Amber and Green, have been produced based on the most up-to-date evidence available and criteria include conservation status at global and European levels and, within the UK: historical decline, trends in population and range, rarity, localised distribution and international importance. These lists are a valuable resource when considering conservation priorities.

2.8 Hazel dormouse

Hazel dormice *Muscardinus avellanarius* are offered full protection through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. If both national and international legislation are taken together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture dormice
- Deliberately, intentionally or recklessly disturb dormice in such a way to be likely to significantly affect:
 - their ability to survive, breed, reproduce, rear or nurture their young
 - their ability to hibernate or migrate
 - their local distribution or abundance
- Damage or destroy breeding sites or resting places of dormice

- Intentionally or recklessly disturb sheltering dormice, or obstruct access to their resting place
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead dormouse, any part of a dormouse or anything derived from a dormouse

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

Hazel dormice are also listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016.

2.9 Invasive plant species

A number of invasive, non-native plant species are listed under Schedule 9 (Part II) of the Wildlife and Countryside Act 1981 (as amended). The most commonly encountered listed species in ecological surveys are Japanese knotweed *Fallopia japonica*, Montbretia *Crocsmia x crocosmiiflora* and variegated yellow archangel *Lamiastrum galeobdolon subsp. argentatum*. Section 14(2) of this Act makes it an offence to 'plant or otherwise cause to grow in the wild (including as a result of development works)' any plant listed on Schedule 9 (Part II).

A number of invasive, non-native plants species are listed under Schedule 2 (Part II) of the Invasive Alien Species (Enforcement and Permitting) Order 2019. The most commonly encountered listed species in ecological surveys are Himalayan balsam *Impatiens glandulifera* and giant hogweed *Heracleum mantegazzianum*. Section 3 of this Act makes it an offence to 'plant or otherwise causes to grow in the wild (including as a result of development works)' any plant which is listed on Schedule 2 (Part II).

Soil or plant material contaminated with non-native and invasive plants can cause ecological damage and may be classified as controlled waste. It is an offence to keep, treat or inappropriately dispose of waste that could harm the environment or human health. If there is any doubt, the local authority or Environment Agency should be contacted to confirm requirements.

2.10 European otter

European otter *Lutra lutra* are offered full protection through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. If both national and international legislation are taken together, it is an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture otters
- Deliberately, intentionally or recklessly disturb otters in such a way to be likely to significantly affect:
 - their ability to survive, breed, reproduce, rear or nurture their young
 - their ability to migrate
 - their local distribution or abundance
- Damage or destroy breeding sites or resting places of otters
- Intentionally or recklessly disturb sheltering otters, or obstruct access to their resting place

- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead otter, any part of an otter or anything derived from otter

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

Otters are also listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016.

2.11 Water vole

Water voles *Arvicola amphibius* are protected by the provisions of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- Intentionally kill, injure or take water vole
- Possess or control live or dead water vole or any part of a water vole
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which a water vole uses for shelter or protection, or disturb water vole using such a place
- Sell, offer, advertise or transport live or dead water voles for sale

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

Water voles are also listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016.

2.12 White-clawed crayfish

White-clawed crayfish *Austropotamobius pallipes* are protected under the Wildlife and Countryside Act 1981 (as amended). They are listed as a Schedule 5 species therefore part of Section 9(1) and Section 9(5) apply. The Countryside and Rights of Way Act 2000 also strengthens their protection. It is offence to:

- Intentionally or recklessly kill or injure white-clawed crayfish
- Sell, offer, advertise or transport for sale a live or dead white-clawed crayfish

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

Their inclusion on the EC Habitats Directive allows areas to be designated as Special Areas of Conservation (SAC) for the presence of white-clawed crayfish. Such a designation brings legal protection under the Conservation of Habitats Regulations 2017, this includes how the site is managed and what development can occur on and in proximity to these sites.

White-clawed crayfish are also listed as species of principal importance under Section 7 of the Environment (Wales) Act 2016.

3 PLANNING POLICY

3.1 Planning Policy Wales

Guidance on nature conservation and planning policy is provided in Planning Policy Wales (Edition 11) Chapter 6 – Distinctive and Natural Places.

Section 6.5.4 of Planning Policy Wales states that 'authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity. In doing so planning authorities must also take account of and promote the resilience of ecosystems, in particular the following aspects:

- diversity between and within ecosystems;
- the connections between and within ecosystems;
- the scale of ecosystems;
- the condition of ecosystems including their structure and functioning; and
- the adaptability of ecosystems'.

Section 6.4.6 states that 'in fulfilling this duty, planning authorities must have regard to:

- the list of habitats and species of principal importance for Wales, published under Section 7 of the Environment (Wales) Act 2016;
- the State of Natural Resources Report (SoNaRR), published by NRW; and
- any Area Statement that covers all or part of the area in which the authority exercises its functions'.

Section 6.4.7 states that 'Planning Authorities should also refer to up to date ecological survey information (where appropriate)'.

Section 6.4.21 states that 'planning authorities must follow a stepwise approach to maintain and enhance biodiversity and build resilient ecological networks by ensuring that any adverse environmental effects are firstly avoided, then minimized, mitigated, and as a last resort compensated for; enhancement must be secured wherever possible.

1. The first priority for planning authorities is to avoid damage to biodiversity and ecosystem functioning. Where there may be harmful environmental effects, planning authorities will need to be satisfied that any reasonable alternative sites that would result in less harm, no harm or gain have been fully considered.
2. Planning authorities should ensure that features and elements of biodiversity or green infrastructure value are retained on site, and enhanced or created wherever possible, by adopting best practice site design and green infrastructure principles. The provision of up-to-date ecological survey information will assist in this process. Where necessary, planning authorities should seek to modify the development proposal through discussion with the applicant at the earliest possible stage. Biodiversity and green infrastructure modifications should draw on the issues and opportunities identified through the Green Infrastructure Assessment.
3. In some circumstances, it will be appropriate to attach planning conditions, obligations, or advisory notes to a permission, to secure biodiversity outcomes. Planning authorities should take care to ensure that any conditions necessary to implement this

policy are, relevant to planning, relevant to the development to be permitted, enforceable, precise, and reasonable in all other respects.

4. When all other options have been exhausted, and where modifications, alternative sites, conditions or obligations are not sufficient to secure biodiversity outcomes, offsite compensation for unavoidable damage must be sought:
 - a. This should normally take the form of habitat creation, or the provision of long-term management arrangements to enhance existing habitats and deliver a net benefit for biodiversity. It should also be informed by a full ecological assessment before habitat creation or restoration starts.
 - b. The Green Infrastructure Assessment should be used to identify suitable locations for securing offsite compensation. Where possible, a landscape-scale approach, focusing on promoting wider ecosystem resilience, should help guide locations for compensation. This exercise will determine whether locations for habitat compensation should be placed close to the development site, or whether new habitat or additional management located further away from the site would best support biodiversity and ecosystem resilience at a wider scale.
 - c. Where compensation for specific species is being sought, the focus should be on maintaining or enhancing the population of the species within its natural range. This approach might also identify locations for providing species-specific compensation further away from the site. Where they exist, Spatial Species Action Plans should be used to help identify suitable locations.
 - d. Any proposed compensation should take account of the Section 6 Duty (Biodiversity and Resilience of Ecosystems Duty), and the five key ecosystem resilience attributes that it outlines. It should also be accompanied by a long-term management plan of agreed and appropriate mitigation and compensation measures.
5. Finally, where the adverse effect on the environment clearly outweighs other material considerations, the development should be refused.'

3.2 Local planning policy

The current planning policy framework for Anglesey is the Anglesey and Gwynedd Joint Local Development Plan 2011 – 2025, adopted on 31st July 2017.

Chapter 6.5 of the Joint Local Development Plan addresses conserving and enhancing the natural environment, with the following context:

- 'A key role of the planning system is to ensure the natural environment is protected effectively by managing the type, design and location of development.
- The planning system has an important part to play in meeting biodiversity objectives by promoting approaches to development, which create new opportunities to enhance biodiversity, prevent biodiversity losses, or compensate for losses where damage is unavoidable.



- It is important that biodiversity and landscape considerations are taken into account at an early stage in the development plan preparation and the development control process.
- The Natural Environment and Rural Communities Act 2006 places a duty on every public authority, in exercising its functions, to have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.
- Both Councils have prepared Local Biodiversity Action Plans.
- Local Authorities have a statutory duty to have regard to the Area of Outstanding Natural Beauty's (AONB) purposes, which is the conservation and enhancement of their natural beauty.
- The duty to have regard to National Park and AONB purposes applies to activities affecting these areas, whether those activities lie within or outside the designated areas.'

Policy AMG 5; Local Biodiversity Conservation is of particular relevance to the Cae'r Glaw Quarry proposal and reads as follows:

'Proposals must protect and, where appropriate, enhance biodiversity that has been identified as being important to the local area by:

- a. Avoiding significant harmful impacts through the sensitive location of development.
- b. Considering opportunities to create, improve and manage wildlife habitats and natural landscape including wildlife corridors, stepping stones, trees, hedges, woodlands and watercourses.

A proposal affecting sites of local biodiversity importance will be refused unless they can conform with all of the following criteria:

1. That there are no other satisfactory alternative sites available for the development.
2. The need for the development outweighs the importance of the site for local nature conservation.
3. That appropriate mitigation or compensation measures are included as part of the proposal.

Where necessary, an Ecological Assessment which highlights the relevant local biodiversity issues should be included with the planning application.'

4 METHODOLOGY

This section describes the details of the consultation, desk study and field surveys that have been undertaken to inform the baseline conditions and to assess the ecological / nature conservation value of the ecological receptors relevant to this assessment. This does not include full details of the surveys undertaken to inform the previous extension area as these do not directly relate to this application.

4.1 Consultation and review of data

In order to collate ecological information on species and / or habitats of interest that may be present, as well as to determine the geographical scope of the search area, a desk study was undertaken. The following sources were used:

- National – Using the UK Government's Multi-Agency Geographical Information for the Countryside (MAGIC) website, information relating to statutorily protected sites was obtained. These sites were scoped to a distance of 10km from the proposed development site.
- Local – A search for protected sites and records of protected or otherwise notable species within a 2km search radius around the proposed development site was undertaken through Cofnod in 2016 as part of the previous suite of surveys undertaken to inform the consented previous proposed extension. The information has been used to inform this report, in addition to the previous survey data gathered during the ecological surveys undertaken to inform the previous application, as detailed above in Section 1.3.

4.2 Field surveys

4.2.1 Preliminary Ecological Appraisal

Field survey

As part of a PEA, a walkover survey of the proposed extension area was carried out on the 9th June 2021 by Tom Kenwright and Toby Hart, and on the 12th July 2021 by Tom Kenwright. The purpose of the surveys was to identify, record and map dominant habitat types within the development area and highlight any further species surveys that may be required based on the quality of those habitats. When conducting the surveys particular focus was concentrated on the following species and habitat features:

- Amphibians
- Reptiles
- Badger
- Hazel dormouse
- Bats
- Birds
- Trees
- Hedgerows
- Plant communities
- Invasive species
- Otter
- Water vole
- White-clawed crayfish

The habitats were assessed by using the phase 1 habitat survey technique, which is a system for environmental audit widely used within the environmental consultancy field. The survey

was undertaken in accordance with the methodology in the 'Handbook for phase 1 habitat survey - A technique for environmental audit' (JNCC, 2010) as recommended by NRW, and in the "Guidelines for Preliminary Ecological Appraisal" (CIEEM, 2017).

The survey area encompassed all of the land within the development footprint and the land to a distance of 30m outside it where accessible.

The phase 1 habitat survey methodology was extended to record any signs of habitats suitable to support protected / invasive species and any incidental observations of other noteworthy species.

Limitations

The surveys were at appropriate times of year when most plant species are readily identifiable and sufficient vegetative identification was possible, allowing a robust assessment of habitats to be undertaken. There are considered to be no limitations to the results of the survey.

4.2.2 Preliminary Ecological Appraisal of the compensation and restoration areas

As part of a Preliminary Ecological Appraisal, a walkover survey of the compensation and restoration areas was carried out on 12th December 2017 by Tom Kenwright and Paul Cassidy.

The purpose of the surveys was to identify, record and map dominant habitat types within these areas to inform the proposed habitat creation and enhancement works, and to highlight any further species surveys that may be required based on the quality of the habitats present. These surveys were undertaken to inform the previous extension area application, however as these areas are now instead proposed as compensation and restoration areas for this new extension application, this survey information is considered relevant to this application.

Both the restoration and compensation area were subject to a preliminary ecological appraisal as per the methodology detailed above for the proposed extension area.

Limitations

The survey was conducted in December when not all plant species are readily identifiable. However, sufficient vegetation identification was possible, allowing a robust assessment of habitats to be undertaken.

4.2.3 National Vegetation Classification survey

A detailed NVC survey was undertaken of any habitats or vegetative communities of botanical interest on the 9th June 2021 by Tom Kenwright and Toby Hart, and on the 12th July 2021 by Tom Kenwright.

Sampling of the vegetation was undertaken according to the methodology detailed in the NVC Users' Handbook (Rodwell, 2006). This involved recording the plant species present within a series of 2m x 2m quadrats, which were placed within what were visually considered to be stands of homogenous vegetation. A minimum of five quadrats were recorded in each area where the vegetation was considered to potentially be representative of a distinct vegetation community. Quadrat locations were purposefully chosen to avoid sampling ecotone and

mosaic habitats that contain boundaries between communities or that are undergoing ecological succession and are in a transitional state.

All plants recorded within a quadrat were assigned a DOMIN score, based on the percentage cover. The DOMIN scale is as follows:

Table 1 – The DOMIN scale of cover / abundance

COVER PERCENTAGE (%)	DOMIN SCORE
91 - 100	10
76 – 90	9
51 – 75	8
34 – 50	7
26 – 33	6
11 – 25	5
4 – 10	4
<4 (many individuals)	3
<4 (several individuals)	2
<4 (few individuals)	1

Frequencies were then assigned to each species recorded in each surveyed vegetative community based on how many quadrats the species was present within. The frequencies are as follows:

Table 2 – Species frequency classes and descriptions

PRESENCE OF SPECIES IN QUADRATS (%)	FREQUENCY CLASS	DESCRIPTION
1 – 20 (i.e. 1 stand in 5)	I	Scarce
21 - 40	II	Occasional
41 - 60	III	Frequent
61 - 80	IV	Constant
81 - 100	V	Constant

Analysis of field data

Following the completion of the field work, the plant communities surveyed were then classified according to NVC standards. This analysis was based on the following:

- The largely dichotomous key to vegetative communities within the British Plant Communities Vol. 1 – 5.
- Comparison of floristic tables and community descriptions within the British Plant Communities Vol. 1 – 5.
- Computer analysis using the Modular Analysis of Vegetation Information System (MAVIS) software package, created by the Centre for Ecology and Hydrology (CEH).
- Surveyor experience.

Comparison with selection criteria for Wildlife Sites in Wales

Within Wales, non-statutory protected sites that have biological designation features (opposed to geological features) are referred to as Wildlife Sites. No specific selection criteria are



available for Wildlife Sites within Anglesey and so the vegetative communities on site have been compared with the 'Wildlife Sites Guidance Wales, A Guide to Develop Local Wildlife Systems in Wales' (Wales Biodiversity Partnership, 2008).

Comparison with habitats of principal importance

The presence of any Habitats of Principal Importance for the conservation of biodiversity as listed within Section 7 of the Environment (Wales) Act 2016 were determined by comparing the surveyed habitats and communities against the published criteria for Habitats of Principal Importance (formerly UK BAP Priority Habitats).

Comparison with Annex 1 habitats

The presence of any habitats listed within Annex I of the Habitats Directive (also known as the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) and transposed into UK law by the Conservation of Habitats and Species Regulations 2017, were determined by considering the recorded habitats against the published criteria for Annex I habitats.

Limitations

The survey was undertaken on the 9th June 2021 and 12th July 2021, within the optimal survey period for grassland, heathland and wetland habitats. The site is managed through sheep grazing, however the relatively low intensity of the grazing regime ensured sufficient vegetative material was available, allowing a robust and accurate assessment of habitats.

4.2.4 GCN impact assessment and environmental DNA (eDNA) testing

As part of a GCN impact assessment, an initial site walkover survey was undertaken on 5th May 2021 by Alasdair Grubb and James Stubbs and a secondary site visit was undertaken by Alasdair Grubb and Sarah McClaren on 29th June 2021.

Habitat suitability index (HSI)

All mapped ponds and aquatic features within 500m of the site boundary were assessed for their potential to support GCNs using the HSI. The HSI is a tool used to provide a numerical indication of the quality of a waterbody in terms of GCN breeding and associated habitat requirements on a scale of 0-1 (0 indicating unsuitable habitat, 1 representing optimal habitat).

HSI scores incorporate ten Suitability Indices (SIs), all of which are factors thought to affect GCNs, namely:

SI 1: Site location	SI 6: Waterfowl presence
SI 2: Size of pond	SI 7: Fish presence
SI 3: Pond permanence	SI 8: Number of ponds within 1km
SI 4: Water quality	SI 9: Terrestrial habitat
SI 5: Perimeter shading	SI 10: Macrophyte cover

In some cases, a net may be used to assess certain SIs, such as water quality. Once a measurement or category has been given for each SI this can then be converted to a figure

between 0 and 1 for use in the HSI calculation. This figure is either translated from an assigned category or measurement or read from a graph in the case of a percentage or number.

The HSI is then calculated from the following formula:

$$\text{HSI} = (\text{SI1} \times \text{SI2} \times \text{SI3} \times \text{SI4} \times \text{SI5} \times \text{SI6} \times \text{SI7} \times \text{SI8} \times \text{SI9} \times \text{SI10})^{1/10}$$

This will give a final HSI result between 0 and 1, providing a measure of habitat suitability for GCN.

The information gathered from the survey was used to provide a likelihood of GCNs and other amphibians being present in the area, in both aquatic and terrestrial habitats.

The proposed development, based on the plans provided, was also assessed for the potential to cause harm to GCNs (if present) using the Natural England Rapid Risk Assessment Tool.

All ponds were noted on the pond plan (Appendix 7).

(eDNA) testing

Ponds 1 and 3 were subjected to eDNA analysis. Pond 2 was not analysed, as GCN absence had already been confirmed by annual monitoring surveys of the pond (associated with the existing GCN EPS mitigation licence).

eDNA testing provides a GCN presence / absence result from water samples taken from a pond, following specific protocols detailed in Biggs *et al.*, 2014. These protocols have been approved by Natural England as a method to determine GCN presence or absence in a waterbody, within the newt breeding season, from 15th April to 30th June. Using the sterile kit provided from a laboratory, 20 water samples were taken from intervals around the waterbody and then mixed together. From there, a 15ml sample was transferred into each of the 6 sample tubes, which contained a preserving fluid. The samples were kept refrigerated overnight, and sent to the laboratory for analysis. This process was repeated for each waterbody sampled.

Limitations

The survey was undertaken at an appropriate time of year and under appropriate weather conditions. All ponds within 500m of the proposed development boundary were accessed. As such, there are considered to be no limitations to the survey.

4.2.5 Reptile presence / absence survey

The methodology of the survey broadly followed that detailed in Froglife Advice Sheet 10: Reptile Survey (1999), which is used as a standard technique for reptile surveys across the UK.

Three standard survey techniques were employed in the search for reptiles: a walkover survey, *in situ* refugia and artificial refugia. To ascertain presence or likely absence of reptiles on a site, seven site visits are required. If reptiles are found to be present, additional site visits are required to assess the size classes of any reptile population present.



Walkover survey

Surveyors walked slowly between refugia locations, examining suitable basking places to record any incidental sightings of reptiles.

In situ refugia

Where present, log piles and discarded potential refugia, such as corrugated sheet materials, were examined during site visits. If considered necessary by the project ecologist, destructive searches of log piles were conducted to ensure no reptiles or other signs of reptiles, such as sloughed skins, were missed. These searches were undertaken with care to ensure that no reptiles were harmed. Log piles were then returned to their original state once the search was complete.

Artificial refugia

Artificial refugia were laid throughout the suitable reptile habitats on site and examined on each site visit.

Refugia consisted of bitumen coated corrugated sheets and felt as well as metal corrugated sheets, all of which measured approximately 0.5m². These refugia warm up quickly and retain heat, thus attracting reptiles. A combination of materials was used as each material has different thermal properties. Metal sheets gain and lose heat quicker than bitumen coated sheets, and therefore each can be more suitable to different reptiles in different situations. The refugia were collected upon completion of the survey work.

Froglife (1999) guidance recommends a density of 10 artificial refugia per hectare of suitable habitat, however it is recognised that other guidelines recommend that in some instances, a higher density is needed to fully assess reptile use of a site. At the time of conducting the survey, the total area due to be impacted by the development was approximately 8 hectares, however the survey boundary was extended to include suitable habitat for reptiles immediately adjacent to the development boundary. The habitats within the survey boundary vary in suitability for reptiles; the majority of the eastern section of the site is of high suitability, but the western section has a higher proportion of semi-improved grassland. The areas with higher quality habitat features were identified during the walkover survey, and artificial refugia were laid in these locations. The refugia were spread across the site area in order to cover the variety of habitats and conditions on site. A total of 136 artificial refugia were deployed on site, which was deemed sufficient to establish reptile presence or likely absence on the site.

The refugia were left to bed down for at least 14 days prior to the first checks. During this time, they develop favourable conditions, such as suitable humidity and temperature gradients, and the reptiles become more familiar with them.

During the survey, some of the traps became overgrown / shaded by surrounding vegetation, so were moved to more suitable locations close by (within 5m), on the judgement of the surveyors.

Population size class assessment

As reptiles were found to be present on site during the initial presence / absence survey, a further eight site visits were conducted in order to assess their population size class.

Froglife (1999) guidelines provide criteria which can be used to estimate a reptile population size class. The survey results were assessed against the table below and each reptile population was assigned the corresponding size class.

Table 3 – Froglife (1999) guidance on reptile population size classes. Figures refer to the maximum number of adults seen by observation and / or under refugia by one person in one day.

SPECIES	POPULATION SIZE CLASS		
	LOW	GOOD	EXCEPTIONAL
Adder <i>Vipera berus</i>	<5	5-10	>10
Grass snake <i>Natrix natrix</i>	<5	5-10	>10
Common lizard <i>Zootoca vivipara</i>	<5	5-20	>20
Slow worm <i>Anguis fragilis</i>	<5	5-20	>20

A low population achieves a score of 1, a good population achieves a score of 2 and an exceptional population achieves a score of 3. These scores and the species assemblage can then be assessed against the following 'Key Reptile Site' criteria in order to determine the relative importance of the site in a wider context:

- Supports three or more reptile species
- Supports two snake species
- Supports an exceptional population of one species
- Supports an assemblage of species scoring at least 4
- Is of particular regional importance due to local rarity (e.g. in the East midlands of England, adders are very rare, so even low populations are important).

If the site meets at least one of the above criteria, it can qualify for the Key Reptile Site Register.

It should be noted that these survey guidelines do not take into account European protected species such as the sand lizard and the smooth snake. These species are unlikely to be encountered during a standard reptile survey. If they are anticipated to be present, different procedures are required.

Surveyors, timings, and weather conditions

Table 4 – Survey dates and weather conditions

Survey No.	Date	Start time	Finish time	Temp (°C)	Cloud Cover (%)	Wind (BFS)	Rain	Surveyors
Refugia laid	05/05/2021	N/A	N/A	N/A	N/A	N/A	N/A	Alasdair Grubb & James Stubbs
1	29/06/2021	10:15	15:00	19	35	3	None	Alasdair Grubb, Sarah McLaren



2	12/07/2021	10:55	15:40	16	80	0-6	Moderate rain for 20 minutes	Amanda Beck
3	20/07/2021	07:00	11:30	24	0	3	None	Alasdair Grubb
4	03/08/2021	11:00	14:30	18	80	3	None	Alasdair Grubb
5	10/08/2021	10:30	13:45	18	85	4	None	Alasdair Grubb
6	12/09/2021	09:30	13:30	18	90	2	None	Daniel Smith
7	26/08/2021	09:40	13:40	17	50	3	None	Amanda Beck
8	01/09/2021	09:45	13:46	14	100	4	None	Abigail Miller, Amanda Beck
9	06/09/2021	10:30	13:30	18	100	1	None	Daniel Smith
10	13/09/2021	11:00	14:00	16	100	2	Light rain for 20 minutes	Alasdair Grubb
11	14/09/2021	10:50	14:30	17	30-50	1	Before survey	Amanda Beck
12	15/09/2021	09:30	13:00	19	10	2	None	Alasdair Grubb
13	17/09/2021	09:45	12:30	17	50	4	None	Daniel Smith
14	20/09/2021	10:00	12:45	15	40	1	Before survey	Daniel Smith
15	12/10/2021	10:30	13:30	14	100	3	None	Alasdair Grubb & Daniel Smith

Limitations

Eighteen refugia were lost during the course of the survey due to the rapid bracken growth; by the end of the survey there were 118 refugia still deployed on site. The total number of traps initially deployed was higher than the 10 per hectare recommended by Froglife (1999) guidance, and the total number of traps collected at the end of the survey period was still sufficient to attain appropriate survey data. Therefore, the loss of eighteen survey traps is not considered to be a limitation to the survey.

The surveys were conducted throughout the recommended reptile survey season, including survey effort during the optimal survey season (April-May and August-September). All surveys were conducted under suitable weather conditions. Therefore, there are considered to be no limitations to the surveys.

4.2.6 Reptile surveys of offsite compensation and restoration areas

The offsite restoration and compensation areas were subject to reptile presence / absence surveys in 2018, in order to establish presence or absence of reptiles and determine the population size class of those species present, thereby obtaining a baseline level of survey data. These surveys were undertaken to inform the previous extension area application, however as these areas are now instead proposed as compensation and restoration areas for this new extension application, this survey information is considered relevant to this application.

Both the restoration and compensation area were subject to reptile presence / absence and population size class assessment surveys as per the same methodology as detailed above for the proposed extension area. The only difference in methodology is in the number of artificial refugia deployed.

The compensation (Zone C) and restoration areas (Zones D and G) have an approximate area of 4.4ha and 3.1ha respectively, but at the time (these areas have since been subject to enhancement works), only smaller proportions of this could be described as suitable reptile habitat due to the presence of extremely dense scrub and woodland, which did not facilitate reptile surveys and may be over-shaded. A total of 105 traps were deployed within the remaining suitable habitat, which produces a density of over 10 artificial refugia per hectare across the combined area of the restoration and compensation areas, regardless of habitat suitability. Since the purpose of the surveys was to estimate a baseline population level for reptiles prior to vegetation clearance and other management techniques, the resulting refugia density was significantly higher than the guideline recommendation and was therefore deemed sufficient to establish reptile presence or likely absence on site.

One refugia was lost during the course of the survey and as such, 104 refugia were still present at the end of the survey period.

All surveys were undertaken by Tom Kenwright or Declan Ghee, with James Hudak assisting on some of the surveys.

Survey timings and weather conditions

Table 5 – Survey dates and weather conditions

Survey No.	Date	Temp (°C)	Cloud cover (%)	Wind (BFS)	Rain
Refugia laid	28/08/18	N/A	N/A	N/A	N/A
1	18/09/18	17	40	4	None
2	19/09/18	17	100	5	None
3	09/10/18	15	90	4	None
4	10/10/18	15	0	2	None
5	11/10/18	14	90	4	None
6	15/10/18	14	10	2	None
7	16/10/18	12	90	2	None
8	17/10/18	10	80	2	None
9	22/10/18	13	10	2	None

10	23/10/18	10	50	2	None
11	25/10/18	11	100	2	None
12	26/10/18	8	50	4	Light rain throughout survey
13	29/10/18	8	10	2	None
14	30/10/18	2	10	2	None
15	31/10/18	9	100	2	Light rain throughout survey

Limitations

Parts of both the restoration and compensation areas could not be included within the survey due to dense scrub and bracken prohibiting access and the laying of refugia. Whilst this may be a limitation, no suitable solution was available; if scrub clearance was carried out to facilitate the survey, this would alter (and probably enhance) the site, thus conflicting with the objective of providing a baseline level of data prior to enhancement efforts. Refugia could still be concentrated in suitable areas such as along linear, ecotone habitats at the edge of scrub and woodland, or in pockets of heathland or grassland, all of which offer good basking habitat for reptiles.

Several of the surveys were also carried out during periods of moderate to strong winds. Whilst this may normally be considered as a limitation, the site is very exposed and as such experiences relatively strong winds for long periods of the year. Therefore, the survey results are still considered to be representative of how the site is used by reptiles under usual conditions.

4.2.7 Invertebrate survey

Many invertebrates are highly seasonal in their availability for survey, having largely annual life cycles. Identification generally requires the availability of the adult stage, which can be as short as a matter of weeks within the field season, the precise time of year varying with the species. Ideally, therefore, assemblages should be sampled across a full season in order to detect as wide a variety of the resident species as possible and to generate a reliable assessment of site conservation value. A minimum of three visits is generally recommended, covering the late spring, high summer and autumnal activity peaks. However, single exploratory or scoping visits can be very instructive in determining whether or not this more detailed survey is warranted and identifying the habitats or features requiring more work. While such visits are best carried out during the main field season, visits at other times of year can still be very instructive.

The site was visited on the morning of 20th July 2021 by Dr Keith Alexander CEnv MCIEEM. Surveying combined direct observation and hand-searching, supplemented by the use of a standard entomological sweep-net and a suction sampler. The techniques applied were as follows:

1. Direct observation:

- Visual assessment of suitable features encountered during the walkover of the site;



- Close inspection of potential invertebrate habitats and recording the presence of any species noted.
2. Hand-searching:
 - Examination of plant foliage for leaf-mines, galls, resting invertebrates, etc.
 - Searching amongst decaying wood and other debris, including looking beneath rocks, fallen wood, etc, lying on the ground.
 3. Use of a standard entomological sweep-net to sample invertebrates present amongst the taller areas of field layer and from the accessible foliage of trees and shrubs.
 4. Use of a domestic leaf sucker/blower machine with two-stroke engine to sample ground-living invertebrates amongst dense vegetation

These are amongst the standard techniques recommended in Drake et al (2007) for use in general site quality assessment and in particular Common Standards Monitoring on SSSIs.

Limitations

Conditions during the survey were reasonable for invertebrate survey, although there had been some dew formed overnight which limited the use of the sweep-net. The temperature was around 25°C, and this was following five or more similarly very warm and dry days and so the site was very dry overall. The 2021 field season had been very atypical with a cold and dry April followed by a wet and cold May, with temperatures not reaching typical summer figures until well into June. The invertebrate fauna may therefore be expected to be somewhat atypical in composition and abundance.

4.3 Impacts assessment

This assessment follows the CIEEM guidelines for ecological impact assessment (Version 1.2, 2022) when assessing the significance of impacts.

The significance of an impact is a matter of professional judgement, but can be described in general terms as being a product of the ecological / nature conservation importance of a receptor (site habitat or species), and the magnitude of the predicted impact. The more ecologically important the receptor and the greater the magnitude of the impact, the higher the significance of that impact is likely to be. Other characteristics which affect the significance of an impact include the extent, duration, timing, reversibility, and frequency of the impact.

The ecological or nature conservation importance of each ecological receptor relevant to the proposed development and this assessment are detailed within Section 5 – Baseline Conditions, before impacts are described and characterised within Section 6 – Impact Assessment. However, it is recognised that other environmental disciplines in the planning process can follow a different criteria for significance. Therefore, an impact significance matrix has also been produced for each ecological receptor relevant to the proposed development and this assessment.

The categories of ecological or nature conservation importance used in these matrices are as follows:



- International – ecological receptors of importance in a European / global context
- National – ecological receptors of importance in the context of Wales or the UK
- County – ecological receptors of importance in the context of Anglesey County
- Local – ecological receptors of importance in the context of Gwalchmai and the surrounding areas
- Site – habitats and species of less than local importance, but of some value
- Negligible or no conservation value – not significant

Table 6 below provides an indication of the terms in which the significance of ecological impacts is considered.

Table 6 – Generalised impact significance matrix

ECOLOGICAL IMPORTANCE OF SITE OR FEATURE	MAGNITUDE OF POTENTIAL IMPACT			
	HIGH	MEDIUM	LOW	NEGLIGIBLE
International	Critical	Critical	Major	Minor
National	Critical	Major	Moderate	Minor
County	Major	Moderate	Minor	Minor
Local	Moderate	Minor	Minor	Not significant
Site	Minor	Minor	Not significant	Not significant
Negligible	Not significant	Not significant	Not significant	Not significant

5 BASELINE CONDITIONS

This section presents a description of the ecological baseline conditions, based upon the results of the PEA and additional species and habitat specific surveys.

5.1 Protected sites

5.1.1 Non-statutorily protected sites

A desk study was conducted for the proposed development site and surrounding area. Non-statutorily protected sites were scoped to a distance of 2km.

There are two non-statutorily protected Wildlife Sites within 2km of the proposed development site:

- E10: Cors Tafarn-y-Grib
Located approximately 500m south-west of the proposed development site, the designation covers a very wet basin mire with predominantly aquatic vegetation, small areas of sedge-rich meadow and a small area of willow carr. A large part of the site is dominated by water horsetail *Equisetum fluviatile* with bottle sedge *Carex rostrata* and bogbean *Menyanthes trifoliata*. The rare greater spearwort *Ranunculus lingua* and common spike-rush *Eleocharis palustris* are locally co-dominant. Around the edges of the site are areas of tall herb vegetation, with meadowsweet *Filipendula ulmaria*, hemlock water dropwort *Oenanthe crocata* and water horsetail. The wet meadow contains abundant carnation sedge *Carex panicea*, common sedge *Carex nigra* and early marsh orchid *Dactylorhiza incarnata*. There is a small pool surrounded by bottle sedge and containing a stand of common club-rush *Schoenoplectus lacustris*. Bird species associated with the site include greylag goose *Anser anser*, Canada goose *Branta canadensis*, sedge warbler *Acrocephalus schoenobaenus*, reed bunting *Emberiza schoeniclus*, whitethroat *Sylvia communis* and moorhen *Gallinula chloropus*.
- E12: Tyddyn Gwyn
Located approximately 1.7km south-east of the proposed development site, the designation comprises a large area of semi-improved neutral grassland with some marshy grassland and dense scrub. The neutral grassland is variable with the most species-rich areas containing abundant common knapweed *Centaurea nigra*, sweet vernal grass *Anthoxanthum odoratum* and crested dog's-tail *Cynosurus cristatus*. Also present are common bird's-foot trefoil *Lotus corniculatus*, greater bird's-foot trefoil *Lotus pedunculatus*, common spotted orchid *Dactylorhiza fuchsii*, and numerous sedge species *Carex spp.* Other parts of the site have been subject to greater levels of agricultural improvement and have an increased abundance of perennial ryegrass *Lolium perenne*. The marshy grassland occurs in three areas and is dominated by rushes with meadowsweet, marsh bedstraw *Galium palustre*, sneezewort *Achillea ptarmica* and oval sedge *Carex leporina*.

Given the distances from the proposed quarrying area site, it is considered unlikely that the proposed development will have any significant direct or indirect impact on these or any other non-statutorily protected sites as the quarry is currently operational, and the extension of the quarry will not have impacts above those already present on site. The drainage and run-off from the quarry will remain unchanged and these sites are not known to be hydrologically

connected to the proposed quarry area. As such, it is considered that the proposed development will not result in any additional significant recreational pressure upon any of the protected sites within the local area, and these sites are not considered further within this assessment.

5.1.2 Statutorily protected sites

A desk study was conducted for the proposed development site and surrounding area. Statutorily protected sites were scoped to a distance of 10km, see Appendix 1.

There are two statutorily protected site within 2km of the proposed development site:

- Y Werthyr SSSI¹
Located approximately 850m west of the proposed development site, the designation comprises a small area of valley mire that supports fen vegetation. This wetland has developed at the head of a short shallow valley running in a northerly direction to the Afon Caradog. It is a relatively intact example of a mesotrophic valley mire or 'poor fen' and has a high water table. Vegetation community's characteristic of this type of habitat are very well represented and include large stands of rushes, including blunt-flowered rush *Juncus subnodulosus*, a variety of sedges including bottle sedge and slender sedge *Carex lasiocarpa* as well as a range of wetland herbs such as the marsh cinquefoil *Potentilla palustris* and bogbean. There is also a well-developed bryophyte layer in which various mosses, particularly *Acrocladium spp.*, are abundant. The uncommon greater spearwort is widely distributed across the site.
- Cors Bodwrog SSSI
Located approximately 1.2km east of the proposed development site, the designation comprises a large area of mesotrophic valley mire that once contained a large lake until it was drained in the 1970s. Purple moor-grass mire is the principal vegetation type within the site, typical associates of which include cross-leaved heath *Erica tetralix*, bog asphodel *Nartheciun ossifragum*, tormentil *Potentilla erecta* and bog-myrtle *Myrica gale*. In places, particularly the edge of the site this community grades into fen meadow dominated by Yorkshire fog *Holcus lanatus*, creeping bent *Agrostis stolonifera* and rush species *Juncus spp.*. Black bog-rush *Schoenus nigricans*, occurs as scattered clumps within the *Molinia* mire and as a local dominant within the less acidic communities present. Blunt-flowered rush and great fen-sedge *Cladium mariscus*, further indicators of local base enrichment, have been recorded. The old peat cuttings ditch lines and wet hollows support the main stands of mesotrophic vegetation variously dominated by bottle sedge, slender sedge, common cotton-grass *Eriophorum angustifolium*, marsh cinquefoil, bogbean, greater tussock-sedge *Carex paniculata* and the nationally scarce lesser tussock sedge *Carex diandra*. The moss cover is variable within this community and includes *Calliargon giganteum* and the bog mosses *Sphagnum subnitens* and *Sphagnum contortum*. A number of uncommon plants are recorded including greater spearwort and lesser bulrush *Typha angustifolia*.

There are twenty-eight statutorily protected sites (designated for ecological reasons) within 2km of the proposed development site:

¹ SSSI – Site of Special Scientific Interest

- Beddmanarch-Cymyran SSSI
- Caeau Talwrn SSSI
- Cors Erddreiniog NNR²
- Corsydd Mon / Anglesey Fens SAC³
- Corsydd Mon a Lyn / Anglesey and Lyn Fells Ramsar⁴
- Fferam Uchaf SSSI
- Glannau Rhoscolyn SSSI
- Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh SAC
- Glannau Ynys Gybi / Holy Island Coast SPA⁵
- Llyn Alaw SSSI
- Llyn Llywenan SSSI
- Llyn Maelog SSSI
- Llynnau Y Fali – Valley Lakes SSSI
- Llyn Padrig SSSI
- Llyn Traffwll SSSI
- Maen Gwyn SSSI
- Malltraeth Marsh / Cors Ddyga SSSI
- Nantanog SSSI
- Newborough Warren and Ynys Llanddwyn NNR
- Newborough Warren – Ynys Llanddwyn SSSI
- Rhosneiger SSSI
- Rhosneiger Reefs SSSI
- Ty Croes SSSI
- Tyddyn Gyrfer SSSI
- Tywyn Aberffraw SSSI
- Ynys Feurig SSSI
- Ynys Feurig, Cemlyn Bay and the Skerries SPA
- Y Twyni o Abermenai I Aberffraw / Abermenai to Aberffraw Dunes SAC

Given the distances from the proposed quarrying area, it is considered unlikely that the proposed development will have any significant direct or indirect impact on these or any other statutorily protected sites as the quarry is currently operational, and the extension of the quarry will not have impacts above those already present on site. The drainage and run-off from the quarry will remain unchanged and these sites are not known to be hydrologically connected to the proposed quarry area. As such, it is considered that the proposed development will not result in any additional significant recreational pressure upon any of the protected sites within the local area and these sites are not considered further within this assessment.

5.2 Habitats

Large areas of the site, particularly the eastern section, comprise a mosaic of habitats under various stages of succession. The attached phase 1 habitat plan at Appendix 2 provides a detailed indication of the location of each habitat, however some areas form a mosaic or are in a transitional stage of succession, which cannot be mapped in full detail. Habitats are colour-coded in accordance with the phase 1 standard.

The following principal habitat types were characterised on site:

- A2.1 Dense scrub
- A2.2 Scattered scrub
- B1.2 Semi-improved acid grassland
- B5 Marshy grassland
- C1.1 Continuous bracken
- E1.8 Dry modified bog
- E2.1 Acidic flush

² NNR – National Nature Reserve

³ SAC – Special Area of Conservation

⁴ Ramsar – Internationally important wetland site

⁵ SPA – Special Protection Area

- E3.1 Fen – valley mire
- G1 Standing water
- I1.4.1 Other exposure – acidic / neutral
- J2.5 Wall

5.2.1 A2.1 Dense scrub and A2.2 scattered scrub

Large stands of dense gorse scrub are present across the site. These stands of gorse comprise a mix of both European gorse *Ulex europaeus* and western gorse *Ulex gallii*, with other species recorded amongst the gorse being limited to bramble *Rubus fruticosus agg.*, bracken and the grassland species detailed below. It is considered that these areas constitute the W23 *Ulex Europaeus – Rubus fruticosus* scrub community.

All stands of dense scrub on site are entirely composed of gorse, with the exception of an area of dense hawthorn *Crataegus monogyna*, grey willow *Salix cinera* and eared willow *Salix aurita* scrub within the north-eastern corner of the survey boundary, but outside of the development boundary. Additionally, numerous stands of scattered hawthorn scrub are present along the drystone wall that runs north to south through the centre of the site.

The areas of dense and scattered scrub on site do not qualify as a Habitat of Principal Importance and are not considered to be a habitat of national or county significance. Dense gorse, willow and hawthorn scrub is also somewhat numerous within the local area and the scrub on site is not species rich and does not support any botanical species of note. Despite this, the scrub provides structural diversity for the site and contributes to the mosaic of habitats on site, which support numerous faunal species. As such, the scrub on site is considered to be of site importance.

5.2.2 B1.2 Semi-improved acid grassland

Large parts of the site, particularly the western section comprise sheep-grazed semi-improved acid grassland. This grassland is subject to moderate levels of grazing, with the majority of the sward being short during all survey visits. The majority of the grassland is relatively species-poor and is dominated by a low number of competitive grasses. The majority of the species present are indicative of neutral conditions; however some acidic indicator species are present in low abundances.

Due to the dominance of mesotrophic grassland species and the high abundance of perennial ryegrass within the sward, it is considered that the community present is most accurately described as being the MG6 *Lolium perenne - Cynosurus cristatus* grassland community. The presence of some acidic indicator species in very low abundances hints towards the grassland being in the later stage of transitioning into this community from a previous acidic community, likely caused by historic agricultural improvement and the continued management of the site through sheep-grazing. The previous acidic community present was likely the U1 or U4 communities which remain on site but are now isolated to less accessible areas or within the immediate vicinity of granite outcrops. It is considered that the grassland most closely fits the MG6b *Lolium perenne – Anthoxanthum odoratum* sub-community, which represents one of the richer sub-communities of MG6 grassland.

Yorkshire fog and perennial ryegrass are the most abundant species within the sward, however spreading meadow-grass *Poa humilis*, crested dog's-tail, sheep's fescue *Festuca ovina*, red fescue *Festuca rubra*, sweet vernal grass, rough meadow-grass *Poa trivialis* and

common bent *Agrostis capillaris* are occasional. Forb species are largely limited to occasional creeping thistle *Cirsium arvense*, white clover *Trifolium repens*, creeping buttercup *Ranunculus repens*, marsh thistle *Cirsium palustre* and common mouse-ear *Cerastium fontanum*. Additional forb species recorded in very low numbers are primarily at the ecotone between the grassland and other habitats and include germander speedwell *Veronica chamaedrys*, common bird's-foot trefoil, heath wood-rush *Luzula multiflora*, sheep's sorrel *Rumex acetosella*, lesser trefoil *Trifolium dubium*, common cat's-ear *Hypochaeris radicata*, common ragwort *Jacobaea vulgaris*, common dog violet *Viola riviniana*, pignut *Conopodium majus*, green-ribbed sedge *Carex binervis*, tormentil, yarrow *Achillea millefolium*, stinging nettle *Urtica dioica* and common chickweed *Stellaria media*.

The site contains many areas of exposed granite as detailed in section 5.2.9 below. In addition, there are numerous small, raised hills where a thin layer of soil remains over buried granite deposits. This grassland is considered to comprise two distinct grassland communities, influenced by the level of agricultural improvement and intensity of sheep-grazing. The pockets within the boundary of the proposed development site are considered to best fit the U1 *Festuca ovina* - *Agrostis capillaris* - *Rumex acetosella* grassland community. Whilst some of these areas that lie within the eastern section of the survey boundary but outside of the development boundary better resemble the U4 *Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland community.

Both of these communities are superficially similar and are broadly characterised by the dominance of sheep's fescue and common bent. However, upon detailed inspection through the NVC survey, the areas of grassland that lie outside of the development boundary are distinct, as evidenced by the presence of constant and abundant sweet vernal grass and a reduced abundance and constancy of sheep's sorrel.

This subtle difference in grassland communities across the site is considered to be a result of the sheep grazing and potential historical agricultural improvement of the western section. The eastern section of the site that lies outside of the proposed development boundary appears to be subject to a lower intensity of sheep grazing, likely due to reduced accessibility from the intervening valley mire and the granite cliffs.

Other areas of grassland are present on site, however these are dominated and covered by dense bracken for most of the year and hence have been mapped as such on the phase 1 habitat plan and are discussed below in section 5.2.4.

The majority of the grassland on site is relatively species poor and widely abundant within the local area. The MG6b grassland is not considered to meet the criteria to qualify as either the lowland acid grassland or the lowland meadow Habitat of Principal Importance. All areas of U1 grassland on site are considered to be relatively low-quality examples of this community and do not meet the criteria to qualify for selection under the Local Wildlife Selection Criteria. The U1 grassland does meet the broad definition of the lowland acid grassland Habitat of Principal Importance, however these areas are very species poor and are considered to be of low value. Additionally, all stands are small and sporadic. Therefore, the grasslands are considered to be of local significance only.

5.2.3 B5 Marshy grassland

An area of purple-moor grass dominated marshy grassland is present within the north-eastern section of the survey boundary, but outside of the proposed development boundary. Whilst this grassland is subject to some grazing, this is limited by its accessibility due to the adjacent

rocky outcrops and valley mire. Due to the dominance of purple moor-grass with constant tormentil, it is considered that the community present is the M25 *Molinia caerulea* - *Potentilla erecta* mire community. This represents one of the more species-poor purple moor-grass dominated communities. A number of other species were recorded, however these are limited to species characteristic of the community or are scarce and are scattered throughout the sward.

The ground is predominantly dry underfoot and the minimal grazing exposure is evidenced by occasional scattered stands of encroaching common heather *Calluna vulgaris*, cross-leaved heath, creeping willow *Salix repens*, hawthorn, bramble and western gorse. Rushes present include frequent sharp-flowered rush *Juncus acutiflorus* and small scattered stands of soft rush *Juncus effusus* and compact rush *Juncus conglomeratus*. Other species present include sheep's fescue, sweet vernal grass, spreading meadow-grass, rough meadow-grass, crested dog's-tail, Yorkshire fog, common yellow sedge *Carex demissa*, glaucous sedge *Carex flacca*, tawny sedge *Carex hostiana*, flea sedge *Carex pulicaris*, carnation sedge, heath wood-rush, greater bird's-foot trefoil, marsh thistle, tormentil, narrow buckler fern *Dryopteris carthusiana*, marsh bedstraw, marsh willowherb *Epilobium palustre*, marsh violet *Viola palustris*, foxglove *Digitalis purpurea*, bog asphodel and heath spotted orchid *Dactylorhiza maculata*.

Following changes to the site boundary to reduce impacts on this and other botanical habitats of interest, this habitat now lies outside of the development boundary and will be retained and unaffected by the development proposals. As such, this habitat has been scoped out at this point of the assessment.

5.2.4 C1.1 Continuous bracken

Large areas of the survey area are dominated by dense stands of bracken, growing over the semi-improved acid grassland, the largest area of which falls outside of the development boundary. It is considered that the community best fits the U20 *Pteridium aquilinum* – *Galium saxatile* community. During the spring when the bracken was still short, the grassland was assessed and was found to be similar to the other areas of semi-improved grassland on site, with the exception of the offsite area to the east of the valley mire, which supported occasional spring quill *Scilla verna*, pignut, lesser stitchwort *Stellaria graminea*, heath bedstraw, greater stitchwort *Stellaria holostea*, English bluebell *Hyacinthoides non-scripta* and foxglove.

Additional species recorded across the other bracken dominated grasslands include sweet vernal grass, cock's-foot *Dactylis glomerata*, rough meadow-grass, Yorkshire fog, sheep's-fescue, crested dog's-tail, red fescue, common bent, spreading meadow-grass, spear thistle *Cirsium vulgare*, marsh thistle, heath wood-rush, dandelion *Taraxacum officinale* agg., bramble, tormentil, germander speedwell, wall speedwell *Veronica arvensis*, common sorrel *Rumex acetosa*, barren strawberry *Potentilla sterilis*, changing forget-me-not *Myosotis discolor*, ground ivy *Glechoma hederacea* and scattered western gorse.

Large areas of bracken are present across the site, however this habitat is widely abundant within the local area. Furthermore, these areas are not considered to support an ecologically diverse community. This habitat is not considered to meet the criteria to qualify as a feature for local wildlife site selection and does not qualify as a Habitat of Principal Importance. Therefore, the areas of continuous bracken on site have been assessed as having site significance only.

5.2.5 E1.8 Dry modified bog

A small area of modified bog is present within a shallow depression within the eastern section of the survey boundary, but outside of the proposed quarrying area. This bog was damp but mostly dry at the time of the surveys and is subject to some, albeit minor grazing. *Sphagnum* sp. is present across the bog, however coverage is limited and large areas of the bog predominantly comprise exposed peat with a sparse covering of common cotton-grass. A small number of purple moor-grass and cross-leaved heath hummocks are present within the centre of the bog, with encroaching western gorse. Bogbean and marsh St John's-wort *Hypericum elodes* were the only other frequent species, being locally abundant in some areas. Other species present in low abundances include soft rush, *Polytrichum* moss, bottle sedge, creeping bent, marsh willowherb, star sedge *Carex echinata*, common sedge, bog asphodel, bog pondweed *Potamogeton polygonifolius*, marsh bedstraw, marsh cinquefoil, tufted hair-grass *Deschampsia cespitosa*, creeping willow, tormentil, heath wood-rush, compact rush, many-stalked spike-rush *Eleocharis multicaulis*, marsh violet and sharp-flowered rush.

The vegetation community within this small bog area is considered to most accurately represent the M29 *Hypericum elodes* – *Potamogeton polygonifolius* soakway community. This community is more commonly associated with mires or pools within bogs, opposed to being a dominant community type to form a bog.

Following changes to the site boundary to reduce impacts on this and other botanical habitats of interest, this habitat now lies outside of the development boundary and will be retained and unaffected by the development proposals. As such, this habitat has been scoped out at this point of the assessment.

5.2.6 E2.1 Neutral / acidic flush

There are numerous flushes across the site, the vast majority of which are species-poor and are dominated by soft rush and / or sharp-flowered rush. All flushes on site are considered to comprise the same vegetation community, however a small number contain more species-rich examples (see Appendix 1 – Target Notes 1 and 2), only one of which lies within the proposed development boundary.

Other species present include Yorkshire fog, creeping bent, compact rush, greater bird's-foot trefoil, sweet vernal grass, rough meadow-grass, marsh bedstraw, tufted hair-grass, lesser spearwort *Ranunculus flammula*, creeping soft-grass *Holcus mollis*, bog stitchwort *Stellaria alsine*, heath wood-rush, marsh thistle, creeping thistle, meadow buttercup *Ranunculus acris*, tormentil, ragged robin *Silene flos-cuculi*, oval sedge, flea sedge, tawny sedge, carnation sedge, glaucous sedge, common yellow sedge, marsh pennywort *Hydrocotyle vulgaris*, self-heal *Prunella vulgaris*, bulbous rush *Juncus bulbosus*, marsh willowherb, creeping forget-me-not *Myosotis secunda*, water mint *Mentha aquatica*, marsh cinquefoil, bogbean, marsh speedwell *Veronica scutellata*, bog asphodel, heath grass *Danthonia decumbens*, heath spotted orchid, sneezewort, bog pondweed, floating club-rush *Eleogiton fluitans* and common spike-rush.

The vegetation within the flushes on site is considered to accurately fit the description of the M23 *Juncus effusus/acutiflorus* – *Galium palustre* mire community. This conclusion has been reached due to the co-dominance of soft rush and sharp-flowered rush, in addition to the presence of constant indicator species such as Yorkshire fog, marsh bedstraw and greater bird's-foot trefoil.

At least some areas of the M23 mire communities on site are considered to be species-rich and are considered to meet the criteria for selection as a local wildlife site. Despite this, the majority of the smaller flushes on site are obviously species-poor and are dominated by soft of sharp-flowered rush. It is considered that some of these areas will not meet the selection criteria.

The more species-rich areas of M23 mire community on site meet the definition and are considered to qualify as a constituent of either the purple moor-grass and rush pasture Habitat of Principal Importance or the lowland fen Habitat of Principal Importance. However, it should be noted that the M23 community on site lacks all of the 'key' botanical species that are listed for the purple moor-grass and rush pasture habitat nationally and lack the presence of sphagnum or peat, which is a key designation feature within the lowland fen habitat definition.

As such, the flushes on site have been assessed as having local significance.

5.2.7 E3.1 Fen – valley mire

Granite outcrop cliffs form a shallow valley in the eastern section of the survey boundary, within which a mire is present. This habitat lies offsite but within 30m of the proposed quarrying boundary to the east.

During the walkover survey, the northern section of the mire was predominantly dry, however the mire becomes damp and slightly waterlogged as it extends south. Evidence of sheep passing through the mire is present, however grazing appears to be minimal. Similar to the acidic / neutral flushes, the vegetation within the valley mire is considered to accurately fit the description of the M23 community. The mire is dominated by soft rush with abundant sharp-flowered rush, however the vegetation is species-rich and numerous forb species are present. The species assemblage is similar across the entirety of the mire, however the northern section that lies adjacent to the purple moor-grass marshy grassland has a greater abundance of grass and sedge species compared to rush dominated southern section. Species present in this area include star sedge, flea sedge, oval sedge, glaucous sedge, heath wood-rush, carnation sedge, tufted hair-grass, Yorkshire fog, creeping bent, purple moor-grass, ground ivy, yellow pimpernel *Lysimachia nemorum* and bugle *Ajuga reptans*. Additionally, small shallow areas of more open vegetation are present within the central section of the mire, with few rushes present and a greater abundance of herbaceous species such as bog pondweed, marsh cinquefoil, marsh St John's-wort, floating club-rush, bogbean, floating sweet-grass *Glyceria fluitans* and creeping forget-me-not.

Other species present throughout the valley mire include water mint, marsh willowherb, greater bird's-foot trefoil, marsh bedstraw, ragged robin, bog stitchwort, rough meadow-grass, cuckoo flower *Cardamine pratensis*, marsh marigold *Caltha palustris*, creeping buttercup, greater willowherb *Epilobium hirsutum*, marsh thistle, creeping bent, common sedge, Yorkshire fog, creeping forget-me-not, marsh speedwell, common spike-rush, sweet vernal grass, red fescue, marsh foxtail *Alopecurus geniculatus*, wavy bittercress *Cardamine flexuosa*, lesser spearwort, common cotton-grass, water starwort *Calitriche sp.*, marsh horsetail *Equisetum palustre*, wild angelica *Angelica sylvestris*, meadowsweet, water horsetail, marsh pennywort, tawny sedge, marsh ragwort *Jacobaea aquatica*, meadow buttercup, compact rush, brown sedge *Carex disticha*, bottle sedge and common mouse-ear.

The area of valley mire lies outside of the proposed quarry extension, and will therefore remain unaffected by the proposals. As a result of the proposed development are not considered to

be significant and impacts on this habitat have been scoped out at this point of the assessment.

5.2.8 G1 Standing water

A single pool of standing water is present on site (Pond 1). In addition, three additional pools were observed offsite but within the survey boundary (Pools 1-3). Pools 1-3 and Pond 1 are considered to be ephemeral, being dry during visits to the site in July. Unlike the rest of the surrounding mire vegetation the pools have a more open herbaceous vegetation, with a lack of dominance by graminoid (grasses, sedge and rushes) species. All of the pools were relatively shallow when holding water, with a maximum depth of 30cm. All of the pools have similar species communities and have abundant floating sweet-grass and bogbean, frequent bog pondweed, floating club-rush, sharp-flowered rush, occasional marsh bedstraw, lesser spearwort and marsh speedwell and rare soft rush, greater bird's-foot trefoil, marsh St John's-wort, creeping bent, marsh cinquefoil and creeping forget-me-not.

NVC surveys of these areas found that the pools best fit the M23 community, with some areas showing affinity to the M29 community, both of which are described above in previous sections. As these features are present within larger areas of M23 mire (valley mire or neutral / acidic flushes) they are considered to form a component part of those communities / habitats.

Pond 1 on site is considered to qualify as a 'Priority Pond' as per the UK Biodiversity Action Plan: Priority Habitat Descriptions, as it was found to contain GCN eDNA; a species protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). However, it is not considered to be used by GCN for breeding purposes, only being used on an occasional basis for foraging and commuting. As such, the value of this habitat is based on an assessment of the habitat itself and any value to GCNs is considered separately in Section 5.3.1 below.

Despite Pond 1 qualifying as a Habitat of Principal Importance, it is an ephemeral waterbody and fails to provide breeding opportunities for the species that is the designation feature. Additionally, the site is located within an area with a very high pond density. As such, the single ephemeral pool on site is only considered to be of site importance.

5.2.9 I1.4.1 Other exposure – acidic / neutral

Numerous granite outcrops are present across the site, the majority of which lie in the eastern section of the survey area and fall outside of the proposed quarrying area. The grassland surrounding these outcrops has been described above in section 5.2.2, however the exposed rock areas also support English stonecrop, *Polytrichum sp.* moss and *Cladonia sp.* lichen.

Granite outcrops along the eastern boundary of the proposed quarrying area form a small valley, within which a valley mire is present, as described above in section 5.2.7. These cliffs have a maximum height of approximately 8m and support scattered navelwort *Umbilicus rupestris*, early hairgrass *Aira praecox*, ivy *Hedera helix*, western polypody *Polypodium interjectum* and wood sorrel *Oxalis acetosella*.

The areas of exposed granite outcrops comprise a low proportion of the site area with the majority lying outside of the survey boundary and due to be retained. Alone, they do not support an exceptional biodiverse community or any species of note. Whilst they do support the more diverse botanical areas of semi-improved acidic grassland, the granite outcrops themselves have no ecological value and the value of the surrounding grassland is considered

within Section 5.2.2 above. As such impacts on this habitat have been scoped out at this point of the assessment.

5.2.10 J2.5 Wall

A low drystone wall runs north to south through the centre of the survey area.

This habitat is considered to be of negligible ecological value and any impacts as a result of the proposed development are not considered to be significant. As such impacts on this habitat have been scoped out at this point of the assessment.

5.3 Protected species or resources

As part of the PEA, specific observations of wildlife were also recorded. Wildlife observations focused on protected species, invasive species or species of conservation concern. Where potential for the presence of protected species was identified, further species or group specific surveys were undertaken. Full details of the results of these surveys are provided below.

5.3.1 Amphibians

The habitats on site vary in their suitability to support GCNs, with the areas of fen (valley mire), dense bracken, scrub and acidic flushes offering high-quality foraging and sheltered commuting opportunities for amphibians. The western section of the site has a higher proportion of grazed semi-improved grassland, which offers lower suitability for foraging and commuting amphibians. The drystone wall that bisects the survey site north-south also provides some commuting and potential hibernating opportunities.

There is a single area of standing water within the proposed development boundary (Pond 1), four areas of standing water within 250m of the proposed site boundary (Pond 2 and Pools 1-3) and one additional area of standing water within 250m - 500m of the proposed development boundary (Pond 3) (see Appendix 7 – Pond plan).

All waterbodies on site and within 500m of the site were accessed and surveyed during an initial GCN impact assessment in May 2021. However, during a subsequent site visit in June 2021, Pools 1 - 3 that lie within the survey boundary but outside of the development boundary, were found to be completely dry and are therefore considered to be unsuitable to support breeding GCNs. During this subsequent visit, Pond 1 had mostly dried out, with a maximum depth of approximately 10cm. Subsequent visits to the site to undertake reptile surveys revealed that the pond was completely dry by the middle of July. July is the key period for GCN eft development, and the presence of standing water is essential for their survival. Given that the pond is considered to dry between June and August annually, it is considered to be unsuitable to support breeding GCNs.

Pond 2 is located approximately 250m to the south-west of the proposed development boundary and is located within the base of the previously quarried areas. Pond 2 is a linear drainage ditch measuring approximately 300m in length and with open pools of standing water at each end. The ditch is subjected to annual GCN population size class assessment surveys as a condition of the existing GCN EPS mitigation licence for the wider quarry. Palmate newts and common toads have been recorded since 2016, however GCNs have never been recorded in this waterbody, considered to be due to the high number of sticklebacks



Gasterosteidae sp. present, which would predate GCN larvae. As part of the existing GCN EPS mitigation licence, newt exclusion fencing has been installed around the working quarry site, and Pond 2 is located within the fenced area. Therefore, GCNs are not considered to be present in or around this pond.

Pond 3 is located approximately 490m north of the proposed development boundary, in an area of farmland. The pond has an area of approximately 500m² and appears to have been man-made for wildfowl shooting purposes, however it is well established.

As part of the GCN impact assessment, the ponds within 500m of the site that were holding water at the time of the survey were assessed for their suitability to support GCNs using the HSI. Pond 1 was assessed as having 'below average' suitability, Pond 2 was assessed as having 'poor' suitability and Pond 3 was assessed as having 'excellent' suitability. In addition, Ponds 1 and 3 were subject to eDNA analysis to determine the presence / absence of GCNs and a search of marginal and aquatic vegetation was undertaken to search for GCN eggs. Pond 2 was not subject to eDNA analysis, as GCN absence has already been confirmed by monitoring surveys of the pond (associated with the existing GCN EPS mitigation licence).

Pond 1 returned 3/12 positive replicates of GCN eDNA, indicating that GCN DNA was present within the pond. The relatively low number of replicates represents a weak score, indicating that GCNs are only present in very low numbers or transiently such as using the pond for foraging purposes rather than breeding. As detailed above, Pond 1 is an ephemeral pool which had partially dried out during the second survey visit at the end of June and completely dried out by mid-July, rendering the pond unsuitable for breeding GCNs. As such, it is considered that GCNs are only using the site for foraging and commuting purposes.

As part of the ecological survey work undertaken of the proposed extension site, 130 artificial refugia were searched 15 times each as part of reptile surveys. When amphibians (including GCNs) are present on a site, they are often found sheltering beneath these refugia. During the reptile surveys, low numbers of common toads, common frogs and palmate newts were observed, however no GCNs were recorded.

All ponds within 500m of the site returned negative results for GCNs (Ponds 2 and 3) or are ephemeral and are considered to be unsuitable to be used by breeding GCNs. As such, it is considered that the low number of GCNs present on site are part of the population known to be breeding within Ponds 4 and 6 that lie within the working quarry and are being monitored as part of the ongoing licence.

In summary, GCNs are known to be present within the local area, and GCN eDNA was identified onsite. However, due to the annual drying of the aquatic features on site during the key eft development period, there are no ponds onsite suitable to support breeding GCNs. GCNs are considered to be present on site in low numbers, in a foraging and commuting capacity.

GCNs and their habitat (aquatic and terrestrial) are afforded full protection by the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. As such, they can be considered to be a species of both international and national importance. Despite this, the UK is a stronghold for GCNs, and one estimate puts the national population at around 400,000 animals in 18,000 breeding sites (JNCC, undated). The proposed development site does not provide suitable breeding opportunities and is only considered to support individual or a very low number of GCNs in a foraging and / or commuting capacity. Therefore, the site is only considered to be of local significance with regards to GCNs.

5.3.2 Reptiles

UES have conducted a suite of surveys on adjacent land parcels, including reptile surveys for a previous planning application (see report reference UES01515/08). These surveys found a good population of slow-worms and a low population of common lizards and adders to be present on an area of heathland mosaic immediately to the south-west of the proposed development site.

The habitats on site, particularly the areas of gorse, bracken, granite outcrops and associated grassland, provide suitable foraging, commuting, basking and breeding opportunities for adder, slow worm and common lizard. The large areas of sheep-grazed grassland on site are of limited value for reptiles.

Reptile surveys undertaken of the proposed extension area by UES in 2021 found that the site supports 'good' populations of common lizard (max count of eight), and slow worm (max count of seven) and a 'low' population of adder (max count of one). Juveniles of all species were also recorded on site, indicating that the site is used for breeding. The site can be classified as important for reptiles as a result of its species assemblage and can qualify for the Key Reptile Site Register.

Common lizard, slow worm and adder are known to be present within the adjacent previously consented extension area (Zone B) which was found to support a 'good' population of slow worm (peak count of fifteen) and 'low' populations of common lizard (peak count of one) and adder (peak count of one) during the 2016 reptile surveys. This site can be classified as important for reptiles as a result of its species assemblage and can qualify for the Key Reptile Site Register.

Reptile surveys of the proposed compensation area (Zone C) found the site to support a 'low' population of slow worms (peak count of four, including juveniles) and a 'low' population of common lizard (peak count of two). Due to the species and population sizes present, the compensation area does not meet the criteria to be classified as important for reptiles and does not qualify for the Key Reptile Site Register.

Reptile surveys of Zones D – G found the site to support a 'good' population of slow worms (peak count of eight, including juveniles). Due to the species and population sizes present, the compensation area does not meet the criteria to be classified as important for reptiles and does not qualify for the Key Reptile Site Register.

Both the compensation and restoration areas have the potential to provide excellent quality habitat for reptiles through management techniques such as scrub clearance and enhancement of refugia and hibernacula. At present, there are high proportions of dense scrub and bracken, which dominate large areas at the expense of heathland and grassland habitats.

Three species of reptile are present on site, all of which were found to be breeding on site. Therefore, the site can be classified as important for reptiles as a result of its species assemblage and can qualify for the Key Reptile Site Register. It is considered to support a reptile population of county importance.

5.3.3 Badger

No records of badger were returned from within 2km of the proposed development site and no evidence of badger activity was observed during the ecological surveys of the previously consented extension area.

A single badger scatt was observed on site during the walkover surveys but was not associated with a dug latrine (see Appendix 2 – Target Note 3). No other evidence of badger activity and no evidence of any potential badger setts were observed on site or within the immediate vicinity of the site during the suite of ecological surveys undertaken to inform this application.

The habitats on site provide some suitable foraging and commuting habitat for badgers, however the site is considered to be broadly unsuitable to support sett building opportunities due to the shallow soils over granite and the lack of sheltered potential sett building locations.

It is considered that badgers are not using the site and immediately adjacent habitats for sett building and badger use of the site is considered to be limited to a single or low number of individuals foraging or commuting across the site in a transitory capacity. As such, the site is considered to be of site importance for badgers.

5.3.4 Bats

There are no buildings on site which could be used by roosting bats. The small granite cliffs along the boundaries of the valley mire in the eastern section of the site do not support any cracks or crevices suitable to support roosting bats. Additionally, there are no trees on site that could be used, with the hawthorn and willow scrub being stunted and lacking suitable roosting features.

The habitats on site provide some opportunities for foraging and commuting bats however the large areas dominated by short sheep-grazed grassland are considered to be of limited value and the suitability of the entire site is limited due to its exposed nature and strong prevailing winds.

Previous bat activity surveys of the previously consented extension area (Zone B) found very low levels of bat activity across the site, with only common species recorded (noctule, common pipistrelle, soprano pipistrelle, *Myotis sp*, and brown long-eared bats) and with no bat activity being recorded during some transect surveys. Given the short distance between the sites and the similar, if not lower quality habitats, it is considered that the site will have the same, if not lower levels of bat activity.

Due to the lack of potential roosting opportunities and the low levels of bat activity by only common and widespread species, the site is considered to be of local significance for bats.

5.3.5 Birds

Although a targeted bird survey was not undertaken, the following bird species were recorded on or within the immediate vicinity of the site during the various site visits.

Table 7– Showing the various bird species recorded on or within the immediate vicinity of the site during the site surveys.

Common name	Scientific Name	Conservation Status	Likely site status
Canada Goose	<i>Branta canadensis</i>		Possible breeding
Pheasant	<i>Phasianus colchicus</i>		Breeding
Red-legged Partridge	<i>Alectoris rufa</i>		Breeding
Woodpigeon	<i>Columba palumbus</i>	Amber	Possible breeding
Oystercatcher	<i>Haematopus ostralegus</i>	NT; Amber	Possible breeding
Woodcock	<i>Scolopax rusticola</i>	Red	Overwintering
Snipe	<i>Gallinago gallinago</i>	Amber	Overwintering; Possible breeding
Herring Gull	<i>Larus argentatus</i>	Red; Sec7	Flyover
Grey Heron	<i>Ardea cinerea</i>	Green	Flyover; Possible foraging
Sparrowhawk	<i>Accipiter nisus</i>	Amber	Possible breeding locally
Buzzard	<i>Buteo buteo</i>	Green	Breeding locally
Magpie	<i>Pica pica</i>	Green	Possible breeding
Jackdaw	<i>Coloeus monedula</i>	Green	Breeding locally
Rook	<i>Corvus frugilegus</i>	Amber	Foraging
Raven	<i>Corvus corax</i>	Green	Breeding locally
Blue Tit	<i>Cyanistes caeruleus</i>	Green	Possible breeding
Skylark	<i>Alauda arvensis</i>	Red; Sec7	Possible breeding
Chiffchaff	<i>Phylloscopus collybita</i>	Green	Possible breeding
Wren	<i>Troglodytes troglodytes</i>	Amber	Possible breeding
Starling	<i>Sturnus vulgaris</i>	Red; Sec7	Possible breeding locally
Song Thrush	<i>Turdus philomelos</i>	Amber; Sec7	Possible breeding
Mistle Thrush	<i>Turdus viscivorus</i>	Red	Overwintering
Redwing	<i>Turdus iliacus</i>	NT; Amber; Sch1	Overwintering
Blackbird	<i>Turdus merula</i>	Green	Possible breeding
Fieldfare	<i>Turdus pilaris</i>	Red; Sch1.1	Overwintering
Robin	<i>Erithacus rubecula</i>	Green	Possible breeding
Stonechat	<i>Saxicola rubicola</i>	Green	Possible breeding
Wheatear	<i>Oenanthe oenanthe</i>	Amber	Possible breeding
Dunnock	<i>Prunella modularis</i>	Amber; Sec7	Possible breeding
Pied Wagtail	<i>Motacilla alba yarellii</i>	Amber	Possible breeding
Meadow Pipit	<i>Anthus pratensis</i>	NT; Amber	Possible breeding
Chaffinch	<i>Fringilla coelebs</i>	Green	Possible breeding
Linnet	<i>Linaria cannabina</i>	Red; Sec7	Possible breeding
Goldfinch	<i>Carduelis carduelis</i>	Green	Possible breeding

British Trust for ornithology (BTO) Birds of Conservation Concern (BoCC): Volume 5 (Green / Amber / Red); Environment (Wales) Act 2016: Section 7 species; IUCN Red list of threatened species (NT); Wildlife and Countryside Act, (Schedule 1 breeding species).

A total of 34 bird species were noted either on or within the immediate vicinity of the site. The bird assemblage observed forms a typical bird assemblage for the habitats present on site; several common passerine species which are considered as possible breeders on site in low densities, a number of wintering thrush species, which were observed in low numbers using the site for foraging and a low number of overwintering waders.



Of the 34 species noted, 19 are cited as species of conservation concern or are statutorily protected:

- Woodpigeon – BoCC Amber listed species. A generalist species which was observed flying over the site. Suitable nesting and foraging habitats are present on site, however these are easily replicated through mitigation and are widely abundant within the local area.
- Oystercatcher – BoCC Amber listed and IUCN Near Threatened species. A ground nesting species, which forages on farmland and wetland. Observed through the late winter flying over the site. Suitable habitats present on site for nesting, but no evidence observed. Farmland habitats are widely abundant within the local area.
- Woodcock – BoCC Red listed species. Observed when flushed from bracken in late winter site visit. Foraging habitats present in farmland and wet flushes. Low quality breeding habitats present (bracken), but higher value habitats present on adjacent areas of heath (which will remain unaffected).
- Snipe – BoCC Amber listed species. Observed when flushed from wet flushes in late winter site visit. Foraging habitats present in farmland and wet flushes. Low quality breeding habitats present (*Juncus* rich areas); these are widely abundant within the local area.
- Herring gull – BoCC Red listed and Section 7 species. Only observed as an occasional flyover species. Not considered to breed locally.
- Sparrowhawk – BoCC Amber listed species. Observed as a flyover species on a single occasion. Suitable nesting habitat is present locally in off-site scrub and woodland. Foraging opportunities present on site due to passerine assemblage supported by the site.
- Rook – BoCC Amber listed species. Observed foraging on farmland occasionally. This habitat is widely abundant within the local area.
- Skylark - BoCC Red listed and Section 7 species. Observed calling in late winter. Possible breeding species.
- Wren - BoCC Amber listed species. A generalist species identified on site. Suitable nesting and foraging habitats are present onsite; however these are easily replicated through mitigation and are widely abundant within the local area.
- Starling – BoCC Red listed and Section 7 species. Observed foraging on farmland occasionally. This habitat is widely abundant within the local area.
- Song thrush – BoCC Amber listed and Section 7 species. Also the only bird species present on site which is listed in the Local BAP for Anglesey. A generalist species identified on site on several occasions. Suitable nesting and foraging habitats are present onsite; however these are easily replicated through mitigation and are widely abundant within the local area.
- Mistle thrush – BoCC Red listed species. Observed foraging on site during late winter. Not likely to breed on site and considered an overwintering species. Suitable foraging habitats are widely abundant within the local area.
- Redwing – BoCC Amber, Section 7 and Schedule 1 listed species. Observed foraging on site during late winter. Not likely to breed on site and considered an overwintering species. Suitable foraging habitats are widely abundant within the local area.
- Fieldfare – BoCC Red and Schedule 1 listed species. Observed foraging on site during late winter. Not likely to breed on site and considered an overwintering species. Suitable foraging habitats are widely abundant within the local area.
- Wheatear – BoCC Amber listed species. Observed on site during summer. Possible breeding species.

- Dunnock – BoCC Amber listed species. A generalist species identified on site. Suitable nesting and foraging habitats are present onsite; however these are easily replicated through mitigation and are widely abundant within the local area.
- Pied wagtail – BoCC Amber listed species. A generalist species identified on site. Suitable nesting and foraging habitats are present onsite; however these are easily replicated through mitigation and are widely abundant within the local area.
- Meadow pipit – BoCC Amber listed and IUCN Near Threatened species. Observed on site during the summer and considered a possible breeder on site. Suitable breeding habitats are widely abundant within the local area.
- Linnet – BoCC Red listed and Section 7 species. Observed on site during the summer and considered a possible breeder within the gorse on site. Suitable breeding habitats are widely abundant within the local area and easily replicated through compensation.

Whilst the site supports a number of species of conservation concern, the majority are generalist species that will use other habitats present within the local area or use easily replicable habitats. As such, it is considered that the site is only of local significance for birds.

5.3.6 Hazel dormouse

No records of hazel dormouse were returned from within 2km of the proposed development site.

The habitats on site are unsuitable for dormice as there are no hedgerows or areas of woodland and the site is isolated from areas of suitable habitat within the wider landscape. Hazel dormice have a limited distribution nationally and are not known to be present within the local area.

Hazel dormice are not considered to be present on site or within the immediate vicinity of the site and are very unlikely to be adversely impacted by the development proposals. As such, this species has been scoped out at this point of the assessment.

5.3.7 Invasive species

No invasive species were observed on site or within the immediate vicinity of the site during the suite of ecological surveys.

Invasive species are not considered to be present on site or within the immediate vicinity of the site and are very unlikely to be spread as a result of the development proposals. As such, adverse impacts associated with invasive species have been scoped out at this point of the assessment.

5.3.8 Otter

There are no aquatic habitats on site or within the immediate vicinity of the site that are suitable to support otter. No evidence of otter activity was observed during the numerous surveys undertaken of the site.

Otters are not considered to be present on site or within the immediate vicinity of the site and are very unlikely to be adversely impacted by the development proposals. As such, this species has been scoped out at this point of the assessment.

5.3.9 Water vole

There are no aquatic habitats on site or within the immediate vicinity of the site that are suitable to support water vole. No evidence of water vole activity was observed during the numerous surveys undertaken of the site.

Water voles are not considered to be present on site or within the immediate vicinity of the site and are very unlikely to be adversely impacted by the development proposals. As such, this species has been scoped out at this point of the assessment.

5.3.10 White-clawed crayfish

There are no aquatic habitats on site or within the immediate vicinity of the site that are suitable to support white-clawed crayfish. No evidence of white-clawed crayfish was observed during the numerous surveys undertaken of the site.

White-clawed crayfish are not considered to be present on site or within the immediate vicinity of the site and are very unlikely to be adversely impacted by the development proposals. As such, this species has been scoped out at this point of the assessment.

5.3.11 General terrestrial invertebrate communities

A total of 70 invertebrate species were noted during the survey. The overall number of species recorded is not particularly high, but it does reflect well the habitats and species present on the site. The site supports a very characteristic invertebrate fauna for an area of lowland dwarf shrub heath and mire on undulating granite bedrock.

Of the 70 species, two have conservation status: grayling butterfly *Hipparchia semele* and a rove beetle *Stenus europaeus*. Grayling butterfly is listed under Section 7 of the Environment (Wales) Act 2016 and has recently been assessed as Vulnerable at a UK level (Fox et al, 2010). British populations have declined dramatically in the past ten years, between 30% and 49%, and especially at inland sites such as this. Grayling butterfly was found to be plentiful on the heathy granite knolls, the majority of which lie in the eastern section of the survey area and fall outside of the proposed quarrying area.

The rove beetle has Nationally Scarce status (Hyman, 1994) and was only found in the basin mire. Following the reduction in the proposed quarrying area, this habitat now lies offsite but within 30m of the proposed quarrying boundary to the east.

A good range of other nationally uncommon and very localised species were also found including the money spider *Araeoncus crassiceps* in the basin mire, marsh whorl snail *Vertigo antivertigo* in the valley mire, *Myrmedobia exilis* on the heathy knolls, and the plant bug *Teratocoris viridis* in the flushed marshy grasslands. Such a range of interesting species across the more semi-natural habitats of the area suggests a site of moderate conservation interest. The whorl snail has been identified as an indicator species of old wetland (Kerney & Stubbs, 1980).

The core grassland areas are semi-improved sheep pasture and are of more limited value for invertebrates.

The species list has been analysed in terms of the Pantheon on-line database, a site assessment application which has been developed by Natural England as part of its work on common standards monitoring. The species list does not achieve the quality expected of a site of SSSI quality.

The valuation of the site takes into consideration the range of species recorded, including the scarce species, the overall assemblages, and the importance of the habitats to the species. It also considers the context of the year's weather, the site and/or its species in relation to the local area and further afield.

From considering the above summary information and data collected from the survey, it is suggested that any impact on the site's key features and species should be considered to be of at least local / county significance.

5.3.12 Summary of ecological importance

Table 8 – Summary of ecological importance of receptors

ECOLOGICAL FEATURE	ECOLOGICAL IMPORTANCE OF FEATURE
Statutorily protected sites	Scoped out
Non-statutorily protected sites	Scoped out
Scrub	Site
Semi-improved acidic grassland	Local
Marshy grassland	Scoped out
Continuous bracken	Site
Dry modified bog	Scoped out
Neutral / acidic flush	Local
Fen / valley mire	Scoped out
Standing water	Site
Other exposure – acidic / neutral	Negligible – scoped out
Wall	Negligible – scoped out
Amphibians	Local
Reptiles	County
Badgers	Site
Bats	Local
Birds	Local
Hazel dormice	Scoped out
Invasive species	N/A
Otter	Scoped out
Water vole	Scoped out
White-clawed crayfish	Scoped out
General invertebrate communities	Local / county

6 IMPACT ASSESSMENT

This section provides an assessment of the significance of predicted impacts on the valued ecological habitats and species with specific reference to the proposed development. The predicted impacts are described in the absence of mitigation and consider both the construction and operational phases of the development.

6.1 Construction

Construction activities that have the potential to impact ecological receptors include land take, vegetation removal, material storage, excavations, soil movements or ground works and use of vehicles, machinery or plant.

6.1.1 Scrub

Direct loss

The proposed development will result in the loss of 0.58ha of dense gorse scrub on site, in addition to the loss of small areas of scattered hawthorn scrub. Given the proposed loss of all scrub present on site, this is considered to be a **high magnitude negative impact at site level, therefore it is considered to be of minor significance.**

6.1.2 Semi-improved acidic grassland

Direct loss

The proposed development will result in the loss of 3.51ha of MG6b semi-improved grassland and 1.15ha of the U1 semi-improved acidic grassland on site. Given the proposed loss of all grassland present on site, this is considered to be a **high magnitude negative impact at local level, therefore it is considered to be of moderate significance.**

6.1.3 Continuous bracken

Direct loss

The proposed development will result in the loss of 1.17ha of the continuous bracken on site. Given the proposed loss of all continuous bracken present on site, this is considered to be a **high magnitude negative impact at site level, therefore it is considered to be of minor significance.**

6.1.4 Neutral / acidic flush

Direct loss

The proposed development will result in the loss of 0.48ha of acidic / neutral flush habitat. Given the proposed loss of all areas of flush habitat present on site, this is considered to be a



high magnitude negative impact at local level, therefore it is considered to be of moderate significance.

6.1.5 Standing water

Direct loss

The proposed development will result in the loss of a single area of ephemeral standing water (Pond 1). Given that this habitat will be removed, this is considered to be a **high magnitude negative impact at site level, therefore it is considered to be of minor significance.**

6.1.6 Amphibians

Risk of harm during the quarrying works

Amphibians using the site during the quarrying phase of the development would be at risk of direct harm (e.g. through excavation work or vegetation clearance) or indirect harm (e.g. through becoming trapped in open excavations). This impact would be negative, could last for the duration of the construction period and is of a high magnitude as it could result in death of any individuals that are present. This considered to be a **high magnitude impact at a local level, therefore it is of moderate significance.**

Habitat loss

The proposed development will result in the loss of areas of suitable foraging and commuting habitat for GCNs and other amphibians, including dense scrub, continuous bracken, flushes and grassland. Despite this, the site boundary has been amended since the initial PEA survey to ensure the retention of the highest value habitats within the eastern section of the survey boundary. Corridors of suitable and similar habitat will be retained around site to the north, east and west which will continue to act as ecological corridors and commuting routes for amphibians moving across the landscape. Pond 1 will be removed as part of the development, however this waterbody is ephemeral and is unsuitable for use by breeding GCNs and is likely only being used on an occasional basis for foraging and commuting purposes. As such, the proposed loss of habitats on site is considered to be a **medium magnitude impact at a local level, therefore it is of minor significance.**

6.1.7 Reptiles

Risk of harm during the quarrying works

Reptiles using the site during the quarrying phase of the development would be at risk of direct harm (e.g. through excavation work or vegetation clearance) or indirect harm (e.g. through becoming trapped in open excavations). This impact would be negative, could last for the duration of the quarrying period and is of a high magnitude as it could result in death of any individuals that are present. This considered to be a **high magnitude impact at a county level, therefore it is of major significance.**

Habitat loss

The proposed development will result in the loss of areas of suitable foraging and commuting habitat for reptiles, including dense scrub, continuous bracken, flushes and grassland. Despite this, the site boundary has been amended since the initial PEA survey to ensure the retention of the highest value habitats within the eastern section of the survey boundary. Corridors of suitable and similar habitat will be retained around site to the north, east and west which will continue to act as ecological corridors and commuting routes for reptiles moving across the landscape. As such, the proposed loss of habitats on site is considered to be **a medium magnitude impact at a county level, therefore it is of minor significance.**

6.1.8 Badgers

Risk of harm

If badgers are using the site for foraging or commuting purposes at the time of quarrying works or vegetation clearance and they are at risk of indirect harm (e.g. through becoming trapped in excavations). Badgers are large and mobile creatures and impacts through direct impacts are unlikely unless badgers excavate a sett on site or within the immediate vicinity of the site prior to the start of vegetation and soil stripping. Given the sett building opportunities present, this is considered unlikely. This impact is of a high magnitude as it could result in the harm or death of badgers however given the observed level of use of the site, it would likely be limited to indirect impacts to individuals or small number of badgers. This is considered to be a **high magnitude impact at a site level, therefore it is of minor significance.**

Habitat loss

The proposed development will result in the loss of areas of suitable foraging and commuting habitat namely dense scrub, continuous bracken and grassland. Given the low level of badger use observed on site and presence and retention of suitable and similar habitat within the immediate surrounding landscape and immediately adjacent to the site boundaries, this is considered to be a **low magnitude impact at a site level, therefore it is not of significance.**

Inappropriate lighting

No additional external lighting will be installed as part of the proposed quarry extension. **As such, there will be no adverse impacts on badgers through inappropriate lighting as a result of the development.**

6.1.9 Bats

Risk of harm and loss of roosting opportunities

There are no potential roosting features within trees or buildings or any other structures on site that could be used by roosting bats. **As such there is no potential risk of harm to bats, nor will there be a loss of roosting opportunities as a result of the development.**

Loss of foraging habitat or severance of commuting corridors

The loss of dense scrub, continuous bracken, flushes and grassland habitats on site will result in a reduction of foraging opportunities for bats. The magnitude of this impact has been

reduced following the reduction in the proposed quarrying area, specifically to incorporate the habitats of highest ecological value. The magnitude of the impact is also limited as areas of similar habitat will be retained immediately adjacent to the north, west and east of the site, which will continue to provide foraging and commuting opportunities for bats using the wider landscape. As such, this is considered to be a **medium magnitude impact at local level, therefore it is of minor significance.**

Inappropriate lighting

No additional external lighting will be installed as part of the proposed quarry extension. **As such, there will be no adverse impacts on bats through inappropriate lighting as a result of the development.**

6.1.10 Birds

Risk of harm

Any vegetation clearance works, including the removal or cutting of dense scrub, scattered scrub, dense bracken and other tall swarded vegetation e.g. grassland or the acidic / neutral flushes, could result in the direct loss of nests, any individuals within the nests and of available nesting territories if conducted during the breeding season. This impact would be of a high magnitude as it could result in the harm or death of birds and their young or eggs. This is considered to be a **high magnitude at a local level, therefore it is of moderate significance.**

Habitat loss

The loss of dense scrub, continuous bracken, flushes and grassland habitats on site will result in a reduction of foraging and nesting opportunities for birds. The magnitude of this impact has been reduced following the reduction in the proposed quarrying area, specifically to incorporate the habitats of highest ecological value. The magnitude of the impact is also limited as areas of similar habitat will be retained immediately adjacent to the north, west and east of the site, which will continue to provide foraging and nesting opportunities for birds using the wider landscape. The cliff faces to the south of Zone A, which provide valuable habitat for raptors and corvids, will also be retained as part of the proposed development. As such, this is considered to be a **medium magnitude impact at local level, therefore it is of minor significance.**

6.1.11 General terrestrial invertebrate communities

Habitat loss and degradation

The wetlands across the site provide the greatest variety of invertebrates and the most interesting species. The valley mire and marshy grassland are located off-site and will be retained as part of the proposed development.

Small exposed rocky outcrops and especially the more extensive ridges provide the other key habitat feature of the site. These are primarily located off-site with only a small proportion being lost as part of the proposed development. The magnitude of this impact has been reduced following the reduction in the proposed quarrying area, specifically to incorporate the habitats of highest ecological value. The magnitude of the impact is also limited as areas of

similar habitat will be retained immediately adjacent to the north and east, which will continue to provide suitable habitat for grayling butterflies locally.

The loss of dense scrub, continuous bracken, flushes and grassland habitats on site will reduce the availability of resources for invertebrates in general, and will impact on the range of species that the site can support.

This is considered to be a low magnitude impact at a local / county level, therefore it is of minor significance.

6.1.12 Summary

Table 9 – Summary of construction impacts

ECOLOGICAL FEATURE	ECOLOGICAL IMPORTANCE OF FEATURE	MAGNITUDE OF POTENTIAL IMPACT	SIGNIFICANCE
Scrub	Site	High	Minor
Semi-improved acidic grassland	Local	High	Moderate
Continuous bracken	Site	High	Minor
Neutral / acidic flush	Local	High	Moderate
Standing water	Site	High	Minor
Amphibians	Local	High	Moderate
Reptiles	County	High	Major
Badgers	Site	High	Minor
Bats	Local	Medium	Minor
Birds	Local	High	Moderate
General invertebrate communities	Local / county	Low	Minor

7 MITIGATION, COMPENSATION & ENHANCEMENT

This section describes the measures which are required to mitigate or compensate for any significant environmental impacts. It also includes any proposed enhancement measures, where applicable.

7.1 Construction

7.1.1 Scrub

Direct loss

No specific scrub planting is proposed to compensate for the losses on site, however this is due to the overabundance of dense scrub within the compensation area, which is currently at the detriment of other habitats of higher distinctiveness e.g. acidic grassland, ponds and heathland. Zone H that is being restored will be allowed to naturally regenerate into a mosaic of habitats, include areas of dense scrub. Given that this regeneration will be allowed to occur naturally, the exact proportion of scrub that will be present on site post development is unknown.

7.1.2 Semi-improved acidic grassland

Direct loss

To compensate for the loss of acidic grassland on site, Zone C within the wider quarry will be subject to enhancement measures and long-term management to create a mosaic of habitats, including acidic grassland. In addition, soil will be translocated to Zone H which will be allowed to naturally regenerate into a mosaic of habitats including acidic grassland. This natural regeneration will be monitored to ensure sufficient habitat establishment takes place and to identify the need for remedial management measures e.g. scrub control in favour of grassland habitats. Furthermore, the existing grassland within Zone D has already and will continue to be subject to ongoing management to maximise its botanical diversity and ecological value.

7.1.3 Continuous bracken

Direct loss

No specific habitat creation is proposed to compensate for the loss of continuous bracken on site, however this is due to the overabundance of bracken within other areas within the wider quarry, which is currently at the detriment of other habitats of higher distinctiveness e.g. acidic grassland and heathland. Zone H will be allowed to naturally regenerate into a mosaic of habitats, including areas of bracken. Given that this regeneration will be allowed to occur naturally, the exact proportion of bracken that will be present on site post development is unknown.

7.1.4 Acidic / neutral flushes

Direct loss

To compensate for the loss of areas of acidic / neutral flushes on site, a large dry scrape with encroaching scrub and trees within Zone C was cleared and excavated to create a large shallow flooded depression (Pond 7). This has since naturally flooded and holds standing water for most of the year and has been colonised by numerous marginal and aquatic species present within the flushes. This includes but is not limited to lesser marshwort *Apium inundatum*, marsh cinquefoil *Comarum palustre*, bulbous rush *Juncus bulbosus*, floating club-rush *Eleogiton fluitans* and soft rush *Juncus effusus*.

7.1.5 Standing water

Habitat loss and enhancements

To compensate for the loss of the ephemeral Pond 1 within the proposed extension area, two new ponds within Zones C (Ponds 7 and 8) have been created, Pond 5 within Zone G has been restored and Pond 4 within Zone D has and will continue to be subject to enhancement measures to remove encroaching willow scrub and encourage marginal and aquatic macrophytes.

7.1.6 Amphibians

Risk of harm during the quarrying works

As GCNs are known to be present on site, a European protected species mitigation licence will need to be granted by NRW to allow the works to proceed. No further GCN presence / absence or population size class assessments are required to inform the planning application or the licence, as there are no ponds present on site that are suitable for GCN breeding, and all other offsite ponds within 500m of the site have confirmed absence of GCNs through eDNA or PSCA surveys undertaken as part of the monitoring surveys for the existing GCN licence for the ongoing quarry works.

This EPS mitigation licence can only be granted once planning permission has been secured and will need to be in place prior to the start of any works on site. Once planning permission has been secured for the extension of the quarry, the existing EPS mitigation licence will be modified to include the extension area. This approach was previously agreed with Matthew Ellis of NRW and David Cowley of Isle of Anglesey County Council for the previously consented extension application. As such, this same approach is proposed for the newly proposed quarry extension.

Mitigation measures that will be implemented to protect GCNs and other amphibians during the works are detailed in the EDS and include the installation of one-way exclusion fencing and a period of trapping (artificial refugia only), and translocation of all amphibians to a suitable receptor area (Zone C) within the wider quarry. No GCNs have ever been observed within the proposed development site and the only evidence of GCN activity within 500m of the site is from 3/12 positive eDNA replicants from the onsite pond (Pond 1). As such, it is considered that the site is used on a transient basis by a very low number of GCNs for foraging or commuting, likely from individuals at the edge of the range of the known population within the wider quarry to the south. As such, it is considered that the pitfall trapping is not considered

necessary and any GCNs present on site would likely be detected and captured during the checks of the artificial refugia, as has been observed by UES on other development sites that support both reptiles and GCNs. To further increase the capture rate, additional artificial refugia will also be placed along the inner perimeter of the exclusion fencing. This is a technique often used in combination with pitfall traps for GCN translocation and often is as effective if not more so than pitfall traps, as observed when utilised by UES in other translocation schemes. Furthermore, the use of pitfall traps is unlikely to be feasible along much of the perimeter fence due to the ground conditions, with large sections of the site having very little substrate within which to dig, layered on top of granite.

Following the completion of the translocation exercise, the artificial refugia will be removed from the working area and the drystone wall and any other potential refugia present on site will be subject to a destructive search and removed from the working area. This search will be undertaken by or under the direct supervision of a suitably qualified ecologist. Any amphibians found will be placed in a suitable individual species carrier and immediately translocated to an appropriate area of similar habitat in Zone C. Handling of animals will only be undertaken by a suitably experienced ecologist.

Following this the one-way exclusion fencing will be retained at the perimeter of the site until vegetation removal and soil stripping can commence. The removal of vegetation and the stripping of soils will be undertaken under ecological supervision. Vegetation and soils will be stripped by an excavator with a toothed bucket and will be translocated to Zones A and H. Any reptiles found will be placed in a suitable individual species carrier and immediately translocated to appropriate similar habitat in Zone C. Handling of animals will only be undertaken by a suitably experienced ecologist.

Full details of the proposed mitigation, trapping and translocation measures, including timings and survey effort, are fully detailed within the EDS and will be fully detailed within the EPS mitigation licence amendment application and will need to be subject to agreement with NRW.

The above measures will also ensure the protection of all common amphibian species using the site.

Habitat loss

At the time of the initial 2016 PEA and reptile surveys of the proposed compensation / receptor zone (Zone C), the area was found to consist of extensive areas of bramble, willow, gorse and bracken. Small pockets of dry dwarf shrub heath were present on rocky outcrops. The area had previously been planted with trees, with rowan *Sorbus aucuparia*, pedunculate oak *Quercus robur* and Scots pine *Pinus sylvestris* present across the site.

Through habitat creation / enhancement and positive management, it was considered that Zone C would act as a suitable receptor site for both amphibians and reptiles. Following the granting of the planning permission for the previous extension area, significant habitat creation and enhancement works were undertaken, despite the proposed quarry extension and translocation never taking place.

It is considered that the habitat creation and enhancement work that have been undertaken have increased the suitability of Zone C and have likely increased the potential carrying capacity for amphibians, especially considering two additional ponds have been created (Ponds 7 & 8). Given that the previously consented quarrying extension has not and will not take place (instead being replaced by this new application), these works are instead

considered as compensation for the proposed quarrying extension and Zone C will continue to act as the proposed receptor site for the translocation exercise.

Given that the initial habitat creation and enhancement works have already been undertaken, the receptor site is currently ready for the translocation of individuals from the working area, meaning that the proposed translocation exercise can commence without delay following the approval of planning permission and the extension of the existing licence.

Prior to undertaking the habitat enhancement and creation works within Zone C, this zone was considered to be on the edge of the GCN populations territorial range, with no established breeding habitats present. As a result of the habitat creation and enhancement works already undertaken, Zone C is now of a much higher suitability for GCNs, providing higher quality terrestrial habitat for foraging, commuting and hibernation, in addition to the provision of potential breeding habitat which was previously absent.

In addition to the enhancement of Zone C for GCNs and other amphibians, additional habitat creation and enhancement works have been or will be undertaken within Zones D, G and H and ongoing management and enhancement of these areas is proposed to compensate for the loss of suitable habitat as a result of the proposed development, in addition to providing net gains in habitat suitability. The measures include the creation and enhancement of numerous ponds and a mosaic of grassland and heathland, woodland and scrub. Full details of the habitat creation and enhancement works that have already been undertaken and are proposed as part of this application are detailed within the LEMP report that has been prepared for the scheme (see report reference UES02396/06).

Monitoring

A period of 21 years of GCN population size class assessment surveys of all ponds within Zones C - G are currently being undertaken in compliance with the existing EPS mitigation licence that has been granted for the existing quarry works. These surveys commenced in 2020 and were subsequently undertaken in 2021 and 2022. These annual monitoring surveys will continue and will incorporate any additional ponds created as part of this development within Zones D, G and H.

Reports of the monitoring results will continue to be provided to the Local Planning Authority and Cofnod for their records, as well as to NRW as part of the EPS mitigation licence requirements.

7.1.7 Reptiles

Risk of harm during the quarrying works

Mitigation measures that will be implemented to protect reptiles during the works are fully detailed in the EDS and include the installation of one-way exclusion fencing and a period trapping (artificial refugia only), and translocation of all reptiles to a suitable receptor area (Zone C) within the wider quarry.

Following the completion of the translocation exercise, the artificial refugia will be removed from the working area and the drystone wall and any other potential refugia present on site will be subject to a destructive search and removed from the working area. This search will be undertaken by or under the direct supervision of a suitably qualified ecologist. Any reptiles found will be placed in a suitable individual species carrier and immediately translocated to an



appropriate area of similar habitat in Zone C. Handling of animals will only be undertaken by a suitably experienced ecologist.

Following this the one-way exclusion fencing will be retained at the perimeter of the site until vegetation removal and soil stripping can commence. The removal of vegetation and the stripping of soils will be undertaken under ecological supervision. Vegetation and soils will be stripped by an excavator with a toothed bucket and will be translocated to Zones A and H. Any reptiles found will be placed in a suitable individual species carrier and immediately translocated to appropriate similar habitat in Zone C. Handling of animals will only be undertaken by a suitably experienced ecologist.

Full details of the proposed mitigation, trapping and translocation measures, including timings and survey effort, are fully detailed within the EDS.

Habitat loss

Through habitat creation / enhancement and positive management, it was considered that Zone C would act as a suitable receptor site for both amphibians and reptiles. Following the granting of the planning permission for the previous extension area, significant habitat creation and enhancement works were undertaken, despite the proposed quarry extension and translocation never taking place.

It is considered that the habitat creation and enhancement work that have been undertaken have increased the suitability of the site and have likely increased the potential carrying capacity for reptiles. Given that the previously consented quarrying extension has not and will not take place (instead being replaced by this new application), these works are instead considered compensation for the proposed quarrying extension and Zone C will continue to act as the proposed receptor site for the translocation exercise.

Given that the initial habitat creation and enhancement works have already been undertaken, the receptor site is currently ready for the translocation of individuals from the working area, meaning that the proposed translocation exercise can commence without delay following the approval of planning permission.

In order to ensure that Zone C continues to be suitable and ready for the translocation of reptiles, an updated walkover and habitat suitability assessment survey was undertaken by Alasdair Grubb in October 2022. The survey found that many of the cleared areas are being encroached by bramble, bracken and gorse and willow scrub. Additionally, some areas of the large marshy area (Pond 7) have become dominated by tall *Juncus* species, at the detriment of uncommon forbs and general biodiversity. Based on the findings, further management measures including control of bracken and scrub will be implemented prior to the commencement of the translocation exercise, as detailed in the EDS and LEMP report.

In addition to the enhancement of Zone C for reptiles, additional habitat creation and enhancement works have been or will be undertaken within Zones D, G and H and ongoing management and enhancement of these areas is proposed to compensate for the loss of suitable habitat as a result of the proposed development, in addition to providing net gains in habitat suitability. The measures include the creation and enhancement of numerous ponds and a mosaic of grassland and heathland, woodland and scrub. Full details of the habitat creation and enhancement works that have already been undertaken and are proposed as part of this application are detailed within the LEMP report that has been prepared for the scheme (see report reference UES02396/06).



Monitoring

Following the completion of the translocation exercise, reptile monitoring surveys will be undertaken of the receptor zone (Zone C). Monitoring surveys will be undertaken biennially (every two years) for a period of 10 years, starting the year after the completion of the translocation exercise. Monitoring thereafter will be undertaken in year 15 and year 20. These surveys will follow the methodology detailed in Froglife Advice Sheet 10: Reptile Survey (1999), which is used as a standard technique for reptile surveys across the UK.

Surveys will be spread across the reptile survey period of March to October inclusive, with at least half of the surveys undertaken during the optimal survey periods of April to mid-June inclusive and / or September. Three standard survey techniques will be employed in the search for reptiles: a walkover survey, *in situ* refugia and artificial refugia, with 15 surveys / checks undertaken each survey year. Full details of the proposed monitoring survey methodology is detailed within the EDS.

In addition to the population size class assessment surveys, Zone C will also be subject to a habitat condition assessment as part of the biennial reptile population size class assessment surveys. This assessment will assess the suitability of the site for reptiles and coupled with the data from the population size class assessments, will highlight any remedial habitat creation or management measures (e.g. scrub or bracken control) required. If management works are required, they are to be undertaken the following year (between years with reptile monitoring surveys) to reduce the disturbance works influencing the results of the ongoing monitoring surveys.

Additional reptile population size class assessment surveys with the same methodology and timing will also be undertaken of Areas D, G and H. However, this monitoring is not directly related to the proposed translocation scheme and instead is being undertaken to monitor the success of habitat creation and enhancement works within the proposed restoration area. As such, the timings are dependent on the implementation of the initial habitat creation and enhancement works within these areas and are detailed fully in the LEMP report.

Reports of the monitoring results should be provided to the Local Planning Authority and Cofnod for their records.

7.1.8 Badgers

Risk of harm

A licence from NRW to disturb, damage or destroy a badger sett is not required for the proposed development to proceed as there are no active badger setts within or immediately adjacent to the proposed development boundary.

Reasonable avoidance measures (RAMs) should be implemented during the development to protect any badgers which may be using the site in a transitory capacity for foraging or commuting.

Habitat loss

To compensate for the loss of habitats on site, existing habitats within the wider quarry have been or will be subject to enhancement measures and ongoing management (Zones C, D and

G) and new habitats will be created within areas of the existing quarry that are to be restored (Zone H). The enhancement measures include the enhancement and creation of ponds, small heathland areas, woodland and a mosaic of scrub, bracken and grassland. These measures will provide additional and higher quality foraging, commuting and sheltered sett building opportunities for badgers.

7.1.9 Bats

Loss of foraging habitat or severance of commuting corridors

To compensate for the loss of areas of foraging habitat, existing habitats within the wider quarry have been or will be subject to enhancement measures and ongoing management (Zones C, D & G) and new habitats will be created within areas of the existing quarry that are to be restored (Zone H). The enhancement measures include the enhancement and creation of ponds, small heathland areas, woodland and a mosaic of scrub, bracken and grassland. These measures will provide additional and higher quality foraging and commuting opportunities for bats.

To provide an ecological enhancement for the wider quarry and to provide roosting opportunities for bats which are currently lacking, the following bat boxes have already been installed within the woodland within Zone C:

- 10x Schwegler 2F bat boxes
- 5x Schwegler 1FF bat boxes

7.1.10 Birds

Risk of harm

To reduce the potential for nesting birds to be present at the time of the works, each phase of the proposed extension area should be stripped of vegetation and soils in advance of quarrying works. This should be undertaken following the completion of the reptile and amphibian translocation programme as detailed in the EDS report.

Any vegetation clearance works, including the removal or cutting of dense scrub, scattered scrub, dense bracken and other tall-swarded vegetation e.g. grassland and the acidic / neutral flushes, will take place outside of the bird breeding season where possible, and will be avoided from March to August inclusive. If this is not possible and works need to take place during this period, a nesting bird check will be undertaken immediately prior to the works. This check will only be undertaken by a suitability qualified ecologist, who will also remain to act as an ecological clerk of works (ECoW) to oversee the removal of vegetation where considered necessary, e.g. for the removal of dense gorse or bracken that cannot confidently be inspected through visual observation alone.

If any active bird nests are observed, a minimum of a 5m buffer zone (potentially larger depending on the species and location of the nest) will be implemented around the nest and will be demarcated by posts and exclusion tape. All contractors on will be made aware of the exclusion zone and the legal requirements for its implementation. No works (including vegetation clearance) will take place within the exclusion zone until a suitably qualified ecologist has confirmed that the nest is no longer active.

Habitat loss

To compensate for the loss of areas of foraging and nesting habitat, existing habitats within the wider quarry have been or will be subject to enhancement measures and ongoing management (Zones C, D & G) and new habitats will be created within areas of the existing quarry that are to be restored (Zone H). The enhancement measures include the enhancement and creation of ponds, small heathland areas, woodland and a mosaic of scrub, bracken and grassland. These measures will provide additional and higher quality foraging and nesting opportunities for birds.

To provide further compensation for the loss of nesting opportunities and to provide an enhancement in the availability of nesting opportunities for species that aren't currently nesting within the wider quarry due to a lack of suitable opportunities, the following bird boxes have already been installed within the woodland within Zone C:

- 10x Schwegler 1B (26mm) nest boxes
- 10x Schwegler 1B (32mm) nest boxes

7.1.11 Invasive species

Enhancement

No invasive species are present within the proposed extension area and hence no mitigation measures to reduce impacts from the spread of invasives is required as part of the proposed development. However, Japanese knotweed has been observed within Zone D. As part of the enhancement works of the wider quarry, this stand of Japanese knotweed will be subject to herbicide application to eradicate and remove it from site. Prior to the implementation of these eradication measures, a suitability qualified ecologist will undertake a search for additional stands of Japanese knotweed, or any other invasive species across Zone D. Following identification, a minimum 2m buffer zone will be implemented around all stands and will be demarcated with posts and exclusion tape.

To reduce the potential for herbicide drift and impacts on non-target habitats, herbicide application will be applied using a stem injection technique and will not be sprayed. All herbicide application must be undertaken by a trained and competent contractor and the manufacturer's information must be consulted to determine the application rate. Due to the close proximity to a waterbody (Pond 4), a glyphosate-based herbicide will be used.

This survey and the subsequent herbicide application will be undertaken during the growing season of July to September inclusive and will commence in 2023, with subsequent annual herbicide application until all stands have been eradicated.

To reduce the potential adverse impacts of invasive species in the long-term, an invasive species walkover survey will be undertaken of Zones C, D, G and H every two years by a suitably qualified ecologist. If any invasive species are observed, a buffer zone will be demarcated as detailed above and will be subject to mechanical or herbicide eradication measures as deemed necessary by the ecologist.

7.1.12 General invertebrate communities

Habitat loss



The valley mire and marshy grassland are located off-site and will be unaffected by the proposed development. As such, no specific mitigation or compensation is considered necessary with regards to the rove beetle.

The granite outcrops are primarily located off-site and it is considered that sufficient habitat will be retained that the population of grayling butterflies will be unaffected. The proposed compensation and enhancement in relation to acid grassland, as discussed in section 7.1.2 will provide additional high-quality habitat containing larval foodplants.

To compensate for the loss of other habitats used by invertebrates in general, existing habitats within the wider quarry have been or will be subject to enhancement measures and ongoing management (Zones C, D & G) and new habitats will be created within areas of the existing quarry that are to be restored (Zone H). The enhancement measures include the enhancement and creation of ponds, small heathland areas, woodland and a mosaic of scrub, bracken and grassland. These measures will provide additional high-quality habitat for invertebrates.

8 RESIDUAL IMPACTS

8.1 Dense scrub

Approximately 0.58ha of dense gorse scrub and small areas of scattered hawthorn scrub will be removed as part of the development.

No specific scrub planting is proposed to compensate for the losses on site, however this is due to the overabundance of dense scrub within the compensation area, which is currently at the detriment of other habitats of higher distinctiveness e.g. grassland, ponds and heathland. Zone H will be allowed to naturally regenerate into a mosaic of habitats, including areas of dense scrub, following the translocation of soils from the proposed extension area. Given that this regeneration will be allowed to occur naturally, the exact proportion of scrub post development is unknown.

The development proposals may result in a small net loss in scrub. As scrub is abundant within the local and wider area, sometimes at the detriment of other habitats of higher ecological distinctiveness, a small net loss in species-poor gorse dominated scrub is **not considered to be a significant adverse impact**.

8.2 Semi-improved acidic grassland

The development will result in the loss of approximately 4.66ha of semi-improved acidic grassland, however the majority of this grassland is not of national or county significance as it is species-poor and does not meet the criteria to qualify as Wildlife Site quality grassland or a Habitat of Principal Importance.

As compensation for the loss of grasslands, large areas within the wider quarry site will be subject to enhancement and long-term management.

The development proposals may result in a small net loss in grassland. However, the mosaic of habitats, including grassland, that are being created and managed within the wider quarry will be of a much higher quality and support a greater botanical diversity than the grassland being lost, the majority of which is species-poor and subject to agricultural improvement. As such, a relatively small net loss in grassland is **not considered to be a significant adverse impact**, especially when considering the mosaic of habits that will be created and managed in the long term as compensation.

8.3 Continuous bracken

Approximately 1.17ha of continuous bracken will be lost as part of the development.

No specific bracken planting is proposed to compensate for the losses on site, however this is due to the overabundance of bracken within the wider quarry site, which is currently at the detriment of other habitats of higher distinctiveness e.g. acidic grassland and heathland. Zone H will be allowed to naturally regenerate into a mosaic of habitats, including areas of bracken. Given that this regeneration will be allowed to occur naturally, the exact proportion of bracken that will be present post development is unknown.

The development proposals may result in a small net loss in bracken. As bracken is abundant within the local and wider area, sometimes at the detriment of other habitats of higher

ecological distinctiveness, a small net loss is **not considered to be a significant adverse impact**.

8.4 Neutral / acidic flush

Approximately 0.48ha of neutral / acidic flush habitat will be lost as part of the development, the majority of which is species poor and are dominated by a low number of common and widespread species.

To compensate for the loss of areas of acidic / neutral flushes on site, a large dry scrape with encroaching scrub and trees within Zone C was cleared and excavated to create a large shallow flooded depression (Pond 7). This has since naturally flooded and holds standing water for most of the year and has been colonised by numerous marginal and aquatic species present within the flushes that are to be lost.

Therefore, it is considered that there won't be a significant residual impact on flush habitats as a result of the proposed development.

8.5 Standing water

To compensate for the loss of the ephemeral Pond 1 within the proposed extension area, two new ponds within Zones C (Ponds 7 and 8) have been created, Pond 5 within Zone G has been restored and Pond 4 within Zone D has and will continue to be subject to enhancement measures to remove encroaching willow scrub and encourage marginal and aquatic macrophytes.

Given the ratio of ponds that are to be created compared to the number that are to be lost, this is considered to be an ecological enhancement and it is considered that the proposed development will result in a **minor positive change**.

8.6 Amphibians

Amphibians will be protected from harm during the proposed quarry extension works through the implementation of mitigation and the capture and translocation of any amphibians present within the proposed working area.

No suitable breeding habitat will be lost as part of the proposed quarry extension, however a total of 4 ponds will be or have been created and 2 ponds will be or have been enhanced within the wider quarry. As such, it is considered that the proposals will result in an overall increase in the availability and quality of breeding habitat for GCNs and other amphibians.

Whilst some areas of suitable amphibian habitat are due to be removed, significant habitat creation and enhancement measures have been and will continue to be implemented within the wider quarry as compensation.

Following the completion of the proposed development and the associated habitat creation and enhancement works, it is considered that the proposed development will result in an increase in the favourable conservation status of the GCN population using the wider quarry. As such, the proposed development is considered to be compliant with Section 6 of the

Environment Wales Act 2016 and Article 2 of the Habitats Directive 1992 and will result in a **minor positive change for GCNs.**

8.7 Reptiles

Reptiles will be protected from harm during the proposed quarry extension works through the implementation of mitigation and the capture and translocation of any reptiles present within the proposed working area.

Whilst some areas of suitable reptile habitat are due to be removed, significant habitat creation and enhancement measures have been and will continue to be implemented within the wider quarry as compensation.

Following the completion of the proposed development and the associated habitat creation and enhancement works, it is considered that the proposed development will result in an increase in the availability and suitability of habitats within the wider quarry. As such, it is considered that the proposed development will result in a **minor positive change for reptiles.**

8.8 Badgers

The implementation of reasonable avoidance measures will ensure that the risk of harm or death of badgers is reduced to negligible levels.

The proposed level of habitat creation and enhancement will ensure that sufficient foraging opportunities will remain available for the badger population present with the local area.

Therefore, it is considered that there won't be a significant residual impact on badgers as a result of the proposed development.

8.9 Bats

There is no risk of harm to bats as a result of the proposed development and there will be no loss of potential roosting habitats.

The proposed level of habitat creation and enhancement will ensure that sufficient foraging opportunities will remain available for bats present with the local area and using the wider quarry site. An enhancement of the availability of roosting opportunities for bats within the wider quarry has already been provided through a suite of bat boxes. As such, it is considered that the proposed development will result in a **minor positive change for bats.**

8.10 Breeding birds

Timing sensitive works to outside of the nesting bird season or undertaking a pre-commencement nesting bird check will ensure risk of harm is minimised to the lowest practicable level.

The proposed level of habitat creation and enhancement will ensure that sufficient foraging and nesting opportunities will remain available for birds present with the local area and using the wider quarry site. Further compensation for the loss of nesting opportunities and the



enhancement of nesting opportunities for species that are currently not breeding on site has already been provided through a suite of bird boxes. As such, it is considered that the proposed development will result in a **minor positive change for birds**.

8.11 Invasive species

No invasive species are present within the proposed extension area, however the Japanese knotweed observed within Zone D will be eradicated as part of the works and all restored areas of the quarry will be subject to biennial checks for invasive species.

As such, it is considered that there will be no risk of invasive species being spread as a result of the proposals, which will result in the eradication of all invasive species currently present within the wider quarry, resulting in a residual **minor positive change**.

8.12 General invertebrate communities

The proposed habitat retention, creation and enhancement, coupled with the long-term management of all habitats on site post development, will ensure that the site continues to support a variety of habitats, suitable to support an abundant and diverse community of invertebrate species.

Therefore, the residual impact of the completed and operational development on invertebrates is considered to be **no significant change**.



8.13 Summary

Table 10 – Summary of residual impacts

ECOLOGICAL FEATURE	RESIDUAL IMPACT
Scrub	Neutral
Grassland	Neutral
Continuous bracken	Neutral
Acidic / neutral flushes	Neutral
Standing water	Minor positive
Amphibians	Minor positive
Reptiles	Minor positive
Badger	Neutral
Bats	Minor positive
Breeding birds	Minor positive
Invasive species	Minor positive
General invertebrate communities	Neutral

9 CONCLUSION

A suite of ecological surveys has been undertaken of the proposed extension area to inform the planning application. As part of the detailed botanical surveys undertaken on site, several ecologically valuable habitats were identified; namely U4 *Festuca ovina*-*Agrostris capillaris*-*Galium saxatile* grassland, M25 *Molinia caerulea*-*Potentilla erecta* mire, M29 *Hypericum elodes*-*Potamogeton polygonifolius* soakway, and M23 *Juncus effusus/acutiflorus*-*Galium palustre* mire. Following identification, the proposed development has been redesigned to retain these habitats and minimise impacts on biodiversity locally. The proposed development will not impact on any habitats or vegetative communities of European importance. Habitats to be lost are of site or local ecological importance only, with all habitats to be impacted being species-poor and low quality.

Zone B covers the previously consented extension area that will now be retained under the development proposals and the permission to quarry the zone will be relinquished through the granting of this new application. The retention and continued proactive management of this area will ensure the following ecologically valuable habitats are retained on site: H7 *Calluna vulgaris*-*Scilla verna* heath, H8 *Calluna vulgaris*-*Ulex galli* heath, U4 *Festuca ovina*-*Agrostris capillaris*-*Galium saxatile* grassland, and M25 *Molinia caerulea*-*Potentilla erecta* mire.

The EclA has identified various impacts up to a county level due to the presence, or potential presence, of protected or species / habitats of principal importance within the site boundary or the surrounding area.

Mitigation and compensation measures are provided within section 7 of this report in order to reduce the impacts to insignificant levels. Furthermore, details of proposed enhancements are provided, which could improve the availability of some habitats and the opportunities for some species locally following the development, resulting in a minor positive outcome.

All proposed mitigation, compensation and enhancement measures are fully detailed within the LEMP and EDS reports that have been prepared for the proposed development.

Provided the proposed measures within this report and the EDS and LEMP are followed, it is considered that the proposed development will be compliant with all relevant legislation and both national and local planning policy, and that the aforementioned ecological receptors will not be significantly negatively impacted.

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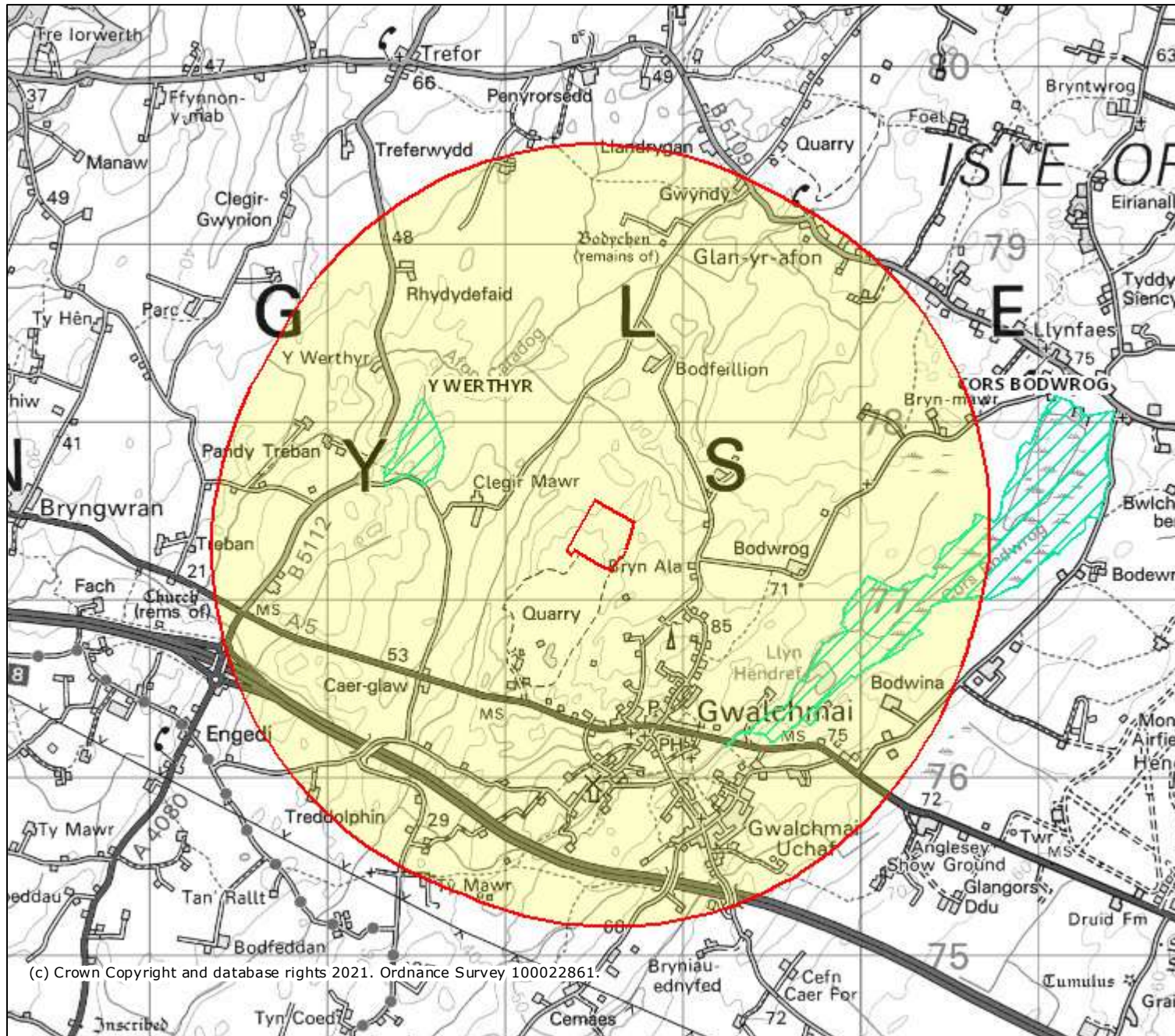
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APPENDICES

Appendix 1 – Statutorily protected sites



Legend

-  National Nature Reserves (Wales)
-  Ramsar Sites (Wales)
-  Sites of Special Scientific Interest (Wales)
-  Special Areas of Conservation (Wales)
-  Special Protection Areas (Wales)
-  Biosphere Reserves (Wales)

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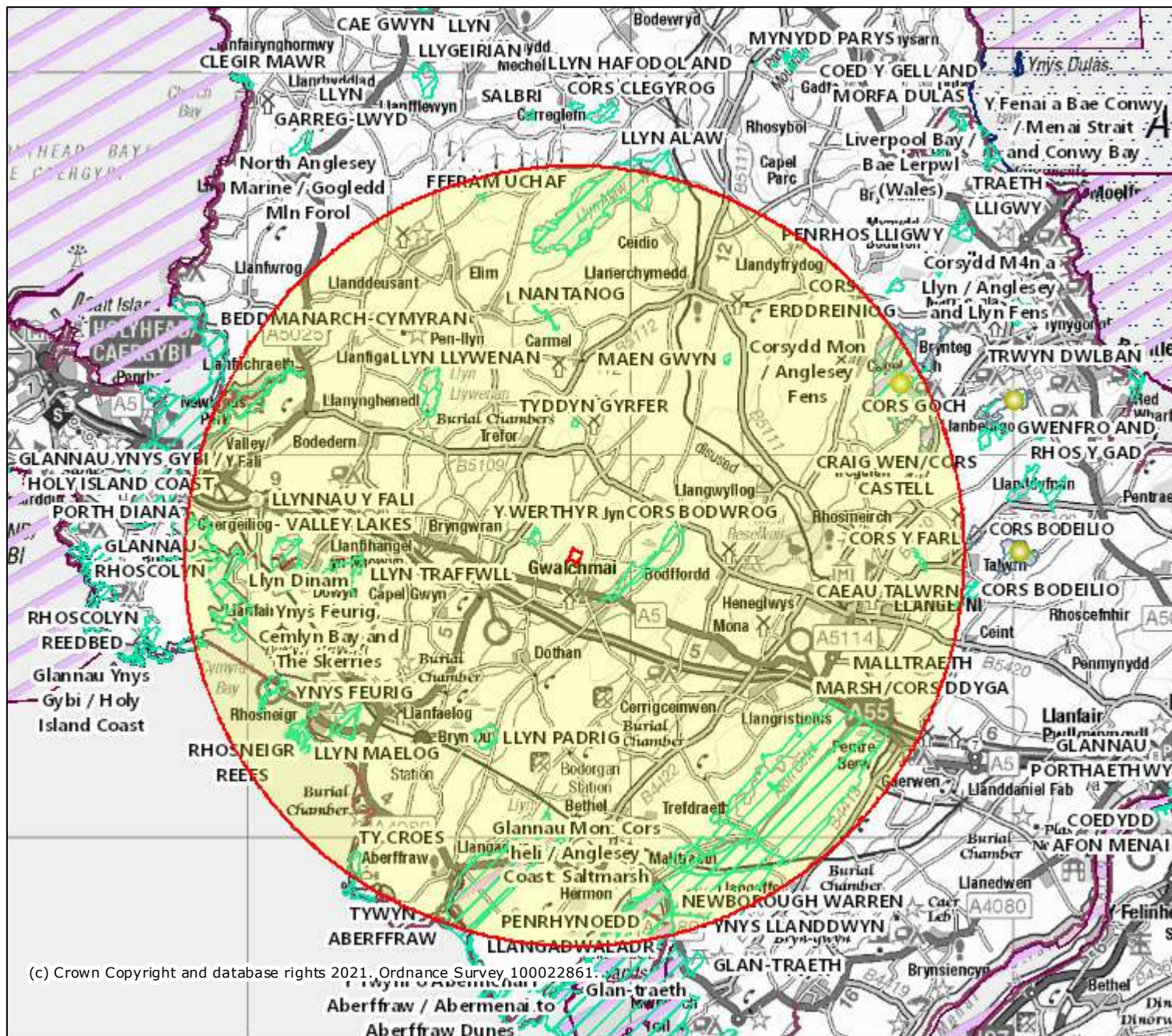
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ymax = 380100



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Legend

-  National Nature Reserves (Wales) - points
-  Ramsar Sites (Wales)
-  Sites of Special Scientific Interest (Wales)
-  Special Areas of Conservation (Wales)
-  Special Protection Areas (Wales)
-  Biosphere Reserves (Wales)

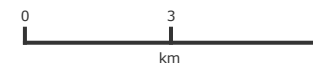
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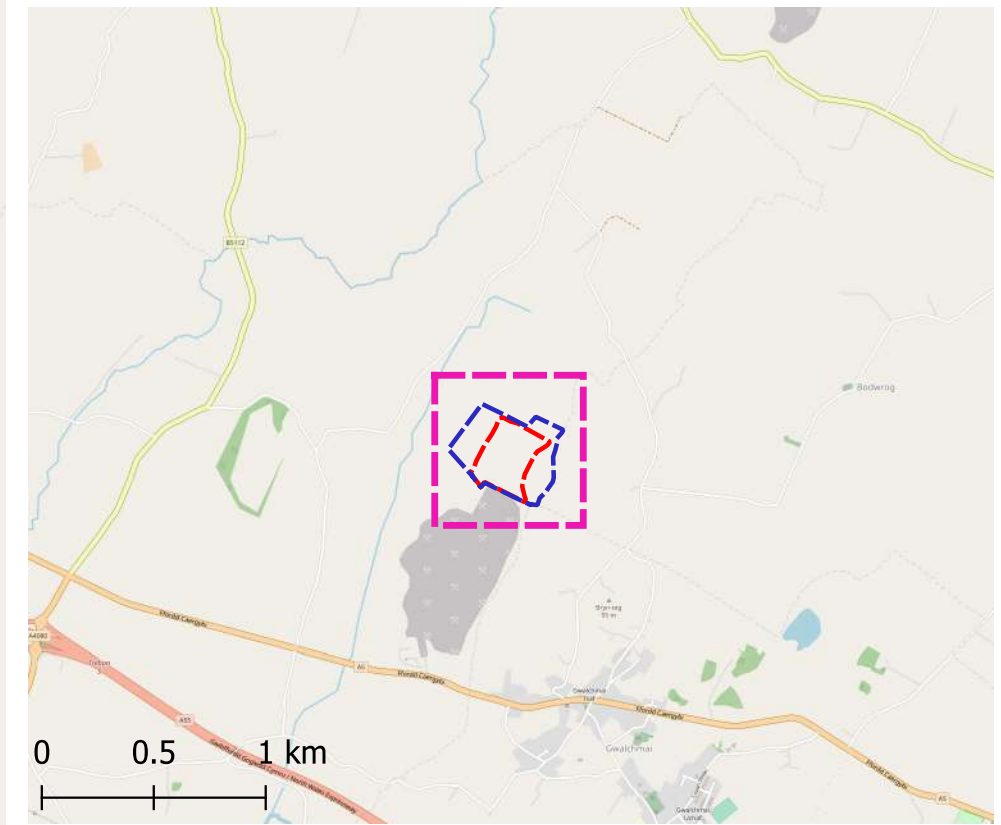
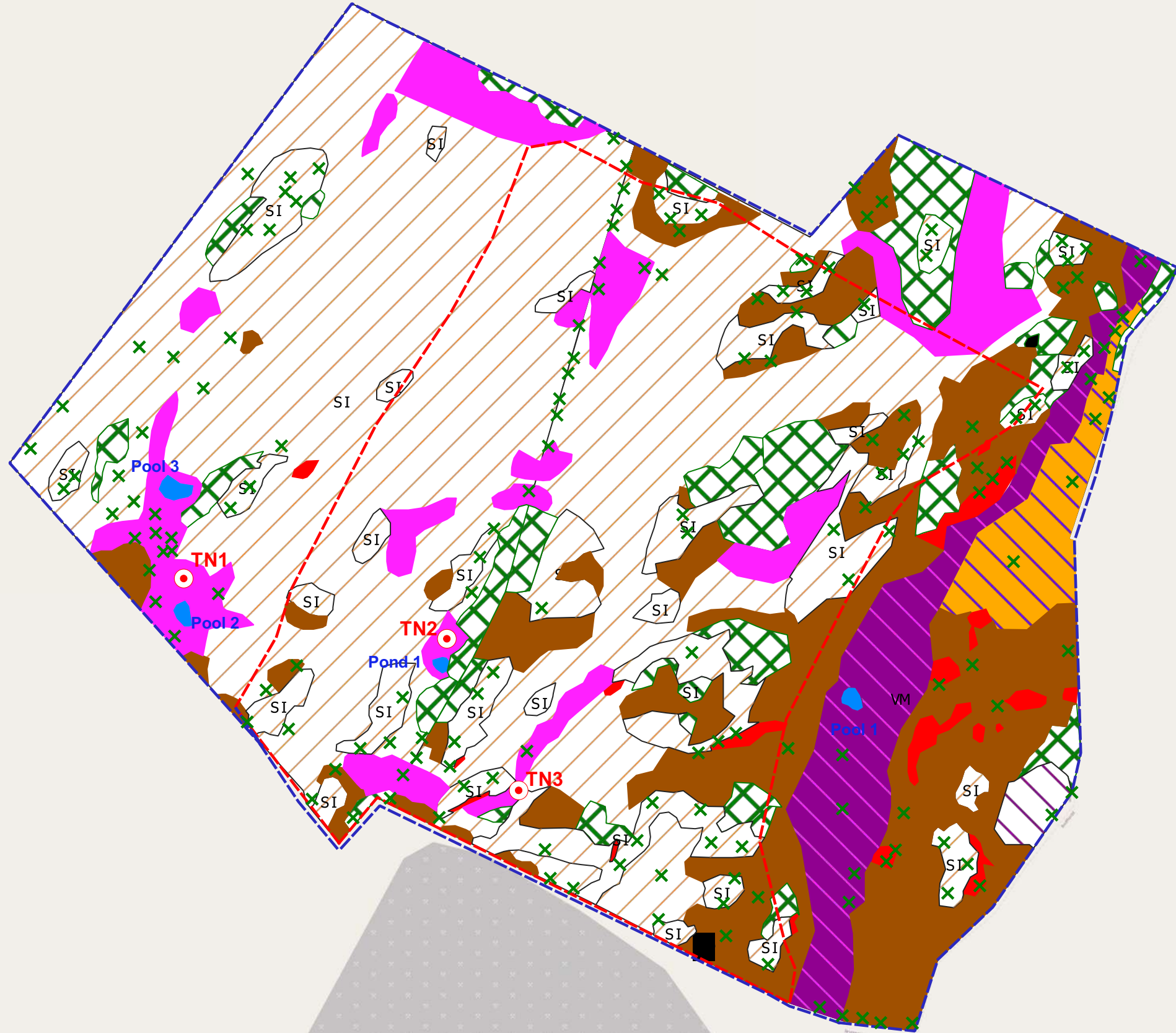
Appendix 2 – Phase 1 habitat plan

- Target Note 1 - Species-rich flush containing two ephemeral ponds.
- Target Note 2 - Species rich flush containing Pond 1
- Target Note 3 - Single badger scat



Preliminary Ecological Appraisal

Site: Cae'r Glaw Quarry
 - Proposed Extension Area
 NGR: SH 38512 77319
 Author: Tom Kenwright
 Date: 01/11/2022



KEY:

A2.1 - Scrub - dense/continuous	E3.1 - Fen - valley mire
A2.2 - Scrub - scattered	G1 - Standing water
B1.2 - Semi-improved acid grassland	I1.4.1 - Other exposure - acid/neutral
B5 - Marshy grassland	J2.5 - Wall
C1.1 - Continuous bracken	Development boundary
E1.8 - Dry modified bog	Survey boundary
E2.1 - Neutral / acidic flush	Target Notes

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



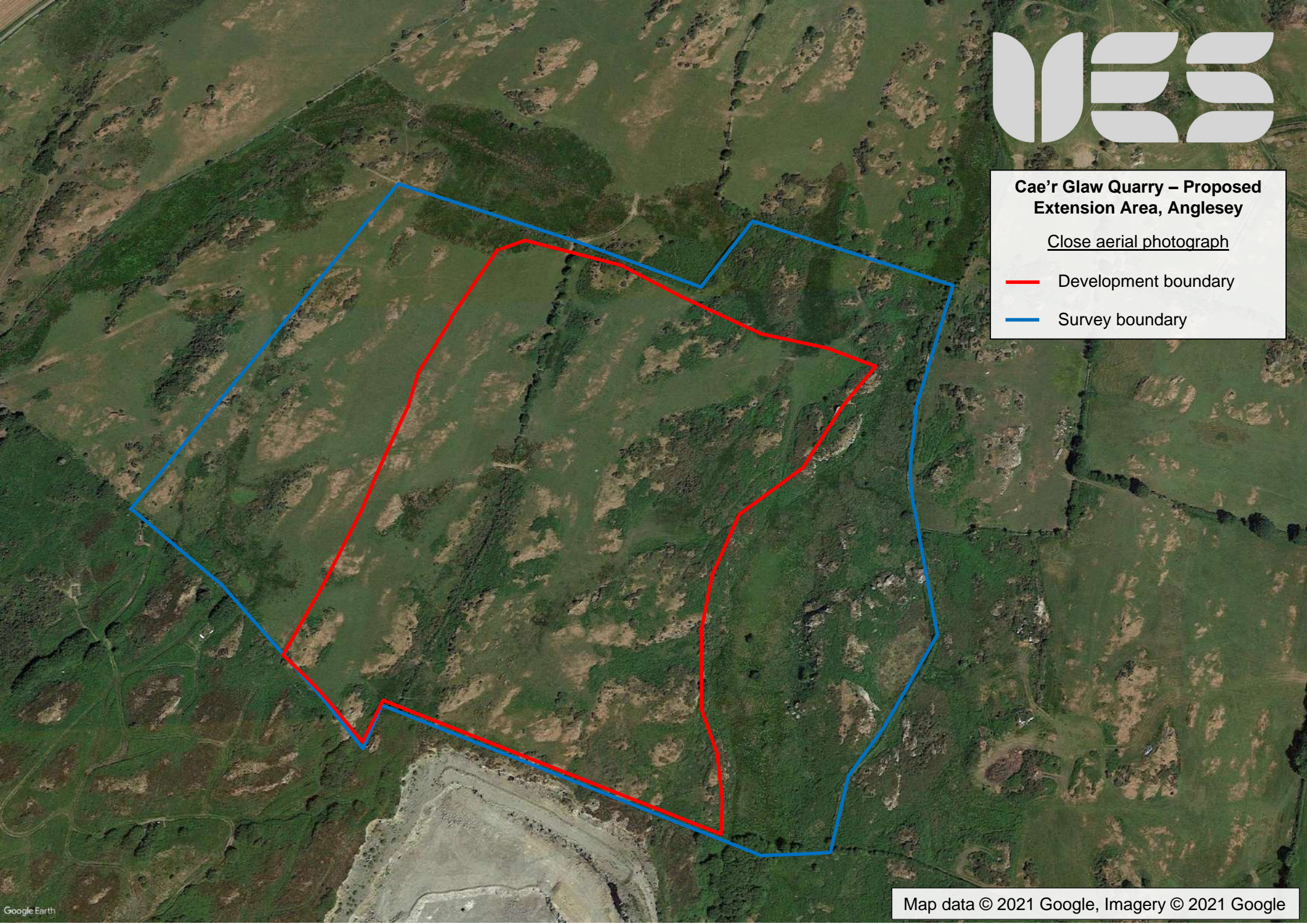
Appendix 3 – Aerial photographs



**Cae'r Glaw Quarry – Proposed
Extension Area, Anglesey**

Close aerial photograph

-  Development boundary
-  Survey boundary





**Cae'r Glaw Quarry – Proposed
Extension Area, Anglesey**

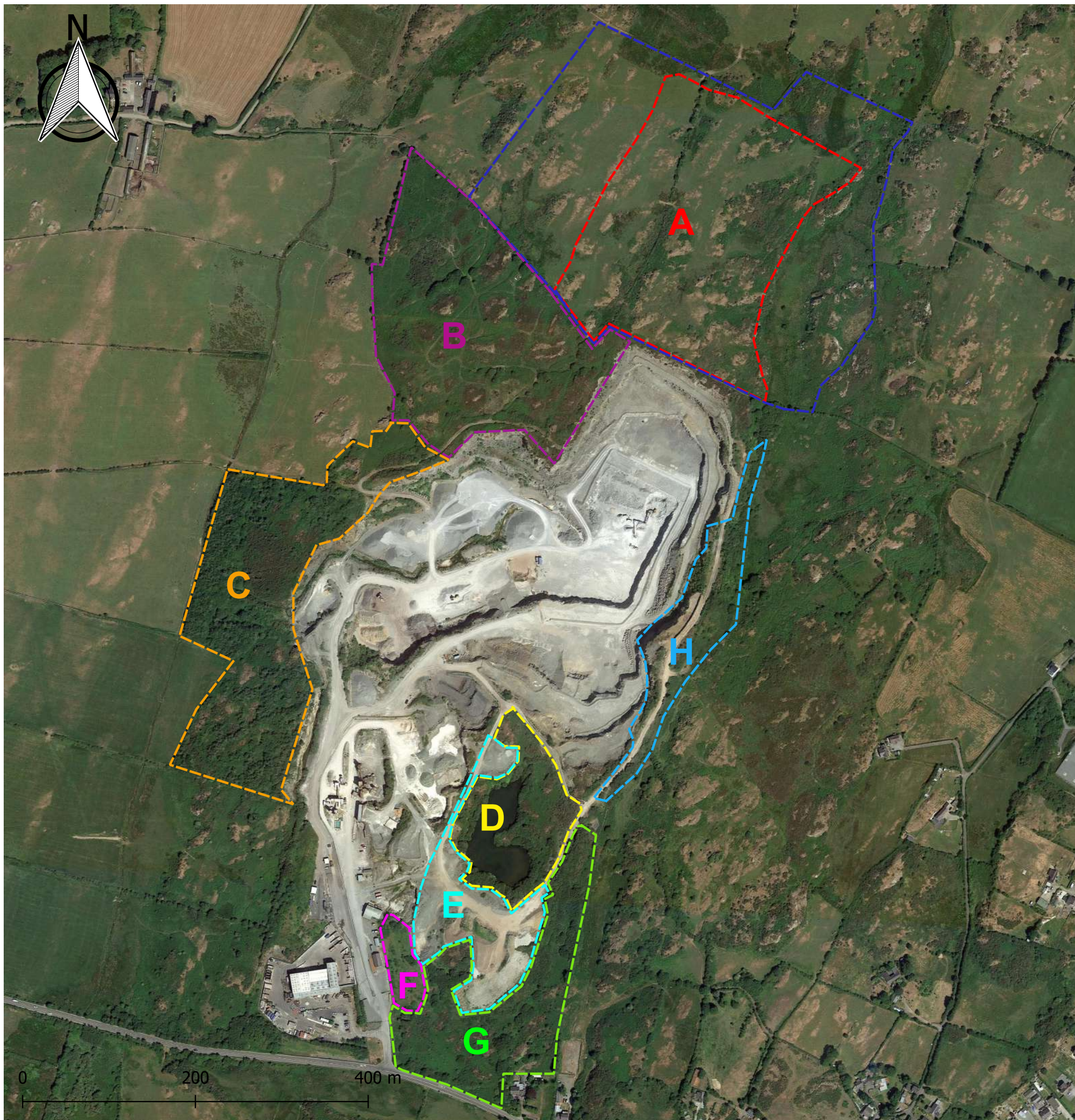
Wide aerial photograph

 Site location



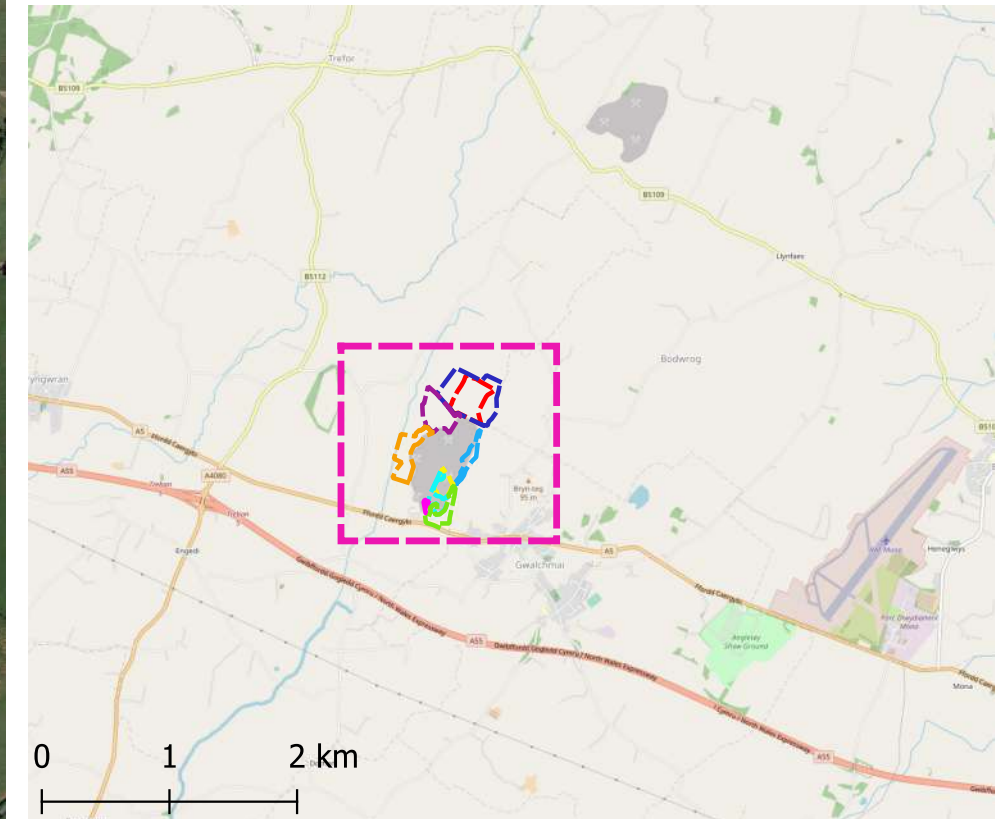


Appendix 4 – Site zonation plan



Site Zonation Plan

Site: Cae'r Glaw Quarry - Proposed Extension Area
NGR: SH 38512 77319
Author: Tom Kenwright
Date: 24/11/2022



KEY:

- Zone A - Development boundary
- Survey boundary
- Zone B
- Zone C
- Zone D
- Zone E
- Zone F
- Zone G
- Zone H

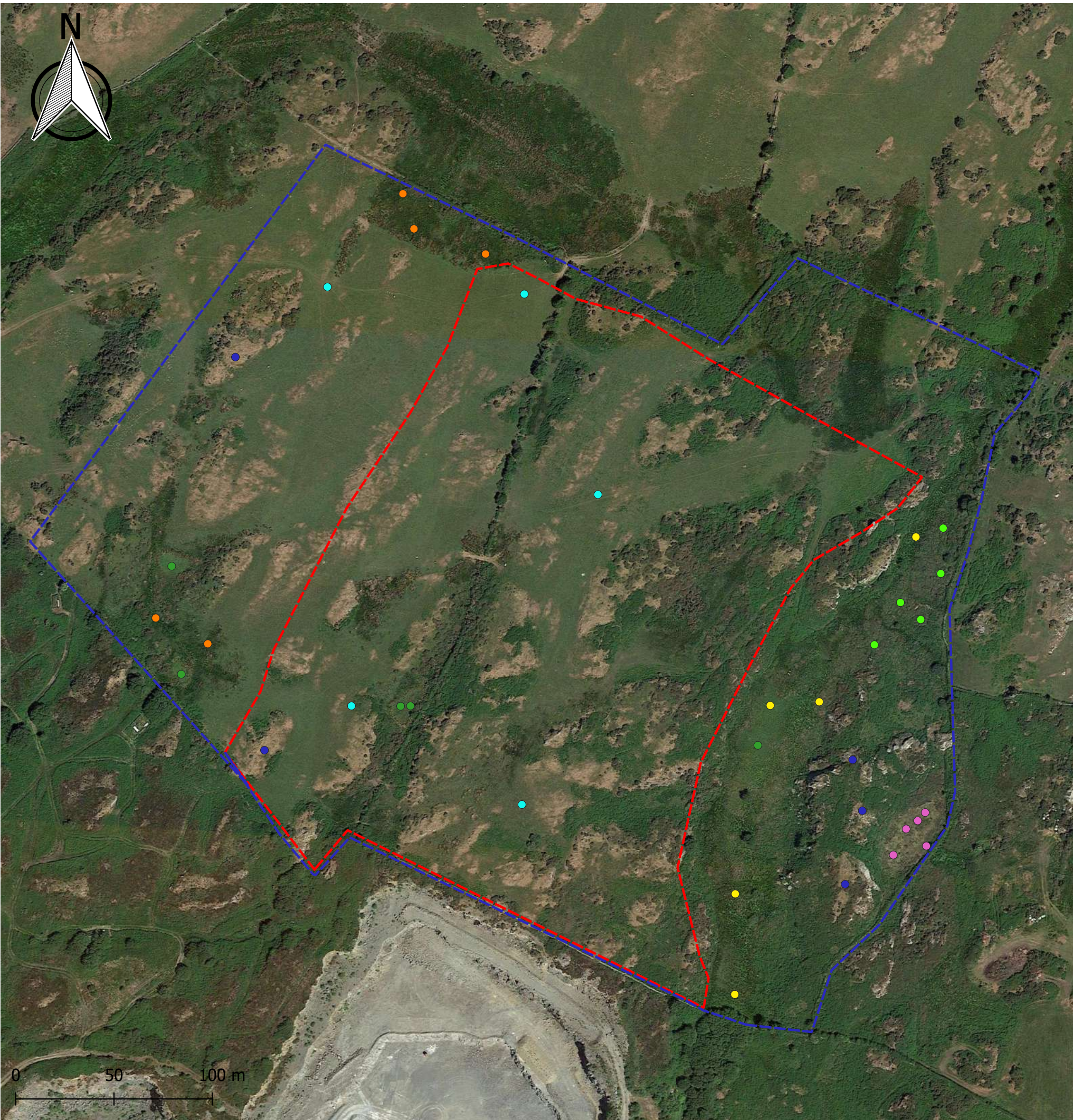
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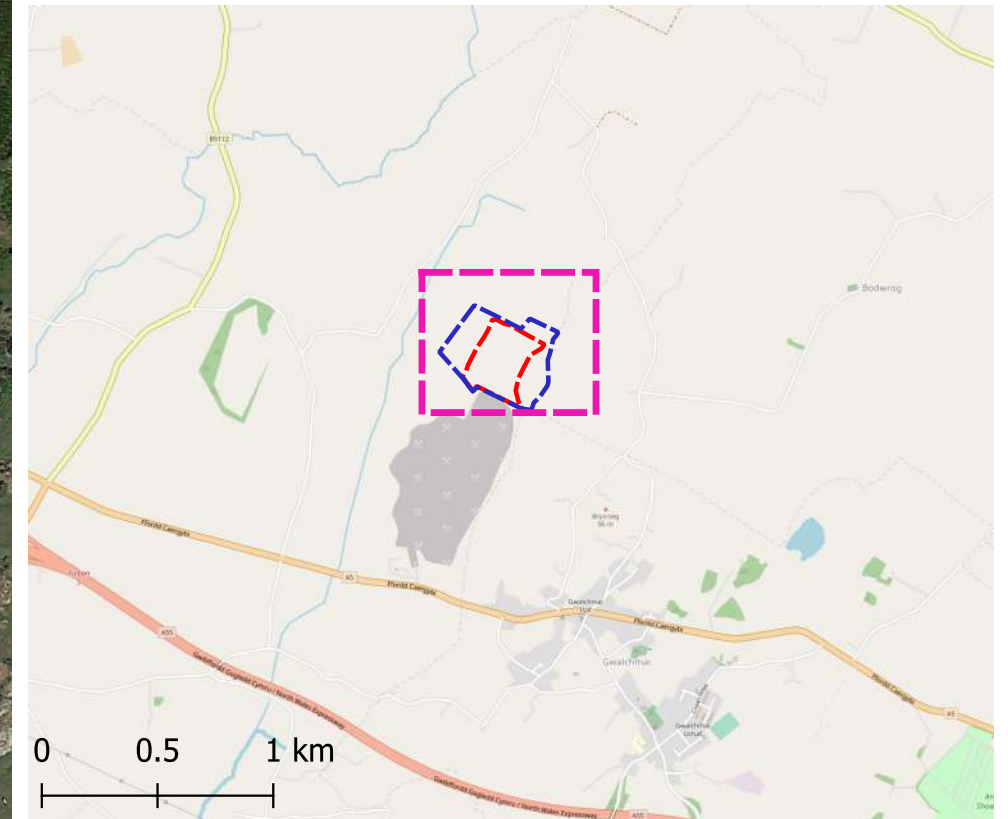


Appendix 5 – NVC survey plan



NVC Survey Quadrat Locations

**Site: Cae'r Glaw Quarry
 Extension Area**
NGR: SH 38485 77366
Author: Tom Kenwright
Date: 12/07/2021



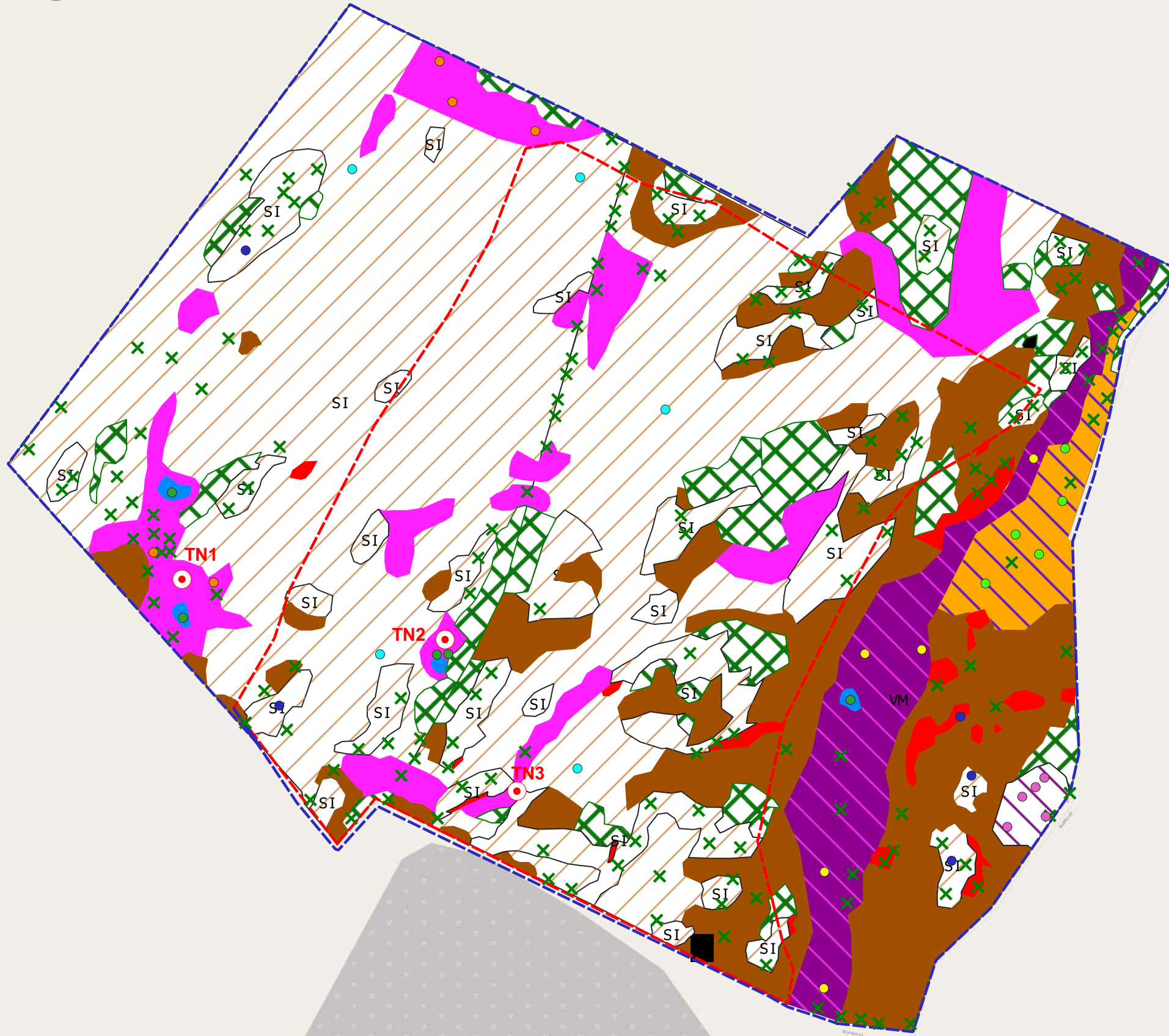
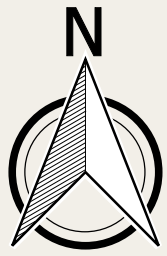
KEY:

- | | |
|--|--------------------------------------|
| A2.1 - Scrub - dense/continuous | Development boundary |
| A2.2 - Scrub - scattered | Survey boundary |
| B1.2 - Semi-improved acid grassland | Target Notes |
| B5 - Marsh/marshy grassland | Acidic / neutral flush quadrat |
| C1.1 - Continuous bracken | Modified bog quadrat |
| E1.8 - Dry modified bog | Molinia marshy grassland quadrat |
| E2.1 - Neutral / acidic flush | Rocky outcrop acid grassland quadrat |
| E3.1 - Fen - valley mire | Sheep-grazed acid grassland quadrat |
| G1 - Standing water | Standing water quadrat |
| I1.4.1 - Other exposure - acid/neutral | Valley mire quadrat |
| J2.5 - Wall | |

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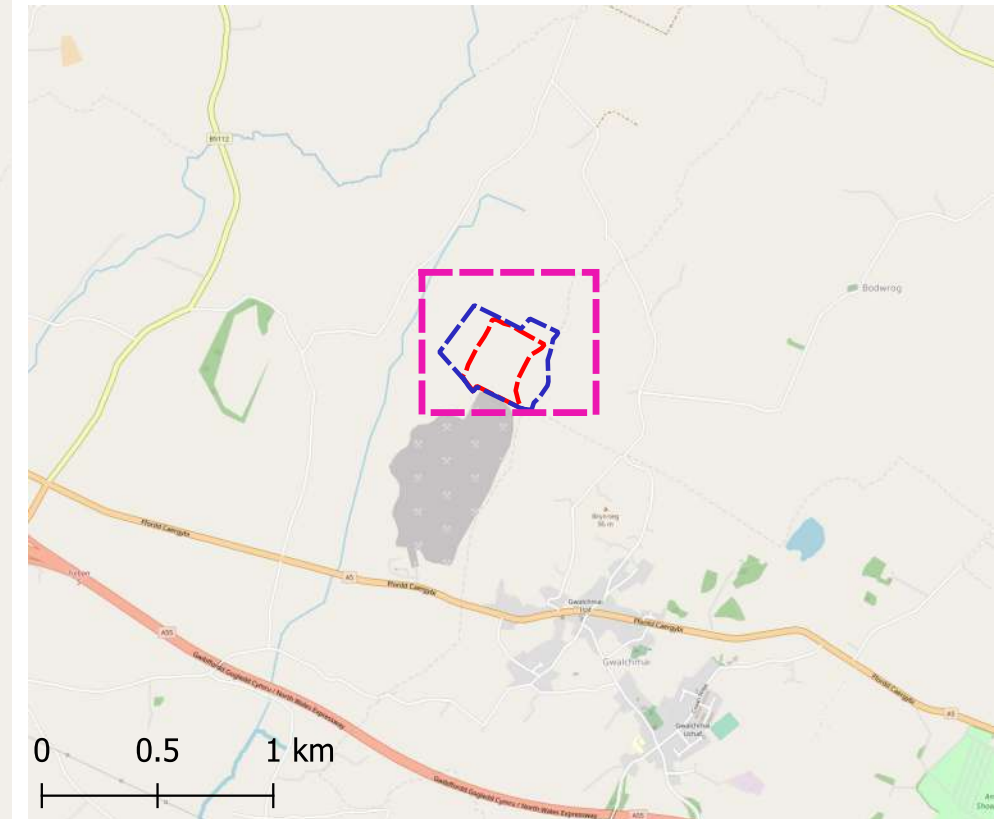
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NVC Survey Quadrat Locations

**Site: Cae'r Glaw Quarry
Extension Area**
NGR: SH 38485 77366
Author: Tom Kenwright
Date: 12/07/2021



KEY:

- | | |
|--|--------------------------------------|
| A2.1 - Scrub - dense/continuous | Development boundary |
| A2.2 - Scrub - scattered | Survey boundary |
| B1.2 - Semi-improved acid grassland | Target Notes |
| B5 - Marsh/marshy grassland | Acidic / neutral flush quadrat |
| C1.1 - Continuous bracken | Modified bog quadrat |
| E1.8 - Dry modified bog | Molinia marshy grassland quadrat |
| E2.1 - Neutral / acidic flush | Rocky outcrop acid grassland quadrat |
| E3.1 - Fen - valley mire | Sheep-grazed acid grassland quadrat |
| G1 - Standing water | Standing water quadrat |
| I1.4.1 - Other exposure - acid/neutral | Valley mire quadrat |
| J2.5 - Wall | |

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Appendix 6 – NVC survey results

Sheep-grazed grassland (MG6b)

Survey Date: 12/07/2021
 Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Lolium perenne</i>	Perennial rye-grass	7	5	5	4	7	100.0	V	Constant
<i>Holcus lanatus</i>	Yorkshire fog	7	7	8	6	7	100.0	V	Constant
<i>Trifolium repens</i>	White clover	5	4	4	6	4	100.0	V	Constant
<i>Poa humilis</i>	Spreading meadow-grass	4	3	4	4	4	100.0	V	Constant
<i>Cynosurus cristatus</i>	Crested dog's-tail	2	5	2	2	4	100.0	V	Constant
<i>Agrostis capillaris</i>	Common bent	2	4	4	5	4	100.0	V	Constant
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	1	1	5	5	4	100.0	V	Constant
<i>Cirsium arvense</i>	Creeping thistle	5	5	2		1	80.0	IV	Constant
<i>Cerastium fontanum</i>	Common mouse-ear	4	3	2		4	80.0	IV	Constant
<i>Ranunculus repens</i>	Creeping buttercup	2	3	3		2	80.0	IV	Constant
<i>Rumex acetosella</i>	Sheep's sorrel				1	1	40.0	II	Occasional
<i>Carex binervis</i>	Green-ribbed sedge				1		20.0	I	Scarce
<i>Potentilla erecta</i>	Tormentil				4		20.0	I	Scarce
<i>Cirsium palustre</i>	Marsh thistle				1		20.0	I	Scarce
<i>Festuca ovina</i>	Sheep's fescue				4		20.0	I	Scarce
<i>Achillea millefolium</i>	Yarrow					2	20.0	I	Scarce

Additional Species recorded outside of quadrats

Latin name	Common name
<i>Veronica chamaedrys</i>	Germander speedwell
<i>Lotus corniculatus</i>	Common bird's-foot trefoil
<i>Luzula multiflora</i>	Heath wood-rush
<i>Trifolium dubium</i>	Lesser trefoil
<i>Hypochaeris radicata</i>	Common cat's-ear
<i>Jacobaea vulgaris</i>	Common ragwort
<i>Viola riviniana</i>	Common dog-violet
<i>Stellaria media</i>	Common chickweed
<i>Urtica dioica</i>	Common nettle
<i>Conopodium majus</i>	Pignut

Rocky outcrop grassland (U1 & U4)

Survey Date: 12/07/2021
 Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Agrostis capillaris</i>	Common bent	8	5	5	4	4	100.0	V	Constant
<i>Poa humilis</i>	Spreading meadow-grass	4	4	4	2	1	100.0	V	Constant
<i>Festuca ovina</i>	Sheep's fescue	4	5	7	4	7	100.0	V	Constant
<i>Rumex acetosella</i>	Sheep's sorrel	2	7	5	3	2	100.0	V	Constant
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	2	1	4	5	5	100.0	V	Constant
<i>Sedum anglicum</i>	English stonecrop	4	3	5	6	5	100.0	V	Constant
<i>Holcus lanatus</i>	Yorkshire fog	4		2	2	2	80.0	IV	Constant
	Bare rock		4	5	6	4	80.0	IV	Constant
<i>Polytrichum sp.</i>	Polytrichum moss		5	5	4	2	80.0	IV	Constant
<i>Bryophyta sp.</i>	Mosses		4	5	5	5	80.0	IV	Constant
<i>Lolium perenne</i>	Perennial rye-grass	2		2			40.0	II	Occasional
<i>Cirsium vulgare</i>	Spear thistle	1			1		40.0	II	Occasional
<i>Cladonia sp.</i>	Cladonia lichen			5		3	40.0	II	Occasional
<i>Cerastium fontanum</i>	Common mouse-ear	2					20.0	I	Scarce
<i>Poa annua</i>	Annual meadow-grass		1				20.0	I	Scarce
<i>Ulex gallii</i>	Western gorse				2		20.0	I	Scarce
<i>Calluna vulgaris</i>	Common heather					4	20.0	I	Scarce
<i>Erica cinerea</i>	Bell heather					4	20.0	I	Scarce

Additional Species recorded outside of quadrats

Latin name	Common name
<i>Galium saxatile</i>	Heath bedstraw
<i>Carex binervis</i>	Green-ribbed sedge
<i>Digitalis purpurea</i>	Foxglove
<i>Polygala serpyllifolia</i>	Heath milkwort
<i>Trifolium repens</i>	White clover
<i>Ulex europaeus</i>	European gorse

Molinia marshy grassland (M25)

Survey Date: 12/07/2021

Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Molinia caerulea</i>	Purple moor-grass	8	5	10	7	7	100.0	V	Constant
<i>Luzula multiflora</i>	Heath wood-rush	2	2	1	2	2	100.0	V	Constant
<i>Potentilla erecta</i>	Tormentil	2	2	3	4	2	100.0	V	Constant
<i>Carex hostiana</i>	Tawny sedge	4		2	3	5	80.0	IV	Constant
<i>Carex pulicaris</i>	Flea sedge	4		1	2	2	80.0	IV	Constant
<i>Anthoxanthum oderatum</i>	Sweet vernal-grass	4	4		5	4	80.0	IV	Constant
<i>Carex panicea</i>	Carnation sedge	1		1	4	4	80.0	IV	Constant
<i>Lotus pedunculatus</i>	Greater bird's-foot trefoil	2	5		3	1	80.0	IV	Constant
<i>Juncus acutiflorus</i>	Sharp-flowered rush		5	4	5	4	80.0	IV	Constant
<i>Ulex gallii</i>	Western gorse		2		4	4	60.0	III	Frequent
<i>Erica tetralix</i>	Cross-leaved heath			4	4	2	60.0	III	Frequent
<i>Poa trivialis</i>	Rough meadow-grass	2	4				40.0	II	Occasional
<i>Salix repens</i>	Creeping willow	1		2			40.0	II	Occasional
<i>Cirsium palustre</i>	Marsh thistle	1	1				40.0	II	Occasional
<i>Juncus effusus</i>	Soft rush	4	2				40.0	II	Occasional
<i>Holcus lanatus</i>	Yorkshire fog	2	4				40.0	II	Occasional
<i>Sphagnum sp.</i>	Sphagnum moss			2		2	40.0	II	Occasional
<i>Carex demissa</i>	Common yellow sedge			2		1	40.0	II	Occasional
<i>Festuca ovina</i>	Sheep's fescue	4					20.0	I	Scarce
<i>Cynosurus cristatus</i>	Crested dog's-tail	2					20.0	I	Scarce
<i>Poa humilis</i>	Spreading meadow-grass	1					20.0	I	Scarce
<i>Juncus conglomeratus</i>	Compact rush		6				20.0	I	Scarce
<i>Calluna vulgaris</i>	Common heather		4				20.0	I	Scarce
<i>Dryopteris carthusiana</i>	Narrow buckler-fern		2				20.0	I	Scarce
<i>Galium palustre</i>	Marsh bedstraw		2				20.0	I	Scarce
<i>Epilobium palustre</i>	Marsh willowherb		1				20.0	I	Scarce
<i>Agrostis capillaris</i>	Common bent		2				20.0	I	Scarce
<i>Viola palustris</i>	Marsh violet		2				20.0	I	Scarce
<i>Carex flacca</i>	Glaucous sedge			2			20.0	I	Scarce
<i>Digitalis purpurea</i>	Foxglove				1		20.0	I	Scarce

Additional Species recorded outside of quadrats

Latin name	Common name
<i>Crataegus monogyna</i>	Hawthorn
<i>Rubus fruticosus agg.</i>	Bramble
<i>Narthecium ossifragum</i>	Bog asphodel
<i>Dactylorhiza maculata</i>	Heath spotted-orchid

Modified bog (M29)

Survey Date: 12/07/2021
 Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Sphagnum sp.</i>	Sphagnum moss	8	5	4	4	3	100.0	V	Constant
<i>Eriophorum angustifolium</i>	Common cotton-grass	5	4	8	4	3	100.0	V	Constant
<i>Menyanthes trifoliata</i>	Bogbean	4	5	2	5	1	100.0	V	Constant
<i>Carex rostrata</i>	Bottle sedge	1	1	1	1	1	100.0	V	Constant
<i>Hypericum elodes</i>	Marsh St John's-wort	4	4	6		8	80.0	IV	Constant
<i>Agrostis stolonifera</i>	Creeping bent	3		2	2	1	80.0	IV	Constant
<i>Erica tetralix</i>	Cross-leaved heath		4	1	5	1	80.0	IV	Constant
<i>Molinia caerulea</i>	Purple moor-grass		4	1	5	1	80.0	IV	Constant
<i>Carex nigra</i>	Common sedge	1	2			3	60.0	III	Frequent
<i>Deschampsia cespitosa</i>	Tufted hair-grass			1	2	4	60.0	III	Frequent
<i>Juncus effusus</i>	Soft rush	5	2				40.0	II	Occasional
<i>Polytrichum sp.</i>	Polytrichum moss	4			5		40.0	II	Occasional
<i>Carex echinata</i>	Star sedge	4				1	40.0	II	Occasional
<i>Epilobium palustre</i>	Marsh willowherb	2	2				40.0	II	Occasional
<i>Narthecium ossifragum</i>	Bog asphodel		1		3		40.0	II	Occasional
<i>Potamogeton polygonifolius</i>	Bog pondweed		2			5	40.0	II	Occasional
<i>Galium palustre</i>	Marsh bedstraw			1		1	40.0	II	Occasional
<i>Eleocharis multicaulis</i>	Many-stalked spike-rush			1	3		40.0	II	Occasional
<i>Ulex gallii</i>	Western gorse			1			20.0	I	Scarce
<i>Comarum palustre</i>	Marsh cinquefoil					4	20.0	I	Scarce

Additional Species recorded outside of quadrats

Latin name	Common name
<i>Salix repens</i>	Creeping willow
<i>Potentilla erecta</i>	Tormentil
<i>Luzula multiflora</i>	Heath wood rush
<i>Juncus conglomeratus</i>	Compact rush
<i>Viola palustris</i>	Marsh violet
<i>Juncus acutiflorus</i>	Sharp-flowered rush

Neutral / acidic flush (M23)

Survey Date: 12/07/2021
 Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Holcus lanatus</i>	Yorkshire fog	5	5	5	5	6	100.0	V	Constant
<i>Agrostis stolonifera</i>	Creeping bent	4	2	3	2	2	100.0	V	Constant
<i>Juncus acutiflorus</i>	Sharp-flowered rush	8	8	7	6	8	100.0	V	Constant
<i>Juncus conglomeratus</i>	Compact rush	2	1	5	6	2	100.0	V	Constant
<i>Lotus pedunculatus</i>	Greater bird's-foot trefoil	4	4	5	4	3	100.0	V	Constant
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	4	2	3	1	3	100.0	V	Constant
<i>Poa trivialis</i>	Rough meadow-grass	2	2	2	1	1	100.0	V	Constant
<i>Deschampsia cespitosa</i>	Tufted hair-grass	2	4	2	3	4	100.0	V	Constant
<i>Galium palustre</i>	Marsh bedstraw	1	1		5		60.0	III	Frequent
<i>Holcus mollis</i>	Creeping soft-grass		1	2	1		60.0	III	Frequent
<i>Cirsium palustre</i>	Marsh thistle			1	3	1	60.0	III	Frequent
<i>Juncus effusus</i>	Soft rush	2			4		40.0	II	Occasional
<i>Stellaria alsine</i>	Bog stitchwort			3	3		40.0	II	Occasional
<i>Luzula multiflora</i>	Heath wood-rush			1		1	40.0	II	Occasional
<i>Ranunculus flammula</i>	Lesser spearwort		3				20.0	I	Scarce
<i>Silene flos-cuculi</i>	Ragged robin				2		20.0	I	Scarce
<i>Carex leporina</i>	Oval sedge				1		20.0	I	Scarce
<i>Carex hostiana</i>	Tawny sedge					2	20.0	I	Scarce
<i>Ranunculus acris</i>	Meadow buttercup					1	20.0	I	Scarce
<i>Potentilla erecta</i>	Tormentil					2	20.0	I	Scarce
<i>Carex pulicaris</i>	Flea sedge					1	20.0	I	Scarce

Additional Species recorded outside of quadrats

Latin name	Common name
<i>Carex panicea</i>	Carnation sedge
<i>Carex flacca</i>	Glaucous sedge
<i>Carex demissa</i>	Common yellow sedge
<i>Hydrocotyle vulgaris</i>	Marsh pennywort
<i>Prunella vulgaris</i>	Self-heal
<i>Juncus bulbosus</i>	Bulbous rush
<i>Epilobium palustre</i>	Marsh willowherb
<i>Myosotis secunda</i>	Creeping forget-me-not
<i>Mentha aquatica</i>	Water mint
<i>Comarum palustre</i>	Marsh cinquefoil
<i>Veronica scutellata</i>	Marsh speedwell
<i>Menyanthes trifoliata</i>	Bogbean
<i>Narthecium ossifragum</i>	Bog asphodel
<i>Danthonia decumbens</i>	Heath-grass
<i>Dactylorhiza maculata</i>	Heath spotted-orchid
<i>Achillea ptarmica</i>	Sneezewort
<i>Eleocharis palustris</i>	Common spike-rush
<i>Potamogeton polygonifolius</i>	Bog pondweed
<i>Isolepis fluitans</i>	Floating club-rush

Valley mire (M23)

Survey Date: 12/07/2021
 Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Juncus effusus</i>	Soft rush	8	6	5	6	5	100.0	V	Constant
<i>Epilobium palustre</i>	Marsh willowherb	2	3	1	3	1	100.0	V	Constant
<i>Lotus pedunculatus</i>	Greater bird's-foot trefoil	2	5	2	4	4	100.0	V	Constant
<i>Galium palustre</i>	Marsh bedstraw	4	4	2	3	4	100.0	V	Constant
<i>Silene flos-cuculi</i>	Ragged robin	2	1	2	3	4	100.0	V	Constant
<i>Stellaria alsine</i>	Bog stitchwort	4	4	1	3	2	100.0	V	Constant
<i>Poa trivialis</i>	Rough meadow-grass	4	5	5	4	5	100.0	V	Constant
<i>Juncus acutiflorus</i>	Sharp-flowered rush	3	4	5	5	5	100.0	V	Constant
<i>Agrostis stolonifera</i>	Creeping bent	1	4	4	2	1	100.0	V	Constant
<i>Cardamine pratensis</i>	Cuckoo flower	1		3	3	2	80.0	IV	Constant
<i>Caltha palustris</i>	Marsh marigold	3	1		1	2	80.0	IV	Constant
<i>Cirsium palustre</i>	Marsh thistle	1	1	1	1		80.0	IV	Constant
<i>Carex nigra</i>	Common sedge		1	2	2	2	80.0	IV	Constant
<i>Holcus lanatus</i>	Yorkshire fog		4	5	5	5	80.0	IV	Constant
<i>Mentha aquatica</i>	Water mint	4	3			1	60.0	III	Frequent
<i>Ranunculus repens</i>	Creeping buttercup	2	2			1	60.0	III	Frequent
<i>Anthoxanthum odoratum</i>	Sweet vernal grass		1	5	2		60.0	III	Frequent
<i>Comarum palustre</i>	Marsh cinquefoil			3	2	4	60.0	III	Frequent
<i>Equisetum fluviatile</i>	Water horsetail	1	1				40.0	II	Occasional
<i>Myosotis secunda</i>	Creeping forget-me-not		4		2		40.0	II	Occasional
<i>Veronica scutellata</i>	Marsh speedwell		2		1		40.0	II	Occasional
<i>Eleocharis palustris</i>	Common spike-rush		2		2		40.0	II	Occasional
<i>Epilobium hirsutum</i>	Greater willowherb	2					20.0	I	Scarce
<i>Molinia caerulea</i>	Purple moor-grass			5			20.0	I	Scarce
<i>Luzula multiflora</i>	Heath wood-rush			1			20.0	I	Scarce
<i>Carex echinata</i>	Star sedge					2	20.0	I	Scarce
<i>Eriophorum angustifolium</i>	Common cotton-grass					1	20.0	I	Scarce
<i>Festuca rubra</i>	Red fescue					4	20.0	I	Scarce

Additional Species recorded outside of quadrats

Latin name	Common name
<i>Carex pulicaris</i>	Flea sedge
<i>Carex leporina</i>	Oval sedge
<i>Carex panicea</i>	Carnation sedge
<i>Carex flacca</i>	Glaucous sedge
<i>Deschampsia cespitosa</i>	Tufted hair-grass
<i>Glechoma hederacea</i>	Ground ivy
<i>Lysimachia nemorum</i>	Yellow pimpernel
<i>Ajuga reptans</i>	Bugle
<i>Hypericum elodes</i>	Marsh St John's-wort
<i>Isolepis fluitans</i>	Floating club-rush
<i>Menyanthes trifoliata</i>	Bogbean
<i>Glyceria fluitans</i>	Floating sweet grass
<i>Alopecurus geniculatus</i>	Marsh foxtail
<i>Cardamine flexuosa</i>	Wavy bittercress
<i>Ranunculus flammula</i>	Lesser spearwort
<i>Equisetum palustre</i>	Marsh horsetail
<i>Callitriche sp.</i>	Water starwort
<i>Angelica sylvestris</i>	Wild angelica
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Carex hostiana</i>	Tawny sedge
<i>Hydrocotyle vulgaris</i>	Marsh pennywort
<i>Jacobaea aquatica</i>	Marsh ragwort
<i>Ranunculus acris</i>	Meadow buttercup
<i>Juncus conglomeratus</i>	Compact rush
<i>Carex disticha</i>	Brown sedge
<i>Cerastium fontanum</i>	Common mouse-ear

Standing water (M23 & M29)

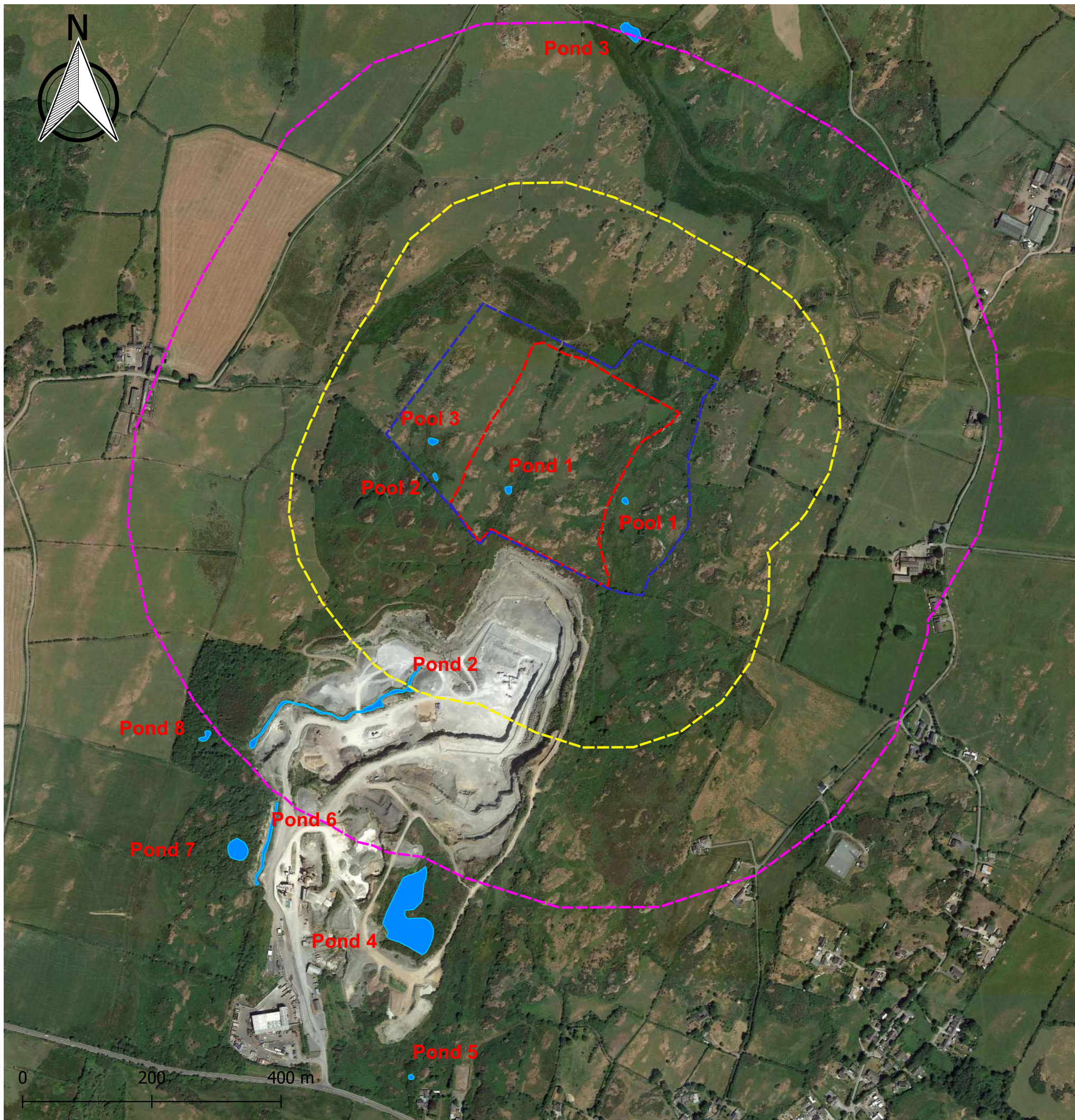
Survey Date: 12/07/2021

Sample area (Metres): 2x2

Latin name	Common name	DOMIN score					Frequency (%)	Frequency (score)	Frequency (description)
		1	2	3	4	5			
<i>Menyanthes trifoliata</i>	Bogbean	8	5	7	7	8	100.0	V	Constant
<i>Juncus acutiflorus</i>	Sharp-flowered rush	3	4	5	4	1	100.0	V	Constant
<i>Galium palustre</i>	Marsh bedstraw	2	4	3	2	3	100.0	V	Constant
<i>Veronica scutellata</i>	Marsh speedwell	1	3	3	3	1	100.0	V	Constant
<i>Isolepis fluitans</i>	Floating club-rush	5	4	5		5	80.0	IV	Constant
<i>Glyceria fluitans</i>	Floating sweet-grass	4	6	4	7		80.0	IV	Constant
<i>Ranunculus flammula</i>	Lesser spearwort	2	2	4		2	80.0	IV	Constant
<i>Potamogeton polygonifolius</i>	Bog pondweed	5	6	2			60.0	III	Frequent
<i>Juncus effusus</i>	Soft rush	5		2		6	60.0	III	Frequent
<i>Hypericum elodes</i>	Marsh St John's-wort	1	2			4	60.0	III	Frequent
<i>Agrostis stolonifera</i>	Creeping bent		2		2	2	60.0	III	Frequent
<i>Comarum palustre</i>	Marsh cinquefoil		2	1		4	60.0	III	Frequent
<i>Myosotis secunda</i>	Creeping forget-me-not			2	3	2	60.0	III	Frequent
<i>Lotus pedunculatus</i>	Great bird's-foot trefoil			2		4	40.0	II	Occasional
<i>Poa trivialis</i>	Rough meadow-grass				1	4	40.0	II	Occasional
<i>Sphagnum sp.</i>	Sphagnum moss		2				20.0	I	Scarce
<i>Epilobium palustre</i>	Marsh willowherb					3	20.0	I	Scarce
<i>Silene flos-cuculi</i>	Ragged robin					3	20.0	I	Scarce
<i>Stellaria alsine</i>	Bog stitchwort					3	20.0	I	Scarce
<i>Cardamine pratensis</i>	Cuckoo flower					2	20.0	I	Scarce
<i>Caltha palustris</i>	Marsh marigold					1	20.0	I	Scarce
<i>Carex nigra</i>	Common sedge					1	20.0	I	Scarce
<i>Holcus lanatus</i>	Yorkshire fog					2	20.0	I	Scarce
<i>Eleocharis palustris</i>	Common spike-rush					1	20.0	I	Scarce

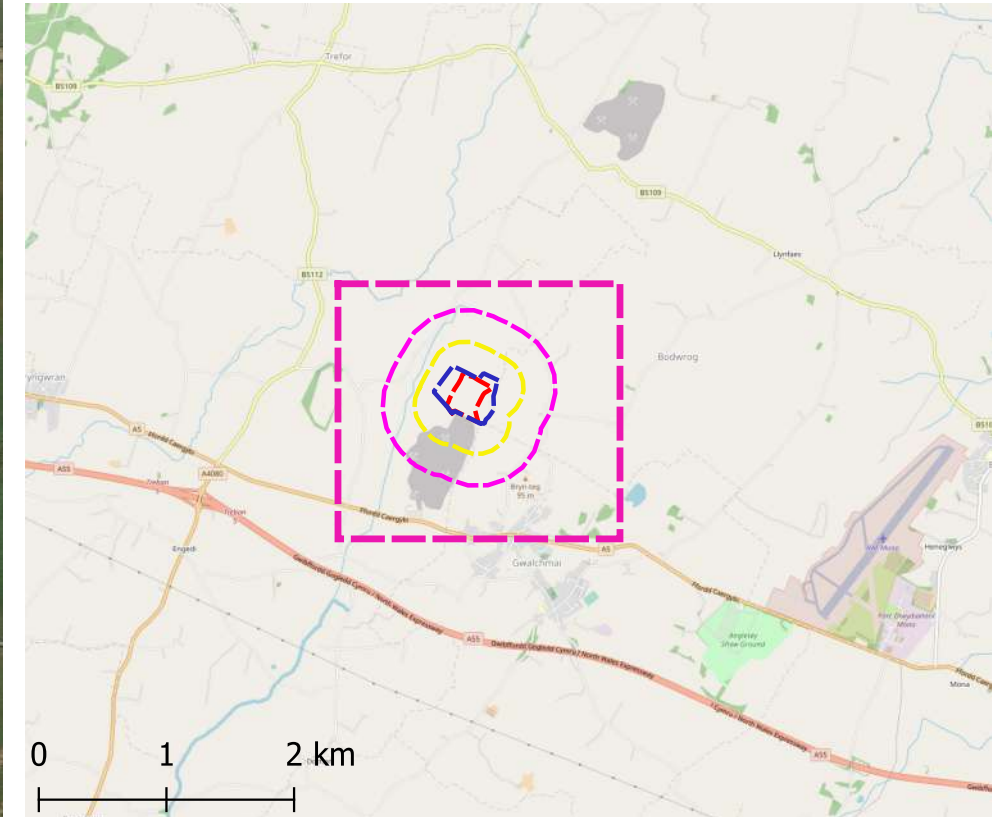


Appendix 7 – Pond plan



Pond Plan

Site: Cae'r Glaw Quarry -
Proposed Extension Area
NGR: SH 38512 77319
Author: Tom Kenwright
Date: 01/11/2022



KEY:

- Development boundary
- Survey boundary
- 250m buffer zone
- 500m buffer zone
- Pond / pool

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Appendix 8 – GCN HSI results

GCN HSI Calculations

	Pond number	P1	P2	P3
	Grid reference	SH3840977315	SH3820177007	SH3864278033
SI number	SI description	SI values		
1	Geographic location	0.5	0.5	0.5
2	Pond area	0.2	0.85	1
3	Pond permanence	0.1	0.9	0.9
4	Water quality	0.67	0.33	0.67
5	Shade	1	1	1
6	Water fowl	0.67	0.67	0.67
7	Fish	1	0.01	0.67
8	Pond density	0.9	0.9	0.9
9	Terrestrial habitat	1	0.33	1
10	Macrophyte cover	0.8	0.5	0.9
HSI score:		0.56	0.41	0.80
Pond suitability:		Below average	Poor	Excellent

HSI Score	Pond Suitability
< 0.50	Poor
0.50 - 0.59	Below average
0.60 - 0.69	Average
0.70 - 0.79	Good
> 0.80	Excellent



Appendix 9 – GCN eDNA survey results

Folio No: E11380
Report No: 1
Purchase Order: UES02936
Client: UNITED ENVIRONMENTAL
SERVICES LTD
Contact: Alasdair Grubb

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (*TRITURUS CRISTATUS*)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 01/07/2021
Date Reported: 13/07/2021
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1824	Pond 1 Cae'r Glaw Extension	SH 38420 77328	Pass	Pass	Pass	Positive	3

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Chris Troth



METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

- SIC:** **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
- DC:** **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
- IC:** **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
- Result:** **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



Folio No: E10117
Report No: 1
Purchase Order: UESO2936
Client: UNITED ENVIRONMENTAL
SERVICES LTD
Contact: Jenny Gibbs

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (*TRITURUS CRISTATUS*)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 09/05/2021
Date Reported: 20/05/2021
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1954	OFFSITE POND 1	SH 384773	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Chris Troth



METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

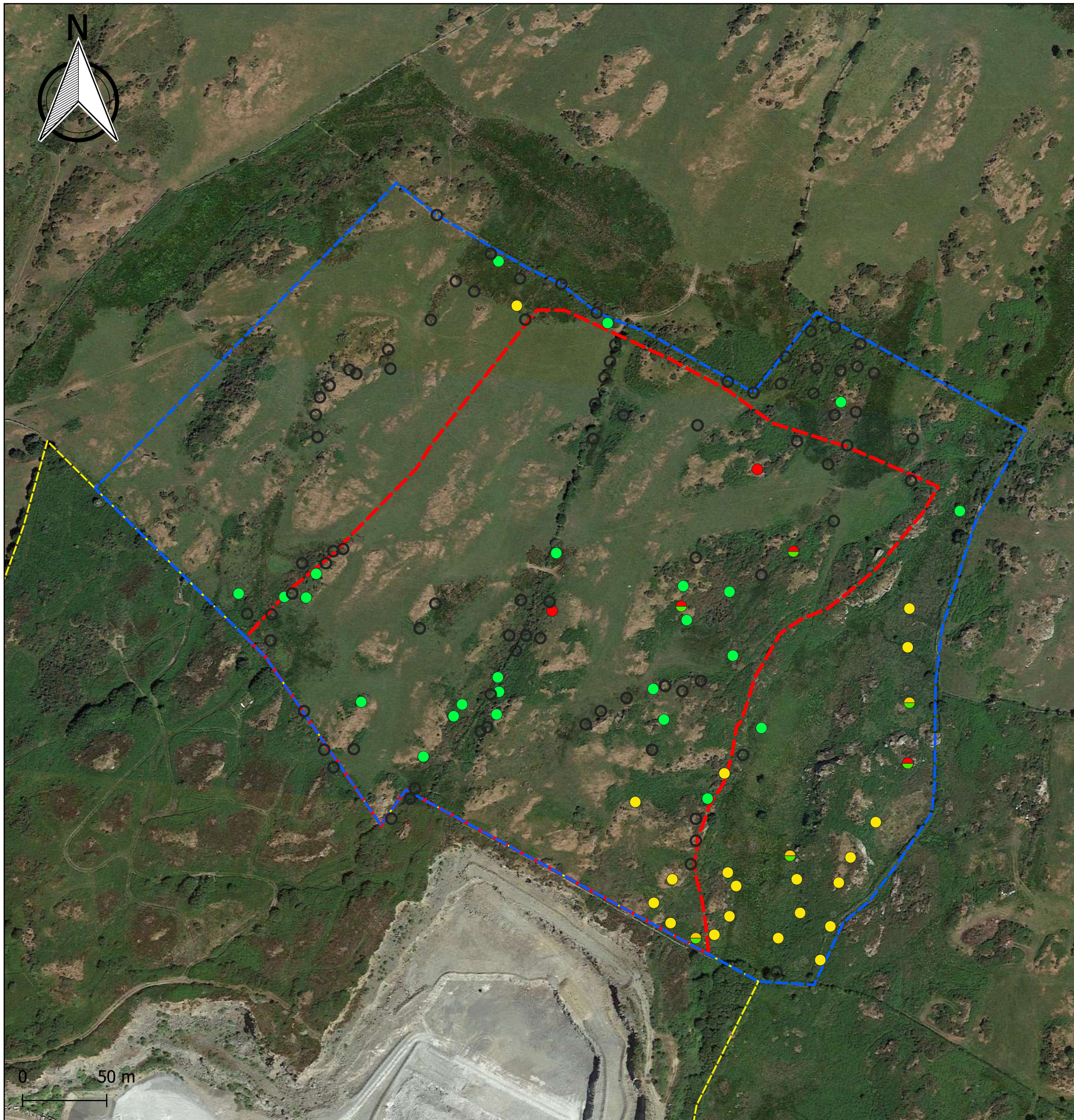
INTERPRETATION OF RESULTS

- SIC:** **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
- DC:** **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
- IC:** **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
- Result:** **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



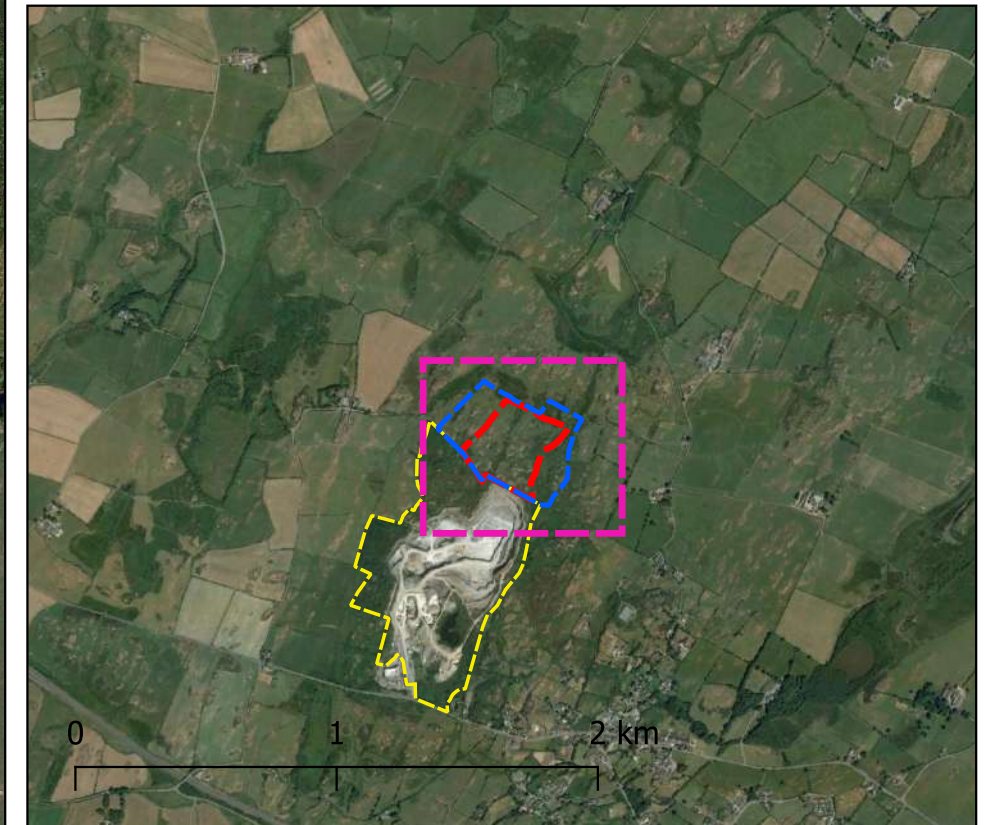


Appendix 10 – Reptile survey plan and results






Site Plan







Site: Gwalchmai Quarry
 NGR: SH 38485 77366
 Author: Alasdair Grubb
 Date: 01/11/2022



KEY:

-  Development boundary
-  Survey boundary
-  Existing quarry site boundary

Survey sheet locations

-  No results
-  Adder
-  Common lizard
-  Adder & Common lizard
-  Slow worm & Common lizard
-  Slow worm

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Appendix 11 – Invertebrate survey results

Cae'r Glaw Quarry Gwalchmai Anglesey

Report on a scoping survey of proposed extension
for terrestrial invertebrates

Commissioned by
United Environmental Services

Dr Keith N A Alexander CEnv, MCIEEM

July 2021

SUMMARY

A walkover survey of an area of land adjoining Cae'r Glaw Quarry in July 2021 aimed to:

- identify presence or potential presence of valuable assemblages and/or species of special interest; and
- identify where further targeted survey work might be required.

The land is an area of granite geology with a complex mosaic of heathy rocky knolls and mostly acid herb-poor grassland with a large valley mire and a small pocket of basin mire in the east of the site. There are also areas of flushed marshy grassland towards the northern and western boundaries. It is divided into two units by a drystone wall which is lined in places by thorn scrub and patches of willow scrub occur locally elsewhere. Although clearly subject to sheep grazing in the recent past, no signs of grazing in the current year were apparent and the marshy grasslands were notably rank and bracken and bramble growth was found to be widespread on drier ground.

The site was found to support invertebrate species characteristic of lowland heathland on granite geology in the damper climate of western Britain. Three to four hours spent on site searching resulted in 70 species of invertebrate identified to genus or species level. Two of these – grayling butterfly *Hipparchia semele* and the rove beetle *Stenus europaeus* – have conservation status, the former listed under Section 7 of the Environment (Wales) Act (EWA) 2016 and assessed as Vulnerable at a UK level and the latter Nationally Scarce. The former was found to be plentiful on the heathy granite knolls while the latter was only found in the small basin mire. A good range of other nationally uncommon and very localised species were also found including the money spider *Araeoncus crassiceps* in the basin mire, marsh whorl snail *Vertigo antivertigo* in the valley mire, the minute bladder bug *Myrmedobia exilis* on the heathy knolls, and the grass bug *Teratocoris viridis* in the flushed marshy grasslands. Such a range of interesting species across the more semi-natural habitats of the area suggests a good quality site of moderate to high conservation interest.

Analysis of this fauna using Natural England's Pantheon database generated an assessment of below SSSI quality. Lowland heathland is however a localised habitat type which has become increasingly scarce in recent decades and is especially threatened at inland localities. Comparable sites have become very scarce on Anglesey, and so the site has been assessed as of significant conservation value although less than county (Anglesey) significance.

It is recommended that this exploratory survey is adequate for the purposes of site assessment for invertebrates. No further survey appears warranted.

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1 INTRODUCTION

1.1 Background

This document reports on a scoping survey of the invertebrate assemblages of an area of land adjoining Cae'r Glaw Quarry on Anglesey and which is proposed for extension to the quarry.

The land is an area of granite geology with a complex mosaic of heathy rocky knolls and mostly acid herb-poor grassland with a large valley mire and a small pocket of basin mire in the east of the site. There are also areas of flushed marshy grassland towards the northern and western boundaries. It is divided into two units by a drystone wall which is lined in places by thorn scrub and patches of willow scrub occur locally elsewhere. Although clearly subject to sheep grazing in the recent past, no signs of grazing in the current year were apparent and the marshy grasslands were notably rank and bracken and bramble growth was found to be widespread on drier ground.

The task for the 2021 invertebrate assessment was:

1. An invertebrate scoping survey to identify the presence of valuable communities and/or species of special interest
2. Provide a brief report detailing methodology, results (including the value of the invertebrate assemblages and any areas of particular interest), and recommendations for further survey (if required),

2 SURVEY METHODOLOGY

2.1 Survey strategy

Many invertebrates are highly seasonal in their availability for survey, having largely annual life cycles. Identification generally requires the availability of the adult stage, which can be as short as a matter of weeks within the field season, the precise time of year varying with the species. Ideally, therefore, assemblages should be sampled across a full season in order to detect as wide a variety of the resident species as possible and to generate a reliable assessment of site conservation value. A minimum of three visits is generally recommended, covering the late spring, high summer and autumnal activity peaks. However, single exploratory or scoping visits can be very instructive in determining whether or not this more detailed survey is warranted and identifying the habitats or features requiring more work. While such visits are best carried out during the main field season, visits at other times of year can still be very instructive.

2.2 General survey methodology

Surveying combined direct observation and hand-searching, supplemented by the use of a standard entomological sweep-net and a suction sampler. The techniques applied were as follows:

1. Direct observation:
 - Visual assessment of suitable features encountered during the walkover of the site;
 - Close inspection of potential invertebrate habitats and recording the presence of any species noted.
2. Hand-searching:
 - Examination of plant foliage for leaf-mines, galls, resting invertebrates, etc.
 - Searching amongst decaying wood and other debris, including looking beneath rocks, fallen wood, etc, lying on the ground.
3. Use of a standard entomological sweep-net to sample invertebrates present amongst the taller areas of field layer and from the accessible foliage of trees and shrubs.
4. Use of a domestic leaf sucker/blower machine with two-stroke engine to sample ground-living invertebrates amongst dense vegetation

These are amongst the standard techniques recommended in Drake et al (2007) for use in general site quality assessment and in particular Common Standards Monitoring on SSSIs.

2.3 Timing & weather conditions

The area was visited on the morning of 20th July 2021. Conditions were reasonable for invertebrate survey, although there had been some dew formed overnight which limited the use of the sweep-net. The temperature was around 25 degrees Centigrade, and this was following five or more similarly very warm and dry days and so the site was very dry overall. The 2021 field season had been very atypical with a cold and dry April followed by a wet and cold May, with temperatures not reaching typical summer figures until well into June. The invertebrate fauna may therefore be expected to be somewhat atypical in composition and abundance.

3 RESULTS & DISCUSSION

3.1 Overview and key habitats and species found

A total of 70 invertebrate species were noted during the site exploration. Although a relatively short list, this is judged to be fairly typical for the approach taken and for the habitats represented at this time of year.

Two of these – grayling butterfly *Hipparchia semele* and the rove beetle *Stenus europaeus* – have conservation status. Grayling is listed under Section 7 of the Environment (Wales) Act (EWA) 2016 and has recently been assessed as Vulnerable at a UK level (Fox et al, 2010). British populations have declined dramatically in the past ten years – between 30 and 49% - and especially at inland sites such as this. It was found to be plentiful on the heathy granite knolls. The rove beetle has Nationally Scarce status (Hyman, 1994) and was only found in the basin mire. A good range of other nationally uncommon and very localised species were also found including the

money spider *Araeoncus crassiceps* in the basin mire, marsh whorl snail *Vertigo antivertigo* in the valley mire, *Myrmedobia exilis* on the heathy knolls, and the plant bug *Teratocoris viridis* in the flushed marshy grasslands. Such a range of interesting species across the more semi-natural habitats of the area suggests a site of moderate conservation interest. The whorl snail has been identified as an indicator species of old wetland (Kerney & Stubbs, 1980).

The core grassland areas are semi-improved sheep pasture and of more limited value for invertebrates.

The species list has been analysed in terms of the Pantheon on-line database, a site assessment application which has been developed by Natural England as part of its work on common standards monitoring. The methodology is detailed in **NERR005 Surveying terrestrial and freshwater invertebrates for conservation evaluation** (Drake et al 2007). The species list does not achieve the quality expected of a site of SSSI quality. Site quality is clearly below national – GB - importance, which is no surprise for such a small and isolated site.

3.2 Wetland areas

The wetlands across the site have provided the greatest variety of invertebrates and the most interesting species. The one Nationally Scarce species, the rove beetle *Stenus europaeus*, was associated with the small basin mire together with the very local money spider *Araeoncus crassiceps*. The old wetland indicator species, marsh whorl snail *Vertigo antivertigo* was found in the much more extensive valley mire, while the uncommon grass bug *Teratocoris viridis* was found in the flushed marshy grassland of the western corner of the site. Such an interesting variety of wetland habitats within such a small area of land is a feature of significant interest.

3.2.1 Basin mire (SH386772)

This peaty bog hollow has characteristic mire vegetation with cotton grass *Eriophorum*, bog asphodel *Narthecium ossifragum*, marsh cinquefoil *Potentilla palustris* and marsh St John's wort *Hypericum elodes*. The site appears to be a high quality basin mire. Sampling here produced an example of the Nationally Scarce rove beetle *Stenus europaeus* and the very local money spider *Araeoncus crassiceps*. The rove beetle appears to be a specialist of long-established lowland peatlands – both fen and mire conditions. Although widespread in Ireland it has a very restricted distribution in Britain and is best known from the East Anglian fens; there are also clusters of records from lowland fen and mire situations in parts of Yorkshire, the new Forest and North Wales. The money spider is best known in Britain across Wales due to its favouring damper heathy conditions.

3.2.2 Valley mire (SH385773)

The valley mire forms a very extensive strip combining areas of rush pasture and marshy grassland with patches of *Molinia-Narthecium-Erica tetralix* mire. Current condition is however poor due to lack of appropriate grazing. The rush pasture and marshy grassland areas are very tall and rank and contain little or none of the open bare ground habitat that is favoured by invertebrates. However, a specimen of marsh

whorl snail *Vertigo antivertigo* provides a good indication of long-term site quality and suggests that the present poor condition may be a recent feature. Kerney (1999) comments that it is more or less restricted to lowland semi-natural wetlands and requires hydrological stability. Although there is no strong evidence for major national decline this species is becoming increasingly scarce in parts of its British range through habitat loss. Killeen (1992) commented that even in Suffolk it is the most severely of the genus affected by habitat loss.

A good range of other invertebrate species typical of mire and rush pasture situations were also found, including the semi-aquatic beetle *Chaetarthria simillima* and the ground beetle *Bembidion mannerheimii* and the ground spider *Clubiona stagnatilis*. Collectively the invertebrate fauna suggests a site of moderate quality.

3.2.3 Flushed marshy grassland (SH381773)

The third area of wetland habitat found to be of significant interest for invertebrates within the site lies in the westernmost corner, above a disused access track leading from Clegir Mawr farm. Flushed grassland alongside a small drainage line here includes such typical mesotrophic wetland herbs as water mint *Mentha aquatica*, marsh marigold *Caltha palustris* and sneezewort *Achillea ptarmica*. This area may be expected to support a rich assemblage of mesotrophic marsh invertebrates. One uncommon species was found on this occasion, the grass bug *Teratocoris viridis*. This has a predominantly northern distribution in Britain and is thought to feed on sedges. Another localised bug species, the grass-feeding rhopalid *Myrmus miriformis* was also present – this is associated with lush damp meadows as well as grass heath situations.

3.3 Heathy knolls

Small exposed rocky outcrops and especially the more extensive ridges provide the other key habitat feature of the site. These provide mosaic habitats of bare rock, lichen-rich ground, areas of stonecrop *Sedum anglicum* and fine dry grassland on thin soils, open heath of heather *Calluna vulgaris*, bell-heather *Erica cinerea* and western gorse *Ulex gallii*, as well as coarser thorn scrub on deeper soils. The more open vegetation appears to be being kept in good condition by rabbit grazing.

These areas provide valuable habitat for the GB Vulnerable butterfly, grayling *Hipparchia semele* which is listed under Section 7 of the Environment (Wales) Act (EWA) 2016. Grayling were present in good numbers across the site. Along with typical heathland weevils *Protopirapion atratum* and *Sitona striatellus* feeding on the western gorse, an especially interesting feature was the minute bladder bug *Myrmedobia exilis*. This is a species of mossy ground in open areas on acid or sandy soils where they feed on aphids. Although widespread in Britain there are notably few records – the females are flightless and so confined to sites with long-established suitable conditions. One spider of interest was also found, the agelenid *Araneus quadratus*, which is an uncommon species of undisturbed heaths and grasslands. The structural variety provided by the heathy areas has sufficient height and strength to support its large orb web. There are few records from Anglesey.

3.4 Old drystone walls

The other feature of particular potential interest for invertebrates are the patches of old hawthorn and blackthorn which line the field boundary walls in a few places. Old thorn scrub is always a valuable feature for invertebrates although on this particular occasion very little could be found in association. This is thought to be a reflection of the 2021 weather patterns rather than site quality as such trees are typically rich in epiphyte assemblages of invertebrates, notably barkflies (Psocodea) which are notoriously sensitive to both very wet and very dry conditions when they hide away and seem virtually impossible to find. The one feature of note found was tree snail *Balea sarsii* – this feeds on the epiphytic lichens encrusting tree bark in open sunny situations and is a feature of the western seaboard areas of Europe.

4 CONCLUSIONS & RECOMMENDATIONS

4.1 Features of significance

Overall, the study site supports a very characteristic invertebrate fauna for an area of lowland dwarf shrub heath and mire on undulating granite bedrock. Site quality appears moderate to high although the condition of the wetland vegetation was found to be poor due to inadequate grazing management. Similar habitat is widespread over much of western Britain although is steadily decreasing through degradation or destruction for more intensive farming and development or neglect resulting in domination by gorse, willow, bracken and bramble.

The associated invertebrate fauna includes one Section 7 (EWA 2016) species: grayling butterfly *Hipparchia semele* and one Nationally Scarce peatland rove beetle *Stenus europaeus*. Analysis of the fauna indicates site quality below national quality, but patches of lowland heath and mire such as this are under threat nationally. Few such heathy knolls now survive on Anglesey. The area is therefore assessed as being below Anglesey importance but more than just local significance for its invertebrate assemblages.

4.2 Further survey requirements

Additional survey time would undoubtedly increase the list of species known to be present on site considerably but the impression gained of site quality suggests that the overall assessment would be unlikely to change as a result of any additional work. Accordingly, no further survey work is recommended.

5 ACKNOWLEDGEMENTS

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APPENDIX 1 FULL LIST OF INVERTEBRATES NOTED IN JULY 2021

Group	Family	Species name	GB Status	
Araneae (spiders)	Agelenidae	<i>Araneus quadratus</i>		
	Clubionidae	<i>Cubiona stagnatilis</i>		
	Linyphiidae	<i>Araeoncus crassiceps</i>		
		<i>Bathyphantes approximatus</i>		
		<i>Microlinyphia pusilla</i>		
		<i>Neottiura bimaculata</i>		
		<i>Oedothorax fuscus</i>		
		<i>Peponocranium ludicrum</i>		
		Lycosidae	<i>Pardosa pullata</i>	
			<i>Pirata piraticus</i>	
		Mimetidae	<i>Ero sp</i>	
		Tetragnathidae	<i>Pachygnatha clerki</i>	
	<i>Tatragnatha extensa</i>			
	Thomisidae	<i>Tibellus sp</i>		
		<i>Xysticus ? cristatus</i>		
	Zoridae	<i>Zora spinimana</i>		
	Butterflies	Hesperiidae	<i>Thymelicus sylvestris</i>	
Pieridae		<i>Pieris napi</i>		
Satyridae		<i>Aphantopus hyperantus</i>		
		<i>Hipparchia semele</i>	VU	
	<i>Maniola jurtina</i>			
	<i>Pyronia tithonus</i>			
Coleoptera (beetles)	Apionidae	<i>Protopirapion atratum</i>		
	Cantharidae	<i>Rhagonycha fulva</i>		
	Carabidae	<i>Bembidion mannerheimi</i>		
	Chrysomelidae	<i>Chaetocnema hortensis</i>		
		<i>Neocrepidodera ferruginea</i>		
		<i>Coccinellidae</i>	<i>Coccidula rufa</i>	
		<i>Propylea 14-guttata</i>		
		<i>Ryzobius litura</i>		
		<i>Subcoccinella 24-punctata</i>		
	Cryptophagidae	<i>Telmatocephalus</i>		
	Curculionidae	<i>Hypera nigrirostris</i>		
		<i>Sitona striatellus</i>		
	Hydrophilidae	<i>Anacaena globulus</i>		
		<i>Chaetarthria simillima</i>		
	Nitidulidae	<i>Brachypterus urticae</i>		
	Scirtidae	<i>Contacyphon ochraceus</i>		
	Staphylinidae	<i>Stenus boops</i>		
<i>Stenus cicindeloides</i>				
<i>Stenus europaeus</i>		NS		

		<i>Stenus fulvicornis</i>
		<i>Stenus lustrator</i>
Dermaptera	Forficulidae	<i>Forficula auricularia</i>
Diptera	Limoniidae	<i>Erioptera lutea</i>
(flies)	Rhagionidae	<i>Chrysopilus cristatus</i>
	Sciomyzidae	<i>Pherbina coryleti</i>
		<i>Tetanocera fuscinervis</i>
		<i>Tetanocera robusta</i>
	Syrphidae	<i>Melanostoma mellinum</i>
		<i>Platycheirus albimanus</i>
	Tabanidae	<i>Chrysops relictus</i>
Hemiptera	Cercopidae	<i>Neophilaenus lineatus</i>
(bugs)		<i>Philaenus spumarius</i>
	Cicadellidae	<i>Cicadella viridis</i>
		<i>Ulopa reticulata</i>
	Lygaeidae	<i>Cymus clavicolus</i>
	Microphysidae	<i>Myrmedobia exilis</i>
	Miridae	<i>Leptopterna sp</i>
		<i>Lygocoris pabulinus</i>
		<i>Stenodema holsaticum</i>
		<i>Teratocoris viridis</i>
		<i>Trigonotylus ruficornis</i>
	Nabidae	<i>Nabis limbatus</i>
	Pentatomidae	<i>Piezodorus lituratus</i>
	Rhopalidae	<i>Myrmus miriformis</i>
Hymenoptera	Formicidae	<i>Formica lemani</i>
Mollusca		<i>Balea sarsii</i>
(snails)		<i>Succinea putris</i>
		<i>Vertigo antivertigo</i>

