

Appendix D

Ecology

D1 Legislation

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This is described in the following sections.

Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations') transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into law within England and Wales.

The 2017 Regulations have been updated by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, to ensure that they operate efficiently post Brexit. These changes include reference to National Site Network.

The Habitat Regulations provide for the designation and protection of sites of European importance known as European Sites or the National Site Network.

European Sites comprise:

1. Special Areas of Conservation (SACs), including candidate sites, designated under the Conservation of Habitats and Species Regulations 2017¹⁷.
2. Special Protection Areas (SPAs) including candidate sites, designated under the Wildlife and Countryside Act 1981 (as amended)¹⁸.
3. Ramsar Sites designated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are also considered as European Sites as a matter of UK Government policy along with proposed SACs and SPAs.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites. Specifically Regulation 63(1) states:

1. "A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which:
 - (a) is likely to have a significant effect on a European site or European marine site (either alone or in combination with other plans or projects), and;
 - (b) is not directly connected with or necessary to the management of that site.
2. must make an appropriate assessment of the implications for that site in view of that site's conservation objectives".

¹⁷ The Habitats Regulations transposes the requirements on Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora in to UK law.

¹⁸ The Wildlife and Countryside Act 1981 transposes the requirements of Directive 79/409/EEC on the Conservation of Wilde Birds (Birds Directive) in to UK law. The Birds Directive has been updated through Directive 2009/147/EC on the Conservation of Wild Birds.

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority under the Town and Country Planning Act 1990. The determining authority is known as the Competent Authority with the Regulations.

The Habitats Regulations also convey special protection to a number of species, which are listed in Schedule 2 of the Regulations and are referred to as European Protected Species (EPS). Those relevant to the proposed development include:

- All UK resident bat species;
- Common dormouse (*Muscardinus avellanarius*);
- Great crested newt (*Triturus cristatus*);
- Otter (*Lutra lutra*);
- Marsh fritillary butterfly (*Euphydryas aurinia*).

Regulation 43 makes it an offence to:

- Deliberately capture, injure or kill any wild animal of a EPS;
- Deliberately disturb wild animals of such a species;
- Deliberately take or destroy the eggs of such a species;
- Damage or destroy a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance, which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to affect significantly the local distribution of the species.

Licences can be granted by the relevant Statutory Nature Conservation Organisation (SNCO) for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".

Ramsar Convention 1971

Wetlands of International Importance (Ramsar Sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are considered European Sites as a matter of UK and Local Government Policy.

Wildlife and Countryside Act 1981 (as amended)

A network of nationally designated sites has been established through the designation of Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981. The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation (Natural

Resources Wales). The protection afforded to SSSIs is used to underpin the designation of areas at a European Level.

The Wildlife and Countryside Act also places obligations on Welsh Ministers and other public bodies with regard to the conserving and enhancing of the features of SSSIs in the exercise of their functions.

The Wildlife and Countryside Act 1981 provides protection to both EPSs and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected, with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

In England and Wales water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008. The Wildlife and Countryside Act 1981 together with amending legislation, lists the following offences:

- Intentionally killing, injuring or taking a water vole by any method.
- Intentionally or recklessly damaging or destroying a water vole place of shelter or protection.
- Intentionally or recklessly damaging disturbing a water vole whilst it is occupying such a structure or place it uses for shelter or protection.
- Intentionally or recklessly obstructing access to a water vole's place of shelter or protection.
- Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

The Act also includes provisions for the control of invasive non-native species (INNS). Under these provisions it is an offence to:

1. Release or allow to escape into the wild any animal which is not ordinarily resident or a regular visitor to Great Britain, or is included in Schedule 9 of the Act.
2. Plant or otherwise cause to grow in the wild any plant which is included in Schedule 9 of the Act.

People undertaking works in proximity to invasive non-native plant species should take all reasonable steps and exercise all due diligence to avoid committing an offence.

The Invasive Alien Species (Enforcement and Permitting) Order 2019

The order came into effect on the 1st December 2019 to allow for enforcement of EU Regulations (Regulation (EU) No. 1143/2014 on the prevention and management of the introduction and spread of invasive alien species in England and Wales) also known as the IAS Regulations.

It lists 66 species which are of European Union concern. There are currently 19 species listed in the Order (16 of these species are found in Wales). Species include:

- Chinese mitten crab (*Eriocheir sinensis*)
- Red Swamp crayfish (*Procambarus clarkii*)
- Crayfish signal (*Pacifastacus leniusculus*)
- Spiny cheek crayfish (*Orconectes limosus*)
- Muntjac deer (*Muntiacus reevesi*)
- Ruddy duck (*Oxyura jamaicensis*)
- Egyptian goose (*Alopochen aegyptiacus*)
- Grey squirrel (*Sciurus carolinensis*)
- Himalayan balsam (*Impatiens glandulifera*)
- Fanwort (otherwise known as Carolina water shield) (*Cabomba caroliniana*)
- Giant hogweed (*Heracleum mantegazzianum*)
- Water hyacinth (*Eichhornia crassipes*)
- Parrots Feather (*Myriophyllum aquaticum*)
- Floating pennywort (*Hydrocotyle ranunculoides*)
- Floating water primrose (*Ludwigia peploides*)
- Water Primrose (*Ludwigia grandiflora*)
- Giant rhubarb (*Gunnera tinctoria*)
- Curly waterweed (*Lagarosiphon major*)
- Nuttall's waterweed (*Elodea nuttallii*)

This Order allows for the enforcement of, including the relevant licences, permits and rules for keeping invasive alien species.

The amendments remove these Invasive Alien Species (IAS) of Union concern from the ambit of the provisions relating to invasive non-native species in sections 14 and 14ZA of the Wildlife and Countryside Act 1981. This is to make the legislation more transparent and easier to use by bringing all the offences relating to species of Union concern into one place.

Criminal offences are introduced for breaches of the main restrictions of The IAS Regulation, as well as offences relating to:

1. False statements;
2. Altering, or not meeting, the conditions of permits and licences;
3. Attempts to commit offences;
4. Obstruction; and
5. Offences for companies and partnerships.

It is also an offence to:

1. Allow the escape or release into the wild an animal that is not normally a resident or regular visitor to Great Britain, or an animal listed in Part 1 of Schedule 2, including species of crabs, ducks and squirrel.
2. Plant, or allow to grow in the wild, plants listed in Part 2 of Schedule 2.
3. Sell, or be involved in the sale of, any plant listed in Part 3 of Schedule 2, including Water Primrose and Floating Pennywort.

If found guilty of an offence a person may be liable to imprisonment of up to two years, or a fine. Permits and licences may be made void where an offence is committed and a person may be banned from being granted a permit or licences again for up to 5 years.

The legislation in relation to the remaining species listed in Schedule 9 of the Wildlife and Countryside Act 1981 remains unchanged.

National Park and Access to the Countryside Act 1949 (as amended)

Local Nature Reserves (LNRs) can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949. However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation.

The Protection of Badgers Act 1992

Badger (*Meles meles*) and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

Interference with a sett includes damaging or destroying it, obstructing access to it, causing a dog to enter it, or disturbing the badgers which are occupying it.

Hedgerow Regulations 1997

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of hedgerows. Local authorities can enforce the retention of Important Hedgerows through the issuing of Retention Notices.

Salmon and Freshwater Fisheries Act 1975 (as amended)

The Salmon and Freshwater Fisheries Act (SAFFA) is legislation that aims to protect freshwater fish, with a particularly strong focus on salmon and trout. The legislation covers a broad range of topics, but of particular relevance to development are those sections covering water pollution, habitat disturbance and fish migration routes.

Under Section 2 (4) it is an offence to wilfully disturb spawn, spawning fish or spawning areas and under Section 4 (1) it is an offence to knowingly permit the flow of poisonous matter and polluting effluents into river courses that are poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

Sections 9 to 15 are concerned with fish passage and migration routes. It is the duty of the waterway owner that when constructing dams, screens or sluices to provide and maintain a facilitating fish pass for migrating salmon or trout. Section 9 allows the regulator to serve notice on the owner or occupier of a dam or obstruction, to install a fish pass where necessary. This section applies to dams which are either new or have been altered to create an increased obstacle to the passage of migratory salmonids. It is also applicable where dams in a state of disrepair have been rebuilt over at least one half of their length.

Eels (England and Wales) Regulations 2009

This implements Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel. The regulations are focussed on the management of commercial eel fisheries (licences, catch returns and restocking) and the passage/migration of eels. The regulations afford powers to the regulators (Environment Agency and Natural Resources Wales) to implement eel recovery measures in all freshwater and estuarine waters in England and Wales.

Part 4 of the regulations is concerned with the passage of eels and makes it a legal requirement to notify the regulator of the construction, alteration or maintenance of any structure likely to affect the passage of eels. This include water intakes and outfalls, dams and weirs, sluices or any other in-river obstruction. Where any such structure exists, the owner, occupier or person in charge of the land on which the dam, structure or obstruction lies may be required to construct and operate an eel pass to allow the free passage of eels.

Wild Mammals (Protection) Act 1996

This Act operates in parallel with the legislation listed above conferring specific protection on rare or threatened mammal species by protecting all wild mammals from any action intended to cause unnecessary suffering.

Natural Environment and Rural Communities (NERC) Act 2006

The Act is primarily intended to implement key aspects of the Government's Rural Strategy published in July 2004; it also addresses a wider range of issues relating broadly to the natural environment. The Act also makes provision in respect of biodiversity, pesticides harmful to wildlife and the protection of birds, and in

respect of invasive non-native species. It alters enforcement powers in connection with wildlife protection and extends time limits for prosecuting certain wildlife offences. It addresses a small number of gaps and uncertainties which have been identified in relation to the law on sites of special scientific interest. It also amends the functions and constitution of National Park authorities, the functions of the Broads Authority and the law on rights of way (DEFRA website September 2016).

The Environment (Wales) Act 2016

The Environment (Wales) Act 2016 replaces the duties on public bodies in Wales to conserve and enhance biodiversity in the exercise of their functions. This duty includes consideration of the resilience of ecosystems in terms of their diversity, connectivity, adaptability, scale and condition. The Act also reinforces the duties in relation to the lists of species and habitats of importance and duties to conserve and enhance those species and habitats. Within this Chapter these are referred to as Section 7 Habitats and Species, although revised lists have not been published to date.

The Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations Act requires public bodies in Wales to consider the long-term impacts of decisions on the social, cultural, environmental and economic well-being of both current and future generations.

In particular the Act includes a number of goals including to maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change.

EIA Directive 2014/52/EU

The Directive 2014/52/EU states that EIAs shall identify, describe and assess the direct and indirect significant effects of climate change relevant to the project. The regulations implementing this directive were transposed into UK legislation in May 2017; The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations, 2107.

D2 Preliminary Ecological Appraisal

CiNER Glass Limited

**Dragon Glass Bottle
Manufacturing Facility**

**Preliminary Ecological Appraisal
Report**

DRAGON-ARUP-ENVE-XX-RP-YE-000001

Issue | 17 April 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927

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Appendices

Appendix A

Legislation

1 Introduction

1.1 Background

Ove Arup and Partners Limited (Arup) has been commissioned by CiNER Glass Ltd to undertake a range of design and consultancy services, including environmental, in relation to the detailed design for a glass works manufacturing facility, on land in Rassau, Blaenau Gwent; hereafter referred to as the 'site'. This includes the completion of an Extended Phase 1 Habitat Survey and production of a Preliminary Ecological Appraisal (PEA) report.

The site is within the Rassau Industrial Estate, in Rassau, Blaenau Gwent, approximately 400 m south of the Brecon Beacons National Park (BBNP). The centre point, Ordnance Survey Grid Reference is SO158128. The site location is shown in Figure 1.

This report presents the findings of the ecological desk study and survey results and provides an ecological appraisal of the site. The purpose of the report is to identify the habitats within the site and to assess the potential for or presence of any legally protected or notable species. It determines the likely ecological impacts of the proposed works during construction and operation and specifies mitigation, compensation and enhancement measures as appropriate.

1.2 The Proposed Works

The facility consists of a three-part operation for the production of glass bottles; the handling of raw material, the manufacturing of the glass containers and the product-inspection and packaging process. The proposed facility consists of a number of distinct components which are summarised below:

- 2No furnaces and associated filters and chimney stacks;
- 2No cullet buildings for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles;
- A printing area for applied decorations (14500 sqm);
- An automated warehouse for storage and distribution of glass bottles (17000 sqm);
- Utilities building which includes plant space, workshops, office space and welfare facilities;
- Visitor building;
- Waste stores;

- Standalone plant buildings;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The site will also include two attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site.

The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. The facility will also require the transportation of finished product glass bottles following production.

The facility is forecasted to create approx. 670 jobs and will operate 24 hours a day, 7 days a week via shift system.

1.3 The Site

The site is comprised of a mosaic of habitats; with grassland and scrub covering the central area, which lies on a flat plateau, and conifer plantation on land which slopes towards the A465. A watercourse lined by trees runs through the site, and to the east is an area of purple moor grass (*Molinia caerulea*) and scrub, and an attenuation lagoon which lies adjacent to the A465. A track dissects the site, connecting the Rassau Industrial Estates to Carno Reservoir to the east. To the west of the site is the Rassau Industrial Estate, and to the north is open land with conifer plantation which adjoin the BBNP.

1.4 Objectives

The objective of this PEA included the following:

- To establish baseline ecological conditions in the site and within the immediate vicinity, including its potential to support important habitats and notable/protected species;
- To identify key ecological constraints to the proposed works;
- To inform project design to allow significant ecological effects to be avoided or minimised wherever possible; and
- To recommend further ecological surveys required to inform an updated ecological assessment as appropriate.

1.5 Zone of Influence

The current guidance on ecological assessments (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018¹) recommends that all ecological

¹ Chartered Institute of Ecology and Environmental Management (2018) Guidelines for

features that occur within a ‘Zone of Influence’ (ZoI) for a proposed development are investigated.

The ZoI includes:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

The ZoI is variable depending on the nature of the construction activities and the ecological receptors affected. For this assessment the following zones have been defined (Table 1).

Table 1: Zone of Influence used for this assessment

Ecological features	Zone of Influence
<i>Nationally Designated Sites</i>	<i>2 km buffer around site boundary</i>
<i>Internationally Designated Sites</i>	<i>5 km buffer around the site boundary</i>
<i>Nationally and Internationally Designated Site, where bats are a qualifying feature</i>	<i>10 km buffer around the site boundary</i>
<i>Relevant species records (including protected and invasive species) and Local Sites</i>	<i>2 km from site boundary</i>
<i>Protected species</i>	<i>Within the proposed site boundary, and adjacent habitats</i>

1.6 Legal Context and Policy Framework

The legal context for ecological survey is provided by a framework of international and domestic legislation which aims to protect specific sites, habitats and species. A full list of relevant legislation is provided in Appendix A.

1.6.1 Sites

Statutory protected sites include:

- European Sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites) protected under the Conservation of Habitats and Species Regulations 2017 (as amended) (also known as the Habitat Regulations) and the International Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention);
- National Sites (Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR)) protected under the Wildlife and Countryside Act 1981 (as amended); and

Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (September 2018).

- Local Sites (Local Nature Reserves (LNRs)), protected under the National Parks and Access to the Countryside Act 1949 (as amended).

These sites are protected by the relevant legislation regardless of whether planning permission is required. Where planning consent is required, they will also be protected by Planning Policy.

Country Parks, Local Wildlife Sites (LWS) including Sites of Importance for Nature Conservation (SINC), and Ancient Woodlands are protected by Planning Policy, which will apply to schemes which require planning consent.

1.6.2 Species

Statutory protected species include:

- European Protected Species (EPS) protected under the Habitat Regulations (as amended); and
- Nationally Protected Species, protected under the Wildlife and Countryside Act 1981 (as amended) (WCA); Protection of Badgers Act 1992; Countryside and Rights of Way Act 2000 (CRoW); The Eels (England and Wales) Regulations 2009 and Salmon and Freshwater Fisheries Act 1975.

These legislations protects different species to varying degrees, and in most cases their habitats also, regardless of whether planning permission is required. In addition, these species are also afforded protection through Planning Policy, which requires that they are a ‘material consideration’ of any planning application.

Species and habitats of conservation concern include:

- Section 7 species and habitats listed in the Environment (Wales) Act 2016 (the Environment Act) (applies to Wales only). These species and habitats are also known as ‘*Species and Habitats of Principal Importance for the Conservation of Biodiversity in Wales and England*’; and
- Locally Protected Species which may be identified within County Local Biodiversity Action Plans (LBAP), the Royal Society for the Protection of Birds (RSPB) ‘Birds of Conservation Concern’ or Red Data books for example.

1.6.3 Habitats

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of Important Hedgerows.

1.6.4 Invasive Non-Native Species (INNS) of Plants

It is an offence to ‘plant or otherwise cause to grow in the wild any plant which is included in Part 2 of Schedule 9’ under the Wildlife and Countryside Act 1981 (as

amended). These species are classified as ‘controlled waste’ and as such must be disposed of safely at a licensed landfill site under the Environmental Protection Act (1990).

1.6.5 The Environment (Wales) Act 2016 and the Natural Environmental Rural Communities Act 2006

Public authority listed in the Environment (Wales) Act 2016, including Local Planning Authorities “must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in doing so promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions”.

Ecosystem resilience is defined as the capacity for ecosystems to adapt, and comprises the key characteristics:

- Diversity between and within ecosystems;
- The connections between and within ecosystems;
- The scale of ecosystems; and
- The condition of ecosystems (including their structure and functioning).
- In complying with the Biodiversity and Resilience of Ecosystems Duty, it is necessary to have regard to:
 - The list published under Section 7;
 - The State of Natural Resources Report (SoNARR) published under Section 8²; and
 - Any area statement published under Section 11 for an area that includes all or part of an area in relation to which the authority exercises functions.

Section 7 lists species and habitats which are ‘of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales’ (as decided by Welsh Government in consultation with Natural Resources Wales (NRW)).

1.6.6 The Well-being of Future Generations Act

It places a duty on public bodies to carry out sustainable development. In this Act “sustainable development” means the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.

² <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en>

The action a public body takes in carrying out sustainable development must include:

- (a) setting and publishing objectives (“well-being objectives”) that are designed to maximise its contribution to achieving each of the well-being goals, and
- (b) taking all reasonable steps (in exercising its functions) to meet those objectives.

The seven well-being goals include: a resilient Wales, a prosperous Wales, a healthier Wales, a more equal Wales, more cohesive communities, a Wales of vibrant culture and thriving Welsh language and a globally responsible Wales.

Of most relevance is 'A resilient Wales', which seeks to maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

1.6.7 Planning Policy

At national level, Planning Policy Wales³ sets the national policies in relation to development control through the Town and Country Planning Act 1990. This is supported by a series of Technical Advice Notes, with Technical Advice Note (TAN) 5⁴ being of particular relevance as it sets out the consideration of nature conservation in the determination of planning applications. This policy and TAN 5 require Local Authorities to take measures to:

- Promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
- Ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment;
- Ensure that statutorily designated sites are properly protected and managed;
- Safeguard protected species; and
- Promote the functions and benefits of soils, and in particular their function as a carbon store.

Developers must ensure that they comply with the above legislation by fully assessing the potential impacts on protected species and habitats from the proposed development. Where planning permission is required, this assessment must be finalised prior to and included with the submission of the planning application. The Planning Authority can then ensure that the necessary protected species and habitats information has been provided to inform an assessment and that proposals are in full accordance with relevant legislation and planning policy.

Welsh Government has produced a Nature Recovery Plan which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart

³ Welsh Government (2018). Planning Policy Wales, Edition 10, December 2018.

⁴ Welsh Assembly Government (2009) Technical Advice Note 5: Nature Conservation and Planning.

of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The Nature Recovery Action Plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016. Developments should seek to complement this, in order to meet objectives, set out in the Environment Act and Well-being Act.

The Blaenau Gwent County Borough Council (BGCBC) Local Biodiversity Action Plan (LBAP)⁵ refers to habitats and species of importance for nature conservation within the county. Of relevance to this project are the river habitat and the species groups otter (*Lutra lutra*); bats; birds; reptiles and amphibians; pollinating insects and invasive non-native species.

⁵ Blaenau Gwent County Borough Council (2015). Blaenau Gwent Local Biodiversity Action Plan.

2 Methods

2.1 Desk Study

A desk study was carried out to identify statutory internationally designated sites (European Sites) within 5 km and nationally designated sites within 2 km of the site centre point. In addition, designated sites where bats were a qualifying feature were searched for within 10 km of the site. Online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)⁶, Natural Resources Wales website⁷ and the Joint Nature Conservation Committee (JNCC) website⁸.

A biodiversity records request of data was provided by South East Wales Biodiversity Records Centre (SEWBRc)⁹ on 6th April 2020. The records included protected and priority species¹⁰ up to 2 km from the site boundary and included details of local designations such as SINC's within 2 km.

2.2 Field Study

An Extended Phase 1 Habitat Survey was led by Arup ecologist Claire Pooley (CEcol, MCIEEM) on 1st April 2020.

The aim of the Extended Phase 1 Habitat Survey was to identify the habitats present within the site where access allowed. The survey was undertaken following the standard JNCC Phase 1 Habitat survey methodology¹¹. Extended Phase 1 Habitat survey is a standard technique for rapidly obtaining baseline ecological information over a large area of land. It is primarily a mapping technique and uses a standard set of habitat definitions for classifying areas of land on the basis of the vegetation present.

The survey also provided an assessment of the potential for habitats present to support legally protected species. Relevant species were considered to include all those protected by European or UK law, and notable species including those identified as being of principal importance in Wales, in response to Section 7 of the Environment (Wales) Act 2016 (Appendix A). The assessment surveys of the habitats to support relevant species included:

⁶ <http://magic.defra.gov.uk/> (accessed 09/04/20).

⁷ <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en> (accessed 09/04/20).

⁸ <http://jncc.defra.gov.uk> (accessed 09/04/20).

⁹ <http://www.sewbrec.org.uk/home.page> (accessed 03/04/19).

¹⁰ EU and UK legally protected species under the Conservation of Habitats and Species Regulations

2017; Wildlife and Countryside Act 1981 (as amended); and species present on the Species of Principal Importance in Wales list in response to Section 7 of the Environment (Wales) Act 2016 (known as Section 7 species).

¹¹ JNCC, (2010), Handbook for Phase 1 habitat survey – a technique for environmental audit, JNCC, Peterborough, ISBN 0 86139 636.

- Any buildings or trees within the boundary were appraised (from the ground only) for their suitability to support breeding, resting and hibernating bats using survey methods based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines¹².
- Searching for signs of badger (*Meles meles*) activity including setts, tracks, foraging holes and latrines within and up to 30 m from the site where possible¹³.
- Assessing the suitability of habitats for dormice (*Muscardinus avellanarius*)¹⁴.
- Assessing the suitability of watercourses for water vole (*Arvicola amphibius*)¹⁵, otter¹⁶ and white-clawed crayfish (*Austropotamobius pallipes*)¹⁷.
- Assessing the suitability of habitats for nesting birds (including any old nests);
- Assessing the suitability of habitats for common species of reptiles; adder, (*Vipera berus*), grass snake (*Natrix helvetica*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*)¹⁸.
- Assessing the potential of terrestrial and aquatic habitats to support amphibians, both protected species and species of conservation concern¹⁹.
- Assessing the suitability of habitats for notable invertebrates.
- Evidence of the presence of invasive non-native plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and subject to strict legal control, such as Japanese knotweed (*Reynoutria japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*).

All accessible areas of the site were walked and the relevant habitat types classified according to their vegetation types. Habitat areas greater than 0.1 ha were mapped on the Extended Phase 1 Habitat Survey Plan (Figure 4) and Target Notes (TNs) were used to highlight any features or habitats of interest and that provide suitable habitat for protected species.

2.3 Limitations

The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys can be

¹² Collins, J. (2016). Bat Surveys: Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat Conservation Trust, London.

¹³ Harris, S., Cresswell, P. and Jefferies, D., 1989. Surveying Badgers. Mammal Society.

¹⁴ Bright, Paul, Morris, P, Mitchell Jones, T. (2006). The Dormouse Conservation Handbook 2nd ed. English Nature.

¹⁵ Dean, M. *et al.* (2016). The Water Vole Mitigation Handbook (The Mammal Society Guidance Series). The Mammal Society, London.

¹⁶ Chanin, P. (2003). Monitoring the Otter, *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.

¹⁷ Peay, Stephanie (2002). Guidance on Habitat for White-clawed Crayfish and its restoration. Environment Agency.

¹⁸ Gent, T. & Gibson, S. (2003). Herpetofauna Workers Manual. Joint Nature Conservation Committee, Peterborough.

¹⁹ Odiham *et al.* (2000). in ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index.

limited by factors affecting the presence of plants and animals, such as the time of year, migration patterns and behaviour.

Whilst not a full protected species or botanical survey, an Extended Phase 1 Habitat Survey allows an experienced ecologist to obtain a sufficient understanding of the ecology of a site in order to either confirm the conservation importance of the site, and assess the potential for impacts on habitats and species likely to represent a material consideration in planning terms, or to ascertain that further surveys will be required before such confirmation can be made.

The survey was undertaken in early April, which although within the recommended time to undertake an Extended Phase 1 Habitat Survey, was at a site which occurs at higher altitudes (approximately 400 m); the temperature is generally cooler, than lower altitudes and it was evident during the survey that the majority of floral species were not in flower. As such, it was more difficult to identify these species. It is acknowledged, however, that the survey does not intend to provide an exhaustive species list. It is considered that the habitats present within the site could be appropriately identified sufficiently to inform this PEA report.

The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

3 Results

3.1 Desk Study

The designated sites identified during the desk study are shown in Figures 2-3.

There are two internationally designated sites located within 5 km of the site (as shown in Figure 2):

- Usk Bat Sites SAC, lies approximately 900 m north-east of the site. Lesser horseshoe bat (*Rhinolophus hipposideros*) are the primary qualifying feature for the SAC. Annex 1 habitats which are a qualifying but not primary reason for selection of the site comprise: blanket bogs, tilio-Acerion forests of slopes, screes and ravines, calcareous rocky slopes with chasmophytic vegetation, caves not open to the public, degraded raised bogs still capable of natural regeneration and European dry heaths.
- Cwm Clydach Woodlands SAC, lies approximately 4.8 km east of the site. Asperulo-Fagetum beech forests are the primary qualifying feature for the SAC. Atlantic acidophilous beech forests with Ilex and sometimes Taxus in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) are a qualifying but not primary reason for selection of the site.

There are two national designated sites within the 2 km of the site (as shown in Figure 2):

- Mynydd Llangatwg SSSI, lies approximately 900 m north-east of the site, and is designated for its geology and biodiversity. The latter comprising base-rich grassland, heather dominated blanket mire and dry heath. Notable vascular plants, bryophytes and lichens are present, in addition to lesser horseshoe bats which roost in cave systems.
- Mynydd Llangynidr SSSI, lies approximately 1.5 km north-west of the site, and is designated for its geomorphology.

There are also five national sites designated for bats within 10 km (as shown in Figure 2):

- Cwm Clydach SSSI, lies approximately 4.3 km east of the site;
- River Usk (Upper Usk) SSSI, lies approximately 7.5 km north and east of the site;
- River Usk (Tributaries) SSSI, lies approximately 7.6 km north of the site;
- Siambre Ddu SSSI, lies approximately 8.7 km east of the site; and
- Buckland Coach and Ice House SSSI, lies approximately 8.8 km north of the site.

There are three LNRs within the 2 km search area (as shown in Figure 3):

- Beaufort Hills Pond and Woodland, approximately 900 m south-east;
- Sirhowy Hill Pond and Woodland, approximately 1.8 km south-west; and

- Parc Nant-Y-Waun, approximately 1.9 km south-east.

There are two areas of ancient woodland within 2 km (as shown in Figure 3). The closest ancient woodland is 1.4 km; separated from the site by the A467.

There are twenty SINC's within the 2 km search area, detailed in Table 2 below.

Table 2: SINC's located within 2 km from the site.

SINC Name	Distance & Orientation from site	Qualifying Features
Rassau pond	100 m south	Open water.
Ebbw River North Section	101 m east	Open standing water and river.
Garnlydan	640 m east	Mosaic habitats with acid grassland, standing open water, bog habitats and flushes, fens, reed beds and other swamps, heathlands and grass heath communities
Ebbw (Fawr) Watercourse	670 m south	Fish and likely presence of otter and dipper (<i>Cinclus cinclus</i>) breeding site.
Beaufort Hill Ponds and Woodland Ebbw Fach	834 m south-east	Mosaic habitats.
Land at Park View, Beaufort	868 m south	Marshy grassland and neutral grassland.
Land to the rear of Glyndwr Road, Rassau	979 m south-west	Neutral grasslands.
Nant y Croft, Rassau	1302 m south-west	Neutral grasslands.
Highway Verge Section 1 Bryn Serth	1341 m south-west	Mosaic habitats.
Rhyd y Blew	1160 m south-west	Standing open water, with support features bring breeding and overwintering birds.

SINC Name	Distance & Orientation from site	Qualifying Features
Bryn Serth	1420 m south-west	Mosaic habitats: acid grasslands, marshy grasslands, heathlands and grass-heath communities standing open water, swamp in addition to notable mammal species
Hirgan Fields Grassland	1495 m south east	Mosaic habitats: acid grassland, neutral grassland, heathlands and grass-heath communities.
Pond Group 1	1596 m south-east	Standing open water.
Clydach Watercourse	1615 m north-east	River habitat, with supporting features of fish, probable otter and dipper breeding site.
Waun y Pound	1744 m south-west	Mosaic habitats, neutral grassland and acid grassland.
Land off Parkhill Crescent	1764 m south-east	Acid grasslands, heathlands and grass-heath communities, mineral spoil tips and other post-industrial land
Sirhowy Hill Woodland and Cardiff Pond	1810 m south	Acid grasslands, heathlands and grass heath communities, marshy grassland, neutral grassland and mosaic habitats.
Bryn Farm, Brynmawr	1832 m east	Mosaic habitats.
Parc Nant-y-Waun	1896 m south-east	Mosaic habitats
Pond Group 2	1916 m east	Standing open water and mosaic habitats.

3.1.1 Species Records

Information provided by SEWBReC is summarised in Table 3 below. Unless otherwise indicated, only records from the last 10 years have been included. No records of INNS were provided.

Table 3: Protected reptile, amphibian, bird, invertebrate and mammal records within 2km of the Site boundary (from 2009-2020). Distances are approximate.

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
Bats					
Brown long-eared bat	<i>Plecotus auritus</i>	EPS, WCA, Section 7	Two records identified from an Anabat detector during a night survey 1334 m west.	2012	-
Noctule	<i>Nyctalus noctula</i>	EPS, WCA, Section 7	Three records identified from bat detectors. Closest record is 1334 m west.	2012	-
Natterer's bat	<i>Myotis nattereri</i>	EPS, WCA, Section 7	One record identified from an Anabat detector during a night survey 1334 m west.	2012	-
Daubenton's bat	<i>Myotis daubentonii</i>	EPS, WCA, Section 7	One record identified from an Anabat detector during a night survey 1334 m west.	2012	-
Myotis species	<i>Myotis</i> sp.	EPS, WCA, Section 7	Two records identified from an Anabat detector during night surveys 133 m west.	2012	-
Unidentified bat	<i>Chiroptera</i>	EPS, WCA, Section 7	One record identified from droppings 1972 m south.	2013	-
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	EPS, WCA, Section 7	80 records including live sightings of hibernating bats 569 m east.	2019	-
Other mammals					
Hedgehog	<i>Erinaceus europaeus</i>	Section 7	Five records; nearest 1402 m south-west.	2010	-

²⁰ EPS is European Protected Species; WCA is species protected under the Wildlife and Countryside Act 1981 (as amended); Section 7 is species listed in response to the Environment (Wales) Act 2016; and Sch 1 is species listed under Schedule 1 of the WCA.

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
Badger	<i>Meles meles</i>	BPA, WCA Section 11	Two records of badgers sighted within scrub within the site.	2014	-
Otter	<i>Lutra lutra</i>	EPS, WCA, Section 7	Two records of dead otters along a road 1605 m west.	2014	-
Birds					
Brambling	<i>Fringilla montifringilla</i>	Sch1	Two records 932 m north-east.	2011	-
Goshawk	<i>Accipiter gentilis</i>	Sch1	Four records 932 m north-east.	2011	-
Wryneck	<i>Jynx torquilla</i>	Sch1	Eight records. 1761 m north-east.	2011	-
Osprey	<i>Pandion haliaetus</i>	Sch1	One record 1761 m north-east.	2012	-
Fieldfare	<i>Turdus pilaris</i>	Sch1	One records near a reservoir, 1758 m south-east.	2014	-
Hobby	<i>Falco subbuteo</i>	Sch1	Three records including hobbies hunting dragonflies, 1741 m north.	2014	-
Peregrine	<i>Falco peregrinus</i>	Sch 1	One record of a juvenile bird with a kill 1586 m east.	2015	-
Little ringed plover	<i>Charadrius dubius</i>	Sch 1	Five records including a pair with chicks. Closest record is 1761 m north-east.	2015	-
Goshawk	<i>Accipiter gentilis</i>	Sch1	Juveniles recorded in forestry 400m west and nest recorded 710 m north-east.	2016	-
Merlin	<i>Falco columbarius</i>	Sch1	14 records. Closest record is 487 m west.	2017	Some records older than 10 years were reported in the following groups: 2 records between 1971 and 2017; and 6

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
					records between 2000 and 2011.
Red kite	<i>Milvus milvus</i>	Sch1	24 records. Closest record is 932 m north-east.	2018	Some records older than 10 years were reported in the following groups: 2 records between 2008 and 2015; 4 records between 2009 and 2012; and 8 records between 2008 and 2016.
Hen harrier	<i>Circus cyaneus</i>	Sch1	Ten records. Closest record is 797 m north.	2018	Some records older than 10 years were reported in the following group: 2 records between 2007 and 2018.
Common crossbill	<i>Loxia curvirostra</i>	Sch1	Ten records. Closest record is from 797 m north.	2018	Some records older than 10 years were reported in the following group: 6 records between 2008 and 2011.
Barn owl	<i>Tyto alba</i>	Sch 1	Nine records including fledged chicks. Closest record is 365 m north-east.	2018	-
Redwing	<i>Turdus iliacus</i>	Sch 1	Two records including one dead bird. Closest record is 923 m east.	2019	-
Reptiles					
Common lizard	<i>Zootoca vivipara</i>	WCA, Section 7	Five records of common lizard including one record of a gravid female. Closest record is 1640 m north-west.	2012	-
Invertebrates					
Small pearl-bordered fritillary	<i>Boloria selene</i>	Section 7	Two records. Closest record is 569 m east.	2011	-

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
Hedge rustic	<i>Tholera cespitis</i>	Section 7	Five records 358 m south.	2011	Some records older than 10 years were reported in the following group: 5 records between 2007 and 2011.
Beaded chestnut	<i>Agrochola lychnidis</i>	Section 7	Six records. Closest record is 358 m south.	2012	-
Mottled rustic	<i>Caradrina morpheus</i>	Section 7	Four records. Closest record is 358 m south.	2012	-
Garden dart	<i>Euxoa nigricans</i>	Section 7	Seven records. Closest record is 358 m south.	2012	Some records older than 10 years were reported in the following group: 21 records between 2007 and 2012.
BrindledbBeauty	<i>Lycia hirtaria</i>	Section 7	15 records. Closest record is 358 m south.	2012	Some records older than 10 years were reported in the following group: 15 records between 2008 and 2012.
Powdered quaker	<i>Orthosia gracilis</i>	Section 7	15 records 358 m south.	2012	Some records older than 10 years were reported in the following group: 57 records between 2008 and 2012.
Anomalous	<i>Stilbia anomala</i>	Section 7	Four records. Closest record is 358 m south.	2012	-
Heath rustic	<i>Xestia agathina</i>	Section 7	Five records 358 m south.	2012	-
Garden tiger	<i>Arctia caja</i>	Section 7	38 records 358 m south.	2013	Some records older than 10 years were reported in the following group: 38 records between 2008 and 2013.
Broom moth	<i>Ceramica pisi</i>	Section 7	27 records. Closest record is 358 m south.	2013	Some records older than 10 years were reported in the following

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
					group: 25 records between 2008 and 2013.
Flounced chestnut	<i>Agrochola helvola</i>	Section 7	Seven records. Closest record is 358 m south.	2013	-
Brown-spotted pinion	<i>Agrochola litura</i>	Section 7	Six records. Closest record is 358 m south.	2013	-
Knot grass	<i>Acronicta rumicis</i>	Section 7	25 records. Closest record is 358 m south.	2013	Some records older than 10 years were reported in the following group: 25 records between 2008 and 2013.
Green brindled crescent	<i>Allophyes oxyacanthae</i>	Section 7	Nine records. Closest record is 358 m south.	2013	-
Ghost moth	<i>Hepialus humuli</i>	Section 7	15 records. Closest record is 358 m south.	2013	Some records older than 10 years were reported in the following group: 15 records between 2008 and 2013
Small Square-spot	<i>Diarsia rubi</i>	Section 7	21 records 358 m south.	2013	Some records older than 10 years were reported in the following group: 215 records between 2008 and 2013.
Rustic	<i>Hoplodrina blanda</i>	Section 7	27 records. Closest record is 358 m south.	2013	Some records older than 10 years were reported in the following group: 27 records between 2008 and 2013.
Sallow	<i>Cirrhia icteritia</i>	Section 7	32 records. Closest record is 358 m south.	2013	Some records older than 10 years were reported in the following group: 31 records between 2007 and 2013.
Dot moth	<i>Melanchra persicariae</i>	Section 7	17 records 358 m south.	2013	Some records older than 10 years were reported in the following

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
					group: 17 records between 2008 and 2013.
Centre-barred sallow	<i>Atethmia centrigo</i>	Section 7	Four records 358 m south.	2013	-
Neglected rustic	<i>Xestia castanea</i>	Section 7	14 records 358 m south.	2013	Some records older than 10 years were reported in the following group: 14 records between 2008 and 2013. Due to this, the exact dates of each record could not be determined and therefore all records within this group have been listed.
Feathered gothic	<i>Tholera decimalis</i>	Section 7	Five records 358 m south.	2013	-
Shaded broad-bar	<i>Scotopteryx chenopodiata</i>	Section 7	10 records 358 m south.	2013	Some records older than 10 years were reported in the following group: 10 records between 2010 and 2013.
White ermine	<i>Spilosoma lubricipeda</i>	Section 7	24 records 358 m south.	2013	Some records older than 10 years were reported in the following group : 24 records between 2008 and 2013.
Dingy skipper	<i>Erynnis tages</i>	Section 7	Three records. Closest record is 1273 m south.	2013	-
Double dart	<i>Graphiphora augur</i>	Section 7	36 records. Closest record is 358 m south.	2014	Some records older than 10 years were reported in the following group: 35 records between 2008 and 2013.
Grayling	<i>Hipparchia semele</i>	Section 7	One record. Closest record is 108 4m south-east.	2014	-

Species / Group	Scientific name	Status ²⁰	Summary of records	Year of nearest record	Comments
Silurian	<i>Eriopygodes imbecilla</i>	Section 7	Two records 358 m south.	2014	-
Small pearl-bordered fritillary	<i>Boloria selene</i>	Section 7	Five records. Closest record is 573m north-east	2014	-
Grey dagger	<i>Acrionicta psi</i>	Section 7	23 records. Closest record is 358 m south.	2014	Some records older than 10 years were reported in the following group: 22 records between 2008 and 2013.
Small heath	<i>Coenonympha pamphilus</i>	Section 7	16 records. Closest record is 342 m west.	2014	Some records older than 10 years were reported in the following group: 2 records between 2009 and 2013.
Dusky brocade	<i>Apamea remissa</i>	Section 7	43 records. Closest record is 358 m south.	2014	Some records older than 10 years were reported in the following group: 29 records between 2008 and 2013.
Autumnal rustic	<i>Eugnorisma glareosa</i>	Section 7	22 records. Closest record is 358 m south.	2016	Some records older than 10 years were reported in the following group: 21 records between 2007 and 2013.
Cinnabar	<i>Tyria jacobaeae</i>	Section 7	36 records. Closest record is 342 m west.	2016	Some records older than 10 years were reported in the following groups: 3 records between 2014 and 2016; and 23 records between 2008 and 2012.
Small phoenix	<i>Ecliptopera silaceata</i>	Section 7	40 records 358 m south.	2016	Some records older than 10 years were reported in the following group: 39 records between 2008 and 2013.

3.2 Field Survey

A brief description of each of the habitats found within the site boundary is given in Section 3.2.1 below. The habitats are listed in order of their JNCC habitat code. An assessment of the potential of the site for supporting protected species is given in Section 3.2.2 and target notes recorded during the field survey in April 2020 are given in Section 3.2.3.

3.2.1 Habitats

Sixteen habitat types were identified on site. These are described below and shown on Figure 4. Photographs are given at the end of this report.

3.2.1.1 Semi-Natural Broadleaved Woodland (A1.1.1)

There was a small area of semi-natural broadleaved woodland within a conifer plantation in the southern part of the site (Photograph 7). The canopy comprised largely oak species (*Quercus* sp.), with scattered willow (*Salix* sp.) and alder (*Alnus glutinosa*). Willow and alder also occurred along the edges of the conifer plantation. Hazel (*Corylus avellana*) and hawthorn (*Crataegus monogyna*) were also evident in the canopy. The ground flora comprised dense bramble (*Rubus fruticosus* agg.), with scattered ferns such as male fern (*Dryopteris filix-mas*).

3.2.1.2 Plantation Coniferous Woodland (A1.2.2)

A conifer plantation was present in the south of the site, planted on sloping ground which adjoined the A465. Species comprised pine (*Pinus* sp.), spruce (*Picea* sp.) and larch (*Larix* sp), the latter being planted on the lower, southerly section of the plantation. The understorey was sparse and supported very limited ground flora.

3.2.1.3 Dense/Continuous Scrub (A2.1)

Dense willow, alder and bramble scrub were present around the periphery of grassland areas, and lining ditches/standing water.

3.2.1.4 Scattered Scrub (A2.2)

Scattered willow and gorse (*Ulex* spp) scrub was present throughout areas of grassland. Other scrub species present included bramble, broom (*Cystitis scoparius*), birch (*Betulus* spp), and alder seedlings.

3.2.1.5 Mixed Scattered Trees (A3.3)

Larch, pine and spruce trees occurred in lines along the stream, as well as adjacent to the building to the south of the site (Photograph 3). Occasional broadleaved species were also present including alder, birch and willow.

3.2.1.6 Acid Grassland – Semi-Improved (B1.2)

The western part of the site supported short acid grassland (Photograph 2) which in places occurred in a mosaic with short perennial vegetation, particularly adjacent to the track. The grassland comprised red fescue (*Festuca rubra*), sheep's fescue (*F. ovina*), cat's ear (*Hypochaeris radicata*), hawkbit (*Leontodon* sp.), bent grass (*Agrostis* sp.), tormentil (*Potentilla erecta*), common knapweed (*Centaurea nigra*), mat grass (*Nardus stricta*), crested dog's-tail (*Cynosurus cristatus*), tufted hair-grass (*Deschampsia cespitosa*), field wood-rush (*Luzula campestris*), coltsfoot (*Tussilago farfara*) and common bird's-foot-trefoil (*Lotus pedunculatus*). In one location there was a larger area of Purple moor grass (TN 16) although generally this grass species was scattered throughout the grassland, along with soft rushes (*Juncus effusus*) and hard rush (*J. inflexus*), thistles (*Cirsium* spp.), and sedges, particularly glaucous sedge (*Carex flacca*) which was abundant in places. Occasional ling heather (*Calluna vulgaris*) and bilberry (*Vaccinium myrtillus*) were also present around the periphery of grassland areas, in addition to tormentil (*Potentilla erecta*).

3.2.1.7 Marshy Grassland (B5)

A large proportion of the open areas of the site were dominated by purple moor grass (Photograph 9), occurring with other species such as common sorrel (*Rumex acetosa*), soft rush, fox glove (*Digitalis purpurea*) and tufted hair-grass. Ling heather and bilberry were present in places and bracken (*Pteridium aquilinum*) was also present at the edges of areas of marshy grassland. The majority of the marshy grassland appeared to be species poor, being largely dominated by purple moor grass and with limited presence/diversity of broadleaved herbs. In enclosed areas in the eastern part of the site, marshy grassland was heavily grazed with bare peat exposed in places (TN 14, photograph 10).

In one part of the site, within marshy grassland, sphagnum moss was frequent, and occurred with cross-leaved heath (*Erica tetralix*) (TN 15), as well as other herbs such as cuckoo flower (*Cardamine pratensis*), tormentil and bistort (*Persicaria* spp.).

3.2.1.8 Acid/Neutral Flush (E2.1)

A flush was present running through an area of grazed marshy grassland in the eastern part of the site.

3.2.1.9 Standing Water (G1)

In a fairly open area of marshy grassland, a wide ditch was present (approximately 3 m) (TN 9, photograph 11). The aquatic vegetation was more diverse and comprised a large proportion of pondweeds (*Potamogeton* spp.) and other species such as lesser spearwort (*Ranunculus flammula*) and sweet-grass (*Glyceria* spp.). The water level was low at the time of the survey, and only small areas of open water were present. A few trees and scrub were present alongside sections of the ditch including willow and bramble.

Within the conifer plantation, two ditches occurred parallel, in lower lying areas between areas of the plantation. At the time of the survey, sections of these ditches had small areas of shallow water, with abundant sweet-grass and some spearwort (TN 5).

A man-made ditch occurred along the southern boundary of the site, at the bottom of the A465 embankment (Photograph 12). This comprised a stony bank/channel and at the time of survey, supported water throughout the ditch. Soft rush was abundant along the edge of the channel, although no other aquatic plants within the channel were noted.

An attenuation lagoon (Photograph 14) occurred to the south east of the site, approximately 120 m from the boundary. This appeared to be a recently man-made lagoon, as a holding for surface run-off from the adjacent, newly constructed section of the A465. The lagoon was approximately 80 m long and 30 m wide, with sloping earth banks, and gravel/shingle edges. It supported deep water, and dense bulrush (*Typha* sp.) was evident at the western end. It was not possible to closely inspect the lagoon due to secure fencing.

3.2.1.10 Running Water (G2)

A stream flowed through the site, into a culvert under the A465 (Photograph 6), and, according to OS mapping, connected to the Afon Ebbw approximately 1.2 km downstream. The stream was lined with a half of a corrugated metal pipe (approximately 50 cm wide), with 45-degree vegetated slopes either side. At the location of the track, which led to the reservoir, the stream was also culverted through a pipe with concrete lined banks either side. At the time of the survey, there was a low volume of water within the channel, which flowed slowly.

A smaller stream flowed through the site (TN 10, photograph 4), further west of the main stream, also running under the track (through two small metal pipes). It occurred adjacent to an earth bank and was surrounded by dense willow and bracken scrub. Vegetation comprised willowherb (*Epilobium* spp.), sweet-grass, soft rush and horsetail (*Equisetum* spp.). At the time of the survey sections of the stream supported a small volume of water, and in places was orange in colour (possibly polluted by iron oxide).

3.2.1.11 Ephemeral/Short Perennial Vegetation (J1.3)

The western part of the site supported grassland, which also occurred in a mosaic with short perennial vegetation (Photograph 1) particularly in areas lying adjacent to the track. These areas comprised low lying vegetation such as ribwort plantain (*Plantago lanceolata*), common cat's-ear (*Hypochaeris radicata*), mouse-ear hawkweed (*Pilosella officinarum*), sedges, daisy (*Bellis perennis*) and mosses. Glaucous sedge was also present.

3.2.1.12 Fence (J2.4)

Stock fences separated fields, to the east of the conifer plantation, and also separated the northern boundary of the site, with conifer plantation/moorland to the north.

3.2.1.13 Earth Bank (J2.8)

An earth bank separated the lower grassland plateau from marshy grassland to the site.

3.2.1.14 Buildings (J3.6)

No buildings were present within the site boundary. A building complex was present to the south, which appeared to be largely derelict, and another building, was present to the north of the site, which appeared to be in use.

3.2.1.15 Bare Ground (J4)

A narrow bare earth track runs along the eastern side of the conifer plantation joining the main track which leads to the reservoir.

3.2.1.16 Gravel/Hard Standing (J5)

A track dissected the centre of the site comprising compacted gravel/stone, and connected the Rassau Industrial Estate to the west with Carno Reservoir to the east.

3.2.2 Species

3.2.2.1 Bats

The grassland and waterbodies within the site, are likely to offer good opportunities for foraging bats. A range of bat species (including Daubenton's, noctule, brown long-eared, Natterer's bat and other myotis species) have been recorded in the wider area and are considered likely to use the site for foraging. The stream, and other habitat features such as trees within the site are considered likely to be used as features for navigation locally, but more optimal habitats for commuting through the wider area/county occur immediately to the east; comprising the reservoir and sheltered tree-lined River Ebbw.

One broadleaved tree within the conifer plantation had snagged branches which may support bat roosts (TN 8). There were no buildings/structures within the site, but those adjacent could support bat roosts.

3.2.2.2 Badger

The site contains large areas of plantation, grasslands and scrub that offer suitable habitat for badger sett building, commuting and foraging.

Records exist of badger using the site, although no signs of badger were recorded during the survey. A number of mammal holes were recorded, but were assessed as being too small for badger and more likely fox (*Vulpes vulpes*) or rabbit (*Oryctolagus cuniculus*). One hole had a pile of recently dug earth outside, more typical of badger however (Photograph 8).

3.2.2.3 Dormouse

No records of dormouse were returned from the desk study.

The conifer plantation is sub-optimal habitat for dormice, and since it is not connected to larger areas of broadleaved woodland, or significant areas of dense scrub, the presence of dormouse is considered unlikely. As such, this species is not considered further in this report.

3.2.2.4 Otter

No evidence of otter was found during the survey. The waterbodies on site are considered to be sub-optimal for otter since they appear to be ephemeral and therefore are not likely to provide key food sources such as fish. The nearby Carno reservoir (approximately 150 m), and adjoining river/woodland, is likely to provide optimum habitat for otter however.

The presence of the reservoir nearby, and the existence of otter records in the wider area, suggests that foraging/commuting otter could occur within the site. Furthermore, local SINC designations, including the River Ebbw, cite otter as a qualifying feature, and otter are known to travel large distances²¹. The dense scrub, trees and woodland within the site could provide suitable habitat for resting and breeding otter.

3.2.2.5 Water Vole

No records of water vole were returned from the desk study and no signs of water vole were recorded during the survey. The majority of waterbodies within the site were assessed as being unsuitable for this species, due to either comprising a stony bank or having a metal lining and therefore not offering burrowing opportunities. One of the streams, and one of the ditches which were within grassland, north of the conifer plantation, could be suitable for water vole due to the presence of earth banks, although these areas are considered to be sub-optimal due to being ephemeral waterbodies and not connected to any other areas of water. Furthermore, both waterbodies supported little emergent aquatic vegetation, which would provide a food source for water vole. As such, this

²¹ http://www.mammal.org.uk/sites/default/files/factsheets/otter_complete.pdf

species is considered unlikely to be present within the site, and is not considered further in this report.

3.2.2.6 Other Mammals

Signs of rabbit were found throughout the site, particularly in grassland areas, and a number of mammal holes (TN 7) were recorded within the conifer plantation, which were considered likely to be used by fox or rabbit. A fox scat was also recorded at one location (TN 1).

The site's habitats could be suitable for a number of Section 7 species, including European polecat (*Mustela putorius*), hedgehog and potentially brown hare (*Lepus europaeus*).

3.2.2.7 Birds

A number of birds were recorded during the survey including species such as bullfinch (*Pyrrhula pyrrhula*) (TN 1). Plantation, trees, scrub and tall/tussocky grassland are likely to provide nesting habitat for a range of bird species. In addition, more open areas with short grassland swards occurring in a mosaic with bare ground, could support ground nesting species such as lapwing (*Vanellus vanellus*).

The conifer plantation has the potential to support breeding species such as crossbill (a WCA Schedule 1 species) and long-eared owl (*Asio otus*); marshy grassland could support species such as snipe (*Gallinago gallinago*); broadleaved trees could support barn owl (a WCA Schedule 1 species); tall grassland could support species such as skylark (*Arlauda arvensis*) and willow scrub could support grasshopper warbler (*Locustella naevia*).

Hen harrier (a WCA Schedule 1 species) have also been recorded within 500 m of the site, however habitats on site are considered unsuitable for breeding for this species due to the limited extent of marshy grassland, however it could use the site for foraging.

3.2.2.8 Reptiles

The extent and mosaic of habitats within the site, particularly species-rich grassland, marshy grassland, scrub, areas of bare ground/short perennial vegetation and waterbodies, are likely to provide optimum habitat for a good population of reptiles.

Records exist of common lizard within the wider area, and during the survey two common lizards were recorded during the survey beneath bitumen felt (TN 12, photograph 15), presumably left on site following previous surveys. An artificial amphibian/reptile refugium had been constructed at one location (TN 13, photograph 13).

Other species of reptiles considered likely to occur include slow worm (*Anguis fragilis*), grass snake (*Natrix natrix*) and adder (*Vipera berus*).

3.2.2.9 Amphibians

No records of amphibians were identified by the data search, including great crested newts (GCN). Frogspawn, likely that of common frog (*Rana temporaria*), was recorded in a small area of water in one of the ditches (TN 9).

A number of areas of standing water were present within the site, and adjacent to the site. Those within the site appeared to be ephemeral; drying out during periods of prolonged dry weather (and largely dry at the time of the survey). As such it is possible, that these waterbodies would be suitable for a range of breeding amphibians (in addition to common frog, which have been recorded), providing they support sufficient water during the breeding season. Ephemeral waterbodies are less likely to support fish predators. The attenuation pond to the south-east of the site supported a much larger volume of water and appeared to be more permanent. However, if fish were present, it would make this waterbody less suitable for amphibians.

It is also likely that any amphibians breeding within waterbodies within the site and wider area, would use suitable connecting terrestrial habitat such as grassland and scrub for foraging, shelter and hibernation. A man-made refugium was recorded (TN 13, photograph 13) (adjacent to the ditch, south of the conifer plantation), which would be suitable for amphibians.

GCN have not been recorded within the wider area, but suitable breeding waterbodies were present within the site, and to the south-east (approximately 120 m). Therefore, the presence of GCN within the site cannot be excluded, until presence/absence within these waterbodies has been undertaken. Great crested newts do not typically range far from their breeding ponds (up to 1.3 km)²² and tend to be found within 250 m of a breeding pond. No other ponds were visible to the north, up to 250 m from the site, and barriers to GCN movement into the site from any other ponds, south or west of the site exist including the A465 and Rassau Industrial Estate.

3.2.2.10 Fish

Waterbodies within the site supported very little water at the time of the survey, although it is likely that during periods of high rainfall water levels are higher. Due to the ephemeral nature of these waterbodies, it is unlikely they support fish or at least significant fish populations. The attenuation lagoon south east of the site, may support fish however.

The watercourses, similarly supported little water at the time of the survey although it is likely there would be a larger volume of water/faster flow during periods of high rainfall which could support fish. It is however considered very unlikely that the watercourses within the site would be used by fish due to the poor/lack connectivity to other watercourses.

²² English nature (2001). Great crested newt mitigation guidelines.

3.2.2.11 Invertebrates

The grassland on site may provide suitable habitat for notable invertebrate species, including Section 7 butterflies, moths, and bumblebees. None were recorded during the survey however. Brownfield sites such as this one, with a typical mosaic of habitats, are ideal for many invertebrates which have complex life-cycles requiring two or more habitats close to each other²³.

3.2.2.12 Invasive Non-Native Species

Rhododendron (*Rhododendron ponticum*) was recorded at one location within the site, adjacent to the stream (TN 11). This species is listed on Schedule 9 of the WCA.

3.2.3 Target Notes

The target notes identified during the field survey are described in Table 4 below. Photographs are given at the end of this report.

Table 4: Target notes recorded on site.

Target Note Number	Target Note Description
TN1	Fox scat.
TN2	Sighting of one bullfinch flying over site. Heard 2 wood warbler one site, robin, magpie, wren, blackbird, carion crow, great tit, blackbird and goldcrest.
TN3	Bird remains (feathers). Potentially a buzzard.
TN4	Stream approx. 2 m width at widest part. Not flowing but may do after rainfall. Earth bank on eastern side, and dense scrub either side. Polluted. Runs to south.
TN5	Ephemeral pool with pondweed and spearwort. Frogspawn. Forms part of larger ditch in plantation.
TN6	Patch of broadleaved woodland within conifer plantation.

²³ <https://www.buglife.org.uk/our-work/brownfields/>

Target Note Number	Target Note Description
TN7	Mammal hole. Small hole but lots of earth dug out typical of badger.
TN8	Tree with low bat roost suitability; snapped branches and hazard beam. Diameter 1 m, height 8 m.
TN9	Ditch: approx 4 m wide. Species include rushes, bulrush and pondweed.
TN10	Running stream: approx. 2 m in width. Plastic lining and pipe. Runs from north to south.
TN11	Rhododendron next to stream on eastern side.
TN12	Sightings of 2 adult common lizards under bitumen mat.
TN13	Artificial reptile/amphibian hibernacula.
TN14	Area of bare peat.
TN15	Area of sphagnum moss and cross-leaved heather.
TN16	Area of purple moor grass.
TN17	Grassland embankment scattered with saplings of conifer and broadleaved species.

4 Recommendations

Recommendations for further consultation, further species surveys or general best practice mitigation to minimise impacts of the proposed works on habitat and species are stated below, in line with PEA guidance²⁴. Measures to enhance biodiversity are also recommended in this section.

4.1 Further Surveys/Assessment and Consultations

4.1.1 Species

4.1.1.1 Bats

Bats are protected under the WCA and Habitat Regulations (as amended). They are protected from disturbance, capture, injury and killing and their roosts are protected from obstruction, damage or destruction.

Only one tree (TN8) was found to have potential bat roosting features during the survey. However, a comprehensive ground level assessment of all trees and structures within the site was not undertaken, in order to confirm the absence of additional roosting features elsewhere. Buildings to the south and north of the site could also provide roosting opportunities for bats.

A preliminary ground assessment of all trees and buildings within and adjacent to the site should be undertaken, to confirm the presence of potential bat roosting features and or signs of bat roosting, in accordance with best practice guidance¹².

If any trees with moderate or greater potential for bat roosts are to be removed or if there is potential for disturbance within 30 m of these, further surveys should be undertaken to confirm presence/likely absence of roosting bats in line with good practice guidelines¹². These may comprise climbing surveys (for trees), or emergence/re-entry surveys (for buildings and trees). At least two further surveys would be required.

If significant vibrations are likely to occur as part of the works, a buffer of 60 m should be used to determine trees/buildings which need further survey work (as detailed above), to confirm the presence/likely absence of roosting bats.

If any bat roosts are found and are likely to be disturbed by the works, a licence will be required from NRW.

Due to the presence of habitats within the site being of moderate value for foraging bats, it is also recommended that bat transect surveys are undertaken monthly from April to October 2020 (inclusive) in accordance with best practice

²⁴ Chartered Institute of Ecology and Environmental Management (CIEEM) (2017). Guidelines for Preliminary Ecological Appraisal. Second Edition. Available online at: <https://cieem.net/resource/guidance-on-preliminary-ecological-appraisal-gpea/> (accessed 09/04/20).

survey guidance¹². Static bat activity monitoring should also be undertaken between April to October 2020, in accordance with best practice survey guidance¹².

4.1.1.2 Otter

Otters are protected under the WCA and Habitat Regulations. Under this legislation, they are protected from disturbance, capture and injury/killing. Their breeding sites and resting places are also protected from damage and destruction.

Due to the presence of suitable habitat within the site, targeted surveys should be undertaken to confirm the presence/absence of otter. This would involve two survey visits between April and September 2020, which would follow best practice survey guidelines¹⁶.

If any otter resting and/or breeding places are found and are likely to be disturbed by the works, a licence will be required from NRW.

4.1.1.3 Badger

Badgers are protected under the Protection of Badgers Act 1992. They are protected from disturbance (while in their setts), injury and killing. Setts are also protected from obstruction, damage or destruction.

Further surveys should be undertaken in suitable habitat to confirm the presence of this species, including any setts, in accordance with best practice guidance¹³.

If any setts are found and could be damaged or disturbed by the works, a licence will be required from NRW. The impact of any vibration effects should also be considered, and where likely to occur a larger search area (60 m) should be used to confirm the presence/absence of badger setts.

4.1.1.4 Breeding Birds

All wild birds, their young and nests are protected under the WCA from taking, injury and killing. Birds under Schedule 1 of the WCA are also protected against disturbance while nesting.

A breeding bird survey is recommended in all suitable habitats within the site in accordance with good practice guidelines^{25,26}, to confirm breeding species and distribution.

4.1.1.5 Reptiles

Reptiles are protected from reckless or intentional harm under the WCA.

²⁵ Bibby, B.B., (2000). Bird Census Techniques. London: Academic Press.

²⁶ Gilbert, G.G., Gibbons, D.W. and Evans, J.,(1998). Bird Monitoring Methods: A manual of techniques. Bedfordshire, RSPB.

Common lizard presence has been confirmed within grassland on the site. A reptile survey of suitable habitats within the site is recommended, to determine population size and distribution. This should follow best practice guidelines^{18,27}.

4.1.1.6 Amphibians

GCN are protected under the WCA and Habitat Regulations. Under this legislation, they are protected from disturbance, capture and injury/killing. Their breeding site and resting places are also protected from damage and destruction.

It is recommended that an environmental DNA (eDNA) survey is undertaken, following best practice²⁸, to confirm presence of GCN in suitable waterbodies, between the beginning of April and the end of June 2020.

Where presence is confirmed, waterbodies should be subject to additional population monitoring in the form of six visits, following best practice guidelines²². If any resting/breeding places could be damaged or disturbed by the works, a licence will be required from NRW.

4.1.1.7 Invertebrates

The mosaic of habitats within the site, are likely to support a range of notable invertebrates. As such an invertebrate survey is recommended, to establish notable species present, their distribution and key habitats where they occur. Sampling sessions should be undertaken between spring and early autumn 2020 and timed to coincide with the peak periods of invertebrate activity.

4.1.1.8 Invasive Non-Native Species

Schedule 9 Of the WCA makes facilitating the spread of listed invasive species, an offence. Rhododendron was found during the field survey at one location.

It is recommended that a INNS survey is undertaken across the site, at an optimal time of year (July to September 2020) to confirm presence of all likely INNS; since the survey was undertaken in early April when some species may have been less visible.

4.1.1.9 Habitats and Plant Communities

The Phase 1 survey does not intend to provide an exhaustive list of species, and furthermore was undertaken at a time of year when floral species would have been more difficult to survey.

Therefore a National Vegetation Classification (NVC)²⁹ survey is recommended, of habitats deemed to be of highest value for nature conservation, to provide

²⁷ Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

²⁸ Biggs *et al.*, (2014) Using eDNA to develop a national citizen science-based monitoring

²⁹ Rodwell *et al.* (1991) National Vegetation Classification Survey.

botanical detail to the Phase 1 survey, and describe the range of variation within the main habitats of nature conservation significance by categorising them in terms of the NVC.

4.2 Protected Sites

A Habitat Regulations Assessment (HRA) should assess potential pathways for effect on internationally designated sites within 10 km of the Site. As a result of new case law as ruled by the European Court of Justice (ECJ, 2018)³⁰, mitigation measures cannot be included within the Screening Stage of HRA, and therefore any potential pathways for effect will need to be evaluated within an Appropriate Assessment. The HRA report will require consultation and agreement with Conservation Staff in NRW.

For any planning applications, the Local Planning Authority (LPA) will also require a copy of the Appropriate Assessment as it assumed they would become the 'competent authority'.

Consultation should be undertaken with relevant teams within NRW regarding impacts on the nearby SSSI's: Mynydd Langatwg and Mynydd Llangynidyr. Consideration should also be given to potential impacts on qualifying bat features of SSSIs within 10 km: Cwm Clydach, River Usk (Upper Usk), River Usk (Tributaries), Siambre Ddu and Buckland Coach and Ice House SSSIs.

4.3 During Vegetation Clearance and Construction (subject to further surveys being undertaken)³¹

4.3.1 General

A toolbox talk should be given to all contractors working within the site by a Suitably Qualified Ecologist (SQE) prior to works, detailing the potential for protected species/habitat within the site, the working methods to be employed and the procedure to follow should any species be identified. A record of attendance should be kept on site, which contractors should sign to indicate they have understood the toolbox talk.

4.3.2 Habitats

Best practice guidelines should be implemented for all works in proximity to watercourses/waterbodies:

- A Construction Environmental Management Plan (CEMP) will be produced and should be maintained by the contractor during the construction phase. This will include site-specific methods to ensure that all Site activities,

³⁰ ECJ (2018). People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

³¹ Further to additional surveys, it may be necessary to change the recommendations provided below for during clearance and construction, and provide additional recommendations for mitigation based on the presence of protected species or notable habitats.

especially those in proximity to watercourses and waterbodies are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (GPPs) and industry best practice (GPP5³², CIRIA³³).

- Habitats of conservation significance should be protected where possible. If these habitats are disturbed and or lost during clearance/construction, they should be re-instated/re-planted within suitable locations in the site and or on adjacent land³⁴.

4.3.3 Species

General advice is detailed below, based on the likely presence of these species. More specific advice will need to be provided further to targeted species surveys which are proposed in Section 4.1.

- All works should be carried out during daylight hours (typically up to 30 minutes before sunset and 30 minutes after sunrise) within the main active period (April to October) where possible, to avoid disturbance to nocturnal animals such as bats, otter and badger.
- In addition, to protect to avoid nocturnal animals such as bats, otter and badger, any task lighting required for health and safety or security reasons should be directional lighting (towards the ground) to avoid light spill onto habitats immediately within or adjacent.
- Good practice working methods should be adhered to which to prevent any adverse impact to otter, badger and other mammals; i.e. excavations should not be left uncovered overnight. If any excavations are required to be left open overnight, a ramp should be created to allow any animals to escape.
- Vegetation clearance should be minimised and should avoid the bird nesting season (March to September) however, if required during this time, a check to confirm the presence/absence of bird nesting activity should be undertaken prior to clearance. If nests are found further work will need to be delayed until young have fledged and left the nest, and the nest is no longer in use.
- Vegetation clearance in areas suitable for reptiles should be undertaken in two stages: with the first cut to 200 mm and then 24 hours later cutting vegetation to the ground; working towards retained vegetation and undertaking finger-tip searching prior to ground level clearance. This should also be undertaken in warm weather when reptiles are active.
- An INNS management plan should be produced in order to prevent the spread of these species during construction, and eradicate where possible.

³² Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), Scottish Environment Protection Agency (SEPA) (2018). Guidance for Pollution Prevention – Works or maintenance in or near water: GPP5 v1.2 Feb 2018. <http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf> (accessed 15.02.19)

³³ CIRIA (2018) CIRIA <http://www.ciria.org> (accessed 15.02.19)

³⁴ unless habitats are judged to be ‘irreplaceable’ and cannot be easily re-created for example peat habitats or ancient woodland, in which case impacts should be avoided.

- Method statements detailing specific avoidance measures and mitigation for protected and or notable species, confirmed to be present on site, should be produced and implemented during clearance and construction. Where protected species licences are also required from NRW, these method statement will need to be submitted with the licence application.

4.3.4 Enhancement Measures

Measures are recommended to enhance the biodiversity within the site and surrounding area, will need to be implemented in line with national policy³ during design, construction and operation. Specific details will need to be provided further to the completion of additional surveys but may comprise:

- The deployment of bird and bat boxes;
- The inclusion of logs/brush piles to encourage invertebrates and also act as a refuge for reptiles, amphibians and small mammals;
- The creation of semi-natural habitats such as waterbodies, species-rich grassland and woodland, using native plants which provide food sources for invertebrates, birds and mammals; and
- The creation of green roofs on buildings.

The long-term management plans will be required for any notable retained habitats as well as and newly created habitats to ensure desired ecological value and botanical communities are retained and created, respectively.

5 Summary and Conclusions

Two internationally designated sites were present within 5 km of the site. Two nationally designated sites, and numerous locally designated sites were present within 2 km of the site. Additionally, 5 nationally protected sites designated for bats were identified within 10 km of the site.

Habitat assessed during the field survey included: conifer plantation and semi-natural broadleaved woodlands, scrub, short perennial vegetation, acid and marshy grasslands, bare ground and gravel/stone tracks, watercourses and standing water.

The site has the potential to support roosting and foraging bats, badgers, otters, birds, reptiles, amphibians, invertebrates and other Section 7 species.

Further surveys have been recommended to provide additional information on the presence/likely absence of protected species within the site. In addition, precautionary methods of working have been recommended to avoid potential impacts to species/habitats during the proposed works. Additional vegetation surveys are also recommended. Further to additional surveys being undertaken, it may also be necessary to provide further recommendations for avoidance/mitigation measures with regard to these species.

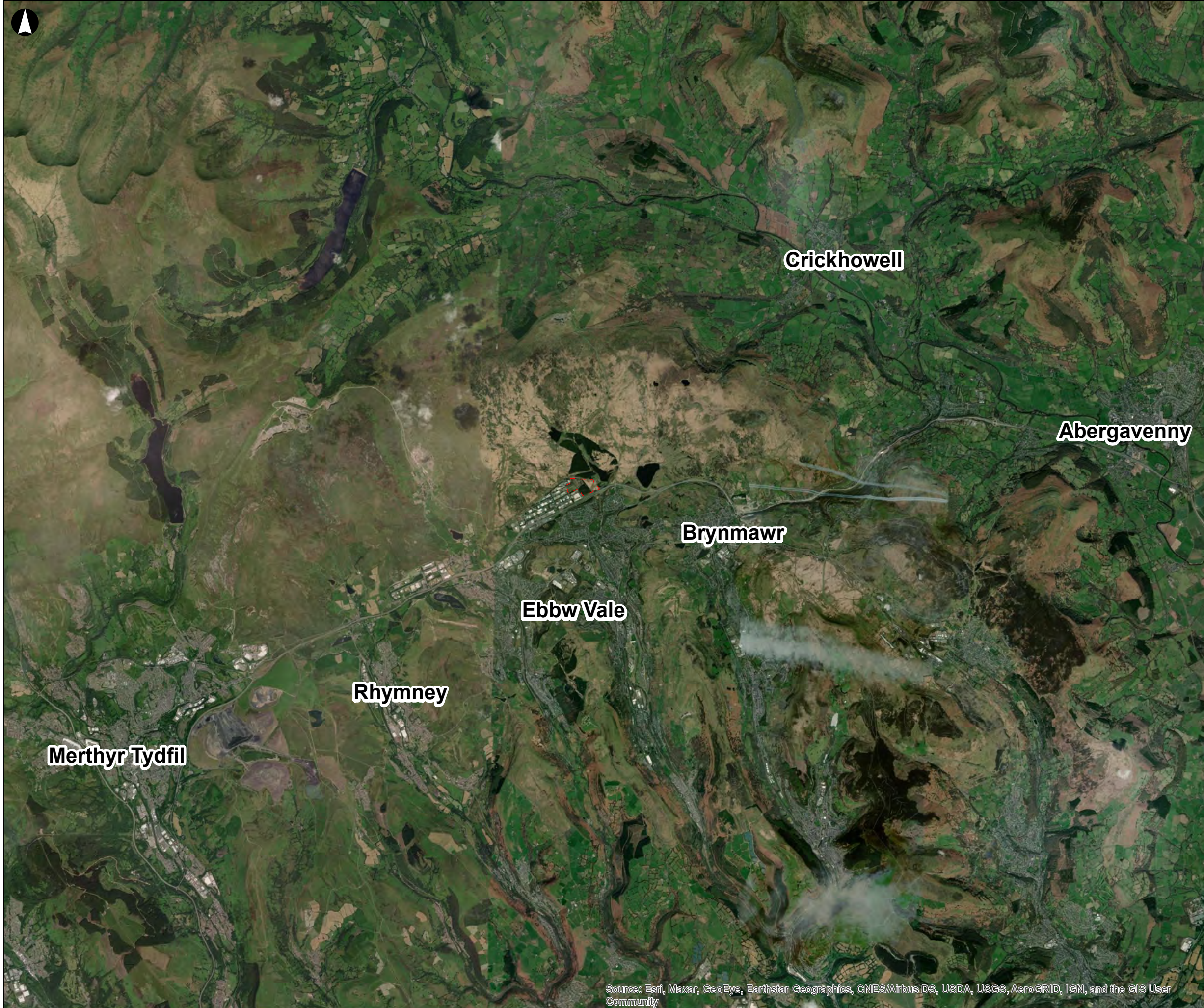
Rhododendron, an invasive non-native species was found within the site and it is recommended that an invasive species management plan is produced.

Enhancements proposed within the site include the deployment of bird and bat boxes and of logs/brush piles for invertebrates, reptiles, amphibians and small mammals, along with the creation of semi-natural habitats and green roofs.

This report is the result of survey work undertaken in April 2020. This report refers, within the limitations stated, to the condition or proposed development of the site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. It is also advised that if there is a delay of over two years in undertaking the works, an updated walkover survey is recommended to ensure the baseline conditions have not changed. No warranty is given as to the possibility of future changes in the condition of the site.

This report is produced solely for the benefit of CiNER Glass Ltd and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

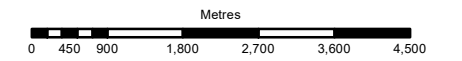
Figures



Legend

Site boundary

Coordinate System: British National Grid



F1	2020-11-20	KJ	CP	PC
Rev	Date	By	Chkd	Appd

ARUP

4 Pierhead Street
Cardiff CF10 4QP
Tel +44 29 2047 3727 Fax +44 29 2047 2277
www.arup.com

Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Site Location

Scale at A3

1:90,000

Role

Suitability

For Issue

Arup Job No

273927

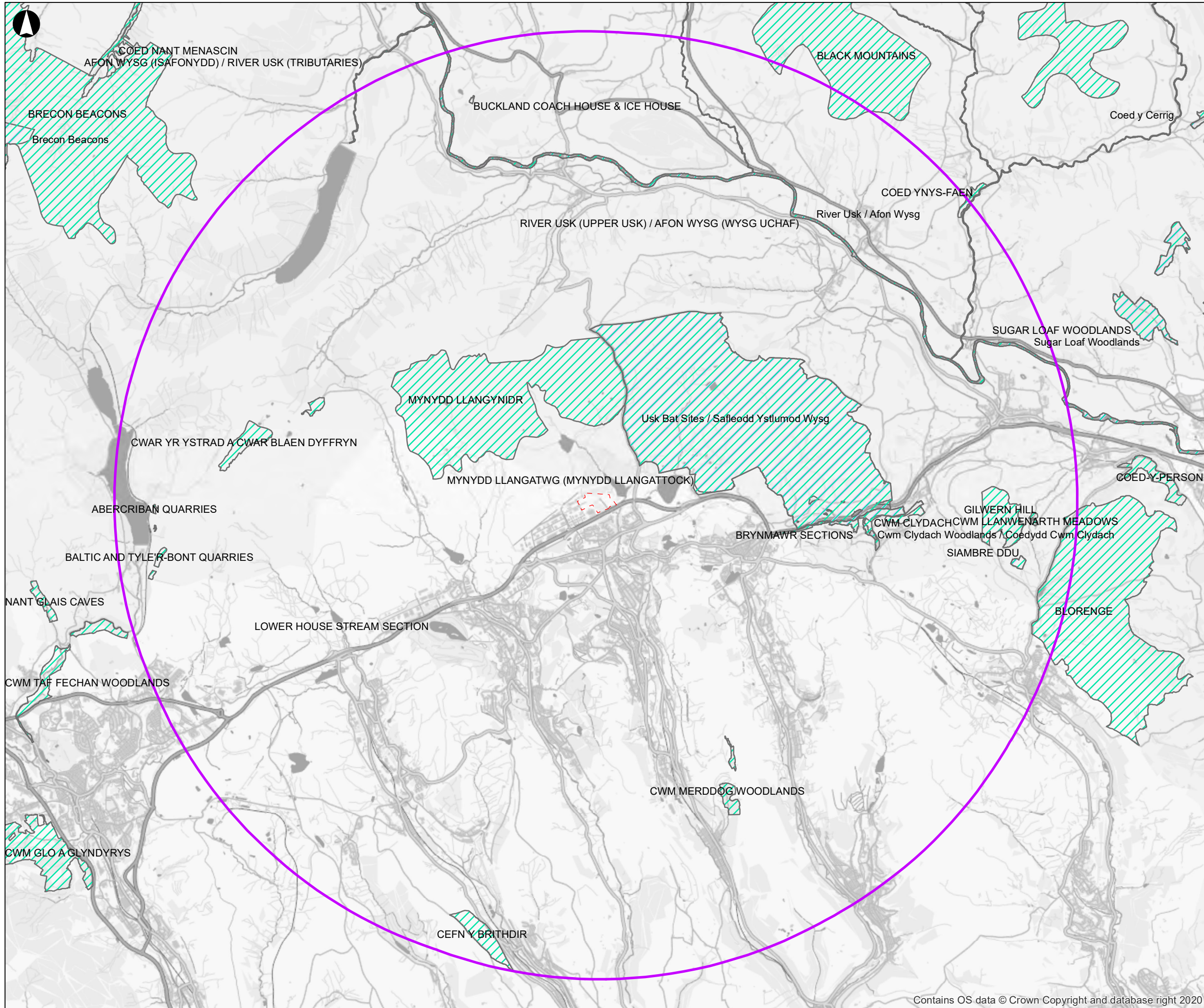
Rev

F1

Name

001

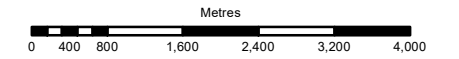
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Site boundary
- 10km Buffer
- Special Area of Conservation
- Site of Special Scientific Interest

Coordinate System: British National Grid



F1	2020-11-20	KJ	CP	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

International and National Designated within 10 km

Scale at A3

1:80,000

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

002

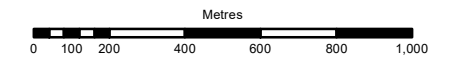
Contains OS data © Crown Copyright and database right 2020



Legend

- Site boundary
- Ancient Woodland
- Local Nature Reserve

Coordinate System: British National Grid



Rev	Date	By	Chkd	Appd
F1	2020-11-20	KJ	CP	PC

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Local Nature Reserves & Ancient Woodland within 2 km

Scale at A3

1:20,000

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

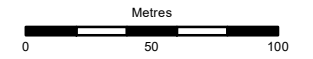
Name

003



- Legend**
- Site boundary
 - A1.1.1 - Broadleaved woodland - semi-natural
 - A1.2.2 - Coniferous woodland - plantation
 - A2.1 - Scrub - dense/continuous
 - A2.2 - Scrub - scattered
 - B1.2 - Acid grassland - semi-improved
 - B5 - Marsh/marshy grassland
 - G1 - Standing water
 - J1.3 - Cultivated/disturbed land - ephemeral/short perennial
 - J3.6 - Buildings
 - J5 - Gravel/hard standing
 - A2.2 - Scrub - scattered
 - A3.3 - Mixed parkland/scattered trees
 - E2.1 - Acid/neutral flush
 - J2.8 - Earth bank
 - J2.4 - Fence
 - J4 - Bare ground
 - G2 - Running water
 - G1 - Standing water
 - Target Notes

Coordinate System: British National Grid



F1	2020-11-20	KJ	CP	PC
Rev	Date	By	Chkd	Appd

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4 Pierhead Street
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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Extended Phase 1 Habitat Survey

Scale at A3

1:3,000

Role

Suitability

For Issue

Arup Job No

273927

Rev




F1

Name

004

Photographs

Photographs of the Site

	
<p>Photograph 1: Short perennial vegetation alongside track.</p>	<p>Photograph 2: Grassland on lower plateau to south of track.</p>
	
<p>Photograph 3: Line of mixed trees along southern boundary of grassland.</p>	<p>Photograph 4: Polluted ditch.</p>
	
<p>Photograph 5: Conifer plantation north of main stream, near reservoir.</p>	<p>Photograph 6: Stream with metal lining.</p>



Photograph 7: Broadleaved woodland within conifer plantation.



Photograph 8: A mammal hole.



Photograph 9: Purple moor grass east of stream.



Photograph 10: Bare peat.



Photograph 11: Ditch north of conifer plantation.



Photograph 12: Ditch along southern boundary of site.



Photograph 13: Artificial reptile/amphibian refuge.



Photograph 14: Attenuation lagoon.



Photograph 15: A common lizard found under bitumen felt.



Photograph 16: Grassland and scrub north of track.

Appendix A

Legislation

A1 Legislative Context

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This is described in the following sections.

A1.1 Statutory Designated Sites

A network of nationally designated sites has been established through the designation of Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation³⁵ (Natural Resources Wales).

The protection afforded to SSSIs is used to underpin the designation of areas at a European Level. European Sites comprise:

- Special Areas of Conservation (SAC) designated under the Conservation of Habitats and Species Regulations 2017 (known as the Habitats Regulations);
- Special Protection Areas (SPA) designated under the Wildlife and Countryside Act.

Wetlands of International Importance (Ramsar Sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are normally also notified as SSSIs but are only considered European Sites as a matter of UK and Local Government Policy.

The Habitats Regulations transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) in to law within England and Wales, while the Wildlife and Countryside Act transposes Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) in the law within England and Wales. Equivalent legislation exists to transpose these directives in the law within Scotland and Northern Ireland.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites are considered. Specifically Regulation 63(1) states:

“A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –

(a) is likely to have a significant effect on a European site or European marine site (either alone or in combination with other plans or projects), and

³⁵ Section 28 of the Wildlife and Countryside Act 1981 (as substituted by Schedule 9 of the Countryside and Rights of Way Act 2000).

(b) is not directly connected with or necessary to the management of that site,

must make an appropriate assessment of the implications for that site in view of that site's conservation objectives."

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority.

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949 (as amended). However this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation.

A1.2 European Protected Species

The Habitats Regulations convey special protection to a number of species which are listed in schedule 2 of the Regulations and are referred to as European Protected Species (EPS):

- All UK resident bat species;
- All whale and dolphin species;
- Large blue butterfly (*Maculinea arion*);
- Common dormouse (*Muscardinus avellanarius*);
- Pool frog (*Rana lessonae*);
- Sand lizard (*Lacerta agilis*);
- Fisher's estuarine moth (*Gortyna borelii lunata*);
- great crested newt (*Triturus cristatus*)
- common otter (*Lutra lutra*)
- wild cat (*Felis silvestris*);
- Lesser Whirlpool Ram's-horn Snail (*Anisus vorticulus*)
- Smooth snake (*Coronella austriaca*);
- Sturgeon (*Acipenser sturio*);
- Natterjack toad (*Bufo calamita*); and
- All marine turtles.
- Regulation 43 makes it an offence to:
 - a) Deliberately capture, injure or kill any wild animal of a EPS;
 - b) Deliberately disturb wild animals of such a species;
 - c) Deliberately takes or destroys the eggs of such a species;
 - d) Damages or destroys a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their

young, to hibernate, to migrate; or to affect significantly the local distribution of the species.

Licences can be granted by the relevant SNCO for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for “preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment”.

A2 UK Protected Species

A2.1 Wildlife and Countryside Act 1981

The Wildlife and Countryside Act 1981 provide protect to both EPSs and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

In England and Wales water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008. The Wildlife and Countryside Act 1981 together with amending legislation, lists the following offences:

- Intentionally killing, injuring or taking a water vole by any method;
- Intentionally or recklessly damaging or destroying a water vole place of shelter or protection;
- Intentionally or recklessly damaging disturbing a water vole whilst it is occupying such a structure or place it uses for shelter or protection;
- Intentionally or recklessly obstructing access to a water vole’s place of shelter or protection;
- Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

The Act also includes provisions for the control of invasive non-native species (INNS). Under these provisions it is an offence to:

- release or allow to escape into the wild any animal which is not ordinarily resident or a regular visitor to Great Britain, or is included in Schedule 9 of the Act;

- plant or otherwise cause to grow in the wild any plant which is included in Schedule 9 of the Act.

People undertaking works in proximity to invasive non-native plant species should take all reasonable steps and exercise all due diligence to avoid committing an offence.

A2.2 The Protection of Badgers Act 1992

Badger and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

A2.3 Eels (England and Wales) Regulations 2009

This implements Council Regulation (EC No. 1100/2007) of 18 September 2007 establishing measures for the recovery of the stock of European Eel (*Anguilla anguilla*). The Regulation requires Member States to implement a number of short and long-term measures to achieve a target of ensuring that at least 40% of the potential production of adult Eels return to the sea to spawn on an annual basis.

A2.4 Other Legislation Relating to Species

Section 6 of the Environment (Wales) Act 2016 includes a duty on all public authorities to “seek to maintain and enhance biodiversity” so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to “promote the resilience of ecosystems”. This duty applies to government bodies, local authorities and statutory undertakers.

To assist in complying with this duty, public authorities must have regard to relevant evidence provided in the State of Natural Resources Report and any relevant area statement for an area in which the authority exercises functions, as well as having regard to the list of living organisms and habitats published under Section 7 of the Act. Species and habitats listed on Section 7 are considered to be of Principal Importance for the conservation of biological diversity.

The Environment (Wales) Act 2016 replaces the NERC Act 2006; Section 6 replaces Section 40 of the NERC Act and Section 7 replaces the Section 42 lists.

A2.5 Hedgerow Regulations 1997

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of Important Hedgerows.

A2.6 National Park and Access to the Countryside Act 1949 (as amended)

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act

1949. However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation.

A3 Planning Policy

A3.1 Planning Policy Wales (PPW)

6.4.5. Statutorily designated sites must be protected from damage and deterioration, with their important features conserved and enhanced by appropriate management.

6.4.20. Although non-statutory designations carry less weight than statutory designations, they can make a vital contribution to delivering an ecological network for biodiversity and resilient ecosystems, and they should be given adequate protection in development plans and the development management process.

6.4.21. Planning authorities must follow a step-wise 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

6.4.22. The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration when a planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat and to ensure that the range and population of the species is sustained.

6.4.25. Planning authorities should protect trees, hedgerows, groups of trees and areas of woodland where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial and identified green infrastructure function. Planning authorities should consider the importance of native woodland and valued trees, and should have regard, where appropriate, to local authority tree strategies or SPG. Permanent removal of woodland should only be permitted where it would achieve significant and clearly defined public benefits. Where woodland or trees are removed as part of a proposed scheme, developers will be expected to provide compensatory planting.

6.4.26. Ancient woodland and semi-natural woodlands and individual ancient, veteran and heritage trees are irreplaceable natural resources, and have significant landscape, biodiversity and cultural value. Such trees and woodlands should be afforded protection from development which would result in their loss or deterioration unless there are significant and clearly defined public benefits; this protection should prevent potentially damaging operations and their unnecessary loss. In the case of a site recorded on the Ancient Woodland Inventory, authorities should consider the advice of NRW.

6.6.28 Nature based solutions should be the first consideration given the opportunity to deliver other multiple benefits, including habitat creation, biodiversity enhancement and water quality improvements. Overall, green infrastructure opportunities can benefit ecosystem resilience and provide opportunities for leisure facilities or renewable energy generation.

A3.2 National Planning Policy Framework (NPPF)

170a Planning policies and decisions should contribute to and enhance the natural and local environment by:

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

175) When determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons⁵⁸ and a suitable compensation strategy exists; and
- d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity

improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

176. The following should be given the same protection as habitats sites:

- a) potential Special Protection Areas and possible Special Areas of Conservation;
- b) listed or proposed Ramsar sites⁵⁹; and
- c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

177. The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats on site.

D3 NVC survey report

Ove Arup and Partners

Land at Rassau Industrial Estate

Vegetation survey



July 2020



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Cover photographs: Left: Mosaic of damp grassland and cleared scrub on industrial plateau; Right: mosaic of marshy grassland and heath north of coniferous plantation.

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1. Introduction

Ove Arup and Partners have commissioned Sturgess Ecology to undertake a vegetation survey of land at Rassau Industrial Estate (approximate central grid reference SO158128). The work is being carried out as part of a range of ecological surveys which are being undertaken on the site.

This report presents an outline of the survey methodology and summarises the findings through a series of vegetation descriptions and target notes. It then provides a preliminary assessment of the nature conservation value of the vegetation types surveyed.

An overview of the 19 hectare study area is presented on an aerial photograph background in Figure 1.

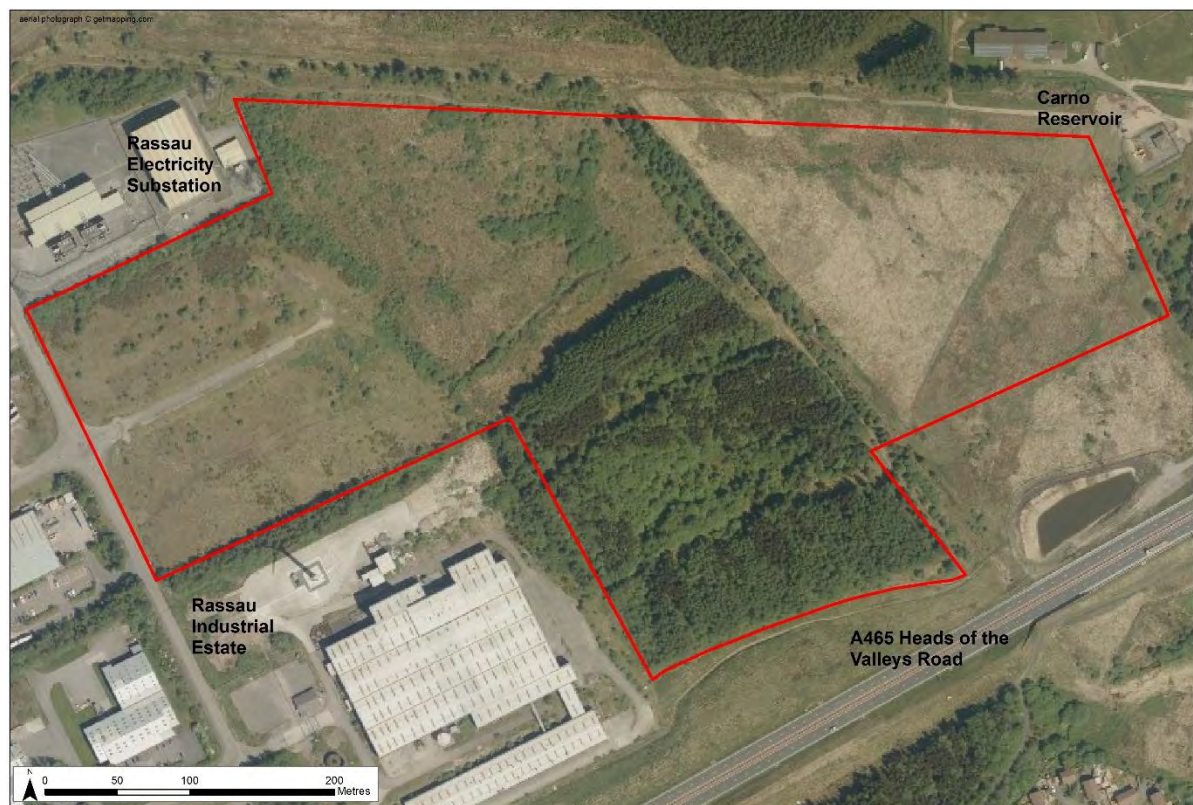


Figure 1. Overview of study area

2. Survey method

The objective of the study was to map and describe the plant communities within the site using National Vegetation Classification (NVC) methods.

The fieldwork and assessment were undertaken by Dr Peter Sturgess CEnv MCIEEM. He is an experienced botanist and familiar with the NVC.

The survey work was carried out on 7, 10 and 17 July 2020. This time of year is optimal for vegetation surveys, because many plants are flowering and readily identifiable. The weather during the surveys was mostly dry, although there were light showers on 7 and 10 July.

The survey was mainly using a simple walk-through method, walking the site to examine and map the various plant communities, and describing the vegetation by recording quadrats,

target notes and a species list. The main plant communities were plotted by eye onto an aerial photograph base plan. Photographs were also taken to illustrate the main types.

The vegetation was delineated into approximately homogeneous stands for mapping purposes. In many cases plant communities occurred in complex and patchy mixes, or merged gradually rather than having clearly defined boundaries. In these cases, the vegetation had to be mapped as mosaics, and the vegetation boundaries shown in the figures should only be considered approximate.

The vegetation types mostly coincide with the broad habitat types and therefore the mapping has attempted to use similar map colouring to standard JNCC habitat survey methodology (JNCC, 2010). The plant communities were described in terms of the published NVC communities (Rodwell, 1991, etc.) through the use of quadrat sampling and target notes. However, in some cases it was not possible to match the communities closely with the published ones.

A total of 66 quadrats were recorded. The quadrats were mostly used to describe the grassland, heath, tall herb and scrub communities. This involved recording every species within square 2x2m sample areas (or 4x4m for scrub). These quadrat areas were selected as being representative samples of the stand in which they occurred. The cover of every species within each quadrat was assessed using the Domin scale, as shown in Table 1. An estimate was also made of the percentage cover by vegetation and the approximate vegetation height (as an average through the quadrat).

Table 1. Domin scale for recording vegetation cover

Percentage cover	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
Associate species (within 1m of a quadrat)	A

The quadrats recorded from similar plant communities were grouped together into floristic tables, giving each distinct community its own table. Following NVC methodology, the occurrence of each species within the group of quadrats was assigned a constancy score as indicated in Table 2. The species within each table were then listed in order of their constancy score. Once the tables were completed, they were compared with the communities within the published NVC classification. In this case, the comparisons have been made on the basis of the author's experience, rather than use of any analytical software.

Table 2. Constancy scores for quadrat data

Frequency within quadrats	Constancy Score
81 - 100%	V
61 - 80%	IV
41 - 60%	III
21 - 40%	II
1 - 20%	I
Associate species (A) only	

The vegetation of the various conifer and broad-leaved plantations has been described by using target notes, because most are relatively young and have not developed a ground flora readily assigned to the published NVC communities.

It is possible that some species that only occur at a low density could have been overlooked by the survey, or are under-represented in the findings. This would mainly be expected for early-flowering species that have finished flowering in the spring. Access to some habitats was also limited by the density of the vegetation, and this may have affected the results; particularly in the areas of dense Bramble and plantation. However, these were generally species-poor habitats that are unlikely to be of high nature conservation value for their flora.

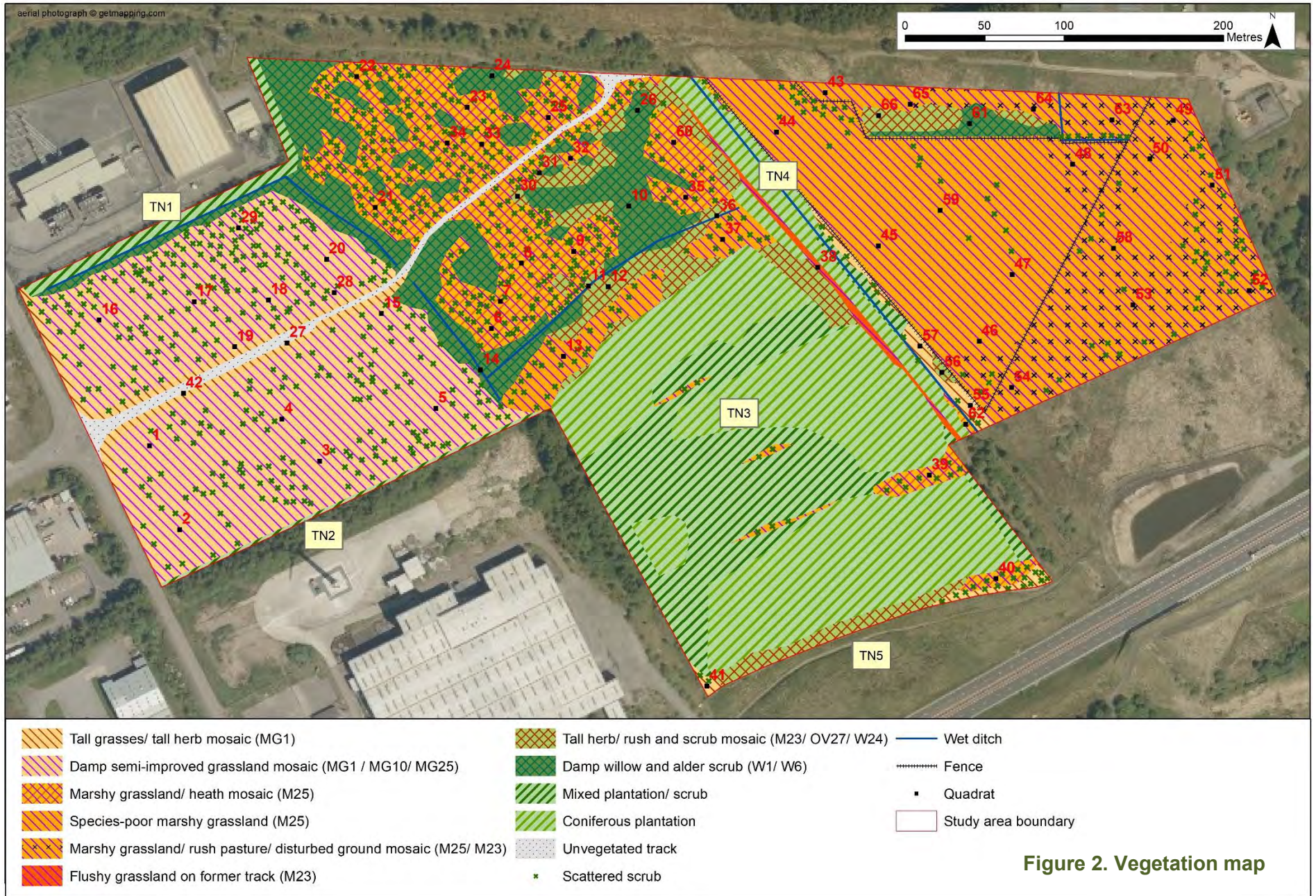
3. Survey findings

A list of the plant species recorded during the survey is presented in Appendix 1, which includes the scientific and common names for each species. Several incidental observations of other wildlife are included as Appendix 2.

The vegetation mapping is presented in Figure 2. This shows the main blocks of the different vegetation types, overlaid on an aerial photograph to provide a context for the observations. The vegetation stands have been plotted by eye and do not always have clearly defined boundaries, so they should only be considered very approximate. The patchy and transitional nature of the vegetation in much of the site has made it necessary to map some areas as mosaic habitats because the scale of variation is too complex to map accurately. Notes on the variations and mosaics seen are included in the subsequent plant community descriptions.

The locations of the quadrats are shown on the survey maps. The quadrats were sampled widely across the site to help describe the range of variation within each community and across the different parts of the site.

The vegetation descriptions and constancy tables are presented below. They broadly categorise the vegetation in terms of the published NVC communities. However, many of the plant communities do not conform easily to the published types because they are in a state of transition following disturbance or changes to grazing management in recent years, or because they are man-made communities such as plantations. Some of the stands have affinities with more than one of the published NVC communities. The community descriptions are presented together with the quadrat data, arranged as NVC vegetation tables. The species in the tables are arranged in order of frequency, as denoted by the constancy score in the right-hand column. The various plantations are described more generally as Target Notes rather than by quadrat data.



MG1 Arrhenatherum elatius grassland

The driest areas of ungrazed grassland are typically dominated by tall grasses, particularly False Oat-grass and Yorkshire Fog. The species diversity tends to be low, although the sward is often supplemented by species from other communities where it occurs as part of a habitat mosaic. The largest patches generally fall comfortably within the NVC MG1 community, but the patchy transitions to damp grassland, open vegetation and scrub communities on the industrial plateau are less easily categorised, especially where they have been disturbed recently.

Table 3. Quadrat data for MG1 grassland

Species	3	15	41	42	55	57	Frequency
<i>Arrhenatherum elatius</i>	4	9	9	9	A	9	V
<i>Holcus lanatus</i>	4	4		4	8	2	V
<i>Rhynchospora squarrosus</i>	8	8	6	4	4		V
<i>Chamerion angustifolium</i>		1	1	A	2	6	IV
<i>Cirsium arvense</i>	4	3			5	4	IV
<i>Festuca rubra</i>	A	3	4	2	7		IV
<i>Rumex acetosa</i>	2			2	1		III
<i>Agrostis stolonifera</i>	1				2		II
<i>Carex flacca</i>	4	2					II
<i>Hypochaeris radicata</i>	1			1			II
<i>Poa pratensis</i>		4		1			II
<i>Ranunculus repens</i>	3					1	II
<i>Rubus fruticosus</i>		4	1		A		II
<i>Taraxacum</i> sp.		A	2	2			II
<i>Tussilago farfara</i>	2			4			II
<i>Vicia sativa</i>		1		2			II
<i>Agrostis capillaris</i>					4	A	I
<i>Anthoxanthum odoratum</i>					4		I
<i>Brachythecium rutabulum</i>						5	I
<i>Calliergonella cuspidata</i>		A	4				I
<i>Carex hirta</i>		2					I
<i>Centaurea nigra</i>	1	A					I
<i>Cynosurus cristatus</i>				2			I
<i>Dactylis glomerata</i>			2	A			I
<i>Deschampsia cespitosa</i>	1						I
<i>Epilobium ciliatum</i>						3	I
<i>Equisetum arvense</i>					2		I
<i>Hieracium</i> sp.		A	1				I
<i>Lotus corniculatus</i>		A	A		4		I
<i>Lotus pedunculatus</i>	1						I
<i>Lychnis flos-cuculi</i>	1						I
<i>Medicago lupulina</i>			2				I
<i>Pilosella officinarum</i>			5	A			I
<i>Pseudoscleropodium purum</i>		A	2				I
<i>Ranunculus acris</i>				2			I
<i>Senecio jacobaea</i>			3		A		I
<i>Trifolium pratense</i>				2			I
<i>Ulex europaeus</i>	2						I
<i>Urtica dioica</i>						2	I
<i>Carex leporina</i>		A					
<i>Carex spicata</i>	A						
<i>Cerastium fontanum</i>		A		A			
<i>Digitalis purpurea</i>					A		
<i>Juncus effusus</i>						A	
<i>Lathyrus pratensis</i>	A	A		A			
<i>Linum catharticum</i>			A				
<i>Plantago lanceolata</i>			A				
<i>Potentilla erecta</i>		A			A	A	
<i>Rhynchospora triquetrus</i>	A						

Species	3	15	41	42	55	57	Frequency
<i>Rumex obtusifolius</i>	A						
<i>Salix caprea</i>			A				
<i>Sorbus aucuparia</i>					A		
<i>Trifolium dubium</i>				A			
<i>Trifolium repens</i>		A					
Species total	15	11	13	13	11	8	
Average height (cm)	30	40	100	80	70	120	
Cover (%)	95	95	95	90	100	100	



MG1 grassland (Q41)

Industrial plateau grassland mosaic

The level development plateau in the west of the study area supports a patchy mix of grassland, wetland, scrub and open vegetation communities that cannot be placed within a single NVC community. The scale of variation can be very small; for example, there are some wetland strips that are only the width of a wheel rut. The plateau seems to be poorly drained, and there are many transitions between wet and dry grassland. The range of plants present include species typical of base rich soils and a few from acid soils, suggesting that the plateau has mixed substrata. Another important factor affecting this area is the recent scrub clearance by flail cutting, which has opened up formerly shaded ground, favouring ruderal plants, and created local soil disturbance by rutting. In addition, the plateau is grazed by sheep.

In terms of the NVC, the flora is closest to MG10 *Holcus lanatus* – *Juncus effusus* rush pasture, but with transitions to MG1 *Arrhenatherum elatius* grassland in the drier parts and MG9 *Holcus lanatus* – *Deschampsia cespitosa* grassland and M23 *Juncus effusus* – *Galium palustre* rush pasture in dampest parts, and possibly grading into a fragmentary M6 mire community in the dampest peaty puddles dominated by Cotton-grass, Sharp-flowered Rush and sedges. Quadrats 28 and 29 were recorded from former scrub patches, apparently dominated by Gorse and Grey Willow until earlier this year. These may formerly have been categorised as U20 and W1 respectively but are now mostly open ground in transition to grassland or reverting back to scrub.

Table 4. Quadrat data for industrial plateau grassland

Species	1	2	4	5	16	17	18	19	20	28	29	Freq.
<i>Holcus lanatus</i>	2	2	2	7	5	4	4	5			3	V
<i>Rhytiadelphus squarrosus</i>	6	4	2	4	A	4	3	6		3	2	V
<i>Calliergonella cuspidata</i>	2	5	7	5		8	7	4				IV
<i>Carex flacca</i>	4	2	A	6	6		5	4	5			IV
<i>Festuca rubra</i>	5	A		4	3	4	2	2	2			IV
<i>Ranunculus repens</i>	A			3	3	1	4	5		2	1	IV
<i>Taraxacum</i> sp.	3	1		2	2		2	4			1	IV
<i>Arrhenatherum elatius</i>	5	1	A	2	A			5		4		III
<i>Cirsium palustre</i>	A	4		A	2	3	2				1	III
<i>Dactylis glomerata</i>	2			3	2			A	2	4		III
<i>Juncus effusus</i>		2	3		4	3	2				2	III
<i>Linum catharticum</i>	2			2	2	1		5	1			III
<i>Lotus corniculatus</i>	4			3	3			4	2			III
<i>Lychnis flos-cuculi</i>		2	4		5	6	4					III
<i>Prunella vulgaris</i>	3	2		4				2	4		3	III
<i>Ranunculus acris</i>	2		1	A	1	1	2	2			A	III
<i>Salix cinerea</i>		A	A		3	2	1			2	1	III
<i>Agrostis stolonifera</i>	4			3					4		2	II
<i>Anthoxanthum odoratum</i>				2				5	4			II
<i>Bellis perennis</i>	A	2		A	3	A	2		2			II
<i>Cirsium arvense</i>		A		4				2		4		II
<i>Cynosurus cristatus</i>	2			2	2	A	2					II
<i>Dactylorhiza</i> sp.		2	1			A	1					II
<i>Deschampsia cespitosa</i>	A		A	2					2	2	2	II
<i>Epilobium hirsutum</i>	A	5	4				1				2	II
<i>Epilobium palustre</i>			2			1	2					II
<i>Equisetum arvense</i>				1			1			2		II
<i>Galium palustre</i>		2	2			2						II
<i>Hypochaeris radicata</i>	2						1	2				II
<i>Juncus inflexus</i>	4	7	4									II
<i>Lathyrus pratensis</i>				3	1					2		II
<i>Medicago lupulina</i>	4							6	2			II
<i>Plantago lanceolata</i>				2			1		3			II
<i>Rumex acetosa</i>	2	A			3		A	1				II
<i>Trifolium dubium</i>	1				3		2					II
<i>Trifolium pratense</i>	2			2			1	3				II
<i>Trifolium repens</i>	3		A	4	2							II
<i>Tussilago farfara</i>	4			4	A	3					2	II
<i>Veronica scutellata</i>		1	A			2	1					II
<i>Vicia sativa</i>	A			1			1			2		II
<i>Agrostis capillaris</i>				3								I
<i>Bryum</i> sp.					3		A		6			I
<i>Cardamine pratensis</i>		2	2									I
<i>Carex leporina</i>	1		A									I
<i>Carex nigra</i>		7										I
<i>Carex otrubae</i>		2	2						A			I
<i>Centaurea nigra</i>								1				I
<i>Centaureum erythraea</i>									3			I
<i>Cerastium fontanum</i>	2			1								I
<i>Climacium dendroides</i>							1					I
<i>Cratoneuron filicinum</i>									2			I
<i>Dactylorhiza praetermissa</i>			1				1					I
<i>Dicranum scoparium</i>	2											I
<i>Eleocharis palustris</i>			7									I
<i>Equisetum palustre</i>			1								A	I
<i>Eriophorum angustifolium</i>			A			3						I
<i>Ervilia hirsuta</i>	1							1				I
<i>Fissidens adianthoides</i>		1					1		A			I
<i>Geranium dissectum</i>				1					2			I
<i>Geranium robertianum</i>										3		I
<i>Holcus mollis</i>										3	A	I

Species	1	2	4	5	16	17	18	19	20	28	29	Freq.
<i>Hypericum tetrapterum</i>							1		1			1
<i>Juncus acutiflorus</i>						4						1
<i>Juncus articulatus</i>			A				3		2			1
<i>Juncus conglomeratus</i>		A	1									1
<i>Leontodon saxatilis</i>									3			1
<i>Lotus pedunculatus</i>	2	2	A									1
<i>Luzula campestris</i>					1			2				1
<i>Luzula multiflora</i>		1								1		1
<i>Myosotis laxa</i>		1	A									1
<i>Pilosella officinarum</i>	2							7	A			1
<i>Plantago major</i>			1									1
<i>Poa pratensis</i>				3								1
<i>Pseudoscleropodium purum</i>	A		1					2				1
<i>Ranunculus flammula</i>						1						1
<i>Rubus fruticosus</i>				1							2	1
<i>Rumex obtusifolius</i>	A	A	A							3		1
<i>Scorzoneroides autumnalis</i>					1							1
<i>Sorbus aucuparia</i>						1						1
<i>Stachys sylvatica</i>										6		1
<i>Typha latifolia</i>			2									1
<i>Ulex europaeus</i>	A			A			A			3	2	1
<i>Veronica serpyllifolia</i>		1							2			1
<i>Vicia cracca</i>				2								1
<i>Betula pubescens</i>					A							
<i>Carex demissa</i>									A			
<i>Crataegus monogyna</i>									A			
<i>Elytrigia repens</i>		A										
<i>Epilobium ciliatum</i>		A										
<i>Juncus bufonius</i>			A									
<i>Leontodon hispidus</i>							A					
<i>Ophrys apifera</i>									A			
<i>Philonotis fontana</i>			A			A						
<i>Polypogon viridis</i>									A			
<i>Rumex crispus</i>	A	A	A	A		A						
<i>Schedonorus arundinaceus</i>				A								
<i>Stachys palustris</i>											A	
Species total	28	24	20	30	22	19	29	23	20	16	14	
Height (cm)	40	90	95	20	30	40	30	40	20	40	30	
Cover (%)	90	20	50	98	85	95	100	95	90	60	20	



Mixed damp and dry grassland on industrial plateau (Q1).



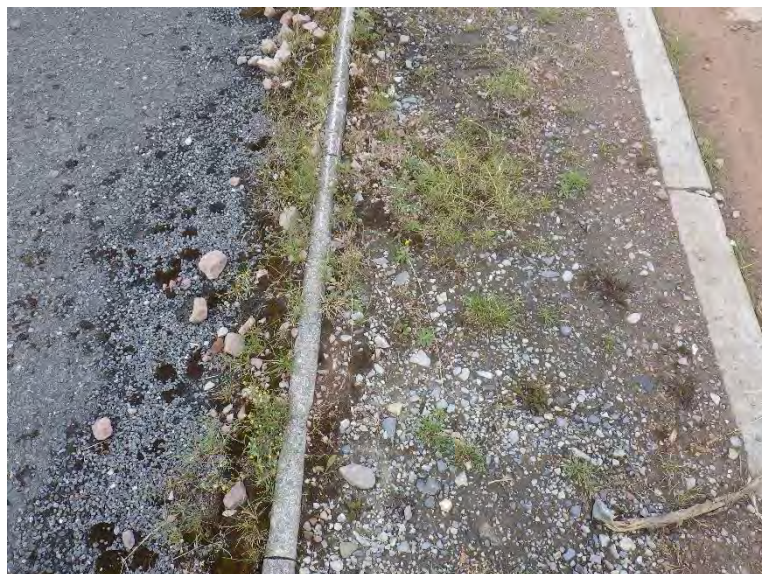
Rutted damp grassland on industrial plateau, with Greater Willowherb and Ragged Robin (Q4).



Rutted damp grassland on industrial plateau, with locally prominent Common Cotton-grass and remnants of Grey Willow scrub (Q17).

OV22 Poa annua – Taraxacum officinale open vegetation community

The edge of the road between the road and the industrial plateau grassland has a transitional fringe of ruderal vegetation mainly comprising sparse grasses, Dandelion and low-growing mosses. There is little or no soil. Only one quadrat (Q27) was recorded as an example of this community. It fits reasonably well with the NVC *Poa annua – Taraxacum officinale community*. Away from the road, the vegetation gradually blends into the adjacent MG1 and industrial plateau grassland.



OV22 open vegetation community at edge of road (Q27)

Table 5. Quadrat data for OV22 open vegetation (Q27)

Species	27
<i>Agrostis stolonifera</i>	3
<i>Festuca rubra</i>	3
<i>Catapodium rigidum</i>	2
<i>Hypochaeris radicata</i>	2
Indeterminate mosses	2
<i>Medicago lupulina</i>	2
<i>Pilosella officinarum</i>	2
<i>Polypogon viridis</i>	2
<i>Cirsium vulgare</i>	1
<i>Lolium perenne</i>	1
<i>Poa annua</i>	1
<i>Taraxacum</i> sp.	1
<i>Trifolium dubium</i>	1
<i>Bellis perennis</i>	A
<i>Cerastium fontanum</i>	A
<i>Dactylis glomerata</i>	A
<i>Holcus lanatus</i>	A
<i>Plantago lanceolata</i>	A
<i>Syntrichia montana</i>	A
Species total	13
Height (cm)	3
Cover (%)	10

Ungrazed marshy grassland mosaic (M23/ M25)

The north-central area supports an ungrazed mosaic of scrub, ungrazed wet acid grassland and young coniferous trees that appear to have arisen by natural regeneration on previously disturbed ground, which still includes some patchy bare ground and wheel ruts. The area has been mapped as a mosaic in Figure 2, and although the main component vegetation types are recorded in separate frequency tables there is a lot of variation and potential overlap between them. Table 6 collates the more rush-dominated part of the mosaic, while Table 7 includes the more open and heathy elements.

The rush-dominated parts broadly fall within the NVC M23 *Juncus effusus*- *Juncus acutiflorus* rush pasture. The patches of Sharp-flowered rush clearly fall closest to the M23a sub-

community, while the Soft-rush patches are closer to the M23b sub-community. However, the high frequency of Purple Moor-grass also shows a strong affinity with M25 *Molinia caerulea* – *Potentilla erecta* mire (Table 7), and there appears to be continuous gradation between M23 and M25 within this area. There are also transitions to Bramble and Grey Willow scrub communities.

Table 6. Quadrat data for rush-dominated ungrazed marshy grassland (M23)

Species	6	9	13	21	31	33	37	Frequency
<i>Juncus effusus</i>	2	4	8	9	10	4	8	V
<i>Molinia caerulea</i>	8	7	8	4		5	7	V
<i>Agrostis stolonifera</i>		3		2			1	III
<i>Calluna vulgaris</i>	4	4					2	III
<i>Chamerion angustifolium</i>	1			3	A		2	III
<i>Cirsium palustre</i>		A		1		1	1	III
<i>Juncus acutiflorus</i>	8	8				8		III
<i>Kindbergia praelonga</i>	4		4	2		3		III
<i>Potentilla erecta</i>	3	2	A	2		1		III
<i>Rhynchospora squarrosus</i>	3	2		5			4	III
<i>Rubus fruticosus</i>	2	A		1	4	A	1	III
<i>Salix cinerea</i>	2	1		1	A	A		III
<i>Sphagnum denticulatum</i>	2	2	3					III
<i>Agrostis capillaris</i>	2	2						II
<i>Holcus lanatus</i>					4		3	II
<i>Holcus mollis</i>				2	2			II
<i>Juncus conglomeratus</i>	2	4				A		II
<i>Luzula multiflora</i>				1			2	II
<i>Sphagnum inundatum</i>				1			2	II
<i>Agrostis canina</i>	A					3		I
<i>Athyrium filix-femina</i>	A		A		1			I
<i>Brachythecium rutabulum</i>						2		I
<i>Calliergonella cuspidata</i>		3						I
<i>Carex binervis</i>		1						I
<i>Carex demissa</i>	2							I
<i>Carex echinata</i>		2						I
<i>Cirsium arvense</i>					1			I
<i>Crataegus monogyna</i>				1				I
<i>Deschampsia cespitosa</i>			2		A			I
<i>Dryopteris dilatata</i>			1					I
<i>Epilobium hirsutum</i>					4			I
<i>Epilobium palustre</i>						1		I
<i>Erica tetralix</i>					2			I
<i>Hypnum jutlandicum</i>		A		4				I
<i>Peltigera sp.</i>				2				I
<i>Pinus contorta</i>				1			A	I
<i>Polytrichum commune</i>				A			4	I
<i>Pseudoscleropodium purum</i>							2	I
<i>Salix repens</i>				2				I
<i>Thuidium tamariscinum</i>	1							I
<i>Ulex europaeus</i>				1				I
<i>Alnus glutinosa</i>	A		A	A				
<i>Carex panicea</i>	A							
<i>Dactylorhiza maculata</i>				A				
<i>Epilobium ciliatum</i>							A	
<i>Larix sp.</i>							A	
<i>Rosa canina</i>	A							
<i>Salix aurita</i>					A	A		
<i>Senecio jacobaea</i>					A			
Species total	15	14	6	19	8	9	13	
Height (cm)	50	70	100	100	130	60	80	
Cover (%)	100	100	100	100	100	100	100	



Ungrazed M23 marshy grassland (Q13)

The drier parts of the ungrazed marshy grassland mosaic are dominated by Purple Moor-grass, often with patchy Heather. The vegetation includes a high proportion of bryophytes and sedges, particularly Star Sedge. The soil is mostly shallow and peaty, but the presence of local, open stony patches with bare mineral soil appears to indicate that the area was disturbed several years ago and is still undergoing successional processes. The frequent Rose-bay Willowherb also suggests a history of disturbance. In terms of the NVC the vegetation can be classified as M25 *Molinia caerulea* – *Potentilla erecta* mire. Most quadrats are closest to the M25a sub-community. The vegetation is rather variable, from relatively open, diverse heathy patches on shallow soil (e.g. Q25) to species-poor dense Purple Moor-grass on deeper peat (e.g. Q43), but most examples are between these two extremes. There are also local transitions to Grey Willow scrub.

Table 7. Quadrat data for Purple Moor-grass and Heather dominated ungrazed marshy grassland (M25)

Species	7	8	22	23	25	32	34	35	39	40	43	65	Freq.
<i>Molinia caerulea</i>	5	8	8	9	4	8	4	5	8	8	10	10	V
<i>Calluna vulgaris</i>	8	5	5	4	3	5	5	A	4				IV
<i>Hypnum jutlandicum</i>	2	4	4	2	2	5	2		2	2			IV
<i>Agrostis canina</i>	A	1	3	2		1	2		2				III
<i>Carex echinata</i>	A	1	2	2		A	2	1					III
<i>Cirsium palustre</i>	1	A		1	1	1	A	3	A	A			III
<i>Juncus effusus</i>	7	5	A	4		4	2	7	A	A	2	A	III
<i>Luzula multiflora</i>			2	1	1	1	A	2	2				III
<i>Potentilla erecta</i>	A	4	5	2	A	2	3	4		4			III
<i>Rhytiadelphus squarrosus</i>	2		2		2	2		5	5				III
<i>Carex binervis</i>		A	2	3		2	1						II
<i>Carex demissa</i>	A	1		1	A		1						II
<i>Carex nigra</i>		2				4		4					II
<i>Chamerion angustifolium</i>	2		A			A		A	A	4	1	1	II
<i>Deschampsia flexuosa</i>		3							2		A	2	II
<i>Erica tetralix</i>	2	4	4	1			A						II
<i>Juncus squarrosus</i>	1	2	A	1		2							II
<i>Polytrichum commune</i>	2						2		2				II
<i>Rubus fruticosus</i>			4					5	4	A		4	II
<i>Agrostis capillaris</i>										2			I
<i>Agrostis stolonifera</i>					2								I
<i>Alnus glutinosa</i>	A		1	A	A								I
<i>Anthoxanthum odoratum</i>					2								I

Species	7	8	22	23	25	32	34	35	39	40	43	65	Freq.
<i>Aulacomnium palustre</i>					2								
<i>Bryum sp.</i>		2											
<i>Campylopus introflexus</i>					3		A						
<i>Cladonia sp.</i>					2								
<i>Cratoneuron filicinum</i>							2						
<i>Deschampsia cespitosa</i>					A				1		A		
<i>Empetrum nigrum</i>					5								
<i>Equisetum fluviatile</i>					1								
<i>Festuca ovina</i>							1						
<i>Galium saxatile</i>						2							
<i>Holcus lanatus</i>					1					2	A		
<i>Hylocomium splendens</i>								4					
<i>Hypnum cupressiforme</i>							2						
<i>Hypochaeris radicata</i>					1								
Indeterminate mosses							2						
<i>Juncus acutiflorus</i>	2									1			
<i>Juncus conglomeratus</i>	A			2	A			4		A			
<i>Kindbergia praelonga</i>								4					
<i>Lotus corniculatus</i>					4								
<i>Peltigera sp.</i>						1							
<i>Picea sitchensis</i>		A			2								
<i>Polytrichastrum formosum</i>						2							
<i>Polytrichum juniperinum</i>					3								
<i>Polytrichum piliferum</i>					3								
<i>Prunella vulgaris</i>					1								
<i>Pseudoscleropodium purum</i>								5		5			
<i>Racomitrium ericoides</i>					2								
<i>Rhytidiadelphus loreus</i>						2				2			
<i>Salix cinerea</i>	A	A		A	1	A		6	A				
<i>Scapania compacta</i>					2								
<i>Scapania irrigua</i>	2						2						
<i>Sphagnum denticulatum</i>	2		A			A							
<i>Sphagnum inundatum</i>							2						
<i>Taraxacum sp.</i>					A			2					
<i>Trichophorum cespitosum</i>				1									
<i>Trifolium repens</i>					1								
<i>Vaccinium myrtillus</i>					A							1	
<i>Vicia sativa</i>					1								
<i>Alnus incana</i>			A										
<i>Bellis perennis</i>					A								
<i>Calliergonella cuspidata</i>					A			A					
<i>Carex flacca</i>					A								
<i>Carex leporina</i>								A					
<i>Carex vesicaria</i>		A											
<i>Pinus contorta</i>	A												
<i>Ranunculus acris</i>					A								
<i>Ranunculus flammula</i>	A												
<i>Salix aurita</i>	A				A								
<i>Scrophularia auriculata</i>											A		
<i>Sorbus aucuparia</i>										A			
<i>Trifolium pratense</i>					A								
Species total	13	13	12	15	25	16	16	15	10	9	3	5	
Height (cm)	60	50	80	60	15	60	40	60	70	70	80	90	
Cover (%)	95	90	100	95	85	100	50	100	100	100	100	100	



*Ungrazed M25 mire,
completely dominated by
Purple Moor-grass (Q43)*



*Heathy element within M25
mire, on shallow soil on
formerly disturbed ground (Q7)*

Grazed marshy grassland mosaic (M25)

The eastern fields are grazed by cattle, and support a less diverse mix of marshy grassland and rush pasture than the ungrazed central area. Purple Moor-grass and Soft Rush are prominent features of the vegetation. Much of the land appears to have been subject to disturbance, as indicated by the presence of patchy bare ground and high frequency of Foxgloves and Rose-bay Willowherb. The presence of scrubby Grey Willow trees and stumps throughout the area, and large tussocks of Purple Moor-grass, may indicate that the fields were ungrazed for some time prior to the recent cattle grazing. The quadrat data for this area has been split into two frequency tables, with Table 8 showing the more typical marshy grassland vegetation (mainly from the north-western field), and Table 9 including the vegetation showing most signs of recent disturbance (particularly from the south-eastern field). The two communities are both subject to heavy trampling by cattle and neither conforms exactly to the published NVC communities.

The western side of the field appears least disturbed, with deeper, peaty soil. Some parts have large tussocks of Purple Moor-grass and a very low species diversity, suggesting that

they had previously been ungrazed for several years. This is probably best described as a disturbed example of M25 *Molinia caerulea* – *Potentilla erecta* mire. Quadrat 50 is from a particularly wet area, and this is probably closer to a flush community but not readily conforming to a published NVC community.

Table 8. Quadrat data for disturbed M25 *Molinia caerulea* – *Potentilla erecta* mire

Species	44	45	46	47	50	59	Frequency
<i>Molinia caerulea</i>	8	7	8	9	A	7	V
<i>Juncus effusus</i>	2	5	4		5	A	IV
<i>Potentilla erecta</i>		2	3	4		1	IV
<i>Juncus squarrosus</i>	1	2		2			III
<i>Digitalis purpurea</i>	1		3	A		A	II
<i>Dryopteris dilatata</i>	A	1		1			II
<i>Agrostis canina</i>		2					I
<i>Agrostis capillaris</i>				2			I
<i>Agrostis stolonifera</i>		1					I
<i>Athyrium filix-femina</i>					1		I
<i>Calliergonella cuspidata</i>					4		I
<i>Calluna vulgaris</i>				1			I
<i>Campylopus sp.</i>	A			1			I
<i>Carex echinata</i>			2				I
<i>Carex leporina</i>		1					I
<i>Carex nigra</i>					3		I
<i>Carex panicea</i>		1					I
<i>Chamerion angustifolium</i>	A			1			I
<i>Deschampsia cespitosa</i>					4		I
<i>Deschampsia flexuosa</i>				2			I
<i>Epilobium ciliatum</i>	1						I
<i>Epilobium hirsutum</i>					2		I
<i>Epilobium parviflorum</i>					2		I
<i>Equisetum palustre</i>					1		I
<i>Erica tetralix</i>			1				I
<i>Galium palustre</i>					2		I
<i>Galium saxatile</i>			1	A			I
<i>Glyceria fluitans</i>					2		I
<i>Juncus articulatus</i>					4		I
<i>Juncus bulbosus</i>					3		I
<i>Juncus inflexus</i>					4		I
<i>Luzula multiflora</i>				2			I
<i>Mimulus guttatus</i>					3		I
<i>Polytrichastrum formosum</i>				2			I
<i>Polytrichum commune</i>	A	2					I
<i>Ranunculus omiophyllus</i>					4		I
<i>Rumex acetosa</i>		1					I
<i>Salix cinerea</i>					2		I
<i>Scrophularia auriculata</i>					2		I
<i>Sphagnum denticulatum</i>		2					I
<i>Vaccinium myrtillus</i>			4				I
<i>Cirsium palustre</i>					A	A	
<i>Hypochaeris radicata</i>			A				
<i>Myosotis laxa</i>					A		
<i>Picea sitchensis</i>				A			
<i>Veronica serpyllifolia</i>	A						
Species total	5	12	8	11	17	2	
Height (cm)	30	60	50	30	90	35	
Cover (%)	90	90	80	95	80	50	



Low-diversity cattle-grazed
M25 mire (Q59)

The more disturbed parts of the eastern fields support a mix of vegetation types, often varying on a small scale and with patchy bare ground and remnants of scrub. These are difficult to assign to NVC communities but probably lie closest to a mix of M25 *Purple Moor-grass - Potentilla erecta* mire and MG10 *Holcus lanatus - Juncus effusus* rush pasture, forming mosaics with ruderal plants and fragmentary Grey Willow and Bramble scrub communities.

Table 9. Quadrat data for disturbed M23 *Juncus effusus* rush pasture / M25 *Molinia caerulea - Potentilla erecta* mire

Species	48	49	51	52	53	54	58	63	64	Freq.
<i>Juncus effusus</i>	4	2	2	5	9	6	9	6	9	V
<i>Molinia caerulea</i>	8		8	5	4	4	2	2	4	V
<i>Agrostis stolonifera</i>	2	6	2	2	2	4		2		IV
<i>Deschampsia cespitosa</i>	1			1		4	4	6	2	IV
<i>Holcus lanatus</i>		4	2	4	3	7	4			IV
<i>Brachythecium rutabulum</i>		2			A		2	2	1	III
<i>Cirsium palustre</i>	1		2	2	A	2			A	III
<i>Digitalis purpurea</i>	1	A	1	2	2		1			III
<i>Epilobium ciliatum</i>	2		2	A	2			2		III
<i>Potentilla erecta</i>	2		2	4	2	A	2		A	III
<i>Ranunculus repens</i>			4		A	4	2	2		III
<i>Rumex acetosa</i>	4		1		2	4				III
<i>Scrophularia auriculata</i>					1		2	2	1	III
<i>Taraxacum</i> sp.	1	2		2		2				III
<i>Agrostis capillaris</i>				2		2				II
<i>Calliergonella cuspidata</i>		7	2							II
<i>Cirsium arvense</i>		A			3		4	5		II
<i>Epilobium hirsutum</i>			A			A	1	1		II
<i>Erica tetralix</i>	1			1						II
<i>Juncus conglomeratus</i>		A	A	3	2	A				II
<i>Juncus inflexus</i>		7	4	2				A		II
<i>Kindbergia praelonga</i>					2		2		4	II
<i>Plantago lanceolata</i>		2		2		4				II
<i>Prunella vulgaris</i>		4		2						II
<i>Rubus fruticosus</i>			1	2	A	A	1			II
<i>Anthoxanthum odoratum</i>				2						I
<i>Athyrium filix-femina</i>					1	A			A	I
<i>Atrichum undulatum</i>				3						I
<i>Calluna vulgaris</i>				2						I
<i>Cardamine flexuosa</i>									1	I
<i>Carex binervis</i>			1							I
<i>Carex demissa</i>		2								I
<i>Carex flacca</i>		A		2				A		I

Species	48	49	51	52	53	54	58	63	64	Freq.
<i>Carex hirta</i>								2		
<i>Carex leporina</i>							2			
<i>Centaurea nigra</i>		2								
<i>Cerastium fontanum</i>						2	A			
<i>Chamerion angustifolium</i>				A			1		A	
<i>Deschampsia flexuosa</i>				2						
<i>Dryopteris dilatata</i>					1					
<i>Epilobium tetragonum</i>									3	
<i>Equisetum arvense</i>		1								
<i>Equisetum palustre</i>								2	A	
<i>Galium saxatile</i>				3						
<i>Geranium dissectum</i>						1				
<i>Holcus mollis</i>				A		2				
Indeterminate mosses							2			
<i>Juncus acutiflorus</i>					A	2				
<i>Juncus articulatus</i>		2								
<i>Juncus bulbosus</i>			2							
<i>Juncus squarrosus</i>	A			2						
<i>Lathyrus pratensis</i>		2								
<i>Plantago major</i>		1								
<i>Poa trivialis</i>	2									
<i>Polytrichum juniperinum</i>				3						
<i>Potentilla reptans</i>		1								
<i>Ranunculus acris</i>		4								
<i>Rhynchospora squarrosus</i>			1							
<i>Rumex crispus</i>		2								
<i>Rumex obtusifolius</i>							1	A		
<i>Sagina procumbens</i>				3						
<i>Senecio jacobaea</i>			1							
<i>Stellaria alsine</i>							1		A	
<i>Trifolium dubium</i>				3						
<i>Carex echinata</i>	A				A					
<i>Cirsium vulgare</i>							A			
<i>Hypochaeris radicata</i>		A	A							
<i>Lotus corniculatus</i>		A								
<i>Lotus pedunculatus</i>				A						
<i>Pinus sylvestris</i>				A						
<i>Ranunculus flammula</i>					A					
<i>Salix cinerea</i>		A		A					A	
Species total	12	18	17	26	14	15	18	12	8	
Height (cm)	40	60	45	30	90	70	80	50	90	
Cover (%)	90	95	75	90	95	95	100	90	100	



Disturbed, grazed marshy grassland, resembling MG10 rush pasture (Q49)

Heath (H12)

There are no large areas of heath within the site, but heath patches are an important element of several of the vegetation mosaics, typically merging with the M25 marshy grassland community. Two quadrats were recorded as examples of the larger patches. Heather is the most consistent feature of these patches but is not very extensive. In terms of the NVC the vegetation is probably a fragmentary form of H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath, even though there is very little Bilberry.

Table 10. Quadrat data for H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath

Quadrat	60	62	Frequency
<i>Agrostis capillaris</i>	2	2	V
<i>Calluna vulgaris</i>	7	8	V
<i>Rhynchospora squarrosus</i>	2	4	V
<i>Agrostis canina</i>	1		III
<i>Anthoxanthum odoratum</i>	2		III
<i>Arrhenatherum elatius</i>		4	III
<i>Aulacomnium palustre</i>	2		III
<i>Campylopus introflexus</i>	2		III
<i>Carex echinata</i>	2		III
<i>Cirsium palustre</i>	2		III
<i>Cladonia</i> sp.	2		III
<i>Dicranum scoparium</i>		4	III
<i>Equisetum arvense</i>		1	III
<i>Festuca rubra</i>		2	III
<i>Hypnum jutlandicum</i>	2		III
<i>Juncus conglomeratus</i>	4		III
<i>Luzula multiflora</i>	1		III
<i>Peltigera</i> sp.	2		III
<i>Picea sitchensis</i>	1	A	III
<i>Pleurozium schreberi</i>		4	III
<i>Polytrichum juniperinum</i>	3		III
<i>Potentilla erecta</i>		4	III
<i>Pseudoscleropodium purum</i>		4	III
<i>Scapania irrigua</i>	2		III
<i>Sphagnum inundatum</i>	2		III
<i>Taraxacum</i> sp.	1	A	III
<i>Thuidium tamariscinum</i>	1		III
<i>Carex nigra</i>	A		
<i>Carex panicea</i>	A		
<i>Empetrum nigrum</i>	A		
<i>Holcus lanatus</i>	A		
<i>Juncus squarrosus</i>	A		
<i>Polytrichum commune</i>	A		
<i>Salix cinerea</i>	A	A	
<i>Sphagnum fimbriatum</i>	A		
<i>Vaccinium myrtillus</i>		A	
Species total	20	10	
Height (cm)	50	45	
Cover (%)	60	100	



*Heathy path among ungrazed
M25 mosaic (Q60)*



*Heathy patch at edge of
channel (Q62)*

Damp track vegetation at TN38 (M23)

A disused vehicle track is present beside the planation and ditch at TN4. It is partly overgrown by the adjacent trees, but the open sections support a diverse, flushy grassland flora that was sampled as Quadrat 38. The vegetation is characterised by a mix of rushes, sedges, bryophytes and low-growing herbs over a damp stony substratum. In terms of the NVC this is closest to M23 *Juncus effusus* – *Juncus acutiflorus* – *Galium palustre* rush pasture. Within the site it is only represented as this narrow strip, and grades into plantations, scrub and M25 vegetation away from the track edges.

Table 11. Quadrat data for damp track vegetation (Quadrat 38)

Species	38
<i>Juncus articulatus</i>	4
<i>Juncus effusus</i>	4
<i>Bellis perennis</i>	3
<i>Calliergonella cuspidata</i>	3
<i>Cynosurus cristatus</i>	3
<i>Prunella vulgaris</i>	3
<i>Ranunculus repens</i>	3
<i>Agrostis stolonifera</i>	2
<i>Anthoxanthum odoratum</i>	2
<i>Carex flacca</i>	2
<i>Carex leporina</i>	2
<i>Cratoneuron filicinum</i>	2
<i>Deschampsia cespitosa</i>	2
<i>Dichodontium palustre</i>	2
<i>Fissidens adianthoides</i>	2
<i>Holcus lanatus</i>	2
<i>Philonotis fontana</i>	2
<i>Ranunculus flammula</i>	2
<i>Rhytiadelphus squarrosus</i>	2
<i>Rubus fruticosus</i>	2
<i>Scorzoneroides autumnalis</i>	2
<i>Carex demissa</i>	1
<i>Cirsium palustre</i>	1
<i>Hypochaeris radicata</i>	1
<i>Molinia caerulea</i>	1
<i>Picea sitchensis</i>	1
<i>Cladonia sp.</i>	A
<i>Dactylorhiza sp.</i>	A
<i>Equisetum arvense</i>	A
<i>Festuca rubra</i>	A
<i>Lolium perenne</i>	A
<i>Luzula multiflora</i>	A
<i>Salix cinerea</i>	A
Species total	26
Height (cm)	25
Cover (%)	80



Damp track with diverse grassland at edge of plantation (Q38)

Ditches

The wettest parts of the area were slow-flowing ditches. These supported a swampy mix of wetland plants, with Water Horsetail, Sharp-flowered Rush and Marsh Bedstraw being most abundant. The vegetation does not easily conform to S10 *Equisetum fluviatile* swamp or any other NVC swamp community but is probably best described as very wet M23 *Juncus effusus* – *Juncus acutiflorus* – *Galium palustre* vegetation. This may be due to the probable history of disturbance of this area. Small quantities of Bottle Sedge and Bulrush are present, but not in sufficient quantity to describe the patches as distinct NVC communities.

Table 12. Ditch vegetation

Species	11	14	36	Frequency
<i>Equisetum fluviatile</i>	9	7	2	V
<i>Galium palustre</i>	5	4	2	V
<i>Juncus acutiflorus</i>	2	8	10	V
<i>Rubus fruticosus</i>	1	1	1	V
<i>Agrostis canina</i>	3		3	IV
<i>Epilobium palustre</i>	2		2	IV
<i>Lotus pedunculatus</i>		1	2	IV
<i>Ranunculus flammula</i>	2	1	A	IV
<i>Brachythecium rivulare</i>			2	II
<i>Cardamine pratensis</i>			2	II
<i>Carex nigra</i>		4		II
<i>Carex rostrata</i>	2			II
<i>Cirsium palustre</i>	A	1		II
<i>Epilobium ciliatum</i>			1	II
<i>Epilobium hirsutum</i>		5		II
<i>Erica tetralix</i>	A	1		II
<i>Holcus mollis</i>			2	II
<i>Juncus conglomeratus</i>			2	II
<i>Juncus effusus</i>	2		A	II
<i>Potamogeton polygonifolius</i>	4			II
<i>Potentilla erecta</i>	A		2	II
<i>Ranunculus acris</i>			2	II
<i>Rhinanthus minor</i>			1	II
<i>Rhytiadelphus squarrosus</i>			4	II
<i>Rumex acetosa</i>		1	A	II
<i>Salix cinerea</i>	A	1		II
<i>Senecio jacobaea</i>		1	A	II
<i>Sphagnum fallax</i>			2	II
<i>Sphagnum fimbriatum</i>	4			II
<i>Sphagnum squarrosum</i>			2	II
<i>Veronica scutellata</i>	3			II
<i>Alnus glutinosa</i>			A	
<i>Carex otrubae</i>		A		
<i>Chamerion angustifolium</i>		A		
<i>Dactylorhiza praetermissa</i>			A	
<i>Deschampsia cespitosa</i>			A	
<i>Dryopteris dilatata</i>	A		A	
<i>Dryopteris filix-mas</i>			A	
<i>Polytrichum commune</i>			A	
<i>Pseudoscleropodium purum</i>			A	
<i>Rumex obtusifolius</i>		A		
<i>Scutellaria minor</i>			A	
<i>Sphagnum palustre</i>			A	
<i>Typha latifolia</i>	A			
<i>Vaccinium myrtillus</i>	A			
Species total	12	13	18	
Height (cm)	70	120	90	
Cover (%)	100	100	100	



Ditch vegetation dominated by Water Horsetail and Marsh Bedstraw (Q11)

Rose-bay Willowherb Community (OV27)

Rose-bay Willowherb occurs at low density in much of the vegetation within the study area, but there are a few places where it forms tall, dense, low-diversity stands. The largest of these are to the north of the eastern fields, which was sampled as Quadrat 66. This vegetation is readily assigned to the published NVC community OV27 *Chamerion angustifolium* vegetation.

Table 13. Quadrat data for OV27 *Chamerion angustifolium* vegetation (Quadrat 66)

Species	66
<i>Chamerion angustifolium</i>	10
<i>Juncus effusus</i>	4
<i>Brachythecium rutabulum</i>	2
<i>Deschampsia cespitosa</i>	2
<i>Molinia caerulea</i>	2
<i>Cardamine flexuosa</i>	A
<i>Scrophularia auriculata</i>	A
Species total	5
Average height (cm)	120
Cover (%)	100



Rose-bay Willowherb community (Q66)

Bramble scrub

Brambles patchily distributed in the ungrazed central parts of the site and around the plantation margins. They are typically associated with Rose-bay Willowherb and rushes, forming transitions with the OV27 and M23 communities. The community appears to be a form of the NVC W24 *Rubus fruticosus* – *Holcus lanatus* underscrub community. However, it is atypical because of the transitions to damp grassland vegetation and the absence of Yorkshire Fog from any of the quadrats.

Table 14. Quadrat data for Bramble scrub vegetation (W24)

Species	12	30	56	Frequency
<i>Chamerion angustifolium</i>	5	4	4	V
<i>Kindbergia praelonga</i>	5	2	4	V
<i>Rubus fruticosus</i>	10	10	10	V
<i>Juncus effusus</i>		6	2	IV
<i>Athyrium filix-femina</i>	1			II
<i>Dryopteris dilatata</i>			1	II
<i>Dryopteris filix-mas</i>	1			II
<i>Epilobium ciliatum</i>			2	II
<i>Equisetum arvense</i>			2	II
<i>Equisetum fluviatile</i>	1			II
<i>Juncus acutiflorus</i>	2			II
<i>Molinia caerulea</i>	1		A	II
<i>Agrostis capillaris</i>			A	
<i>Cirsium arvense</i>			A	
<i>Cirsium palustre</i>			A	
<i>Digitalis purpurea</i>	A			
<i>Potentilla erecta</i>	A			
<i>Salix cinerea</i>	A	A		
<i>Sambucus nigra</i>	A			
<i>Vaccinium myrtillus</i>	A			
Species total	8	4	7	
Height (cm)	120	120	100	
Cover (%)	100	100	100	

*Bramble scrub (Q12)*

Grey Willow scrub

Grey Willow scrub forms large and small patches within the habitat mosaic of the ungrazed central area. It is also present in a few rides or clearings within the large central plantation. It is generally present as an early successional stage of the unmanaged marshy grassland, rather than as a distinct woodland community, but it is developing woodland ground flora including a number of ferns. Eared Willow and Creeping Willow are present in some of the younger stands, but not in the taller, denser scrub. Within the NVC the Willow scrub is best described as a young example of W1 *Salix cinerea* – *Galium palustre* woodland, still showing signs of transition from M23 marshy grassland.

Table 15. Quadrat data for Bramble scrub vegetation

Species	10	24	26	61	Frequency
<i>Juncus effusus</i>	2	9	2	2	V
<i>Rubus fruticosus</i>	8	4	8	1	V
<i>Salix cinerea</i>	10	10	10	10	V
<i>Brachythecium rutabulum</i>	3		5	2	IV
<i>Cardamine flexuosa</i>	3		1	2	IV
<i>Deschampsia cespitosa</i>	A	2	4	4	IV
<i>Epilobium ciliatum</i>	2	2		1	IV
<i>Galium palustre</i>	2	4	1		IV
<i>Agrostis stolonifera</i>	4	4			III
<i>Chamerion angustifolium</i>			6	3	III
<i>Dryopteris filix-mas</i>	1			1	III
<i>Kindbergia praelonga</i>	3	6			III
<i>Alnus glutinosa</i>		4			II
<i>Athyrium filix-femina</i>	A			1	II
<i>Cirsium arvense</i>			1		II
<i>Cirsium palustre</i>		A		1	II
<i>Cirsium vulgare</i>		1			II
<i>Dryopteris dilatata</i>	A	1			II
<i>Epilobium hirsutum</i>			4		II
<i>Equisetum palustre</i>			3		II
<i>Galium aparine</i>	2				II
<i>Holcus lanatus</i>	5				II
<i>Molinia caerulea</i>	A			2	II
<i>Rhynchospora squarrosus</i>		2			II
<i>Atrichum undulatum</i>				A	
<i>Crataegus monogyna</i>		A			
<i>Epilobium palustre</i>		A			
<i>Equisetum fluviatile</i>		A			
<i>Poa trivialis</i>		A	A		
Species total	12	12	11	12	
Height (cm)	1100	800	1000	500	
Cover (%)	100	100	100	100	



Grey Willow scrub (Q10)

Woodlands

The woodlands are generally man-made plantations, and they do not easily conform to NVC communities. They are described as target notes.

TN1 North-western plantation

The north-western edge of the industrial plateau is bordered by a mixed plantation. It mostly lies on a south-facing bank beside the Rassau electricity substation and there is a shaded wet ditch running along its foot. The main plantation trees include Italian Alder, Grey Alder, Rowan, Swedish Whitebeam, Hazel and Field Maple, with occasional conifers including Lodgepole and Corsican Pine and Sitka Spruce. Grey Willow, Alder and Gorse are dominant along the foot of the slope but may not be part of the original plantation. The woodland ground flora is mostly limited to a species-poor mix of sparse grasses and Brambles. However, the ditch supports a number of wetland plants including Bulrush, Branched Bur-reed and Common Spike-rush.

Species list from North-western plantation (TN1)

<i>Acer campestre</i>	<i>Epilobium palustre</i>	<i>Ranunculus repens</i>
<i>Alnus cordata</i>	<i>Equisetum palustre</i>	<i>Rosa arvensis</i>
<i>Alnus glutinosa</i>	<i>Festuca rubra</i>	<i>Rosa canina</i>
<i>Alnus incana</i>	<i>Galium palustre</i>	<i>Rubus fruticosus</i>
<i>Arrhenatherum elatius</i>	<i>Geranium robertianum</i>	<i>Salix cinerea</i>
<i>Betula pubescens</i>	<i>Holcus lanatus</i>	<i>Solanum dulcamara</i>
<i>Cirsium palustre</i>	<i>Holcus mollis</i>	<i>Sorbus aucuparia</i>
<i>Cornus sanguinea</i>	<i>Juncus effusus</i>	<i>Sparganium erectum</i>
<i>Corylus avellana</i>	<i>Myosotis laxa</i>	<i>Taraxacum</i> sp.
<i>Crataegus monogyna</i>	<i>Picea sitchensis</i>	<i>Typha latifolia</i>
<i>Dactylis glomerata</i>	<i>Pinus contorta</i>	<i>Ulex europaeus</i>
<i>Deschampsia cespitosa</i>	<i>Pinus nigra</i>	<i>Viburnum lantana</i>
<i>Eleocharis palustris</i>	<i>Prunus spinosa</i>	
<i>Epilobium montanum</i>	<i>Quercus robur</i>	



Plantation at TN1



Wet ditch at foot of bank in TN1

TN2 South-western plantation

The southern edge of the industrial plateau is bordered by a mixed plantation which is broadly similar in character to TN1. It lies outside the project area so was only examined through the perimeter fence. The main plantation trees include Grey Alder, Common Alder, Sitka Spruce, Goat Willow, Red-osier Dogwood and Lodgepole Pine. The ground flora is very sparse and mainly limited to mosses and grasses.

Species list from South-western plantation (TN2)

Alnus glutinosa
Alnus incana
Anthoxanthum odoratum
Arrhenatherum elatius
Cirsium arvense
Cornus sericea
Cotoneaster simonsii
Cytisus scoparius
Dactylis glomerata
Deschampsia cespitosa

Equisetum arvense
Festuca rubra
Holcus lanatus
Holcus mollis
Luzula multiflora
Picea sitchensis
Pinus contorta
Prunella vulgaris
Rhytiadelphus loreus
Rhytiadelphus squarrosus

Rosa canina
Rubus fruticosus
Salix aurita
Salix caprea
Salix cinerea
Senecio jacobaea
Tussilago farfara
Ulex europaeus



Plantation at TN2

TN3 Central plantation

This is the largest woodland within the project area. It comprises a patchy mix of canopy trees with the most frequent ones including Sitka Spruce, Lodgepole Pine, Grey Alder and Japanese Larch. The former plantation rides forming east-west gaps through the plantation have largely been colonised by Grey Willow and Common Alder, although they still retain a sparse, low-diversity marshy grassland flora. There is virtually no ground flora beneath the dense Sitka Spruce and Lodgepole Pine canopies, other than mosses and sparse grasses near the margins. However, the Grey Alder and Japanese Larch areas have an understory of Bramble and a developing ground flora dominated by Ivy and ferns. Rhododendron is locally prominent, especially beneath the Larch in the south of the area. The ground topography within the plantation is very variable, with many ridges and banks, and several damp hollows with shallow standing water. There has been windthrow of several trees, especially amongst the Lodgepole Pines in the centre of the plantation.

Species list from central plantation (TN3)

<i>Acer pseudoplatanus</i>	<i>Epilobium tetragonum</i>	<i>Pleurozium schreberi</i>
<i>Agrostis capillaris</i>	<i>Equisetum fluviatile</i>	<i>Polystichum setiferum</i>
<i>Agrostis stolonifera</i>	<i>Eurhynchium striatum</i>	<i>Polytrichastrum formosum</i>
<i>Alnus glutinosa</i>	<i>Festuca rubra</i>	<i>Polytrichum commune</i>
<i>Alnus incana</i>	<i>Galium palustre</i>	<i>Potentilla erecta</i>
<i>Athyrium filix-femina</i>	<i>Geranium robertianum</i>	<i>Pseudoscleropodium purum</i>
<i>Brachythecium rutabulum</i>	<i>Glyceria fluitans</i>	<i>Ranunculus flammula</i>
<i>Campylopus sp.</i>	<i>Holcus lanatus</i>	<i>Ranunculus repens</i>
<i>Cardamine pratensis</i>	<i>Holcus mollis</i>	<i>Rhododendron ponticum</i>
<i>Chamerion angustifolium</i>	<i>Hypnum cupressiforme</i>	<i>Rhytiadelphus loreus</i>
<i>Cirsium palustre</i>	<i>Ilex aquifolium</i>	<i>Rosa canina</i>
<i>Cotoneaster bullatus</i>	<i>Juncus effusus</i>	<i>Rubus fruticosus</i>
<i>Crataegus monogyna</i>	<i>Kindbergia praelonga</i>	<i>Salix cinerea</i>
<i>Dactylorhiza praetermissa</i>	<i>Larix kaempferi</i>	<i>Sphagnum denticulatum</i>
<i>Deschampsia cespitosa</i>	<i>Mnium hornum</i>	<i>Sphagnum fallax</i>
<i>Deschampsia flexuosa</i>	<i>Molinia caerulea</i>	<i>Sphagnum inundatum</i>
<i>Dryopteris dilatata</i>	<i>Picea sitchensis</i>	<i>Thuidium tamariscinum</i>
<i>Epilobium montanum</i>	<i>Pinus sylvestris</i>	<i>Vaccinium myrtillus</i>



Dense Sitka Spruce at the north of TN3, with no ground flora.



Grey Alder in the central part of the TN3 plantation, with a ground flora dominated by brambles and ferns.



A clearing along one of the old rides in TN3, retaining a species-poor damp grassland flora.

TN4 Ditch plantation

A linear plantation on the steep banks bordering a metal-lined ditch. The main canopy tree is Sitka Spruce, but there are also Hawthorn and Rowan trees, and local areas where Grey Willow scrub is dominant. Rhododendron occurs patchily in a few areas. The ground flora is generally sparse, but the lighter margins support a mix of heath and M25 marshy grassland, and occasional Gorse.

Species list from ditch plantation (TN4)

Anthoxanthum odoratum
Athyrium filix-femina
Blechnum spicant
Callitriche sp.
Calluna vulgaris
Chamerion angustifolium
Cirsium palustre
Crataegus monogyna
Dryopteris dilatata
Dryopteris filix-mas

Epilobium ciliatum
Ilex aquifolium
Kindbergia praelonga
Larix kaempferi
Luzula multiflora
Pleurozium schreberi
Picea sitchensis
Potentilla erecta
Prunella vulgaris
Pseudoscleropodium purum

Ranunculus repens
Rhododendron ponticum
Rhytiadelphus loreus
Rosa canina
Rubus fruticosus
Salix cinerea
Sorbus aucuparia
Ulex europaeus
Urtica dioica
Vaccinium myrtillus



Plantation at TN4, looking from northern end.



Plantation at TN4, showing the metal-lined ditch, with very little ground flora beneath the dense Sitka Spruce canopy.

TN5 A465 plantation

The wide south-facing bank of the A465 adjacent to the southern edge of the study area has largely been planted up with broad-leaved trees as part of the highway landscaping. The trees are still very young, and the main vegetation of the area is still predominantly grassland. The area supports a relatively diverse flora, with elements of several different grassland, tall herb and scrub communities, indicative of its recent origin and likely use of a wildflower seed mix. The tree species include Scots Pine, White Willow, Lodgepole Pine, Alder, Field Maple, Hawthorn, Hornbeam, Sycamore, Wild Cherry, Swedish Whitebeam, Downy Birch, Pedunculate Oak, Norway Maple, Rowan, Hazel, Yew and Box. The scrub includes Bramble, Gorse, Grey Willow and Broom. The grassland is dominated by Yorkshire Fog, Red Fescue, Sweet Vernal-grass, Crested Dog's-tail, with the most prominent herbs including Rose-bay Willowherb, Lady's Bedstraw, Hedge Bedstraw, Creeping Thistle, Spear Thistle, Yarrow, Colt's-foot, Broad-leaved Dock, Meadow Vetchling, Tufted Vetch, Marsh Woundwort and several Willowherbs. There are occasional plants of Heather and Marsh Orchids.

Species list from A465 plantation (TN5)

<i>Acer campestre</i>	<i>Deschampsia cespitosa</i>	<i>Rubus fruticosus</i>
<i>Acer platanoides</i>	<i>Epilobium ciliatum</i>	<i>Rumex acetosa</i>
<i>Acer pseudoplatanus</i>	<i>Epilobium hirsutum</i>	<i>Rumex conglomeratus</i>
<i>Achillea millefolium</i>	<i>Festuca rubra</i>	<i>Rumex obtusifolius</i>
<i>Alnus glutinosa</i>	<i>Galium album</i>	<i>Salix alba</i>
<i>Anthoxanthum odoratum</i>	<i>Galium palustre</i>	<i>Salix cinerea</i>
<i>Arrhenatherum elatius</i>	<i>Galium verum</i>	<i>Salix fragilis</i>
<i>Betula pubescens</i>	<i>Geranium robertianum</i>	<i>Senecio jacobaea</i>
<i>Buxus sempervirens</i>	<i>Glyceria fluitans</i>	<i>Sorbus aucuparia</i>
<i>Calluna vulgaris</i>	<i>Holcus lanatus</i>	<i>Sorbus intermedia</i>
<i>Carex leporina</i>	<i>Holcus mollis</i>	<i>Stellaria alsine</i>
<i>Carpinus betulus</i>	<i>Hypericum maculatum</i>	<i>Taxus baccata</i>
<i>Chamerion angustifolium</i>	<i>Juncus effusus</i>	<i>Trifolium dubium</i>
<i>Cirsium arvense</i>	<i>Lathyrus pratensis</i>	<i>Tussilago farfara</i>
<i>Cirsium vulgare</i>	<i>Pinus contorta</i>	<i>Ulex europaeus</i>
<i>Corylus avellana</i>	<i>Pinus sylvestris</i>	<i>Urtica dioica</i>
<i>Crataegus monogyna</i>	<i>Prunella vulgaris</i>	<i>Vicia cracca</i>
<i>Cynosurus cristatus</i>	<i>Prunus avium</i>	<i>Vicia sativa</i>
<i>Cytisus scoparius</i>	<i>Quercus robur</i>	<i>Vicia sepium</i>
<i>Dactylis glomerata</i>	<i>Ranunculus repens</i>	
<i>Dactylorhiza sp.</i>	<i>Rosa canina</i>	



The plantation on the A465 road verge (TN5).

4. Evaluation

The nature conservation significance of the various plant communities was assessed in a geographical context, following the approach set out in 'Guidelines for Ecological Impact Assessment' (CIEEM, 2018). The criteria used to assist in the evaluation are summarised in Table 16.

The evaluation relates to the plant communities as individual stands of vegetation, to help to identify which are the most important. It does not consider them in combination as a whole site, or at a landscape scale.

Table 16: Evaluation of habitats

Level of Value	Habitats
International	Areas designated as Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Ramsar sites in response to European Directives and International Conventions.
National	Areas designated as Sites of Special Scientific Interest (SSSI), National Nature Reserve (NNR), or equivalent for key areas, habitats and plant communities.
Regional	Areas of habitat of suitable size and quality to be considered for notification as SSSI (based on Guidelines for the Selection of Biological SSSIs, JNCC 1998). Extensive areas of Environment (Wales) Act (2016) Section 7 habitats, listed as 'habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.
County	Areas meeting Wildlife Sites Guidelines selection criteria (Wales Biodiversity Partnership, 2008); areas of Section 7 habitats; areas of Ancient woodland.
District/Local value	Areas of LBAP habitat. Important hedgerows classified under The Hedgerow Regulations 1997. Any non-designated habitat assemblage of moderate biodiversity value.

In this case there are no vegetation types that are considered to be significant in an international or national context. There are no designated SSSIs within the study area and none of the habitats were considered of sufficient botanical merit to qualify as being Regionally important for its flora.

None of the plant species recorded is included in the Environment (Wales) Act 2016 Section 7 lists of species of 'principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales'. However, several species are included as 'Contributory Species' in the Wildlife Sites Guidelines. These are as follows:

- *Alchemilla glabra* (Smooth Lady's-mantle). Several plants on industrial plateau (near Q28).
- *Carex vesicaria* (Bladder Sedge). Patch on damp western margin of industrial plateau, apparently growing as a casual rather than in its usual wetland habitat.
- *Empetrum nigrum* (Crowberry). Small patches present in heathy areas on stony ground with central mosaic habitat (including at Q25 and Q60).
- *Ophrys apifera* (Bee Orchid). Two plants seen in short turf within north-east part of industrial plateau (near Q20).
- *Viburnum lantana* (Wayfaring Tree). Included in plantation at TN1.

The presence of 5 or more Contributory Species can be used as a criterion for selecting wildlife sites. In this case the Wayfaring Tree should not be included because it has been planted as part of a former landscaping scheme. There are therefore only 4 qualifying species and this criterion for nature conservation value is not met. However, these species should certainly be regarded as having at least Local Value for nature conservation.



Crowberry in heathy patch at TN25

The Wildlife Sites Guidelines also have criteria based on assemblages of indicator species. The indicator species list for marshy grassland is the most appropriate for this site. The following marshy indicator species were recorded in the marshy grassland habitat:

<i>Agrostis canina</i>	<i>Eleocharis palustris</i>	<i>Lychnis flos-cuculi</i>
<i>Cardamine pratensis</i>	<i>Equisetum palustre</i>	<i>Molinia caerulea</i>
<i>Carex binervis</i>	<i>Erica tetralix</i>	<i>Myosotis laxa</i>
<i>Carex demissa</i>	<i>Eriophorum angustifolium</i>	<i>Potentilla erecta</i>
<i>Carex echinata</i>	<i>Eupatorium cannabinum</i>	<i>Ranunculus flammula</i>
<i>Carex flacca</i>	<i>Galium palustre</i>	<i>Rhinanthus minor</i>
<i>Carex leporina</i>	<i>Glyceria fluitans</i>	<i>Rumex conglomeratus</i>
<i>Carex nigra</i>	<i>Hypericum tetrapterum</i>	<i>Salix repens</i>
<i>Carex panicea</i>	<i>Juncus acutiflorus</i>	<i>Scrophularia auriculata</i>
<i>Carex rostrata</i>	<i>Juncus articulatus</i>	<i>Scutellaria minor</i>
<i>Dactylorhiza fuchsii</i>	<i>Juncus conglomeratus</i>	<i>Stellaria alsine</i>
<i>Dactylorhiza maculata</i>	<i>Juncus squarrosus</i>	<i>Trichophorum cespitosum</i>
<i>Dactylorhiza praetermissa</i>	<i>Lotus pedunculatus</i>	<i>Veronica beccabunga</i>
<i>Dactylorhiza sp.</i>	<i>Luzula multiflora</i>	<i>Veronica scutellata</i>

This shows that the marshy grassland within the site supports a very good range of indicator species, despite its relatively recent origin and history of disturbance. The diversity is not evenly distributed within the site, and the disturbed parts of the eastern fields would not be considered of county value in their current condition but may recover in time. The wettest parts of the industrial plateau would qualify as supporting valuable concentrations of marshy grassland plants, but they could probably not be considered important in a county context due to their patchy nature and artificial origin. The most diverse habitat is in the ungrazed central part, but this is very patchy and may not retain its value for many more years without management to limit the encroachment by scrub.

The industrial plateau with its mix of wet and dry grassland and scrub within the site could feasibly be assessed against the selection criteria for open mosaic habitats on previously

developed land. The flora of the plateau easily exceeds the necessary 20 indicator species set out in the Wildlife Sites Guidelines. These are as follows:

<i>Alchemilla glabra</i>	<i>Eupatorium cannabinum</i>	<i>Myosotis laxa</i>
<i>Calluna vulgaris</i>	<i>Galium palustre</i>	<i>Nardus stricta</i>
<i>Cardamine pratensis</i>	<i>Glyceria fluitans</i>	<i>Ophrys apifera</i>
<i>Carex demissa</i>	<i>Hypericum tetrapterum</i>	<i>Pilosella officinarum</i>
<i>Carex echinata</i>	<i>Hieracium sp.</i>	<i>Potentilla erecta</i>
<i>Carex flacca</i>	<i>Hypochaeris radicata</i>	<i>Ranunculus flammula</i>
<i>Carex leporina</i>	<i>Inula conyzae</i>	<i>Rhinanthus minor</i>
<i>Carex nigra</i>	<i>Juncus acutiflorus</i>	<i>Rumex acetosa</i>
<i>Carex otrubae</i>	<i>Juncus articulatus</i>	<i>Rumex conglomeratus</i>
<i>Carex panicea</i>	<i>Juncus conglomeratus</i>	<i>Schedonorus arundinaceus</i>
<i>Carex spicata</i>	<i>Lathyrus pratensis</i>	<i>Scrophularia auriculata</i>
<i>Carex vesicaria</i>	<i>Leontodon hispidus</i>	<i>Scutellaria minor</i>
<i>Catapodium rigidum</i>	<i>Leontodon saxatilis</i>	<i>Stachys palustris</i>
<i>Chaenorhinum minus</i>	<i>Linum catharticum</i>	<i>Stellaria graminea</i>
<i>Centaurea nigra</i>	<i>Lotus corniculatus</i>	<i>Stellaria alsine</i>
<i>Centaureum erythraea</i>	<i>Lotus pedunculatus</i>	<i>Trifolium medium</i>
<i>Dactylorhiza fuchsii</i>	<i>Luzula campestris</i>	<i>Trifolium pratense</i>
<i>Dactylorhiza praetermissa</i>	<i>Luzula multiflora</i>	<i>Tussilago farfara</i>
<i>Dactylorhiza sp.</i>	<i>Lychnis flos-cuculi</i>	<i>Veronica officinalis</i>
<i>Equisetum palustre</i>	<i>Medicago lupulina</i>	<i>Vicia cracca</i>
<i>Eriophorum angustifolium</i>	<i>Molinia caerulea</i>	<i>Veronica scutellata</i>

On balance the diversity of the marshy grassland and industrial plateau could be regarded as meeting the Wildlife Sites Guidelines criteria because they support a diverse mosaic of marshy grassland, scrub and post-industrial communities, all showing a diverse native flora, even though they have a history of disturbance and do not readily conform to the published NVC communities. This would equate to being of value for nature conservation in a County context.

The flora of the plantations and dense scrub habitats is not considered to be significant for nature conservation. Their main flora interest is the heathy vegetation around some of the margins, but this is of no more than local value. (However, the habitats may have value for other types of wildlife such as birds or insects.)



Bee Orchid on industrial plateau

Several non-native invasive species were observed, but most were only in very small quantity. These are as follows:

- *Rhododendron ponticum* (Rhododendron). Locally frequent in conifer plantations at TN3 and TN4.
- *Cotoneaster bullatus* (Hollyberry Cotoneaster). Two plants seen in scrub mosaic in central area.
- *Cotoneaster simonsii* (Himalayan Cotoneaster). Several small plants present in scrub mosaic in central area and on industrial plateau.

These plants are listed in Schedule 9 of the Wildlife and Countryside Act, which makes it unlawful to plant or to cause them to spread in the wild.

In addition to the above, a small amount of Cherry Laurel was also present in the plantation at TN3, and several plants of Monkeyflower were present in damp disturbed ground in the easternmost field. Both of these are known to have invasive tendencies in some situations, although they are not included in the Wildlife and Countryside Act list of invasive species.



Rhododendron in plantation at TN3.



Himalayan Cotoneaster in marshy grassland/ scrub mosaic.

5. Recommendations

Development on this site is likely to involve a substantial loss of the current habitats, so the key recommendation for conserving the flora diversity would be to ensure that sufficient land around the site margin can be set aside and managed to preserve and enhance examples of vegetation with the highest value for nature conservation. In this case, the diverse marshy grassland and heath vegetation, and species-rich 'post-industrial' grassland. This will probably require some form of habitat management plan and an agreement with a local farmer to graze the area in an environmentally sensitive manner, using cattle or horses. Periodic scrub and grassland management is likely to be required if the habitat cannot be grazed.

The scrub and woodland habitats are of relatively recent origin and have low value for their flora but could feasibly be converted back to heath or grassland which would restore vegetation with greater botanical diversity.

Removal of non-native invasive species is strongly recommended, to prevent them from spreading. Stump treatment by herbicide is likely to be required after the Rhododendrons and larger Cotoneaster plants have been cut down.

If the locally uncommon 'SINC contributory species' would be lost to the development, it would be worth trying to relocate them (where possible) to suitable new habitats which will be managed favourably in the long term. This may not be possible with the existing Bee Orchids, which die after flowering, but any new basal rosettes could be transplanted in early spring.

There has clearly been a substantial loss of peat depth in the eastern fields in recent years. Therefore, if any areas of peat would be retained it may be worth investigating options for blocking drains and reinstating management for *Sphagnum* mosses to restore the peat. This would help with carbon-capture as well as producing a valuable habitat for uncommon wet-heath and marshy grassland plants.



The loss of peat and drying out of the eastern fields is demonstrated by how much the ground level has fallen since the concrete fence posts were installed. Seeking measures to stop further loss of peat is recommended.

No further botanical investigations are proposed at this stage. However, if the project is delayed for more than two years it would be worth carrying out another survey to check whether there have been any significant changes in the vegetation.

A botanical survey would be appropriate prior to construction, to locate any uncommon species that might be transplanted, and to confirm the locations of any non-native invasive species that may need to be controlled.

Fungi were not included in the vegetation survey, but two waxcap species were observed incidentally: *Hygrocybe acutoconica* on the industrial plateau and *H.conica* in short heathy grassland in the central habitat mosaic. In addition, the Slimy Spike (*Gomphidius glutinosus*) was noted at the edge of the plantation at TN3. This is considered uncommon in Wales. A further investigation of fungi is recommended to help clarify the nature conservation value of the local fungi population.



The Slimy Spike fungus (Gomphidius glutinosus) found in TN3 has very few records from Wales.



Persistent Waxcaps (Hygrocybe acutoconica) on the industrial plateau.

6. References

CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.1 updated September 2019). Chartered Institute of Ecology and Environmental Management, Winchester.

JNCC (2010). Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit. Joint Nature Conservation Committee, Peterborough.

Rodwell, J.S. (ed.) C.D.Pigott, D.A. Ratcliffe, A.J.C. Malloch, H.J.B. Birks, M.C.F. Proctor, D.W.Shimwell, J.P. Huntley, E.Radford, M.J.Wiggington, P.Wilkins, (1991 - 2000). British Plant Communities. Volumes 1-5. Cambridge University Press, Cambridge.

Wales Biodiversity Partnership (2008). Guidelines for the Selection of Wildlife Sites in Wales.

Appendix 1. Plant species list

The following species were identified during the vegetation survey. Due to the size of the site and nature of the study this should not be considered a comprehensive list of every plant species within the project area. (Species shown in brackets were recorded outside the study area but close to the boundary.)

The frequency column provides a rough estimate of overall abundance for the vascular plant species. This uses the DAFOR scale, where D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare. The prefix L = Local is used where a species has a restricted distribution within the site.

Species	Common Name	Frequency
VASCULAR PLANTS		
<i>Acer campestre</i>	Field Maple	R
(<i>Acer platanoides</i>)	(Norway Maple)	-
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Achillea millefolium</i>	Yarrow	R
<i>Agrostis canina</i>	Velvet Bent	O
<i>Agrostis capillaris</i>	Common Bent	F
<i>Agrostis stolonifera</i>	Creeping Bent	A
<i>Alchemilla glabra</i>	Smooth Lady's-mantle	R
<i>Alnus cordata</i>	Italian Alder	R
<i>Alnus glutinosa</i>	Alder	O
<i>Alnus incana</i>	Grey Alder	LF
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	F
<i>Arrhenatherum elatius</i>	False Oat-grass	F
<i>Asplenium scolopendrium</i>	Hart's-tongue Fern	R
<i>Athyrium filix-femina</i>	Lady Fern	O
<i>Bellis perennis</i>	Daisy	O
<i>Betula pubescens</i>	Downy Birch	O
<i>Blechnum spicant</i>	Hard Fern	R
<i>Bromus hordeaceus</i>	Soft Brome	R
(<i>Buxus sempervirens</i>)	(Box)	-
<i>Callitriche</i> sp.	Water Starwort (indeterminate)	R
<i>Calluna vulgaris</i>	Heather	F
<i>Cardamine flexuosa</i>	Wavy Bittercress	F
<i>Cardamine pratensis</i>	Cuckoo Flower	R
<i>Carex binervis</i>	Green-ribbed Sedge	O
<i>Carex demissa</i>	Common Yellow-Sedge	O
<i>Carex divulsa</i>	Grey Sedge	R
<i>Carex echinata</i>	Star Sedge	F
<i>Carex flacca</i>	Glaucous Sedge	F
<i>Carex hirta</i>	Hairy Sedge	O
<i>Carex leporina</i>	Oval Sedge	O
<i>Carex nigra</i>	Common Sedge	F
<i>Carex otrubae</i>	False Fox-sedge	O
<i>Carex panicea</i>	Carnation Sedge	O
<i>Carex rostrata</i>	Bottle Sedge	R
<i>Carex spicata</i>	Spiked Sedge	R
<i>Carex vesicaria</i>	Bladder Sedge	R

Species	Common Name	Frequency
<i>(Carpinus betulus)</i>	(Hornbeam)	-
<i>Catapodium rigidum</i>	Fern Grass	LO
<i>Centaurea nigra</i>	Common Knapweed	F
<i>Centaureum erythraea</i>	Common Centaury	R
<i>Cerastium fontanum</i>	Common Mouse-ear	O
<i>Chaenorhinum minus</i>	Small Toadflax	R
<i>Chamerion angustifolium</i>	Rose-bay Willowherb	F/ LA
<i>Cirsium arvense</i>	Creeping Thistle	O
<i>Cirsium palustre</i>	Marsh Thistle	F
<i>Cirsium vulgare</i>	Spear Thistle	R
<i>Cornus sanguinea</i>	Dogwood	O
<i>Cornus sericea</i>	Red-osier Dogwood	R
<i>Corylus avellana</i>	Hazel	LO
<i>Cotoneaster bullatus</i>	Hollyberry Cotoneaster	R
<i>Cotoneaster cf x suecicus</i>	Cotoneaster	R
<i>Cotoneaster simonsii</i>	Himalayan Cotoneaster	R
<i>Crataegus monogyna</i>	Hawthorn	LF
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Cytisus scoparius</i>	Broom	R
<i>Dactylis glomerata</i>	Cock's-foot Grass	O
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	O
<i>Dactylorhiza maculata</i>	Heath Spotted-orchid	R
<i>Dactylorhiza praetermissa</i>	Southern Marsh-orchid	O
<i>Dactylorhiza sp.</i>	Marsh-orchid (indeterminate)	O
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	F
<i>Deschampsia flexuosa</i>	Wavy Hair-grass	O
<i>Digitalis purpurea</i>	Foxglove	F
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Dryopteris filix-mas</i>	Male Fern	O
<i>Eleocharis palustris</i>	Common Spike-rush	R
<i>Elytrigia repens</i>	Couch	R
<i>Empetrum nigrum</i>	Crowberry	R
<i>Epilobium ciliatum</i>	American Willowherb	F
<i>Epilobium hirsutum</i>	Greater Willowherb	F
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Epilobium palustre</i>	Marsh Willowherb	O
<i>Epilobium parviflorum</i>	Hoary Willowherb	R
<i>Epilobium tetragonum</i>	Square-stalked Willowherb	R
<i>Equisetum arvense</i>	Field Horsetail	O
<i>Equisetum fluviatile</i>	Water Horsetail	LF
<i>Equisetum palustre</i>	Marsh Horsetail	LO
<i>Erica tetralix</i>	Cross-leaved Heath	O
<i>Eriophorum angustifolium</i>	Common Cotton-grass	O
<i>Ervilia hirsuta</i>	Hairy Tare	R
<i>Ervum tetraspermum</i>	Smooth Tare	R
<i>Eupatorium cannabinum</i>	Hemp Agrimony	R
<i>Festuca ovina</i>	Sheep's Fescue	R
<i>Festuca rubra</i>	Red Fescue	O
<i>Fragaria vesca</i>	Wild Strawberry	R
<i>(Galium album)</i>	(Hedge Bedstraw)	-
<i>Galium aparine</i>	Cleavers	R

Species	Common Name	Frequency
<i>Galium palustre</i>	Marsh Bedstraw	F
<i>Galium saxatile</i>	Heath Bedstraw	O
(<i>Galium verum</i>)	(Lady's Mantle)	-
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill	O
<i>Geranium robertianum</i>	Herb Robert	LO
<i>Geum urbanum</i>	Wood Avens	R
<i>Glyceria fluitans</i>	Floating Sweet-grass	R
<i>Hieracium sp.</i>	Hawkweed	R
<i>Holcus lanatus</i>	Yorkshire Fog	F
<i>Holcus mollis</i>	Creeping Soft-grass	F
(<i>Hypericum maculatum</i>)	(Imperforate St. John's-Wort)	-
<i>Hypericum tetrapterum</i>	Square-Stalked St. John's-Wort	R
<i>Hypochaeris radicata</i>	Common Cat's-Ear	O
<i>Ilex aquifolium</i>	Holly	R
<i>Inula conyzae</i>	Ploughman's Spikenard	R
<i>Juncus acutiflorus</i>	Sharp-flowered Rush	F
<i>Juncus articulatus</i>	Jointed Rush	O
<i>Juncus bufonius</i>	Toad Rush	O
<i>Juncus bulbosus</i>	Bulbous Rush	R
<i>Juncus conglomeratus</i>	Compact Rush	O
<i>Juncus effusus</i>	Soft Rush	A
<i>Juncus inflexus</i>	Hard Rush	A
<i>Juncus squarrosus</i>	Heath Rush	O
<i>Larix kaempferi</i>	Japanese Larch	R
<i>Lathyrus pratensis</i>	Meadow Vetchling	O
<i>Leontodon hispidus</i>	Rough Hawk-bit	R
<i>Leontodon saxatilis</i>	Lesser Hawkbit	R
<i>Linum catharticum</i>	Fairy Flax	O
<i>Lolium perenne</i>	Perennial Rye-grass	R
<i>Lotus corniculatus</i>	Common Bird's-foot Trefoil	LO
<i>Lotus pedunculatus</i>	Greater Bird's-foot Trefoil	LO
<i>Luzula campestris</i>	Field Woodrush	R
<i>Luzula multiflora</i>	Heath Woodrush	F
<i>Lychnis flos-cuculi</i>	Ragged Robin	LO
<i>Medicago lupulina</i>	Black Medick	O
<i>Mimulus guttatus</i>	Monkeyflower	R
<i>Molinia caerulea</i>	Purple Moor-grass	A
<i>Myosotis laxa</i>	Tufted Forget-me-not	O
<i>Ophrys apifera</i>	Bee Orchid	R
<i>Phalaris arundinacea</i>	Reed Canary-grass	R
<i>Phleum pratense</i>	Timothy	R
<i>Picea sitchensis</i>	Sitka Spruce	LD
<i>Pilosella aurantiaca</i>	Fox-and-cubs	R
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	R
<i>Pinus contorta</i>	Lodgepole Pine	LD
<i>Pinus nigra</i>	Corsican Pine	LF
<i>Pinus sylvestris</i>	Scots Pine	R
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Plantago major</i>	Greater Plantain	R
<i>Poa annua</i>	Annual Meadow-grass	R
<i>Poa pratensis</i>	Smooth Meadow-grass	R

Species	Common Name	Frequency
<i>Poa trivialis</i>	Rough Meadow-grass	O
<i>Polypogon viridis</i>	Water Bent	R
<i>Polystichum setiferum</i>	Soft Shield-fern	R
<i>Potamogeton polygonifolius</i>	Bog Pondweed	R
<i>Potentilla erecta</i>	Tormentil	F
<i>Prunella vulgaris</i>	Self-Heal	O
(<i>Prunus avium</i>)	(Wild Cherry)	-
<i>Prunus spinosa</i>	Blackthorn	LO
<i>Quercus robur</i>	Pedunculate Oak	R
<i>Ranunculus acris</i>	Meadow Buttercup	O
<i>Ranunculus flammula</i>	Lesser Spearwort	O
<i>Ranunculus omiophyllus</i>	Round-leaved Water-crowfoot	R
<i>Ranunculus repens</i>	Creeping Buttercup	F
<i>Rhinanthus minor</i>	Yellow Rattle	LO
<i>Rhododendron ponticum</i>	Rhododendron	O
<i>Rosa arvensis</i>	Field Rose	R
<i>Rosa canina</i>	Dog Rose	O
<i>Rubus fruticosus</i>	Bramble	A / LD
<i>Rumex acetosa</i>	Common Sorrel	F
(<i>Rumex conglomeratus</i>)	(Clustered Dock)	-
<i>Rumex crispus</i>	Curled Dock	O
<i>Rumex obtusifolius</i>	Broad-Leaved Dock	R
<i>Salix aurita</i>	Eared Willow	O
(<i>Salix alba</i>)	(White Willow)	-
<i>Salix caprea</i>	Goat Willow	R
<i>Salix cinerea</i>	Grey Willow	A / LD
(<i>Salix fragilis</i>)	(Crack Willow)	-
<i>Salix repens</i>	Creeping Willow	R
<i>Salix viminalis</i>	Osier	R
<i>Sambucus nigra</i>	Elder	O
<i>Schedonorus arundinaceus</i>	Tall Fescue	R
<i>Scorzonerooides autumnalis</i>	Autumn Hawk-bit	R
<i>Scrophularia auriculata</i>	Water Figwort	LF
<i>Scutellaria minor</i>	Lesser Skullcap	R
<i>Senecio jacobaea</i>	Ragwort	O
<i>Solanum dulcamara</i>	Bittersweet	R
<i>Sonchus oleraceus</i>	Smooth Sow-thistle	R
<i>Sorbus aucuparia</i>	Rowan	O
(<i>Sorbus intermedia</i>)	(Swedish Whitebeam)	R
<i>Sparganium erectum</i>	Branched Bur-reed	R
<i>Stachys palustris</i>	Marsh Woundwort	R
<i>Stachys sylvatica</i>	Hedge Woundwort	R
<i>Stellaria alsine</i>	Bog Stitchwort	O
<i>Stellaria graminea</i>	Lesser Stitchwort	R
<i>Taraxacum</i> sp.	Dandelion	O
(<i>Taxus baccata</i>)	(Yew)	-
<i>Tragopogon pratensis</i>	Goat's-Beard	R
<i>Trichophorum cespitosum</i>	Deer-grass	R
<i>Trifolium dubium</i>	Lesser Trefoil	R
<i>Trifolium medium</i>	Zigzag Clover	R
<i>Trifolium pratense</i>	Red Clover	LF

Species	Common Name	Frequency
<i>Trifolium repens</i>	White Clover	F
<i>Tussilago farfara</i>	Colt's Foot	LO
<i>Typha latifolia</i>	Bulrush	R
<i>Ulex europaeus</i>	Common Gorse	LF
<i>Urtica dioica</i>	Nettle	O
<i>Vaccinium myrtillus</i>	Bilberry	O
<i>Veronica beccabunga</i>	Brooklime	R
<i>Veronica chamaedrys</i>	Germander Speedwell	R
<i>Veronica officinalis</i>	Heath Speedwell	R
<i>Veronica scutellata</i>	Marsh Speedwell	R
<i>Veronica serpyllifolia</i>	Thyme-leaved Speedwell	R
<i>Viburnum lantana</i>	Wayfaring Tree	R
<i>Viburnum opulus</i>	Guelder Rose	R
<i>Vicia cracca</i>	Tufted Vetch	LO
<i>Vicia sativa</i>	Common Vetch	R
(<i>Vicia sepium</i>)	(Bush Vetch)	-
BRYOPHYTES		
<i>Aulacomnium palustre</i>	Bog Groove-moss	+
<i>Brachythecium rivulare</i>	River Feather-moss	+
<i>Brachythecium rutabulum</i>	Rough-stalked Feather-moss	+
<i>Bryum pseudotriquetrum</i>	Thread-moss	+
<i>Calliergonella cuspidata</i>	Pointed Spear-moss	+
<i>Campylopus sp.</i>	Moss	+
<i>Campylopus introflexus</i>	Heath Star-moss	+
<i>Climacium dendroides</i>	Tree-moss	+
<i>Cratoneuron filicinum</i>	Fern-leaved Hook-moss	+
<i>Dichodontium palustre</i>	Marsh Forklet-moss	+
<i>Dicranum scoparium</i>	Broom Fork-moss	+
<i>Eurhynchium striatum</i>	Common Striated Feather-moss	+
<i>Fissidens adianthoides</i>	Maidenhair Pocket-moss	+
<i>Hylocomium splendens</i>	Glittering Wood-moss	+
<i>Hypnum cupressiforme</i>	Cypress-leaved Plait-moss	+
<i>Hypnum jutlandicum</i>	Heath Plait-moss	+
<i>Kindbergia praelonga</i>	Common Feather-moss	+
<i>Mnium hornum</i>	Swan's-neck Thyme-moss	+
<i>Philonotis fontana</i>	Fountain Apple-moss	+
<i>Pleurozium schreberi</i>	Red-stemmed Feather-moss	+
<i>Polytrichum commune</i>	Common Haircap	+
<i>Polytrichastrum formosum</i>	Bank Haircap	+
<i>Polytrichum juniperinum</i>	Juniper Haircap	+
<i>Polytrichum piliferum</i>	Bristly Haircap	+
<i>Pseudoscleropodium purum</i>	Neat Feather-moss	+
<i>Racomitrium ericoides</i>	Dense fringe-moss	+
<i>Rhytidiadelphus loreus</i>	Little Shaggy-moss	+
<i>Rhytidiadelphus squarrosus</i>	Springy Turf-moss	+
<i>Rhytidiadelphus triquetrus</i>	Big Shaggy-moss	+
<i>Scapania compacta</i>	Thick-set Earwort	+
<i>Scapania irrigua</i>	Heath Earwort	+
<i>Sphagnum denticulatum</i>	Cow-horn Bog-moss	+
<i>Sphagnum fallax</i>	Flat-topped Bog-moss	+
<i>Sphagnum fimbriatum</i>	Fringed Bog-moss	+

Species	Common Name	Frequency
<i>Sphagnum inundatum</i>	Lesser Cow-horn Bog-moss	+
<i>Sphagnum palustre</i>	Blunt-leaved Bog-moss	+
<i>Sphagnum squarrosum</i>	Spiky Bog-moss	+
<i>Syntrichia montana</i>	Intermediate Screw-moss	+
<i>Thuidium tamariscinum</i>	Common Tamarisk-moss	+



Smooth Lady's Mantle
(*Alchemilla glabra*) on the
industrial plateau



Cross-leaved Heath (*Erica*
tetralix) in the central heath/
marshy grassland mosaic.

Appendix 2. Incidental observations

FUNGI	
<i>Hygrocybe acutoconica</i>	Persistent Waxcap
<i>Hygrocybe conica</i>	Blackening Waxcap
<i>Melampsora lini</i>	A rust on <i>Linum catharticum</i>
<i>Suillus grevillei</i>	Larch Bolete
<i>Gomphidius glutinosus</i>	Slimy Spike
INVERTEBRATES	
<i>Aphantopus hyperantus</i>	Ringlet Butterfly
<i>Autographa gamma</i>	Silver Y
<i>Coenonympha pamphilus</i>	Small Heath
<i>Euclidia glyphica</i>	Burnet Companion
<i>Maniola jurtina</i>	Meadow Brown
<i>Thymelicus sylvestris</i>	Small Skipper Butterfly
<i>Tyria jacobaeae</i>	Cinnabar
<i>Zygaena sp.</i>	Burnet Moth
AMPHIBIANS	
<i>Bufo bufo</i>	Common Toad
<i>Lissotriton helveticus</i>	Palmate Newt
<i>Rana temporaria</i>	Common Frog
REPTILES	
<i>Zootoca vivipara</i>	Common Lizard
BIRDS	
<i>Buteo buteo</i>	Buzzard
<i>Carduelis carduelis</i>	Goldfinch
<i>Corvus corone</i>	Carrion Crow
<i>Corvus monedula</i>	Jackdaw
<i>Erithacus rubecula</i>	Robin
<i>Hirundo rustica</i>	Swallow
<i>Parus caeruleus</i>	Blue Tit
<i>Parus major</i>	Great Tit
<i>Pica pica</i>	Magpie
<i>Sylvia atricapilla</i>	Blackcap
<i>Turdus merula</i>	Blackbird
MAMMALS	
<i>Meles meles</i>	Badger (field signs)
<i>Oryctolagus cuniculus</i>	Rabbit (live sighting/ droppings)



Common Lizards basking on fly-tipped refuse on the industrial plateau.

D4 Fungi Survey Report

Ove Arup and Partners

Land at Rassau Industrial Estate

Fungi survey



October 2020



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Cover photographs: Left: *Gomphidius glutinosus* (Slimy Spike). Right: *Tricholomopsis rutilans* (Plums and Custard).

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1. Introduction

Ove Arup and Partners are currently undertaking a series of ecological surveys of land at Rassau Industrial Estate (approximate central grid reference SO158128). During a vegetation survey in summer 2020¹ several species of fungi were observed, including *Gomphidius glutinosus* which is uncommon in Wales. Further investigation has subsequently been commissioned to try to clarify whether the site has other nature conservation significance for fungi.

This report presents an outline of the survey methodology and summarises the findings. It then provides an initial assessment of the nature conservation value of the fungi population at the site.

2. Survey method

There are currently no standard or established protocols for surveys of fungi, but surveys of large areas tend to be carried out using walk-over or transect sampling methods. In this case a combination of the two was used, focussing within areas judged to be most likely to support fungi populations of nature conservation significance. An overview of the study area is presented on an aerial photograph background in Figure 1. Survey effort was concentrated on the plantations and areas of short heathy grassland, which were judged to have the greatest potential for finding fungi with significance for nature conservation. The cattle-grazed and recently disturbed parts of the site were not included in the survey.

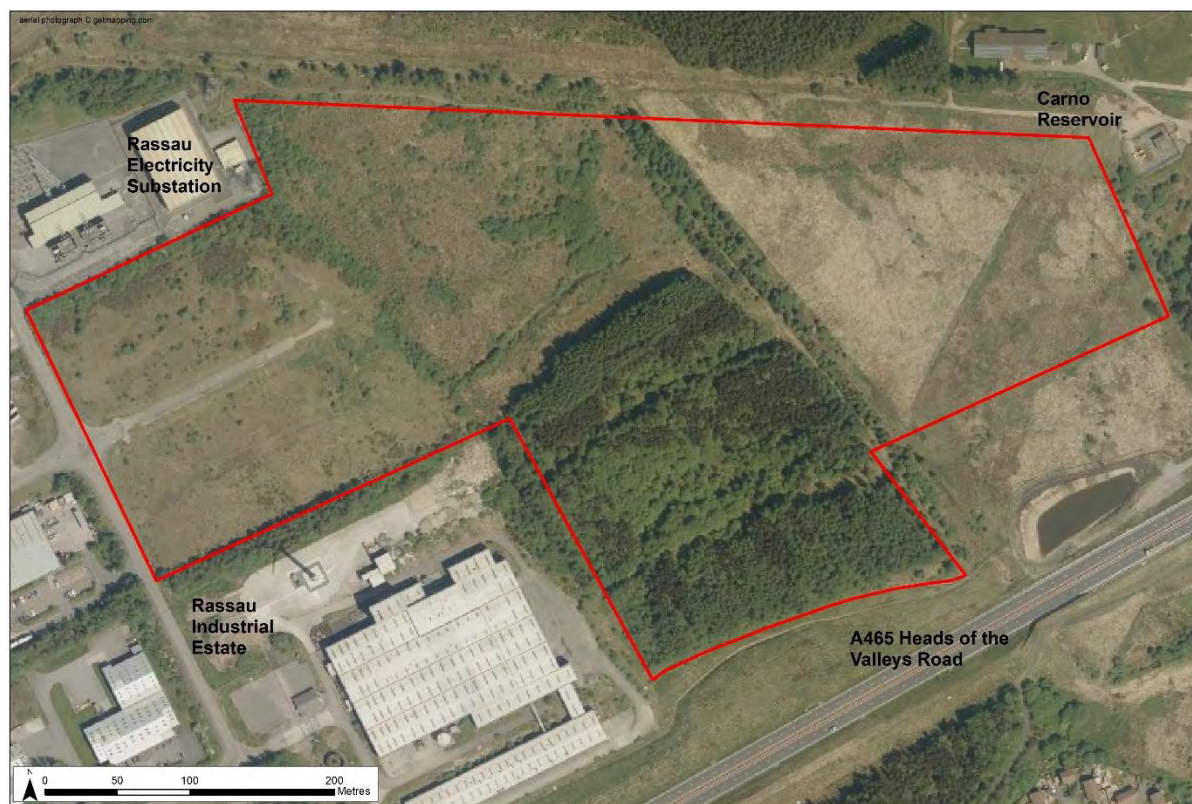


Figure 1. Overview of study area

¹ Sturgess Ecology (July, 2020). Land at Rassau Industrial Estate, vegetation survey. Unpublished report to Ove Arup and Partners Ltd.

Fungi surveys are ideally carried out over several months and/ or years because fungi only produce their fruiting bodies intermittently, often with species fruiting at different times of year, and sometimes only every few years. Fruiting can vary considerably from year to year, depending on a range of factors, particularly weather and land management. In this case, due to the project timescales, the investigation has been limited to two survey visits during September and October 2020. These months can be very productive for some groups of fungi, although it cannot be expected to find all of the species that are present. For example, it would generally not be possible to find spring-fruited fungi, and even some species that typically appear in the autumn would not be recorded unless they are fruiting on the particular day of the survey. The survey visits were all carried out during favourable weather conditions, avoiding heavy rain, frost and prolonged dry weather.

The fieldwork was undertaken by two surveyors working together. Dr Peter Sturgess CEnv MCIEEM is an experienced ecologist already familiar with the site from the vegetation study, with a particular interest in waxcap fungi. Emma Williams is one of the foremost fungi recorders in south-east Wales, with expertise in woodland fungi and a special interest in fungi on coal spoil habitats, including many micro-fungi.

The survey was carried out by a simple walk-through of the various habitats, spotting fungi growing from the ground or on stumps etc, and targeting features considered likely to be good for fungi for more detailed inspection. Sometimes the surveyors focussed on a particular location for 30 minutes or so of very close examination, to search out smaller species, by turning over logs etc. before continuing the walk-through.

Identification of fungi was generally carried out by fieldwork supported by microscopy. Some species could be readily identified by field characters on site, but it was necessary to collect specimens for a high proportion of more difficult species, to allow determination from reference books, specialist keys and by microscopy. In many cases it was not possible to identify fungi to species, or even to genus, especially with older or damaged specimens.

3. Survey findings

A total of 202 fungi taxa were identified. The survey findings have been summarised into a species list, in Table 1, setting out the survey visit when each species was recorded. It is arranged in alphabetical order by scientific name, but also gives common names (where available).

Fungi taxonomy is currently undergoing significant revision, especially as a result of DNA studies in recent years. It is likely that many species listed in Table 1 have more than one name in current use (e.g. Persistent Waxcap is referred to as *Hygrocybe persistens* in many older reference books, but more recent texts refer to it as *H.acutoconica*, and some others split it into several sub-species). This report has tried to use names found in current general reference books, but there is often inconsistency between these, and it is possible that some of the names used in the table will have been superseded. In general this report uses scientific names, because many of the fungi do not have common names.

Several photographs taken during the survey are presented in Appendix 1 to show examples of some of the species and habitat features. These include some of the species considered to be of high nature conservation value, and a selection of other species that help to illustrate the broad range of fungi covered by the survey.

Table 1. Summary of survey findings.

Species	Common name	14/9/2020	10/10/20
<i>Acanthophiobolus helicosporus</i>	(no common name)		+
<i>AcrospERMUM graminum</i>	(no common name)		+
<i>Agaricus sp.</i>	A mushroom	+	
<i>Amanita rubescens</i>	Blusher	+	+
<i>Ampulloclitocybe clavipes</i>	Clubfoot Mushroom		+
<i>Amylostereum chailletii</i>	Powdered Duster	+	
<i>Arachnopeziza obtusipila</i>	(no common name)		+
<i>Ascocoryne cylichnium</i>	A jelly fungus		+
<i>Ascocoryne sarcoides</i>	Purple Jellydisc		+
<i>Boletus badius</i>	Bay Bolete	+	+
<i>Botrytis cinerea</i>	Grey Mould		+
<i>Botrytis fabae</i>	Chocolate Spot	+	
<i>Calocera pallidospatulata</i>	Pale Stagshorn	+	+
<i>Calycine (Bisporella) citrina</i>	Lemon Disco		+
<i>Cejpia hystrix</i>	(no common name)		+
<i>Chlorociboria aeruginosa</i>	Green Elf Cup	+	
<i>Cistella fugiens</i>	(no common name)	+	
<i>Claussenomyces cf atrovirens</i>	(no common name)		+
<i>Claussenomyces cf prasinulus</i>	(no common name)		+
<i>Claviceps purpurea</i>	Ergot	+	+
<i>Clavulina cinerea</i>	Grey Coral		+
<i>Clavulina coralloides</i>	Crested Coral	+	
<i>Coleosporium tusilagnis</i>	A rust on Coltsfoot		+
<i>Conocybe sp.</i>	Conecap	+	
<i>Conocybe subpubescens</i>	Downy Conecap		+
<i>Conocybe velata</i>	Veiled Conecap		+
<i>Coprinellus domesticus</i>	Fire-rug inkcap		+
<i>Coprinellus micaceus</i>	Glistening Inkcap	+	
<i>Cortinarius acutus</i>	Peaked Webcap	+	
<i>Cortinarius anomalus</i>	Variable Webcap		+
<i>Cortinarius brunneus var glandicolor.</i>	A Webcap		+
<i>Cortinarius decipiens</i>	Sepia Webcap		+
<i>Cortinarius flexipes</i>	Pelargonium Webcap		+
<i>Cortinarius helvelloides</i>	A Webcap	+	
<i>Cortinarius multiformis</i>	A Webcap	+	
<i>Cortinarius obtusus</i>	Blunt Webcap	+	
<i>Cortinarius varius</i>	A Webcap	+	
<i>Coryne cf tasmanica</i>	(no common name)		+
<i>Crepidotus cesatii</i>	Round-spored Oysterling	+	
<i>Crepidotus epibryus</i>	Grass Oysterling	+	+
<i>Crepidotus lundellii</i>	An Oysterling	+	
<i>Crepidotus variabilis</i>	Variable Oysterling	+	
<i>Cudoniella clavus</i>	Spring Pin		+
<i>Cyphella sp.</i>	A mouse-ear fungus		+
<i>Cystolepiota seminuda</i>	Bearded Dapperling	+	
<i>Dacrymyces stillatus</i>	Common Jellyspot	+	+
<i>Daedaleopsis confragosa</i>	Blushing Bracket		+
<i>Delicatula integrella</i>	(no common name)		+
<i>Diaporthe arctii</i>	(no common name)	+	
<i>Durella cf atrocyanea</i>	(no common name)	+	
<i>Entoloma clypeatum</i>	Shield Pinkgill		+
<i>Entoloma juncinum</i>	A pinkgill	+	
<i>Entoloma pallescens</i>	A pinkgill		+

Species	Common name	14/9/2020	10/10/20
<i>Entoloma pleopodium</i>	Aromatic Pinkgill		+
<i>Entoloma rhodopolium</i>	Wood Pinkgill		+
<i>Entoloma sericellum</i>	Cream Pinkgill	+	
<i>Entoloma sp.</i>	Pinkgill	+	
<i>Entoloma undatum</i>	A pinkgill		+
<i>Erysiphe capreae</i>	A powdery mildew on willow	+	
<i>Erysiphe hyperici</i>	A powdery mildew on St.John's-wort	+	
<i>Erysiphe trifoliorum</i>	A powdery mildew on clovers	+	+
<i>Exidia recisa</i>	Amber Jelly		+
<i>Frommeëlla tormentillae (on Potentilla erecta)</i>	A rust on Tormentil		+
<i>Galerina calyptrata</i>	A bell fungus	+	
<i>Galerina marginata</i>	Funeral Bell		+
<i>Galerina vittiformis</i>	Hairy Leg Bell	+	+
<i>Ganoderma sp.</i>	A bracket fungus		+
<i>Gibellula cf pulchra</i>	Fungal infection on a harvestman	+	
<i>Gloeophyllum sepiarium</i>	Conifer Mazegill	+	
<i>Glyphium elatum</i>	(no common name)	+	
<i>Golovinomyces asterum var. asterum</i>	A powdery mildew on Daisy	+	
<i>Gomphidius glutinosus</i>	Slimy Spike	+	
<i>Hebeloma crustuliniforme</i>	Poisonpie	+	
<i>Hebeloma fragilipes</i>	A poisonpie	+	
<i>Hebeloma helodes</i>	A poisonpie	+	
<i>Hebeloma leucosarx</i>	Birch Poisonpie		+
<i>Hebeloma lutense</i>	A poisonpie	+	
<i>Hebeloma pusillum</i>	Dwarf Poisonpie	+	
<i>Hebeloma velutipes</i>	A poisonpie	+	
<i>Helminthosphaeria clavariarum (on Clavulina cinerea)</i>	A fungal parasite on Grey Coral		+
<i>Hemimycena lactea</i>	Milky Bonnet		+
<i>Hemimycena tortuosa</i>	Dewdrop Bonnet	+	
<i>Heterobasidion parviporum</i>	A root rot fungus	+	
<i>Hyalorbilia inflatula</i>	(no common name)		+
<i>Hygrocybe acutoconica</i>	Persistent Waxcap	+	
<i>Hygrocybe conica</i>	Blackening Waxcap	+	
<i>Hymenoscyphus vernus</i>	(no common name)		+
<i>Hypholoma fasciculare</i>	Sulphur Tuft		+
<i>Hypocrea cf placentula</i>	(no common name)		+
<i>Hypomyces aurantius</i>	Orange Polypore Mould (on <i>Stereum</i> sp.)		+
<i>Hypomyces lateritius</i>	Ochre Gillgobbler	+	
<i>Hypomyces luteovirens</i>	A parasite on <i>Russula</i> sp.	+	
<i>Hypoxyton stygium</i>	(no common name)		+
<i>Inocybe calospora</i>	A fibrecap		+
<i>Inocybe cookei</i>	Straw Fibrecap		+
<i>Inocybe paludinella</i>	A fibrecap		+
<i>Inocybe sindonia</i>	Beige Fibrecap		+
<i>Inonotus radiatus</i>	Alder Bracket	+	+
<i>Isaria cf fumosorosea</i>	(no common name)	+	
<i>Kuehneola uredinis</i>	Pale Bramble Rust	+	
<i>Laccaria bicolor</i>	Bicoloured Deceiver	+	
<i>Laccaria laccata</i>	Deceiver	+	+
<i>Laccaria proxima</i>	Scurfy Deceiver		+
<i>Laccaria tortilis</i>	Twisted Deceiver	+	+

Species	Common name	14/9/2020	10/10/20
<i>Lachnum apalum</i>	Rush Disco		+
<i>Lachnum controversum</i>	(no common name)		+
<i>Lachnum virgineum</i>	Snowy Disco	+	+
<i>Lactarius deterrimus</i>	False Saffron Milkcap	+	
<i>Lactarius obscuratus</i>	Alder Milkcap	+	
<i>Leptospora rubella</i>	(no common name)	+	
<i>Lycoperdon nigrescens</i>	Dusky Puffball		+
<i>Marasmiellus vaillantii</i>	Goblet Parachute		+
<i>Marasmius epiphyllus</i>	Leaf Parachute		+
<i>Melampsora caprearum</i>	Rust on willow	+	
<i>Melampsora epitea</i>	Rust on willow	+	
<i>Mollisia fusca</i>	(no common name)		+
<i>Mollisia hydrophila</i>	(no common name)	+	
<i>Mycena ambramsii</i>	A bonnet fungus	+	+
<i>Mycena arcangeliana</i>	Angel's Bonnet	+	
<i>Mycena bulbosa</i>	Rush Bonnet		+
<i>Mycena capillaripes</i>	Pinkedge Bonnet		+
<i>Mycena cinerella</i>	Mealy Bonnet		+
<i>Mycena citrinomarginata</i>	A bonnet fungus		+
<i>Mycena delicatella</i>	A bonnet fungus		+
<i>Mycena epipterygia</i>	Yellowleg Bonnet		+
<i>Mycena filopes</i>	Iodine Bonnet	+	+
<i>Mycena flavoalba</i>	Ivory Bonnet		+
<i>Mycena galericulata</i>	Common Bonnet	+	+
<i>Mycena haematopus</i>	Bleeding Bonnet		+
<i>Mycena leptocephala</i>	Nitrous Bonnet	+	+
<i>Mycena meliigena</i>	Mauve Bonnet		+
<i>Mycena metata</i>	A bonnet fungus	+	
<i>Mycena pseudocorticola</i>	A bonnet fungus		+
<i>Mycena pterigena</i>	A bonnet fungus	+	
<i>Mycena pura</i>	Lilac Bonnet		+
<i>Mycena stipata</i>	Clustered Pine Bonnet		+
<i>Mycena stylobates</i>	Bulbous Bonnet	+	+
<i>Mycena vitillis</i>	Snapping Bonnet	+	
<i>Mycena zephirus</i>	A bonnet fungus	+	
<i>Naohidemyces (Pucciniastrum) vacciniorum</i>	Bilberry Rust		+
<i>Naucoria salicis</i>	Willow Aldercap	+	
<i>Niptera cf pilosa</i>	(no common name)		+
<i>Olla sp.</i>	(no common name)		+
<i>Parasola auricoma</i>	An inkcap		+
<i>Pezizella eburnea</i>	(no common name)		+
<i>Phaeosphaeria fuckelii</i>	(no common name)	+	+
<i>Phellinus lundellii</i>	Birch Bristle Bracket		+
<i>Phloeomana hiemalis</i>	(no common name)	+	
<i>Pholiotina rugosa</i>	Common Conecap	+	+
<i>Pilobolus sp.</i>	Dung Cannon	+	
<i>Pleospora phaeocomoides</i>	(no common name)	+	
<i>Polyporus leptocephalus</i>	Blackfoot Polypore	+	+
<i>Postia stiptica</i>	Bitter Bracket	+	
<i>Postia subcaesia</i>	Blueing Bracket	+	
<i>Psathyrella artemisiae</i>	Petticoat Brittlestem	+	
<i>Psathyrella candolleana</i>	Pale Brittlestem	+	+
<i>Psathyrella corrugis</i>	Red Edge Brittlestem		+
<i>Psathyrella pseudogracilis</i>	A brittlestem	+	

Species	Common name	14/9/2020	10/10/20
<i>Pseudopeziza trifolii</i>	Clover Leaf-spot	+	
<i>Psilocybe (Deconica) inquilina</i>	Flecked Brownie		+
<i>Puccinia cf punctata</i>	A rust on Marsh Bedstraw	+	
<i>Puccinia cnici-oleracei</i>	A rust on Marsh Thistle		+
<i>Puccinia hieracii</i>	A rust on Dandelion	+	
<i>Puccinia poarum</i>	Colt's-foot Rust	+	+
<i>Pyrenopeziza adenostylidis</i>	(no common name)	+	
<i>Rhizomarasmius setosus</i>	Beechleaf Parachute		+
<i>Rhodocollybia butyracea</i>	Buttercup	+	+
<i>Rhodocollybia butyracea var asema</i>	Buttercup (pale form)		+
<i>Rhytisma salicinum</i>	Willow Tarspot	+	+
<i>Rickenella fibula</i>	Orange Mosscap	+	
<i>Rimbachia bryophila</i>	Veined Mossear		+
<i>Roseodiscus equisetinus</i>	(no common name)	+	
<i>Russula aquosa</i>	Red Swamp Brittlegill		+
<i>Russula emetica</i>	The Sickener		+
<i>Russula ochroleuca</i>	Ochre Brittlegill	+	+
<i>Russula sp.</i>	Brittlegill (several indeterminate species)	+	
<i>Ruzenia spermoides</i>	(no common name)		+
<i>Sarcoscypha austriaca</i>	Scarlet Elf-cup		+
<i>Sawadaea bicornis</i>	Maple Mildew	+	
<i>Schizopora paradoxa</i>	Split Porecrust		+
<i>Skeletocutis vulgaris</i>	(no common name)	+	
<i>Stereum rugosum</i>	Bleeding Broadleaf Crust		+
<i>Suillus grevillei var badius</i>	Larch Bolete (dark form)	+	
<i>Suillus grevillei var grevillei</i>	Larch Bolete	+	
<i>Suillus luteus</i>	Slippery Jack	+	
<i>Taphrina alni</i>	Alder Tongue		+
<i>Tephrocybe palustris</i>	Sphagnum Greyling		+
<i>Tilachlidium brachiatum</i>	(no common name)		+
<i>Trechispora cohaerens</i>	(no common name)	+	
<i>Tremella foliacea</i>	Leafy Brain		+
<i>Tremella mesenterica</i>	Yellow Brain		+
<i>Trichoderma sp.</i>	A cushion fungus		+
<i>Tricholomopsis rutilans</i>	Plums and Custard		+
<i>Trichopeziza mollissima</i>	(no common name)	+	
<i>Tubaria conspersa</i>	Felted Twiglet		+
<i>Tubaria dispersa</i>	Hawthorn Twiglet	+	+
<i>Tubaria furfuracea</i>	Scurfy Twiglet		+
<i>Uromyces viciae-fabae</i>	A rust on vetch	+	
<i>Xerocomellus chrysenteron</i>	Red-cracking Bolete	+	
<i>Xylaria cinerea</i>	(no common name)	+	+
<i>Xylaria hypoxylon</i>	Candlesnuff Fungus		+
<i>Xylodon nespори</i>	(no common name)	+	

4. Assessment

The assessment of nature conservation value for fungi generally follows the guidelines set out in Wildlife Sites Guidance Wales², with greater value being placed on species that are considered to be rare or scarce, and habitats supporting a high diversity of fungi species.

Fungi assessment can be very difficult due to a general lack of fungi recording, and problems with identifying many species (particularly where there have been recent taxonomic changes). In many cases it is hard to know whether a species is truly rare or just under-recorded. Many of the species recorded during the present survey are very infrequently recorded, and they include several new records for south-east Wales. These tend to be species where microscopy is essential (e.g. many smaller specimens and micro-fungi) and fungi that are difficult to identify, especially where descriptions are not included in general field-guides (for e.g. groups such as *Entoloma*, *Psathyrella* and *Cortinarius*). These are likely to be under-recorded, but they may also include some rare species. A judgement has had to be made on species that may be genuinely rare, based on national distributions and available literature, filtered by the surveyors' experience.

The majority of fungi recorded on this site are likely to be common and widespread species (although many are considered likely to be under-recorded). The industrial plateau, plantation and scrub habitats mainly supported a low diversity of probably widespread species. However, there are a few exceptions that are discussed below, and key locations given in Figure 2:

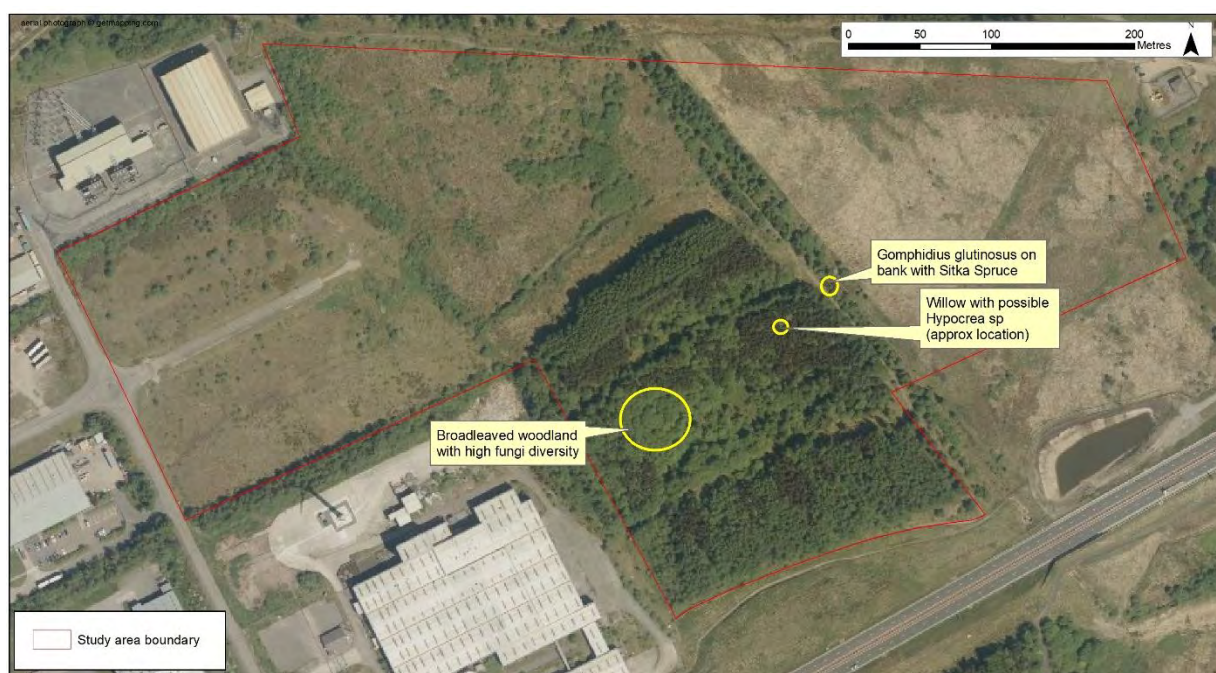


Figure 2. Location of key findings from fungi survey

Gomphidius glutinosus is assessed as having county significance for nature conservation. It has a widespread distribution but in Britain it is only abundant in Scotland and considered uncommon elsewhere³. This is a large species with a brightly coloured stem base and other easily recognised features, so it is unlikely to be under-recorded. It is associated with conifers,

² Wales Biodiversity Partnership (2008). Wildlife Sites Guidance Wales: A guide to develop local wildlife sites in Wales.

³ Kibby G. (2017). Mushrooms and toadstools of Britain and Europe (Volume 1)

and at Rassau was growing on banking beneath Sitka Spruce at the eastern edge of the plantation.

Hypoxylon stygium and *Rimbachia bryophila* are small fungi but they are likely to be genuinely rare, rather than just under-recorded. They were both found in the broad-leaved / mixed woodland in the western part of the plantation. *H.stygium* was growing on a dead deciduous bough. The record of *R.bryophila*, which was found on mossy banking, appears to be the first record for South Wales. *Coryne cf tasmanica* was also found on a deciduous trunk in this area. This is usually considered to be an Australian species and may be a first record for Wales. A specimen has been retained for confirmation by DNA analysis. The presence of these species would qualify this area of mossy, broad-leaved woodland as having likely significance for fungi in a county context, because they meet the Wildlife Sites Guidelines of supporting species recorded from 10 or fewer 10km grid squares in Wales, and species recorded from 3 or fewer sites within a Watsonian Vice County.

A species of *Hypocrea* was found on a rush stem north of the plantation. This appears to be *H.placentula*, which if confirmed would be new to Wales, and possibly to Britain. A specimen has been sent for confirmation using DNA analysis. However, there is nothing significant about the patch of rush the fungus was growing in that would warrant its protection.

One interesting observation made during the study was that squirrels had been gnawing into the wood of several dead branches of an old Grey Willow in the plantation. Squirrels are often attracted to wood that supports members of the Hypocreales, and it seems likely that one of these is present here. One significant member of this group that often grows on dead willows includes *Hypocreopsis rhododendri* (Hazel Gloves). Unfortunately there was no way to investigate this further within the available project time-frame.

5. Discussion and recommendations

The weather conditions during the surveys were generally good for finding fungi, and many species were found. However, the number of fungi recorded is likely to be a substantial underestimate of the true total. This is because the project time constraints only allowed for two survey visits in the autumn, which would mean that fungi that tend to appear early or late in the autumn, or in spring or other times of year would probably have been missed. (Interestingly, a small specimen of Scarlet Elf-cup *Sarcoscypha austriaca* was found in the broad-leaved woodland and this may be very common there in spring). Even some autumn-fruiting fungi would also almost certainly have been missed, if the fruiting bodies were only present at low density or well-hidden under vegetation, or simply not present along the transect lines being searched by the surveyors. Some fungi are very transient in their appearance, and some delicate fruiting bodies may only last for a day or so, which further reduces their chances of being found during just two days of fieldwork.

It was not possible to identify all of the fungi seen during the survey, and specimens of at least 20 additional species remained un-named. In some cases they were too old, damaged or decaying, and in others they were too young and had not produced any spores. Some young specimens were incubated for several days to see if they would mature sufficiently to permit identification, but this only worked for a low proportion of samples. In a few cases the specimens did not easily fit with the available reference texts, and this highlights the difficulty of fungi surveys.

A key difficulty with the assessment of nature conservation significance for fungi is that the distribution of many species is uncertain. There is a good case for *Gomphidius glutinosus* being rare in south-east Wales, but the relative rarity of small fungi such as those mentioned from the broad-leaved woodland is more difficult to prove, because these groups are often under-recorded and the assessment has to be based on the surveyors' judgement and available literature. However, the clustering of several likely uncommon woodland species in

a relatively restricted part of the plantation suggests that this is a valuable habitat. The history of this broad-leaved woodland may be different from the rest of the adjacent plantation, because it does not appear to have the same arrangement of drainage, and there are also several crater-like depressions that may be remnants from former bell-pit mining. It would be interesting to find out if the trees in this area are older than the conifers and Grey Alders of the adjacent plantation, or whether the apparent age of the habitat might be due to other factors, such as the high rainfall in this area.

The key recommendation for minimising impacts on fungi is to minimise the land-take from the areas of high nature conservation value. In this case this would mean avoiding or minimising the loss of the older broad-leaved woodland and the location of the *Gomphidius glutinosus*.

Translocating individual fungi species is generally not feasible as a mitigation option. There are few cases where this has been attempted, and species within soil are unlikely to transplant successfully. However, species that depend on dead wood (or dead trees) above ground could potentially be relocated, provided that it is not damaged in the movement process and the new site has suitable environmental conditions. Therefore, it may be worth moving the dead willow with the likely *Hypocrea* fungi to nearby retained woodland with a similar microclimate. However, a DNA check of the wood would be advisable first, to confirm whether it does actually contain any notable species.

If the new development requires large numbers of trees to be felled, it is recommended that some of the trunks and larger branches are stacked within any retained woodland to provide a habitat for fungi as they break down. Preferably with some trunks left in open locations and others in shade, to enable a range of fungi communities to develop.

Any planting proposed as new landscaping works should aim to support a similar range of tree species to those being lost, especially favouring native species. Ash is not recommended due to the prevalence of Ash Die-back disease in the area. Welsh-sourced stock and bare-rooted trees should be used if possible, to minimise risk of importing non-native fungi through trees of foreign provenance or imported soils.

The study area clearly supports a wide range of fungi, including a number of uncommon species as well as many more widespread and frequent species. This diversity is also likely to support a range of other organisms that depend on fungi for food or shelter. These include many insects⁴ (particularly Saproxylic beetles and Diptera), as well as molluscs, springtails, woodlice and slime-moulds. These groups are often poorly understood but many are known to be specialist feeders on certain types of fungi, and some are even host-species specific. Therefore, efforts to conserve fungal diversity are likely to benefit a range of associated fungi-dependent species.

⁴ Birkemoe, T. Jacobsen, R.M., Sverdrup-Thygeson, A. & Biedermann, P.H.W. (2018). Insect-fungus interactions in dead wood systems. In Saproxylic Insects: Diversity, Ecology and Conservation. M.D.Ulyshen (ed). Springer.

Appendix 1. Photographs



Photograph 1. The industrial plateau area generally supported damp grassland and recently cleared scrub with little nature conservation significance for fungi.



Photograph 2. The patchy mosaic of young willow scrub and marshy grassland supports a relatively low diversity of fungi species. Its value for fungi would be expected to increase as the habitat matures.



Photograph 3. Most of the conifer plantation supports a low diversity of fungi (dominated by *Russula ochroleuca*, *Amanita rubescens* and *Rhodocollybia butyracea*). The low diversity probably reflects the relatively young age of the trees.



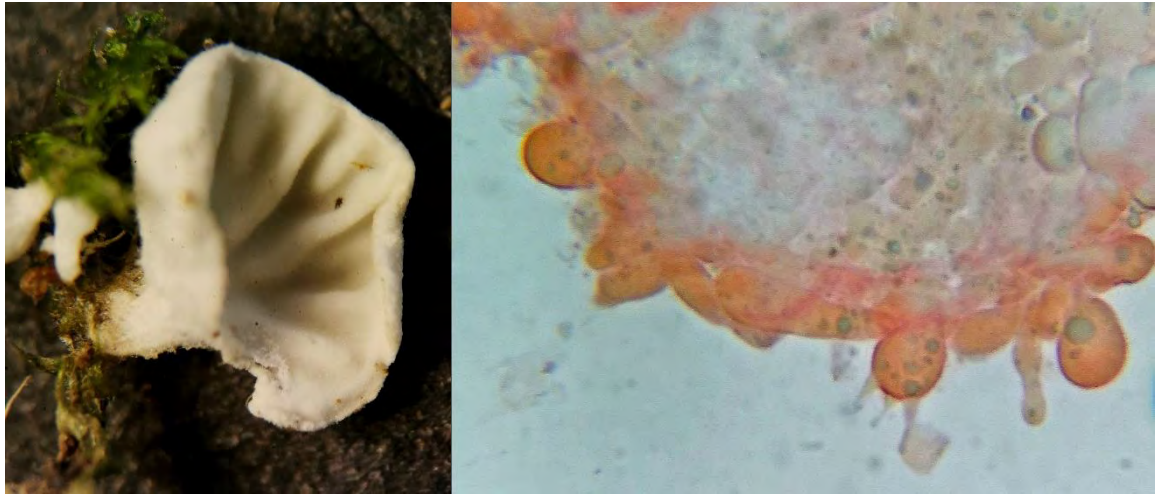
Photograph 4. Areas of broad-leaved trees within the plantation support a more varied ground flora with dead wood and dense growths of moss on the trees.



Photograph 5. *Gomphidius glutinosus* (Slimy Spike), a locally rare species found under Sitka Spruce at the eastern edge of the plantation.



Photograph 6. *Rimbachia bryophila* (Veined Moss-ear) growing on moss in the broad-leaved part of the plantation. This appears to be a new record for South Wales.



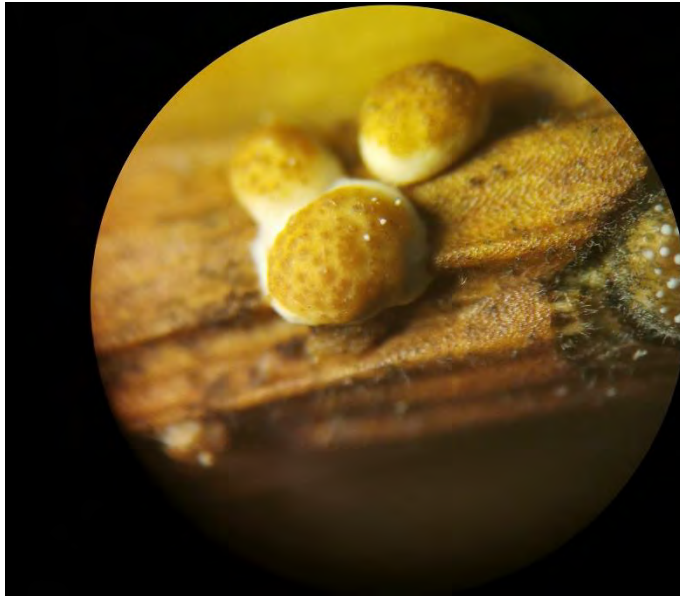
Photograph 7. *Rimbachia bryophila* (Veined Moss-ear), including microscopy detail of basidia.



Photograph 8. *Coryne cf tasmanica*, on dead wood under broad-leaved trees. Possibly a new species for Wales.



Photograph 9. *Coryne cf tasmanica*. Pictures showing microscopy detail.



Photograph 10. *Hypocrea cf placentula* on a rush stem. Possibly new to Wales.



Photograph 11. *Rhodocollybia butyracea* (Butter-cap). Very common in the conifer plantation.



Photograph 12. *Lactarius deterrimus* (False Saffron Milk-cap) from scrubby grassland.



Photograph 13. *Suillus grevillei* (Larch Bolete) found in the southern part of the plantation.



Photograph 14. *Russula ochroleuca* (Ochre Brittlegill) was one of the most abundant fungi in the conifer plantation.



Photograph 15. *Tremella foliacea* (Leafy Brain) on dead broad-leaved tree.



Photograph 16. *Tremella mesenterica* (Yellow Brain) on dead Gorse.



Photograph 17. *Tubaria furfuracea* (Scurfy Twiglet) on dead wood under broad-leaved trees.



Photograph 18. *Calycina (Bisporella) citrina* on dead broad-leaved wood.



Photograph 19. *Taphrina alni* (Alder Tongue) growing out of an Alder cone.



Photograph 20. *Rhytisma salicinum* (Willow Tar-spot) on leaves of Grey Willow.



Photograph 21. *Hygrocybe conica* (Blackening Waxcap) on the industrial plateau.



Photograph 22. *Russula emetica* (The Sickener) in the conifer plantation.



Photograph 23. *Amanita rubescens* (Blusher) in the conifer plantation.



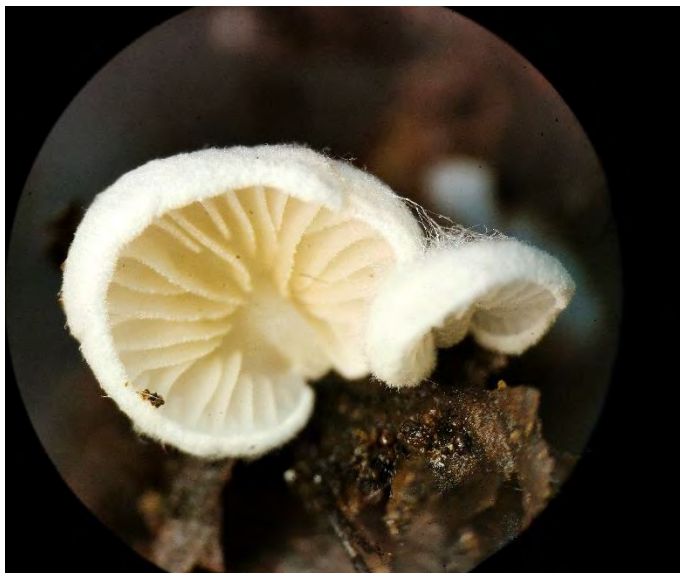
Photograph 24. *Gloeophyllum sepiarium* (Conifer Mazegill) on dead conifer logs.



Photograph 25. *Chlorociboria aeruginosa* (Green Elfcup) on dead deciduous wood.



Photograph 26. *Crepidotus cesatii* (Round-spored Oysterling) on dead deciduous wood.



Photograph 27. *Crepidotus epibryus* (Grass Oysterling), viewed under microscope.



Photograph 28. *Exidia recisa* (Amber Jelly) on dead willow.



Photograph 29. *Cudoniella clavus* (Spring Pin).



Photograph 30. *Rhizomarasmius setosus* (Beechleaf Parachute), showing distinctive hairy stem under microscope.



Photograph 31. *Suillus luteus* (Slippery Jack) in scrub.



Photograph 32. *Hygrocybe acutoconica* (Persistent Waxcap) found in summer vegetation survey. A few specimens were still present during the September survey.



Photograph 33. *Sarcoscypha austriaca* (Scarlet Elf cup) from damp broadleaved woodland. Only these very young specimens were found. This species is likely to be more frequent in spring.

D5 Invertebrate Survey



**RASSAU, BLAENAU GWENT
INVERTEBRATE SURVEY, 2020**
David Boyce

DC Boyce
Ecologist
October 2020



1. INTRODUCTION

This report details the findings of an invertebrate survey carried out under contract to Arup. It aimed to assess the importance for invertebrates of an area of land at Rassau, which lies immediately to the north of the of the A465 Heads of the Valleys road. It comprises a mixture of marshy grassland and bog, coniferous plantation, willow scrub and ruderal vegetation. For the sake of brevity, the site is hereafter referred to as 'Rassau'. It lies within the Watsonian county of Brecknock (vc42). A central grid reference for the site approximates to SO159128.

2. METHODS

Survey work in 2020 was undertaken on the 28th of May, 26th of June and 4th of September. On the first day, a rapid visual 'walkover' assessment of the area was undertaken. Using the results of the initial walkover, the range of invertebrate habitats present on the site was identified and it was then possible to prioritise those areas where follow-up survey was required.

The main emphasis for more detailed invertebrate surveys was on those habitats likely to have the greatest invertebrate interest (eg. marshy grassland, willow scrub and ruderal vegetation). Other less promising habitat types (eg. coniferous plantation and heavily poached marshy grassland) were also surveyed in less detail, with the aim being to ensure complete coverage of the whole range of main invertebrate habitats represented on the site.

In addition to general spot-searching techniques, some more specialised sampling methods were used to ensure all potentially important habitat features were sampled effectively. Grassland, wetland and ruderal vegetation were mostly sampled by sweeping the vegetation with a heavy-duty entomological sweep net and beating tall herbaceous plants over a white plastic tray. Ground-active invertebrates in grass tussocks and litter were sampled by shaking them out over a white plastic tray. Catches were collected into tubes with either ethyl acetate or iso-propyl alcohol. Subsequently, all samples were identified down to species level. A range of invertebrate groups have been covered, with a full checklist of all species identified given in Table 3.1.

The survey methods, including the choice of taxa selected for sampling follow Natural England's advice for undertaking invertebrate site assessments (Drake, *et. al.*, 2007).

For the purposes of this survey, a series of five survey units (abbreviated SU1 to 5 in this report) have been identified, which correspond to the main blocks of distinctly different habitat present across the site. These survey units are shown on Figure 2.1 below.



Figure 2.1. Location of invertebrate survey units at Rassau, Blaenau Gwent - 2020

3. RESULTS

Table 3.1 below gives a checklist of all the invertebrates recorded during the three days' fieldwork in 2020. Following this, sub-section 3.1 lists those species with a formal conservation status that are regarded as key species when assessing the importance of the site for invertebrates. In sub-section 3.2, the key species are used to produce a list of key habitat features for invertebrates at Rassau. Key habitats are defined here as being those that support at least one of the key species identified in sub-section 3.1. A brief review of the significance of other habitats in which no key species were recorded is given in sub-section 3.3. An overall assessment of the importance of the site for invertebrates is provided in section 4.

The importance of the various invertebrate habitats at Rassau is described in sub-sections 3.2 and 3.3 and in the conclusions at section 4. This is framed in terms of the Chartered Institute of Ecology and Environmental Management's (CIEEM) Geographical Frame of Reference (CIEEM, 2018). This includes a series of geographically-defined importance categories, from 'International/European' for the most important sites, down to 'Local' at the lowest end of the scale. I have included an additional category, of 'Low Importance' for those habitats/sites that are of low to negligible significance for invertebrates and do not therefore merit inclusion in any of the CIEEM GFR categories.

The codes in the fourth column of Table 3.1 refer to the survey units in which species were recorded in 2020. The location of these survey units is shown on Figure 2.1 above. The emboldened status categories given in the third column of Table 3.1 and also after the scientific name in sub-section 3.1 refer to those species having a formal rarity/threat status ascribed to them by the UK government conservation agencies. These are defined as follows:

S7 – Species of Principal Importance for the maintenance and enhancement of biodiversity in Wales that are listed in Section 7 of the Environment (Wales) Act, 2016.

pNS – Provisional Nationally Scarce. The rove beetle *Philonthus parvicornis* is likely to be accorded Nationally Scarce status in the forthcoming Review of this group (Boyce, *in prep.*), but has no formal conservation status currently.

Table 3.1. Checklist of invertebrates recorded at Rassau, Blaenau Gwent - 2020

Species scientific name	Species English name	Status	Survey units
<i>Deroceras reticulatum</i>	Netted field slug		1
<i>Deroceras laeve</i>	Marsh slug		2
<i>Arion hortensis</i> agg.	Garden slug		1
<i>Cochlicopa lubrica</i>	Slippery moss snail		1
<i>Euconulus fulvus</i>	A Euconulid snail		1
<i>Cepaea hortensis</i>	White-lipped snail		1
<i>Cepaea nemoralis</i>	Brown-lipped snail		1,4
<i>Trochulus striolatus</i>	Strawberry snail		5
<i>Oxychilus alliarius</i>	Garlic snail		1
<i>Nesovitrea hammonis</i>	Rayed glass snail		1
<i>Pyrrhosoma nymphula</i>	Large red damselfly		1,4
<i>Enallagma cyathigerum</i>	Common blue damselfly		3
<i>Aeshna mixta</i>	Migrant hawker dragonfly		5
<i>Cordulegaster boltonii</i>	Golden-ringed dragonfly		3
<i>Sympetrum striolatum</i>	Common darter dragonfly		2,5
<i>Tetrix undulata</i>	Common groundhopper		4
<i>Omocestus viridulus</i>	Common green grasshopper		1
<i>Chorthippus brunneus</i>	Field grasshopper		4
<i>Chorthippus parallelus</i>	Meadow grasshopper		4,5
<i>Labia minor</i>	Lesser earwig		5
<i>Forficula auricularia</i>	Common earwig		5
<i>Dolycoris baccarum</i>	Hairy shieldbug		1
<i>Piezodorus lituratus</i>	Gorse shieldbug		1
<i>Zicrona caerulea</i>	Blue shieldbug		2
<i>Lamprolax picea</i>	A ground bug		2
<i>Saldula saltatoria</i>	Common shore bug		1
<i>Leistus ferrugineus</i>	A ground beetle		2
<i>Notiophilus palustris</i>	A ground beetle		1,2
<i>Pterostichus diligens</i>	A ground beetle		2
<i>Pterostichus strenuus</i>	A ground beetle		1
<i>Pterostichus rhaeticus</i>	A ground beetle		2
<i>Pterostichus madidus</i>	A ground beetle		1
<i>Bradycellus harpalinus</i>	A ground beetle		2
<i>Olisthopus rotundatus</i>	A ground beetle		2
<i>Agonum fuliginosum</i>	A ground beetle		2
<i>Paradromius linearis</i>	A ground beetle		1
<i>Anacaena globulus</i>	A water beetle		2
<i>Megasternum concinnum</i>	A Hydrophilid beetle		4
<i>Carcinops pumilio</i>	A clown beetle		5
<i>Eusphalerum torquatum</i>	A rove beetle		1
<i>Olophrum piceum</i>	A rove beetle		2
<i>Metopsia clypeata</i>	A rove beetle		1
<i>Tachyporus chrysomelinus</i> ss.	A rove beetle		1

Gymnusa brevicollis	A rove beetle		1
Oxyptoda procerula	A rove beetle		1
Myllaena brevicornis	A rove beetle		2
Nehemitropia lividipennis	A rove beetle		5
Atheta laticollis	A rove beetle		5
Atheta fungi agg.	A rove beetle		1
Dalotia coriaria	A rove beetle		5
Drusilla canaliculata	A rove beetle		1
Stenus impressus	A rove beetle		1
Stenus providus	A rove beetle		2
Stenus brunripes	A rove beetle		1
Lithocharis ochracea	A rove beetle		5
Phacophallus parumpunctatus	A rove beetle		5
Gyrophypnus fracticornis	A rove beetle		5
Quedius curtipennis	A rove beetle		2
Quedius fuliginosus	A rove beetle		2
Quedius persimilis	A rove beetle		2
Ocyopus olens	Devil's coach-horse beetle		1
Bisnius puella	A rove beetle		5
Philonthus albipes	A rove beetle		5
Philonthus parvicornis	A rove beetle	pNS	5
Contacyphon hilaris	A marsh beetle		2
Cantharis cryptica	A soldier beetle		4
Cantharis flavilabris	A soldier beetle		1
Cantharis nigricans	A soldier beetle		1
Rhagonycha lignosa	A soldier beetle		4
Rhagonycha nigriventris	A soldier beetle		1
Micrambe ulicis	A Cryptophagid beetle		1,4
Rhizobius litura	A ladybird		5
Coccinella septempunctata	7-spot ladybird		1,4
Mordellistena pumila agg.	A Mordellid beetle		1
Oedemera lurida	An Oedemerid beetle		3
Omonadus formicarius	An Anthicid beetle		5
Pachytodes cerambyciformis	A longhorn beetle		4
Bruchus loti	A seed beetle		1
Gastrophysa viridula	Dock leaf beetle		1
Luperus longicornis	A leaf beetle		3
Lochmaea caprea	A leaf beetle		2
Neocrepidodera transversa	A flea beetle		5
Longitarsus rubiginosus	A flea beetle		1
Ceratapion carduorum	An Apionid weevil		1
Eutrichapion ervi	An Apionid weevil		1,4
Protapion nigritarse	An Apionid weevil		1
Cionus hortulanus	A figwort weevil		5
Micrelus ericae	A weevil		2

Otiorhynchus sulcatus	Vine weevil		1
Phyllobius pyri	A weevil		1,4
Sitona suturalis	A weevil		1,4
Hypera plantaginis	A weevil		4
Hypera postica	A weevil		1
Sesia bembeciformis	Lunar hornet clearwing moth		1
Zygaena trifolii	5-spot burnet moth		4
Erynnis tages	Dingy skipper butterfly	S7	1
Thymelicus sylvestris	Small skipper		1
Ochlodes sylvanus	Large skipper		2
Anthocharis cardamines	Orange tip butterfly		2
Pieris napi	Green-veined white butterfly		2,4
Pararge aegeria	Speckled wood butterfly		3
Coenonympha pamphilus	Small heath butterfly	S7	1
Aphantopus hyperantus	Ringlet butterfly		2
Maniola jurtina	Meadow brown butterfly		1
Vanessa atalanta	Red admiral butterfly		1
Aglais urticae	Small tortoiseshell butterfly		1
Polyommatus icarus	Common blue butterfly		1
Macrothylacia rubi	Fox moth		1
Deilephila elpenor	Elephant hawk-moth		1
Epirrhoe tristata	Small argent and sable moth		4
Lomaspilis marginata	Clouded border moth		3
Chiasmia clathrata	Latticed heath moth		1
Ematurga atomaria	Common heath moth		4
Cerura vinula	Puss moth		4
Notodonta dromedarius	Iron prominent		2
Tyria jacobaeae	Cinnabar moth	S7	1
Euclidia glyphica	Burnet companion moth		1
Euclidia mi	Mother Shipton moth		1
Autographa gamma	Silver Y moth		1,4,5
Lycophotia porphyrea	True lover's knot moth		2
Chrysopilus cristatus	Black snipefly		3
Rhagio tringarius	Marsh snipefly		3
Haematopota pluvialis	Notch-horned cleg		2
Empis tessellata	A dance fly		4
Chrysotoxum arcuatum	A hoverfly		4
Chrysotoxum bicinctum	A hoverfly		3
Episyrphus balteatus	A hoverfly		2
Eristalis pertinax	A drone fly		3
Eristalis tenax	A drone fly		5
Helophilus pendulus	A hoverfly		3,5
Microdon myrmicae	A hoverfly		2
Scaeva pyrastris	A hoverfly		4
Sericomyia lappona	A hoverfly		1

<i>Sericomyia silentis</i>	A hoverfly		3,5
<i>Syrirta pipiens</i>	A hoverfly		2
<i>Volucella bombylans</i>	A hoverfly		3
<i>Volucella pellucens</i>	A hoverfly		3
<i>Xanthogramma citrofasciatum</i>	A hoverfly		1
<i>Scathophaga stercoraria</i>	A dung fly		5
<i>Anthophora furcata</i>	Fork-tailed flower bee		4
<i>Apis mellifera</i>	Honeybee		1
<i>Bombus lucorum</i> agg.	White-tailed bumblebee		5
<i>Bombus lucorum/terrestris</i>	Buff-tailed/white-tailed bumblebee workers		1,4
<i>Bombus hortorum</i>	Garden bumblebee		1
<i>Bombus lapidarius</i>	Red-tailed bumblebee		1,4
<i>Bombus monticola</i>	Mountain bumblebee		1
<i>Bombus pratorum</i>	Early bumblebee		1
<i>Bombus pascuorum</i>	Common carder bumblebee		1,4,5
<i>Halictus rubicundus</i>	Orange-legged furrow bee		2
<i>Lasioglossum albipes</i>	Bloomed furrow bee		1
<i>Megachile versicolor</i>	Brown-footed leafcutter bee		1
<i>Megachile willughbiella</i>	Willughby's leafcutter bee		1
<i>Formica lemani</i>	Northern negro ant		1
<i>Lasius flavus</i>	Yellow meadow ant		1,3
<i>Lasius niger</i>	Black garden ant		1,4
<i>Myrmica ruginodis</i>	A red ant		1,3
<i>Myrmica scabrinodis</i>	A red ant		1
<i>Trichoniscus pusillus</i>	Common pigmy woodlouse		1
<i>Oniscus asellus</i>	Common shiny woodlouse		1
<i>Philoscia muscorum</i>	Common striped woodlouse		1
<i>Armadillidium vulgare</i>	Common pill woodlouse		1
<i>Mitopus morio</i>	A harvestman spider		2
<i>Nemastoma bimaculatum</i>	A harvestman spider		2
<i>Araneus quadratus</i>	An orb-weaving spider		5
<i>Agalenatea redii</i>	An orb-weaving spider		5
<i>Pisaura mirabilis</i>	Nursery web spider		2,4
<i>Dictyna arundinacea</i>	A Dictynid spider		2

3.1. Key invertebrates at Rassau, Blaenau Gwent - 2020

Two key species have been recorded at Rassau in 2020. The emboldened status categories given after the species name have been explained at the start of section 3 species of Principal Importance above. Two other Lepidoptera that are listed in Section 7 of the Environment Act (Wales) as Species of Principal Importance, the small heath butterfly and cinnabar moth, are not listed here as key species. This is because they are listed in Section 7 for 'research only' and though having declined in other parts of Britain, they are still relatively common and do not appear to have decreased so markedly in Wales.

3.1.1. A rove beetle *Philonthus parvicornis* (Gravenhorst, 1802). **pNS.**

P. parvicornis is a relatively small all-black member of this very large Staphylinid genus. It has a rounded head and a row of five punctures on either side of the pronotal mid-line. It can only be reliably distinguished from other similar species by examination of the male genitalia. It is usually found in cow or horse dung in a range of open situations, though it has also been recorded less frequently in other patch habitats such as compost heaps and carrion. Recent British records of *P. parvicornis* are confined to scattered sites in England, north as far as Yorkshire and a handful of Welsh localities, though there is an old record from Cumbria. It was not given a conservation status in the earlier national assessment of Hyman & Parsons (1994), but will probably be upgraded to Nationally Scarce in the forthcoming Species Status Review (Boyce, *in prep.*). A single male was collected in a decomposing grass heap on the heavily grazed marshy grassland at the eastern end of the site (SU5).

3.1.2. Dingy skipper butterfly *Erynnis tages* (Linnaeus, 1758). **S7.**

This distinctive species is usually single brooded, flying between late-April and late-June, although partial second broods can occur in late-July and August. Larvae feed on common bird's-foot trefoil *Lotus corniculatus*, greater bird's-foot trefoil *Lotus pedunculatus* and horseshoe vetch *Anthyllis vulneraria*. Adults are frequently seen flying rapidly and low over the ground, or basking on bare ground or low vegetation. The dingy skipper occurs in a wide range of open habitats, including coastal dunes, maritime grassland and undercliffs, chalk grassland, woodland rides, heathland and road verges. It is widely distributed in central and southern England, but becomes scarcer to the north and east. Scottish and Irish populations are mainly coastal. In Wales, its largest populations are in the south, with large colonies still to be found along the coast, on sand dunes and maritime grassland, but also inland on post-industrial brownfield sites. Elsewhere, it has declined, with a particularly severe loss of inland colonies and for this reason, it has been included on the Section 7 priority species list for Wales. A number of adults were recorded during the May visit to Rassau on the area of ruderal grassland at the western end of the site (SU1).

3.2. Key invertebrate habitats at Rassau, Blaenau Gwent, 2020

3.2.1. Ruderal grassland

Associated key species: Dingy skipper butterfly

Survey unit 1 has stands of ruderal grassland with a small population of the dingy skipper butterfly, whose larvae feed on the frequent patches of bird's-foot trefoil here. The short height of the sward, allied to the presence of patches of bare ground creates the warm microclimate required by the larvae of this butterfly. It is thought very likely that the colony at the site forms a small element of a larger population present on other areas of similar habitat scattered across the Rassau Industrial Estate.

Consequently, this habitat feature is considered to be of no more than Local Importance for invertebrates.

3.2.2. Patch habitats on marshy grassland

Associated key species: *Philonthus parvicornis*

Patch habitats are defined as those such as dung, carrion and decaying grass heaps that support high concentrations of saprophagous invertebrates and their predators. Piles of old, decaying silage on the marshy grassland in survey unit 5 had a moderately rich invertebrate fauna that included one key species; the rove beetle *Philonthus parvicornis*.

This habitat feature is thought to be of no more than Low to Local Importance for invertebrates.

3.3. Other invertebrate habitats at Rassau, Blaenau Gwent, 2020

3.3.1. Unmanaged marshy grassland

The only other habitat worthy of note for invertebrates is the areas of rush- and/or *Molinia*-dominated marshy grassland in SU1 and SU2. Though no key invertebrates were recorded from here, they have a moderately diverse wetland fauna that includes wetland specialists such as the blue shieldbug *Zicrona caerulea*, the ground bug *Lamprolax picea* and the rove beetle *Gymnusa brevicollis*. It is therefore assessed to be of Local Importance for invertebrates.

3.3.2. Heavily grazed and poached marshy grassland

The stands of marshy grassland in SU5 have been very heavily grazed by stock, with much bare, poached peat. This extensive area is consequently of only Low Importance for invertebrates.

3.3.3. Rank neutral grassland

Stands of rank, neutral grassland on the bank above the A465 road (SU4) are assessed as being of Low Importance for invertebrates.

3.3.4. Coniferous and broadleaved plantation woodland

The stands of woodland in SU3 are thought to be of only Low Importance for invertebrates.

4. CONCLUSIONS

The survey work undertaken in 2020 indicates that the site at Rassau, Blaenau Gwent has rather a species-poor invertebrate assemblage, with the most interesting fauna being associated with the stands of ruderal and marshy grassland in SU1.

Overall, this is a site of only Low to Local Importance for invertebrates.

5. ACKNOWLEDGEMENTS

I would like to acknowledge the assistance of Claire Pooley and Paul Clack of Arup in the planning and execution of this contract.

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D6 Amphibian Survey Report

CiNER Glass Limited
**Dragon Glass Bottle
Manufacturing Facility**
Amphibian Survey Report

DRAGON-ARUP-ENVE-XX-RP-YE-000005

Issue | 13 October 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927

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Figure 1: Study Area

Figure 2: Waterbody Locations

Figure 3: Waterbody 4 Artificial Refugia Locations

Figure 4: HSI Assessment Results

Figure 5: eDNA Results

Appendices

Appendix A

Great Crested Newt Survey Data

1 Introduction

1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by CiNER Glass Ltd to undertake a range of consultancy services in relation to the proposed Dragon Glass Bottle Manufacturing facility, hereafter referred to as ‘the Project’.

Further to the production of a Preliminary Ecological Appraisal Report¹, a range of ecological surveys were commissioned to identify the baseline ecological conditions of the site, and to inform the assessment of impacts as part of the Ecological Impact Assessment (EcIA), which will support a subsequent planning application for the Project.

This document describes the amphibian surveys undertaken for the Project.

1.2 Objectives

The objectives of the amphibian survey were to ascertain the following:

- Presence/likely absence of great crested newts *Triturus cristatus* within the study area;
- Population size-class of great crested newts, if present;
- Distribution of great crested newts, if present; and
- An appreciation of other notable² amphibian species that may be present.

¹ Arup (2020) CiNER Glass Ltd. Preliminary Ecological Appraisal.

² ‘Notable’ species and habitats considered in this report include species and habitats of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, in response to section 7 of the Environment (Wales) Act 2016, in addition to any species considered to be of significance for nature conservation such species listed in red data books, the Royal Society for the Protection of Birds (RSPB) ‘Birds of Conservation Concern’ lists and or Local Biodiversity Action Plans (LBAPs).

2 Project Description

The facility consists of a three-part operation for the production of glass bottles; the handling of raw material, the manufacturing of the glass containers and the product-inspection and packaging process. The proposed facility covers a total area of approximately 144,000 sqm and consists of a number of distinct components which are summarised below:

- 2No furnaces and associated filters and chimney stacks;
- 2No cullet buildings for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles;
- A printing area for applied decorations (14500 sqm);
- An automated warehouse for storage and distribution of glass bottles (17000 sqm);
- Utilities building which includes plant space, workshops, office space and welfare facilities;
- Visitor building;
- Waste stores;
- Standalone plant buildings;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The site will also include two attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site.

The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. The facility will also require the transportation of finished product glass bottles following production.

The facility is forecasted to create approx. 670 jobs and will operate 24 hours a day, 7 days a week via shift system.

3 Site Description

The site is allocated within the Ebbw Vale Enterprise Zone and occupies a strategic location adjacent to the A465 Heads of the Valleys Road in the head of the South Wales Valleys, approximately 700 m to the north of Rassau village and 3 km north of Ebbw Vale town centre. The site is displayed on Figure 1.

The Rassau Industrial Estate, built in the late 1970s – early 1980s, currently comprises of purpose-built light industrial/manufacturing units with ancillary office accommodation. The industrial estate is situated on the foot slopes of Mynydd Llangynidr, approximately 500m south of the Brecon Beacons National Park (BBNP) boundary.

The proposed site is currently undeveloped and is located on the eastern extent of the industrial estate consisting of existing grass land, scrub, broadleaved and coniferous woodland. An unadopted asphalt access road extends from the western boundary of the site which transitions into an unbound gravel track providing access to the eastern site extents.

A tributary of the Ebbw River (Afon Ebwy) is located within the centre of the site which appears to have been diverted around the northern extent of Rassau Industrial Estate as part of the industrial estate development. The Ebbw River is part of the South East Valleys catchment which eventually flow into the Usk Estuary.

The topography of the site falls gradually from north to south, with the terrain elevation ranging from 427.5 m AOD in the north down to 390 m AOD in the south eastern corner.

4 Study Area

The project site boundary, and planning application boundary, is shown in Figure 1. All suitable waterbodies³ within 500m of project site were surveyed during the amphibian surveys. This comprised seven waterbodies in total, as displayed on Figure 2.

³ Excluding waterbodies which are separated from the Project site by dispersal barriers such as main roads and/or are too large to be suitable, such as the adjacent reservoir.

5 Legislation

Great crested newt is a European Protected Species (EPS) under the Conservation of Habitats and Species Regulations 2017 (as amended) (known as the Habitats Regulations). The Habitats Regulations protects EPS against the following:

- Deliberate capturing, injuring or killing of any wild EPS;
- Deliberate disturbance of any wild EPS;
- Deliberate removal or destruction of the eggs of any EPS; and
- The damage or destruction of a breeding site or resting place of any EPS.

Great crested newt is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA) along with natterjack toad *Bufo calamita*. Natterjack toad is almost exclusively confined to coastal sand dune systems, coastal grazing marshes and sandy heaths, however, and are therefore unlikely to be found within the study area. The WCA protects great crested newt and natterjack toad against intentional killing, injuring or taking, possession and trade, and disturbance through prohibition of actions that could affect places they use for shelter.

Palmate newt *Lissotriton helveticus*, smooth newt *Lissotriton vulgaris*, common toad *Bufo bufo* and common frog *Rana temporaria* are only partially protected under the WCA. This protection prohibits the trading of these four species.

Great crested newt, natterjack toad and common toad are listed as priority species of principal importance for the conservation of biodiversity in response to Section 7 of the Environment Act (Wales) 2016. This legislation places the duties on public bodies in Wales to conserve and enhance biodiversity in the exercise of their functions, including the consideration of the resilience of ecosystems in terms of their diversity, connectivity, adaptability, scale and condition.

Lastly, great crested newt, common toad and natterjack toad are all listed as UK Biodiversity Action Plan Priority Species. Action Plans exist for each UK BAP Priority Species to demonstrate the UK's commitment to help reduce or halt the significant losses in global biodiversity.

Actions which are prohibited by legislation can be made lawful on the approval and granting of a licence from Natural Resources Wales (NRW), subject to conditions.

6 Methodology

6.1 Desk Study

An ecological data search was carried out to identify amphibian species within 2 km of the site's boundary. Such data was obtained from the South East Wales Biodiversity Records Centre (SEWBReC)¹ on 6th April 2020. Data obtained is also presented within the Preliminary Ecological Appraisal Report in relation to the Project.

6.2 Field Surveys

6.2.1 Habitat Suitability Index Assessment

A total of seven waterbodies, as shown on Figure 2, were assessed for their suitability to support great crested newt using the standard Habitat Suitability Index (HSI)^{4,5} methodology on the 13th May 2020.

The methodology has been designed to evaluate habitat quality in order to assess which waterbodies provide suitable habitat for great crested newts as breeding ponds. The HSI is a numerical index, which ranges from 0 to 1. It is calculated using ten key habitat criteria and is based on the assumption that habitat quality determines great crested newt presence/absence. Using this standard approach, ponds with higher scores are considered more likely to support great crested newts compared to those with lower scores (see Table 1 below).

Table 1: Predicted presence of great crested newts based upon HSI results

HSI	Pond Suitability	Predicted Occupancy
<0.5	Poor	0.03
0.5-0.59	Below average	0.20
0.6-0.69	Average	0.55
0.7-0.79	Good	0.79
>0.8	Excellent	0.93

Great crested newt were considered likely to be absent from ponds assessed as 'poor', whilst ponds assessed as 'below average' or above required further survey to determine presence or likely absence. This further survey was in the form of Environmental DNA (eDNA) sampling, which is described in the following section.

⁴ Amphibian and Reptile Groups of the United Kingdom, *ARG UK Advice Note 5, Great Crested Newt Habitat Suitability Index*, May 2010.

⁵ Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M.(2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

6.2.2 Environmental DNA Survey

Environmental DNA (eDNA) tests were carried out on four of the waterbodies that were assessed as ‘below average’ or above during the HSI assessment (shown on Figure 4).

In accordance with best practice guidelines⁶ surveys were undertaken within the optimum timeframes (sampling was undertaken concurrently with the HSI assessments on the 13th May 2020) and followed the recommended methodology. Collected samples were sent to NatureMetrics⁷ for analysis.

6.2.3 Presence/Absence Survey and Population Assessment

A full presence/likely absence survey for great crested newt was carried out at Waterbody 4 which returned a ‘positive’ eDNA result, and Waterbody 1 and 7 (as a precautionary approach).

Waterbody 1 returned an ‘inconclusive’ eDNA result but was found to be dry during a site visit on the 2nd June, prior to the commencement of the presence/absence survey and as such was scoped out of further surveys.

Waterbody 7 was scoped out of further survey during the HSI assessment due to being dry at the time. However, rainfall during the month of June led to a small pool of water within Waterbody 7 prior to Visit 6 on the 29th June. As such, Waterbody 7 was surveyed in addition to Waterbody 4 during Visit 6.

Presence/likely absence surveys were carried out generally in accordance with the methodology prescribed within the Great Crested Newt Conservation Handbook⁸, although a number of limitations were encountered as described within Section 6.3 of this report. The dates of each survey visit, and the methods used are summarised in Table 2. Weather conditions are given in Appendix A.

Where possible, at least three survey methods were employed during each survey visit, including torch survey, bottle traps, egg search, refuge searches and netting, as described below:

- **Torch Survey:** The banks of each waterbody were walked after dark, using a high-powered torch (1 million candle power) to search for newts and other amphibians. Animals observed were identified to species, sex and life stage where possible.
- **Bottle traps:** Bottle traps were placed around the perimeter of the waterbodies at approximately 2 metre intervals (where suitable habitat and health and safety considerations allowed) shortly before dusk and checked the following morning to determine whether amphibians were present or absent. Each trap was made from a 2-litre plastic bottle with the top cut off and inverted, to make a funnel leading into the bottle. Bamboo canes were used to anchor the

⁶ <https://naturalresources.wales/media/3509/guidance-on-use-of-dna-sampling-of-great-crested-newts.pdf>

⁷ NatureMetrics Ltd. <https://www.naturemetrics.co.uk/>

⁸ Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001), Great Crested Newt Conservation Handbook, Froglife, Halesworth.

traps into the waterbody, taking care to ensure that each bottle included an air bubble. Any animals caught were immediately returned to the waterbody after identification.

- **Egg searches:** Submerged and peripheral vegetation was searched for the presence of newt eggs. The eggs are usually folded in the leaves of aquatic plants, dead leaves or overhanging grass leaves. It is necessary to unfold the leaf to identify the egg. The unfolding increases the risk of predation, therefore once an egg is found the use of this technique is ceased. Recommended survey effort for this method is 15 minutes searching per 50 metre of bank. The presence of eggs of other amphibians was also noted, where observed.
- **Netting:** A sturdy dip-net was used to net the shoreline, for an average of fifteen minutes per 50 metres of shoreline. Care was taken not to damage larvae, and to reduce disturbance to the pond.
- **Refuge searches:** Searches of the artificial refuges (described below), and existing refuges such as logs, wooden planks and debris within the terrestrial habitats immediately surrounding the waterbody was undertaken. Any amphibians found were identified to species, sex and life stage where possible.

Table 2: Dates of survey visits and methods employed during presence/absence and population assessment surveys

Waterbody Ref.	Visit 1 - 5 th June 2020	Visit 2 - 10 th June 2020	Visit 3 - 15 th June 2020	Visit 4 - 19 th June 2020	Visit 5 - 25 th June 2020	Visit 6 - 29 th June 2020
	Method: Bottle Trapping (B; Number of traps); Torching (T); Netting (N); Egg Searching (E); Refugia Search (R)					
WB4	E (too dry for other methods)	N; E; R (too dry for B or T)	N; E; R (too dry for B or T)	N; E; R (too dry for B or T)	N; E; R (too dry for B or T)	B:17; T; E; R
WB7	-	-	-	-	-	B:11; T; N; E; R

Population size class of great crested newt is established using the maximum adult count per pond per survey visit, either through torching or bottle trapping, as follows:

- ‘Small’ for maximum counts up to 10;
- ‘Medium’ for maximum counts between 11 and 100; and
- ‘Large’ for maximum counts over 100.

6.2.4 Surveyors

Surveys were led by a combination of Suitably Qualified Ecologists (SQE) who are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and have the relevant experience for undertaking such surveys: Kathryn Jones ACIEEM (NRW Great Crested Newt Survey Licence S087465-1), Claire Pooley MCIEEM (NRW Great Crested Newt Survey Licence

S087588-1) and Martyn Owen MCIEEM (NRW Great Crested Newt Survey Licence S087841-1), supported by Eloise Arif ACIEEM and Alexandra Kinsey ACIEEM.

6.3 Limitations

eDNA tests were not carried out on Waterbodies 6 and 7, despite their ‘average’ and ‘below average’ suitability (respectively), due to being dry at the time of the eDNA sampling. However as discussed, waterbody 7 held water later in June, and was therefore subject to further survey effort.

Presence/absence and population assessment surveys were not carried out during the optimum timeframe⁹, due to the late commission of the surveys (in part due to the Covid-19 pandemic). Although eDNA surveys were undertaken as soon as possible following the commission, presence/absence surveys did not commence until after the eDNA results has been returned, in early June. All six survey visits were conducted within the month of June, with no survey visits between mid-April and mid-May; in addition, the last three survey visits were completed between mid to late June.

However, surveys between mid-April and mid-May should still detect presence of great crested newt efts, and potentially juvenile and adult newts that have not dispersed to terrestrial habitats; subject to waterbodies still holding sufficient water. This is acknowledged by the survey guidance which states that bottle trapping, netting and torching are still acceptable survey methods during June.

Waterbody 4 did not hold enough water during the first five survey visits to torch, bottle trap or net. Furthermore, there were limited natural refuges around Waterbody 4 that could be searched. As such, 22 artificial refugia (roofing felt mats measuring 0.5 m²) were placed along the banks of Waterbody 4 during Visit 1 (locations shown in Figure 3). These were then checked during all subsequent visits, in order to maximise survey effort despite the limitations present.

Waterbody 7 was dry during visits 1- 5 but held water during visit 6. As such this waterbody was netted first during the 6th visit. A palmate newt with potential dermocystid parasites was caught during this visit (photograph in Appendix A) however; and, as such, netting was not then conducted at Waterbody 4 to avoid any cross contamination from Waterbody 7.

Despite these limitations during the field surveys, it is considered that sufficient survey effort was undertaken to provide confidence in the negative result, despite the positive eDNA result.

⁹ In line with the guidance, to determine presence/likely absence, four survey visits should be undertaken between mid-March and mid-June with at least two of these visits being undertaken between mid-April and mid-May. For those waterbodies where great crested newts are found to be present, a population size class assessment should be undertaken, which involves a total of six visits (an additional two visits after the presence/absence survey), with at least 3 visits undertaken during mid-April to mid-May.

The eDNA score was 1/12 (1 out of 12 tests scoring positive), indicating less confidence in the result. False positives are known to occur during handling and laboratory analysis, as well as by cross contamination in the field¹⁰. This is supported by the lack of great crested newts records returned by the data search, as well as the negative results of the presence/absence surveys and population size class assessment. Furthermore, a number of old bottle traps were found at Waterbody 4 during the HSI and eDNA sampling survey visit, assumed to be left behind from historic surveys. These could potentially have contaminated Waterbody 4 leading to a false positive eDNA result. Direct consultation was also undertaken with the Blaenau Gwent County Borough Council (BGCBC) ecologist, Liz Hancock, on 8th June 2020, who confirmed that there were no records of great crested newt within the area of the Project.

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, factors such as the time of year and natural behaviour of the animals. Nevertheless, these surveys were conducted at the optimal survey periods and using methodologies which are in accordance with published guidelines.

¹⁰ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford

7 Results

7.1 Desk Study

The data search undertaken by SEWBReC within 2km of the site returned three records of common toad, three records of palmate newt and three records of common frog from the last ten years.

The closest common toad record were two records located 1.3km south east from 2018. The closest palmate newt record was located 1.1km east from 2015. The closest common frog record was located 1.3km south east from 2018.

No records of great crested newt were returned from within 2km of the site, either from within the previous 10 years or prior.

7.2 Field Surveys

7.2.1 HSI Assessment

Of the seven waterbodies identified, one was considered to have ‘good’ suitability for great crested newt, two were considered to have ‘average’ suitability, three were considered to have ‘below average’ suitability, and one was considered to be unsuitable and therefore was not subject to a HSI assessment. The results of the HSI assessment are summarised in Table 3 and displayed on Figure 4. Further details, including photographs of waterbodies, are given in Appendix A.

Table 3: Summary of HSI assessment results

Waterbody Ref.	HSI Score	HSI Assessment
WB1	0.58	Below average
WB2	0.58	Below average
WB3	0.77	Good
WB4	0.64	Average
WB5	Unsuitable – man-made channel with flowing water	
WB6 (dry at time of HSI)	0.61	Average
WB7 (dry at time of HSI)	0.59	Below average

7.2.2 eDNA Sampling

eDNA samples were taken from waterbodies 1, 2, 3 and 4. The results of the sampling are summarised in Table 4 and displayed on Figure 5. Further details are given in Appendix A.

Table 4: Summary of eDNA sampling results

Waterbody Ref.	eDNA Result
WB1	Inconclusive
WB2	Negative
WB3	Negative
WB4	Positive

7.2.3 Presence/Absence Survey

The presence/absence surveys confirmed the presence of adult palmate newts. Newt eggs and efts recorded were also considered to be palmate newts, although due to similarities to smooth newts it was not possible to confirm this. Regardless of this, a breeding population of palmate/smooth newts were present.

No great crested newt were recorded at either waterbody during any survey visit. Despite the limitations encountered (as outlined in Section 6.3), great crested newt are considered likely absent from the study area, based on the lack of desk study records, the low eDNA score suggesting unreliable eDNA results and the lack of field survey results.

The results of the presence/absence survey are summarised in Table 5, with further details including photographs given in Appendix A.

Table 5: Summary of presence/absence survey results

Waterbody Ref.	Visit 1 - 5 th June 2020	Visit 2 - 10 th June 2020	Visit 3 - 15 th June 2020	Visit 4 - 19 th June 2020	Visit 5 - 25 th June 2020	Visit 6 - 29 th June 2020
WB4	No amphibian s recorded	4x newt eft / juvenile caught in net (palmate / smooth)	2x adult female palmate newt 30x c.1cm long efts and 15x very recently hatched efts (palmate / smooth)	newt efts (palmate / smooth) caught in net 1x adult palmate newt caught in net	1x newt egg (palmate / smooth) 1x newt eft / juvenile netted (palmate / smooth)	2x adult newts (probably palmate) torched
WB7	-	-	-	-	-	1x adult newt (probably palmate) torched 6x adult female and 4x adult male palmate trapped

8 Conclusions

No great crested newts were found within the site and they are considered unlikely to be present. Adult palmate newts were found to be present within the site. Although it was not possible to confirm whether newt eggs and efts found were smooth or palmate newts, it is considered likely that these were palmate newts due to the presence of palmate newt adults, and therefore that a breeding population of this species was present.

Populations of other common amphibian species, including common frog and common toad, are also likely to be present.

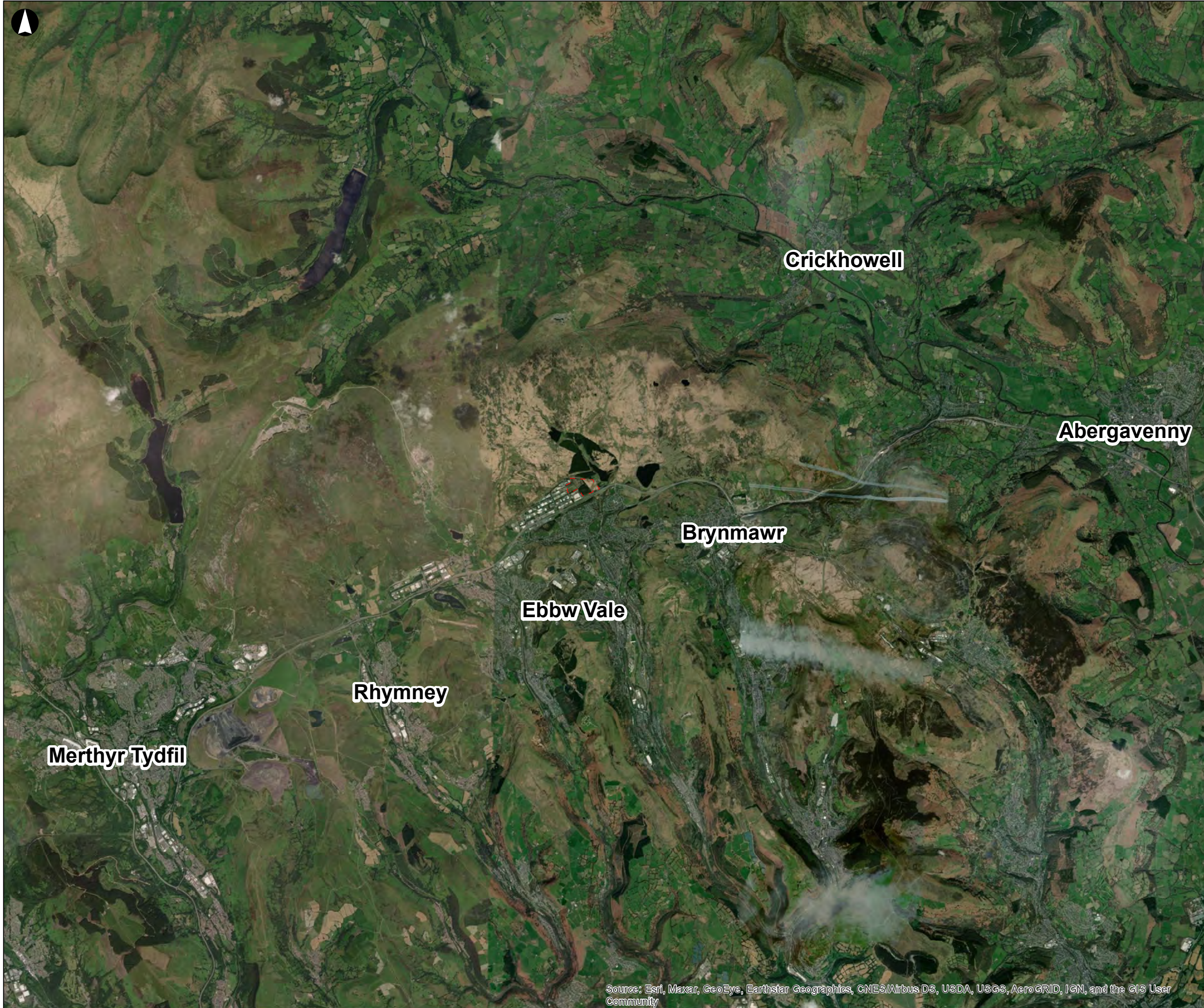
A full amphibian impact assessment will be included within the EcIA for the project and this will include an assessment of the significance of impacts from the project on protected and/or notable amphibian species. This will also detail any mitigation or compensation measures required to ensure there is no significant effects on populations of amphibian species within the site.

This report is the result of the survey work undertaken between May and June 2020. This report refers, within the limitations stated, to the condition of the site at the time of the surveys. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. No warranty is given as to the possibility of future changes in the condition of the site.


The results of these surveys are considered valid for a minimum of 18 months to a maximum of 3 years. If more than 18 months elapses before any planning application is submitted, the requirement for repeat surveys should be reviewed¹¹.

¹¹ Chartered Institute of Ecology and Environmental Management (2019). *Advice Note on the Lifespan of Ecological Reports and Surveys*.

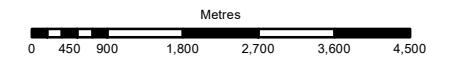
Figures



Legend

 Site boundary

Coordinate System: British National Grid



F1	2020-11-20	KJ	CP	PC
Rev	Date	By	Chkd	Appd

ARUP

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Cardiff CF10 4QP
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www.arup.com

Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Site Location

Scale at A3

1:90,000

Role

Suitability

For Issue

Arup Job No
273927

Rev
F1

Name
001

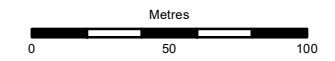
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Site boundary
- Waterbodies

Coordinate System: British National Grid



F1	2020-11-20	EA	EA	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Waterbody Locations

Scale at A3

1:2,750

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

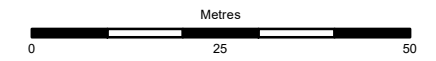
002



Legend

- Artificial refugia
- Waterbodies

Coordinate System: British National Grid



F1	2020-11-20	EA	EA	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

**Waterbody 4
Artificial Refugia Locations**

Scale at A3

1:1,000

Role

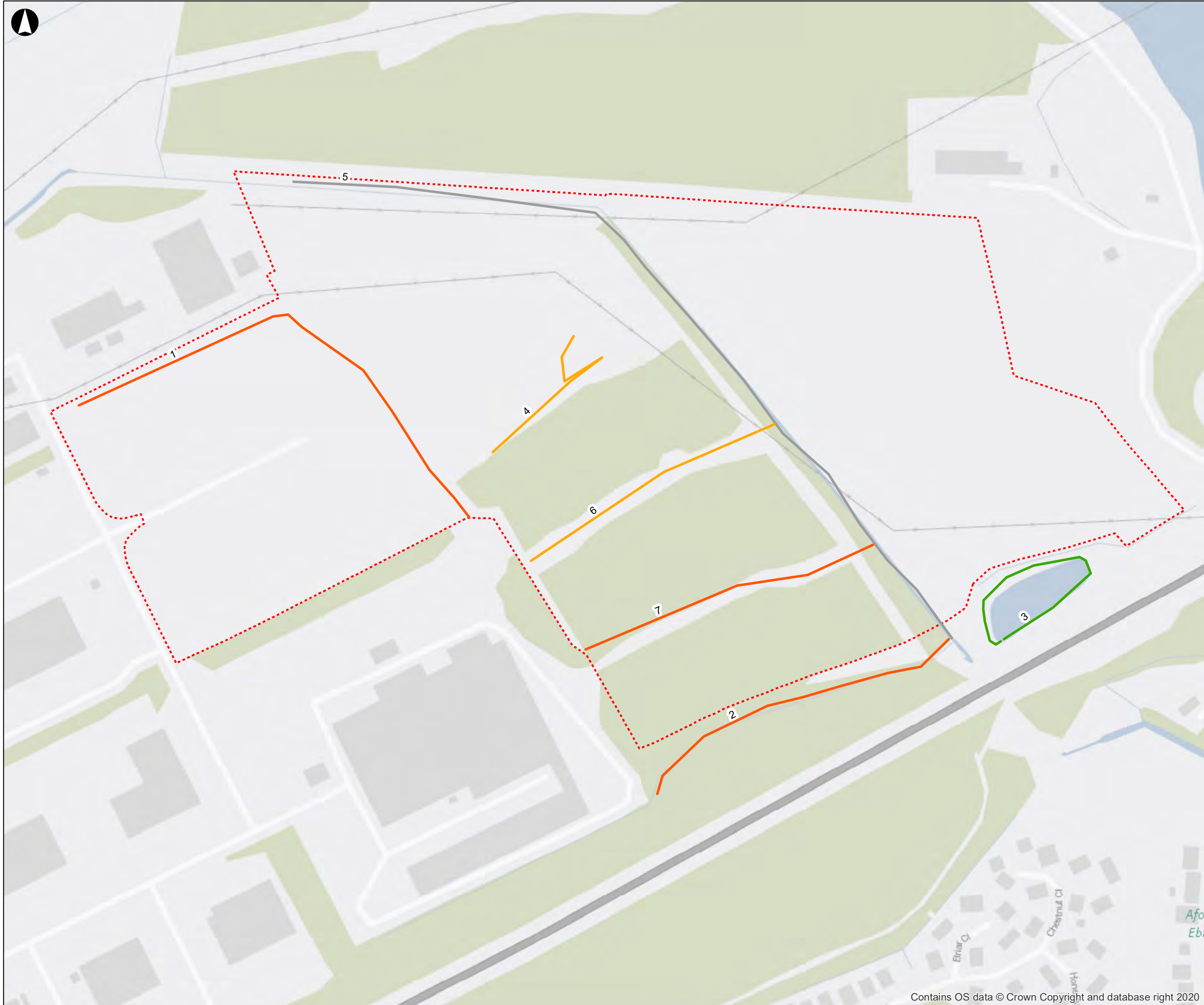
Suitability

For Issue

Arup Job No
273927

Rev
F1

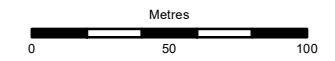
Name
003



Legend

- Site boundary
- HSI Category**
- Good
- Average
- Below average
- Unsuitable

Coordinate System: British National Grid



F1	2020-11-20	EA	EA	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Habitat Suitability Index (HSI) Assessment Results

Scale at A3

1:2,750

Role

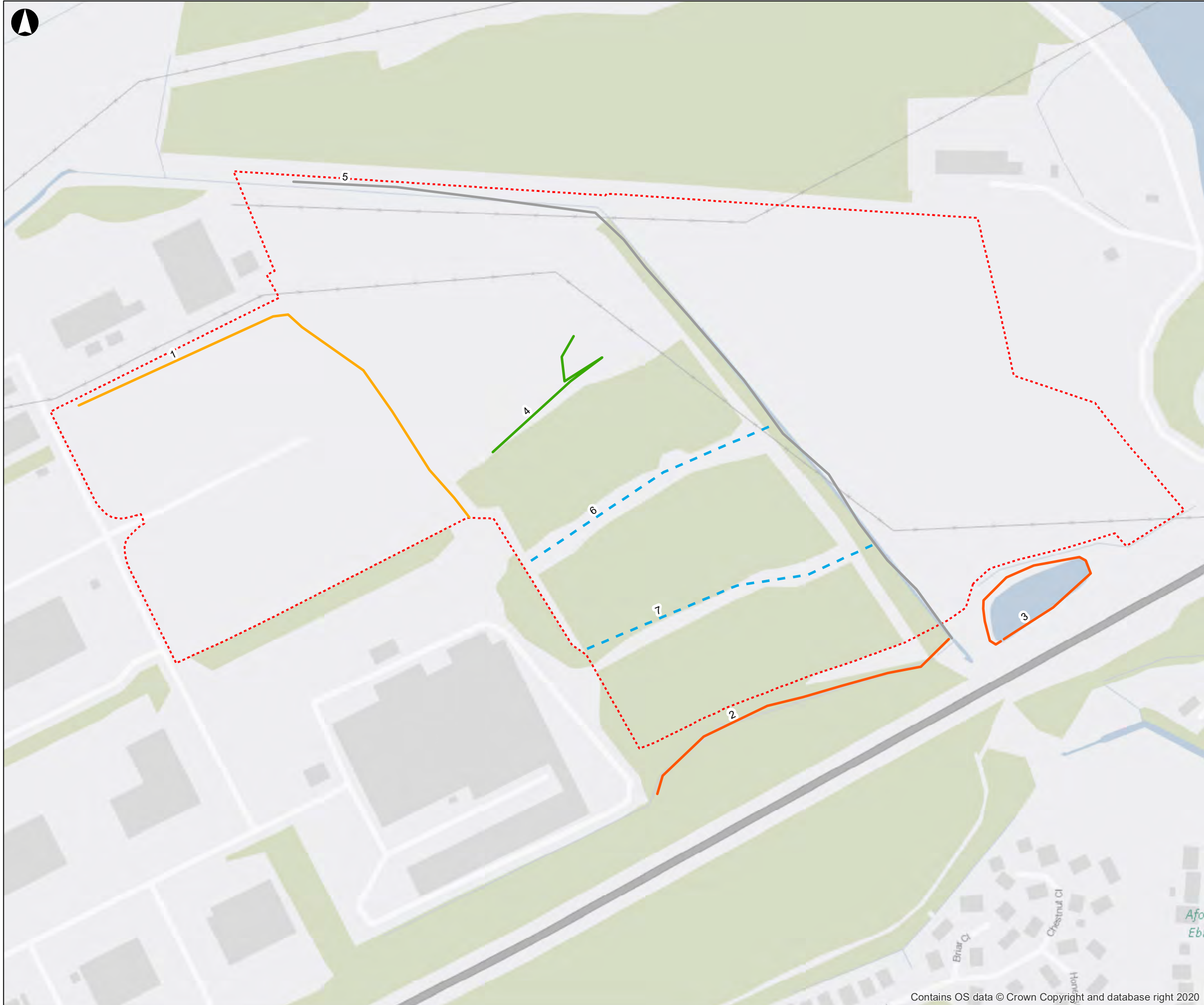
Suitability

For Issue

Arup Job No
273927

Rev
F1

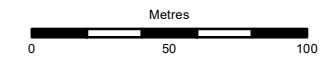
Name
004



Legend

- Site boundary
- eDNA Result**
- Positive
- Negative
- Inconclusive
- Unsuitable
- eDNA not possible (dry)

Coordinate System: British National Grid



F1	2020-11-20	EA	EA	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

eDNA Results

Scale at A3

1:2,750

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

005

Appendix A

Great Crested Newt Survey Data

A1 Weather Conditions

Date	Survey	Temp. (°C)	Wind Speed (Beaufort Scale) and Direction	Cloud Cover (%)	Conditions
13/05/2020	HSI and eDNA	6	2 NW	100	Dry
05/06/2020	Presence / absence visit 1	13	4 NW	50	Dry
10/06/2020	Presence / absence visit 2	12	1 W	70	Sunny
15/06/2020	Presence / absence visit 3	19	1 SW	25	Dry
19/06/2020	Presence / absence visit 4	11	2 W	100	Light drizzle
25/06/2020	Presence / absence visit 5	28	2 S	20	Sunny
29/06/2020	Presence / absence visit 6	11	2 W	100	Dry

A2 HSI Assessment Survey Forms

Waterbody Number:	1	Date:	13th May 2020	GPS:	51.806785,-3.226673
--------------------------	---	--------------	---------------	-------------	---------------------

Waterbody Type		Pond		Scores			
Pond Scores				Location Zone	0.5	Location Score	0.5
Pond Area m²	400	Pond Area Score	Small: 0.8 m sq	Drying	0.1	Drying Score	0.1
Pond Density	2.5461	Pond Density Score	0.66	Water Quality	0.67	Water Quality Score	0.67
Number of Ponds		8		Shade	0.6	Shade Score	0.6
HSI Scores				Fowl	1	Fowl Score	1
Pond HSI Score		0.58		Fish	1	Fish Score	1
Larger Pond HSI Score		0.56		Terrestrial Habitat Quality	0.67	Habitat Score	0.67
Reen HSI Score		0.50		Macrophyte Cover Percentage	Low: 0.6	Macrophyte Score	0.6

Notes: Ditch along northern edge of northern field. Bordered by willow and gorse scrub some typhus and iris. Green algae present. Dry in places.

Photo 1



Photo 2



Photo 3



Photo 4

Photo 5



Waterbody Number:	2	Date:	13th May 2020	GPS:	51.805584,-3.220276
--------------------------	---	--------------	---------------	-------------	---------------------

Waterbody Type	Pond
-----------------------	------

Pond Scores			
Pond Area m²	150	Pond Area Score	Small: 0.3 m sq
Pond Density	2.5461	Pond Density Score	0.66
Number of Ponds	8		

HSI Scores	
Pond HSI Score	0.58
Larger Pond HSI Score	0.62
Reen HSI Score	0.57

Scores			
Location Zone	0.5	Location Score	0.5
Drying	0.1	Drying Score	0.1
Water Quality	1	Water Quality Score	1
Shade	1	Shade Score	1
Fowl	1	Fowl Score	1
Fish	1	Fish Score	1
Terrestrial Habitat Quality	1	Habitat Score	1
Macrophyte Cover Percentage	Low: 0.4	Macrophyte Score	0.4

Notes:	Along A465. Only wet in a small section. Bordered by rushes. Some glyceria. Tadpoles present.
---------------	-----------------------------------------------------------------------------------------------

Photo 1



Photo 2



Photo 3



Photo 4



Waterbody Number:	3	Date:	13th May 2020	GPS:	51.806348,-3.216640
--------------------------	---	--------------	---------------	-------------	---------------------

Waterbody Type		Pond		Scores			
Pond Scores				Location Zone	0.5	Location Score	0.5
Pond Area m²	1950	Pond Area Score	Large: 0.81 m sq	Drying	1.0	Drying Score	1.0
Pond Density	2.5461	Pond Density Score	0.66	Water Quality	1	Water Quality Score	1
Number of Ponds		8		Shade	1	Shade Score	1
HSI Scores				Fowl	0.67	Fowl Score	0.67
Pond HSI Score		0.77		Fish	1	Fish Score	1
Larger Pond HSI Score		0.76		Terrestrial Habitat Quality	0.67	Habitat Score	0.67
Reen HSI Score		0.80		Macrophyte Cover Percentage	Low: 0.6	Macrophyte Score	0.6

Notes: Attenuation lagoon by A465. Typha around edges. Elodea present. Tadpoles present.

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Waterbody Number:	4	Date:	13th May 2020	GPS:	51.807882,-3.221737
--------------------------	---	--------------	---------------	-------------	---------------------

Waterbody Type	Pond
-----------------------	------

Pond Scores			
Pond Area m²	350	Pond Area Score	Small: 0.7 m sq
Pond Density	2.5461	Pond Density Score	0.66
Number of Ponds	8		

HSI Scores	
Pond HSI Score	0.64
Larger Pond HSI Score	0.64
Reen HSI Score	0.59

Scores			
Location Zone	0.5	Location Score	0.5
Drying	0.1	Drying Score	0.1
Water Quality	0.67	Water Quality Score	0.67
Shade	0.8	Shade Score	0.8
Fowl	1	Fowl Score	1
Fish	1	Fish Score	1
Terrestrial Habitat Quality	1	Habitat Score	1
Macrophyte Cover Percentage	High: 0.95	Macrophyte Score	0.95

Notes:	Boggy area between scrub and plantation. Little surface water, although would fill up in rain. Horsetail and potamatogon present.
---------------	-----------------------------------------------------------------------------------------------------------------------------------

Photo 1



Photo 2



Photo 3



Waterbody Number:	6	Date:	13th May 2020	GPS:	51.807242,-3.2208958
--------------------------	---	--------------	---------------	-------------	----------------------

Waterbody Type		Pond		Scores			
Pond Scores				Location Zone	0.5	Location Score	0.5
Pond Area m²	400	Pond Area Score	Small: 0.8 m sq	Drying	0.1	Drying Score	0.1
Pond Density	2.5461	Pond Density Score	0.89	Water Quality	0.67	Water Quality Score	0.67
Number of Ponds		8		Shade	0.7	Shade Score	0.7
HSI Scores				Fowl	1	Fowl Score	1
Pond HSI Score		0.61		Fish	1	Fish Score	1
Larger Pond HSI Score		0.59		Terrestrial Habitat Quality	1	Habitat Score	1
Reen HSI Score		0.51		Macrophyte Cover Percentage	Low: 0.4	Macrophyte Score	0.4

Notes:	Dry at time of HSI. Ditch running through woodland.
---------------	-----------------------------------------------------

Photo 1

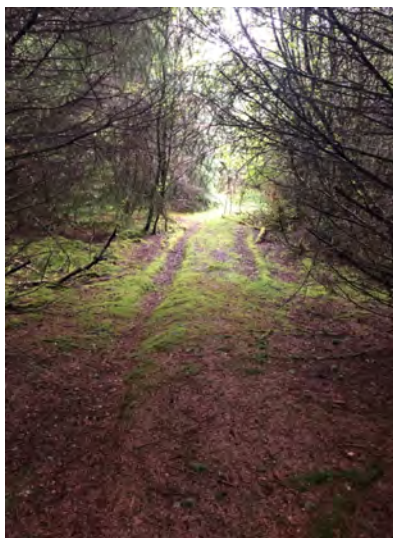


Photo 2



Photo 3



Waterbody Number:	7	Date:	13th May 2020	GPS:	51.806432,-3.2201234
--------------------------	---	--------------	---------------	-------------	----------------------

Waterbody Type		Pond		Scores			
Pond Scores				Location Zone	0.5	Location Score	0.5
Pond Area m²	300	Pond Area Score	Small: 0.6 m sq	Drying	0.1	Drying Score	0.1
Pond Density	2.5461	Pond Density Score	0.89	Water Quality	0.67	Water Quality Score	0.67
Number of Ponds		8		Shade	0.7	Shade Score	0.7
HSI Scores				Fowl	1	Fowl Score	1
Pond HSI Score		0.59		Fish	1	Fish Score	1
Larger Pond HSI Score		0.59		Terrestrial Habitat Quality	1	Habitat Score	1
Reen HSI Score		0.51		Macrophyte Cover Percentage	Low: 0.4	Macrophyte Score	0.4

Notes:	Dry at time of HSI. Ditch in woodland. Some flow. Appears to be a vehicle track which floods ephemerally.
---------------	-----------------------------------------------------------------------------------------------------------

Photo 1



Photo 2



A3 eDNA Sampling Results Form

Report: 101281-1

Order number: 101281

Great Crested Newt eDNA Results

Company: Ove Arup and Partners Ltd (Arup)

Project code | Task code: Ciner

Date of Report: 29 May 2020

Number of samples: 4

Thank you for sending your sample(s) for analysis by NatureMetrics. Your sample(s) have been processed in accordance with the protocol set out in Appendix 5 of Biggs et al. (2014).

DNA was precipitated via centrifugation at 14,000 x g and then extracted using Qiagen Blood and Tissue extraction kits.

qPCR amplification was carried out in 12 replicates per sample, using the primers and probe described by Biggs et al. (2014), in the presence of both positive and negative controls.

Results indicate GCN presence in 'WB4'. No GCN were detected in 'WB2' and 'WB3'. All controls performed as expected and so the results are conclusive. Inhibition was detected in 'WB1', which was not resolved with multiple rounds of DNA dilution as prescribed by Biggs et al. (2014), we therefore return this result as inconclusive.

Results are based on the samples as supplied by the client to the laboratory. Incorrect sampling methodology may affect the results. Note that a negative result does not preclude the presence of Great Crested Newts at a level below the limits of detection.

Sample	Pond ID	Arrived	Inhibition	Degradation	Score	GCN status
729	'WB1'	15-May	Yes	No	0	Inconclusive
727	'WB2'	15-May	No	No	0	Negative
728	'WB3'	15-May	No	No	0	Negative
730	'WB4'	15-May	NA	No	1	Positive



End of report

Report issued by: Dr. Narin Kirikyali

Contact: gcn@naturemetrics.co.uk | 01491 829042



Understanding your results

Positive GCN DNA has been detected in this sample, meaning that at least one of the 12 replicates has been amplified. Remember that this is not a quantitative test, so you should not interpret a high eDNA score (e.g. 12/12) as necessarily indicating a larger population of GCN than a low eDNA score (e.g. 1/12).

Negative No GCN DNA has been detected in this sample, and the internal and external controls worked as expected. This tells us that if there had been GCN DNA in the sample, we would have detected it, so we can be confident in its absence from the sample provided.

Inconclusive No GCN DNA was detected in the sample, but the internal controls failed to amplify as expected. This means that any GCN DNA in the sample might also have failed to amplify properly, so we cannot have confidence in this negative result. Inconclusive results can be caused by the degradation of the DNA (when the DNA marker contained in the ethanol in the kits fails to amplify) or by inhibition of the reaction (when the marker added in the lab fails to amplify) caused by certain chemicals or organic compounds that may be present in the water sample.

inhibitors Naturally-occurring chemicals/compounds that cause DNA amplification to fail, potentially resulting in false-negative results. Common inhibitors include tannins, humic acids and other organic compounds. Inhibitors can be overcome by either diluting the DNA (and the inhibitors), but dilution carries the risk of reducing the DNA concentration below the limits of detection.

negative control Used to determine if PCR reactions are contaminated.

positive control Used to determine whether the assay is working correctly.

primers Short sections of synthesised DNA that bind to either end of the DNA segment to be amplified by PCR.

probe A short section of synthesised DNA that binds to a specific section of the target species' DNA within the section flanked by the primers. The probe is designed to be totally specific to that species. The probe is labelled such that it fluoresces during amplification, which is used to infer the presence of the target species' DNA in the sample.

qPCR Stands for 'quantitative PCR', sometimes also known as 'real-time PCR'. A PCR reaction incorporating a coloured dye that fluoresces during amplification, allowing a machine to track the progress of the reaction. Often used with species-specific Primers where detection of amplification is used to infer the presence of the target species' DNA in the sample. If the species is not present in the sample, no fluorescence will be detected.



A4 **Presence/Absence Survey Results Forms**

Extended Phase 1 Target Notes

ARUP

Waterbody Ref:	WB4	Date:	10th June 2020	GPS:	51.807867, -3.221856
Surveyors:	Kathryn Jones; Eloise Arif;				
Job Number:	273927	Visit No.	2		
TN Type:	Other				
Description	4x small newt eft/juvenile caught in net				

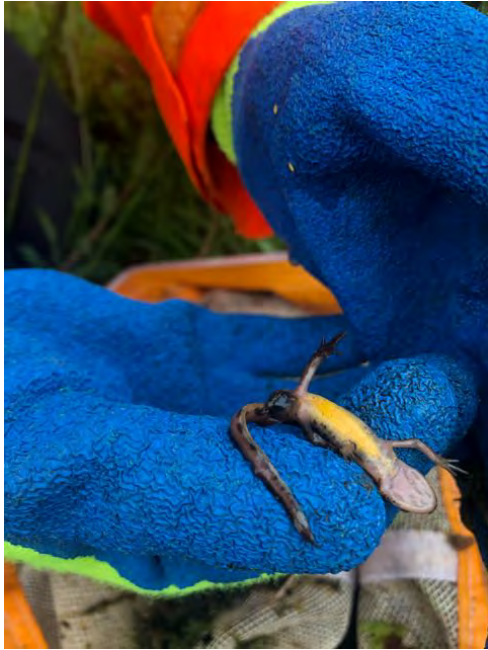
Photo 1



Extended Phase 1 Target Notes

Waterbody Ref:	WB4	Date:	19th June 2020	GPS:	51.807794, -3.2218
Surveyors:	Kathryn Jones; Alexandra Kinsey				
Job Number:	273927	Visit No.	4		
TN Type:	Other				
Description	Adult male palmate newt caught in net				

Photo 1



Extended Phase 1 Target Notes

Waterbody Ref:	WB4	Date:	19th June 2020	GPS:	51.807854, -3.221806
Surveyors:	Kathryn Jones; Alexandra Kinsey;				
Job Number:	273927	Visit No.	4		
TN Type:	Other				
Description	Smooth/palmate eft caught in net				

Photo 1



Extended Phase 1 Target Notes

ARUP

Waterbody Ref:	WB4	Date:	25th June 2020	GPS:	51.807863, -3.221757
Surveyors:	Eloise Arif; Kathryn Jones;				
Job Number:	273927	Visit No.	5		
TN Type:	Other				
Description	Smooth/palmate eft/juvenile netted.				

Photo 1



Extended Phase 1 Target Notes

Waterbody Ref:	WB4	Date:	25th June 2020	GPS:	51.807199, -3.220861
Surveyors:	Eloise Arif; Kathryn Jones;				
Job Number:	273927	Visit No.	5		
TN Type:	Other				
Description	Smooth/palmate egg found in egg search				

Photo 1



Unique Reference:	2882	Date:	29th June 2020		
Surveyor:	Eloise Arif; Kathryn Jones;	GPS	51.807977, -3.221521		
Waterbody Number:	4	Job Number	273927		
Turbidity Score:	2	Bottle Trap Number:	17		
Methods:	Bottle Trapping; Torching; Egg Search; Refugia Search;	Vegetation Score:	4		
Species:	Smooth Newt; Palmate Newt;	Type:	Male; Female;	Population:	2

Other Aquatic Species and Notes:

2 adult smooth/palmates torched.
None under refugia or trapped and no eggs.

Unique Reference:	2881	Date:	29th June 2020
Surveyor:	Eloise Arif; Kathryn Jones;	GPS	51.806560, -3.226680
Waterbody Number:	7	Job Number	273927
Turbidity Score:	3	Bottle Trap Number:	11
Methods:	Bottle Trapping; Torching; Netting; Egg Search;	Vegetation Score:	2
Species:	Smooth Newt; Palmate Newt;	Type:	Male; Female;
		Population:	10

Other Aquatic Species and Notes:

1 adult smooth/palmate torched.
6 adult female, 4 adult male palmate trapped.
None netted. No eggs.

Photo 1



Photo 2



Photo 3



D7 Reptile Survey Report

CiNER Glass Limited
**Dragon Glass Bottle
Manufacturing Facility**
Reptile Survey Report

DRAGON-ARUP-ENVE-XX-RP-YE-000006

Issue | 20 November 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927

Ove Arup & Partners Ltd
4 Pierhead Street
Capital Waterside
Cardiff CF10 4QP
United Kingdom
www.arup.com

ARUP

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2	Project Description	2
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Appendices

Appendix A

Reptile Survey Data

Appendix B

Photographs

1 Introduction

1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by CiNER Glass Ltd to undertake a range of consultancy services in relation to the proposed Dragon Glass Bottle Manufacturing facility, hereafter referred to as 'the Project'.

Further to the production of a Preliminary Ecological Appraisal Report¹, a range of ecological surveys were commissioned to identify the baseline ecological conditions of the site, and to inform the assessment of impacts as part of the Ecological Impact Assessment (EcIA), which will support a subsequent planning application for the Project.

This document describes the reptile surveys undertaken for the Project.

1.2 Objectives

The objectives of the reptile survey were to ascertain the following:

- The presence or absence of reptile species within the study area; and
- The abundance of any reptile species present within the study area.

¹ Arup (2020) CiNER Glass Limited. Preliminary Ecological Appraisal.

2 Project Description

The facility consists of a three-part operation for the production of glass bottles; the handling of raw material, the manufacturing of the glass containers and the product-inspection and packaging process. The proposed facility consists of a number of distinct components which are summarised below:

- 2No furnaces and associated filters and chimney stacks;
- 2No cullet buildings for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles;
- A printing area for applied decorations (14500 sqm);
- An automated warehouse for storage and distribution of glass bottles (17000 sqm);
- Utilities building which includes plant space, workshops, office space and welfare facilities;
- Visitor building;
- Waste stores;
- Standalone plant buildings;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The site will also include two attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site.

The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. The facility will also require the transportation of finished product glass bottles following production.

The facility is forecasted to create approx. 670 jobs and will operate 24 hours a day, 7 days a week via shift system.

3 Site Description

The site is allocated within the Ebbw Vale Enterprise Zone and occupies a strategic location adjacent to the A465 Heads of the Valleys Road in the head of the South Wales Valleys, approximately 700 m to the north of Rassau village and 3 km north of Ebbw Vale town centre. The site is displayed on Figure 1.

The Rassau Industrial Estate, built in the late 1970s – early 1980s, currently comprises of purpose-built light industrial/manufacturing units with ancillary office accommodation. The industrial estate is situated on the foot slopes of Mynydd Llangynidr, approximately 500m south of the Brecon Beacons National Park (BBNP) boundary.

The proposed site is currently undeveloped and is located on the eastern extent of the industrial estate consisting of existing grass land, scrub, broadleaved and coniferous woodland. An unadopted asphalt access road extends from the western boundary of the site which transitions into an unbound gravel track providing access to the eastern site extents.

A tributary of the Ebbw River (Afon Ebwy) is located within the centre of the site which appears to have been diverted around the northern extent of Rassau Industrial Estate as part of the industrial estate development. The Ebbw River is part of the South East Valleys catchment which eventually flow into the Usk Estuary.

The topography of the site falls gradually from north to south, with the terrain elevation ranging from 427.5 m AOD in the north down to 390 m AOD in the south eastern corner.

4 Study Area

The study area (Figure 1) encompasses the terrestrial land within the red line boundary of the Project site.

5 Legislation

Common reptile species receive partial protection under the Wildlife and Country Act 1981 (as amended). Common reptile species include adder (*Vipera berus*), common lizard (*Zootoca vivipara*), grass snake (*Natrix helvetica*), and slow worm (*Anguis fragilis*). Under this legislation, it is an offence to:

- Intentionally or recklessly kill or injure reptile species; and
- Sell, offer or advertise for sale, possess or transport for the purposes of sale these animals, whether alive or dead, or any part thereof.

The Environment (Wales) Act 2016 includes a duty on all public authorities to have regard to the conservation of biodiversity in the exercise of their functions. This duty applies to government bodies, local authorities and statutory undertakers. The Act also requires lists to be published of Habitats and Species considered to be of Principal Importance for the Conservation of Biological Diversity. These are referred as Section 7 habitats and species after the sections of the Act which require the publication of lists in each devolved area. All common reptiles are listed as a Section 7 Species.

All four common reptile species are listed as UK Biodiversity Action Plan (UKBAP) Priority Species. Action Plans exist for each UK BAP Priority Species to demonstrate the UK's commitment to help reduce or halt the significant losses in global biodiversity².

² The UKBAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in July 2012. The UK list of priority species, however, remains an important reference source and has been used to help draw up statutory lists of priority species.

6 Methodology

6.1 Desk Study

An ecological data search was carried out to identify reptile species within 2 km of the site's boundary. Such data was obtained from the South East Wales Biodiversity Records Centre (SEWBRc)³ on 6th April 2020. Data obtained is also presented within the Preliminary Ecological Appraisal Report⁴ in relation to the Project⁴.

6.2 Field Surveys

The reptile survey methodology followed best practice guidelines⁵, utilising artificial refugia placed in representative areas of suitable habitat for reptiles across the site. Artificial refugia comprised a combination of flat and corrugated roofing felt mats measuring 0.5 m x 0.5 m and corrugated metal mats measuring 0.5 m x 1 m, were placed in suitable habitat in groups of 10 and spaced approximately 10 m apart.

Approximately 140 refugia were placed, primarily in sunny areas, on top of flattened vegetation (where possible). Locations of refuges deployed across the site are shown on Figure 2. Further detail of locations and numbering of the mats are shown on Figure 3, Figure 4, and Figure 5. Refuges were deployed on 18th May 2020, no less than two weeks ahead of the first survey, to allow refuges to 'bed in' to the environment. Mats were also deployed for great crested newt (GCN) surveys⁶ and checked on 10th, 15th, 19th, and 25th June 2020 for any reptiles that may use these mats.

During each survey, the area around each refuge was first checked from a suitable distance before it was approached. Each refuge was approached slowly to check for basking reptiles; each refuge was then lifted and the area beneath checked for reptiles. Where possible, a photograph was taken of any reptile observed. Once checked, the refuge was replaced in its original location. The order in which all refuges were checked was altered during each survey visit. Incidental records of reptiles that were not under mats were also recorded during the surveys.

Dates of surveys, as well as weather conditions during each survey are presented in Table 1.

³ <http://www.sewbrec.org.uk/home.page> (accessed 06/04/20).

⁴ Arup (2020) CiNER Glass Ltd. Preliminary Ecological Appraisal.

⁵ Gent, T. and Gibson, S. (2003). Herpetofauna Workers Manual. JNCC, Peterborough.

⁶ Arup (2020) CiNER Glass Ltd. Amphibian Survey Report.

Table 1. Survey dates and weather conditions.

Visit Number	Date	Temp at start (°C)	Weather Conditions at start ⁷	Weather Conditions at end ⁷	Temp at end (°C)
1	2 June 2020	14	W: 2 / CC: 10 / P: none	W: 2 / CC: 60 / P: none	17
2	10 June 2020	12	W: 1 / CC: 70 / P: none	W: 1 / CC: 100 / P: none	13
3	15 June 2020	16	W: 1 / CC: 40 / P: none	W: 1 / CC: 60 / P: none	19
4	2 September 2020	12	W: 1 / CC: 80 / P: none	W: 1 / CC: 100 / P: none	13
5	4 September 2020	13	W: 3 / CC: 90 / P: none	W: 2 / CC: 100 / P: none	13
6	8 September 2020	15	W: 3 / CC: 90 / P: none	W: 3 / CC: 80 / P: none	14
7	10 Sept 2019	13	W: 1 / CC: 100 / P: none	W: 1 / CC: 100 / P: none	16

Incidental recordings of reptile species sighted during ecological surveys or site visits throughout 2020, other than the reptile surveys described within this report, are also reported in Appendix A. These records are not considered within peak counts of reptile species populations and only relate to common lizard.

All surveys were completed by Suitably Qualified Ecologists (SQE) Eloise Arif (ACIEEM), Kathryn Jones (ACIEEM) Rosemary Cripps and Alexandra Kinsey who all have a minimum of three years surveying for reptiles.

⁷ Weather conditions are reported as follows – W: Wind on the Beaufort Scale / CC: Cloud Cover as a % / P: Precipitation.

6.3 Assessment of Reptile Populations

The population status of any reptile species recorded on site was assessed against criteria as detailed by guidance published by Froglife⁸. Populations of reptile species are assigned a population size class based on the highest peak count recorded during one day, where the peak count is the total number of adults recorded in any one survey. The population size classes are detailed in Table 2 below.

Table 2. Population size classes of reptiles.

Species	Population size class		
	Low Population	Good Population	Exceptional Population
Adder	< 5	5 – 10	> 10
Grass snake	< 5	5 – 10	> 10
Common lizard	< 5	5 – 20	> 20
Slow worm	< 5	5 – 20	> 20

6.4 Limitations

The surveys were undertaken in suitable weather conditions (dry, mild days) and during the optimum survey period (April, May and September)⁶.

Three survey visits were conducted during June (outside of the optimal survey period, due to the late commission), however the air temperature was within the optimum range and reptiles were recorded, so this is not considered to be a significant survey limitation.

It was not possible to deploy reptile mats and survey the eastern field due to livestock being present during each survey visit. This area however was well-grazed and poached which is sub-optimal for reptiles and is therefore not considered to be a significant limitation.

Sometimes it was not possible to distinguish if a common lizard was male or female if it moved out of sight quickly. Information collated is sufficient to determine abundance, distribution and indicative population size.

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, factors such as the time of year and natural behaviour of the animals. Nevertheless, these surveys

⁸ Froglife (1999) *Advice Sheet 10: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife, Peterborough.

were conducted at the optimal survey periods and using methodologies which are in accordance with published guidelines.

7 Results

7.1 Desk Study

The desk study records do not indicate the presence of any reptile species within 1 km of the site. During upgrade works at the adjacent Carno reservoir (150m East) in 2020, for Welsh Water, Arup are aware that an adder was found in the spillway, which was released into nearby scrub, thereby confirming presence of adders in the local area.

7.2 Field Surveys

Field surveys identified a ‘good’ population of common lizard to be present within the survey area. No other reptile species were identified on any of the surveys. No reptiles were recorded using the GCN mats as describes above. Peak counts of reptiles recorded within the survey area are shown in Table 3, with the majority of these records being in the western extent of the Site. The locations of reptiles recorded during the surveys are presented in overview on Figure 6, and detailed in Figure 7, Figure 8, and Figure 9. Full reptile survey data is presented in Appendix A. Photographs are given in Appendix B.

In addition to records of adults, there were records of juveniles, sub-adults and gravid females of common lizard during the surveys, indicating that a breeding population of this species is present on site.

Table 3. Peak reptile species populations recorded during seven survey visits.

Species	Scientific Name	Peak count / Visit number	Population size class
Common lizard	<i>Zootoca vivipara</i>	9/ Visit 3, 4 and 7	Good

A common lizard was recorded on Site during the deployment of the reptile mats under a pile of old logs. Another common lizard was recorded on Site during reptile visit 2 under an old mat that was not part of the deployed mats. A common lizard was also observed during a mammal survey. A further three sub-adult common lizards were observed on reptile mat 26 during an otter survey. These are further detailed in Appendix A2.

8 Conclusions

Seven reptile surveys of the site were completed, surveying any areas of habitat suitable for reptiles within the red line boundary of the survey area. The site was found to support the following populations of reptile species:

- Good population of common lizard. Data collated gives evidence that these are a breeding population.

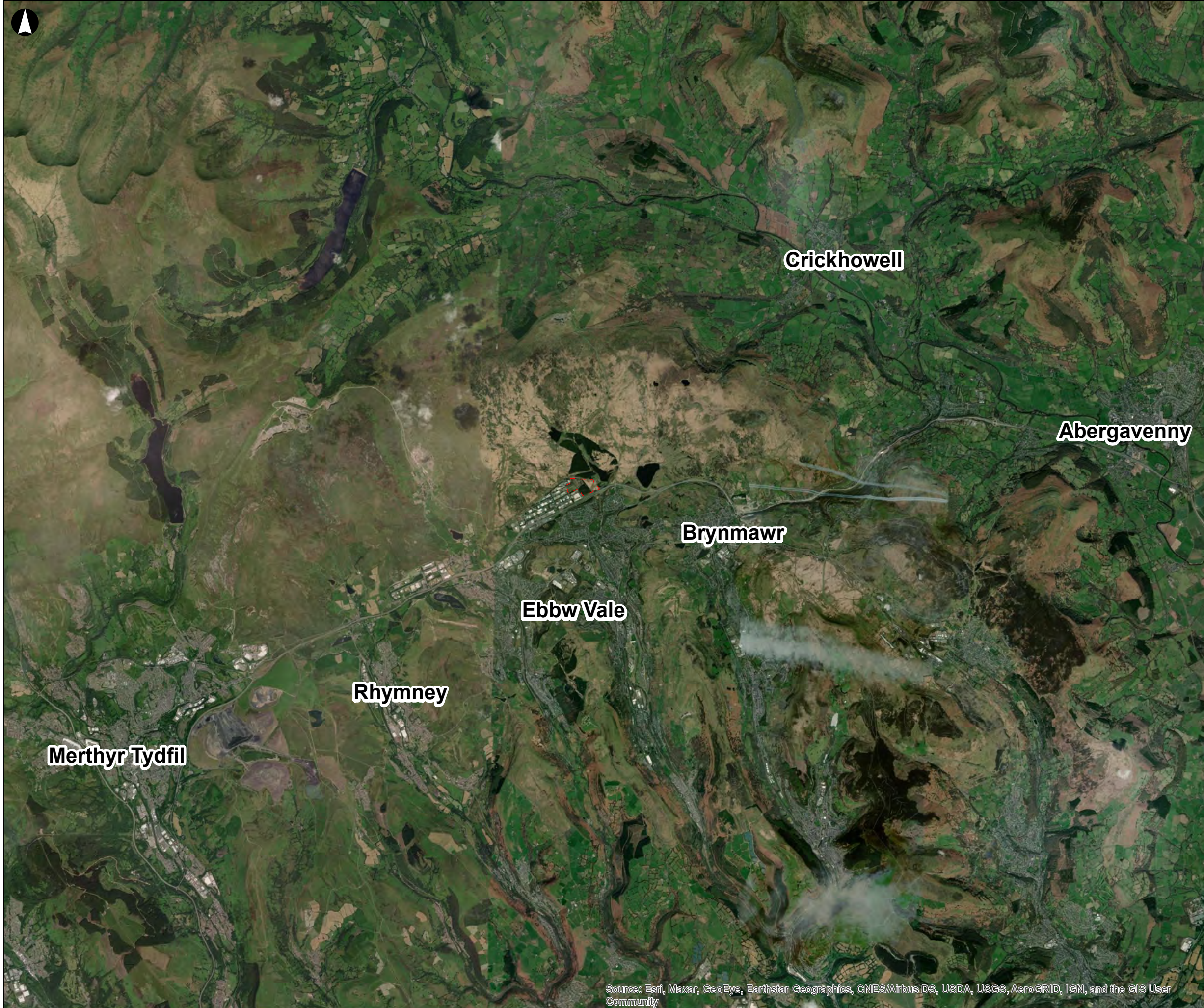
This report is the result of survey work undertaken between May and September 2020. This report refers, within the limitations stated, to the condition or proposed development of the site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. No warranty is given as to the possibility of future changes in the condition of the site.

The results of these surveys are considered valid for a minimum of 18 months to a maximum of 3 years. If more than 18 months elapses before any planning application is submitted, the requirement for repeat surveys should be reviewed⁹.

This report is produced solely for the benefit of CiNER Glass Ltd and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

⁹ Chartered Institute of Ecology and Environmental Management (2019). *Advice Note on the Lifespan of Ecological Reports and Surveys*.

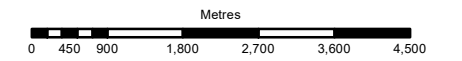
Figures



Legend

Site boundary

Coordinate System: British National Grid



F1	2020-11-20	KJ	CP	PC
Rev	Date	By	Chkd	Appd

ARUP

4 Pierhead Street
Cardiff CF10 4QP
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www.arup.com

Client
CINER Glass Ltd.



Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Site Location

Scale at A3
1:90,000

Suitability
For Issue

Arup Job No 273927	Rev F1
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Name
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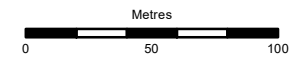
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Site boundary
- Reptile Mats

Coordinate System: British National Grid



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Rev	Date	By	Chkd	Appd

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Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Reptile Mat Placement (Overview)

Scale at A3
1:3,000

Role
For Issue

Arup Job No 273927	Rev F1
Name 002	

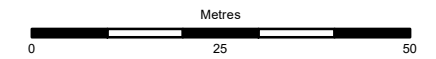
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Legend

● Reptile Mats

Coordinate System: British National Grid



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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Reptile Mat Placement (West)

Scale at A3

1:1,000

Role

Suitability

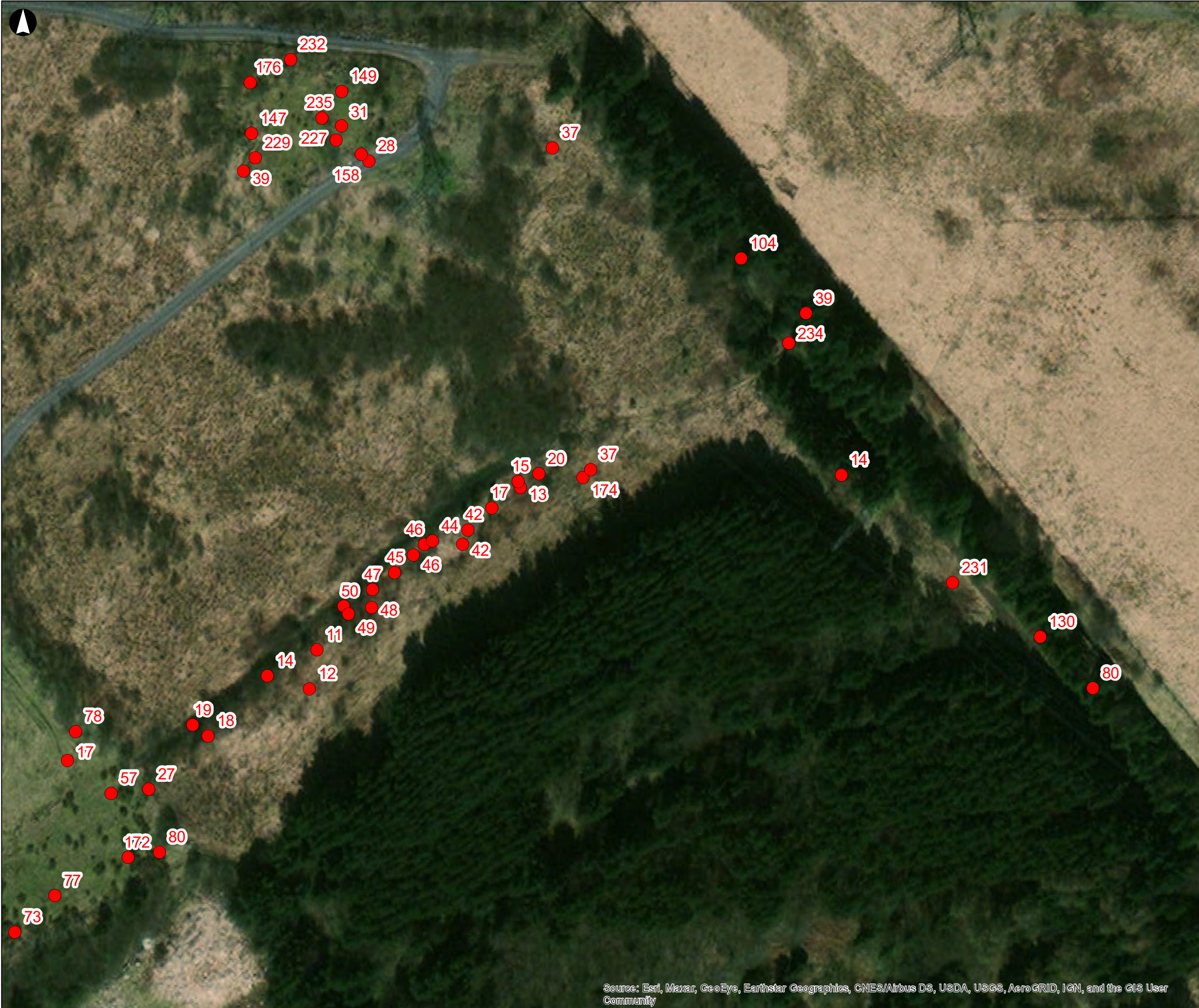
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Arup Job No
273927

Rev
F1

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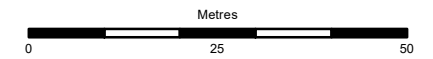
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

● Reptile Mats

Coordinate System: British National Grid



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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Reptile Mat Placement (Centre)

Scale at A3

1:1,000

Role

Suitability

For Issue

Arup Job No

273927

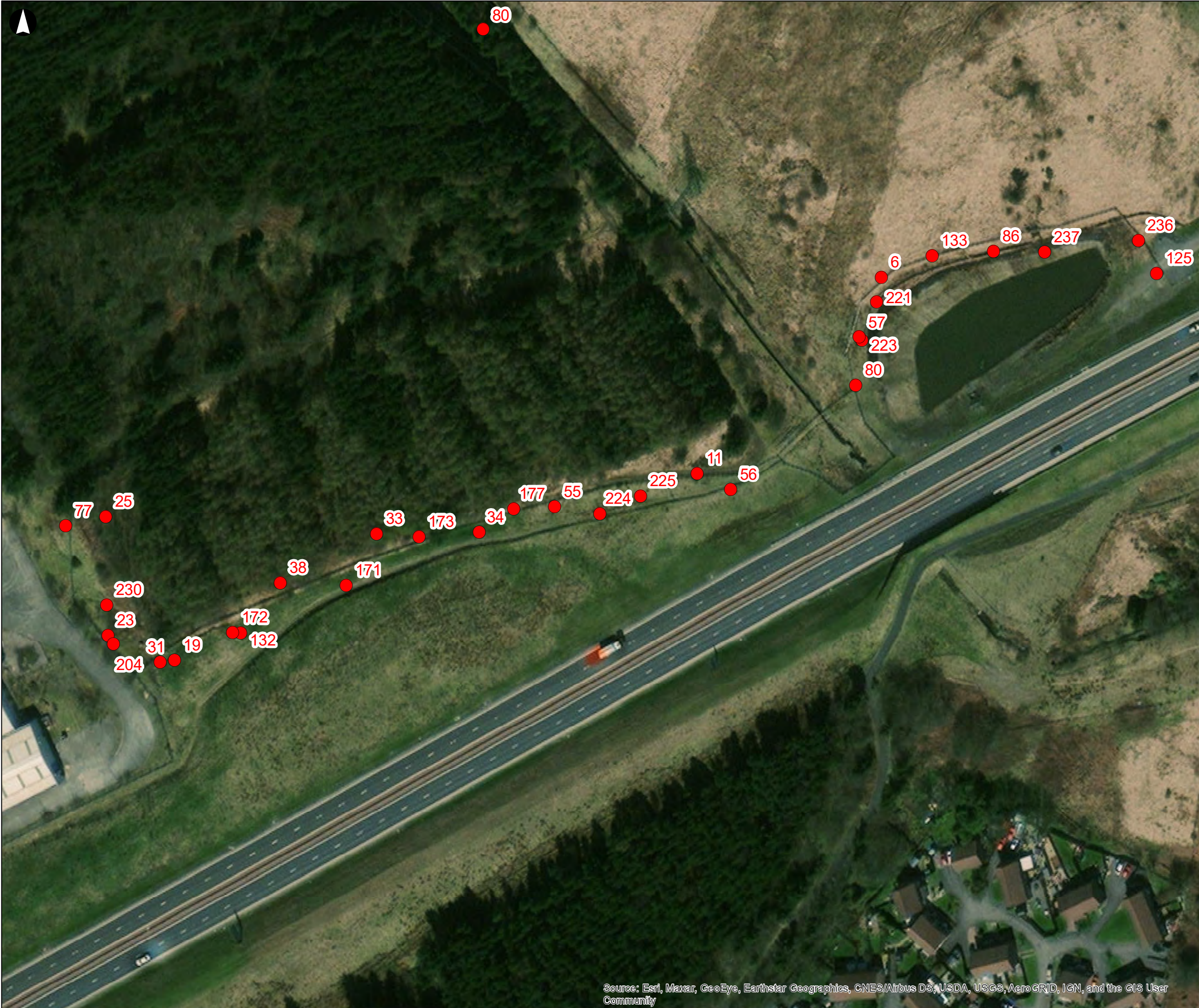
Rev

F1

Name

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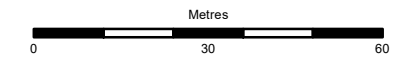
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

● Reptile Mats

Coordinate System: British National Grid



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Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Reptile Mat Placement (East)

Scale at A3
1:1,300

Role
For Issue

Arup Job No 273927	Rev F1
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Name
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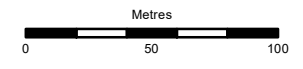
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Legend

- Site boundary
- Common Lizard

Coordinate System: British National Grid



F1	2020-11-20	AK	CP	PC
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Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Reptile Survey Results (Overview)

Scale at A3
1:3,000
Role

Suitability
For Issue

Arup Job No 273927	Rev F1
Name 006	

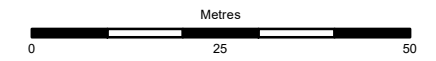
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

● Common Lizard

Coordinate System: British National Grid



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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Reptile Survey Results (West)

Scale at A3

1:1,000

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

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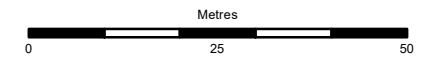
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Legend

● Common Lizard

Coordinate System: British National Grid



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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Reptile Survey Results (Centre)

Scale at A3

1:1,000

Role

Suitability

For Issue

Arup Job No
273927

Rev
F1

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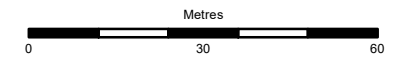
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

● Common Lizard

Coordinate System: British National Grid



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Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Reptile Survey Results (East)

Scale at A3
1:1,300

Role
For Issue

Arup Job No 273927	Rev F1
Name 009	

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

Appendix A

Reptile Survey Data

A1 Reptile Survey Data

Table A1. Full data from reptile surveys of the site. Count represents the number of individuals counted per reptile species. Bold counts numbers show the peak count for each reptile species recorded on site across all surveys.

Visit Number	Species	Reptile refugia where reptiles found	Details of reptiles identified	Total Count
1 Reptile mat deployment	Common lizard	N/A	2x adult	2
2	Common lizard	6, 45, 56	1x adult male 1 x gravid female 1x sub-adult	3
3	Common lizard	224, 125, 202, 16,46, 11, 226	1x adult (missing tail) 5x adult 3 x adult (Female-gravid)	9
4	Common lizard	17, 20, 23, 43, 60, 230	1x adult female 2x juvenile 6 x sub-adult	9
5	Common lizard	1, 20, 23,	1x female lizard skin 2x adult male 1x adult female 1x juvenile	5
6	Common lizard	8, 10, 14, 17, 20, 21, 65	1 x skin only 2 x adult female 1 x adult male 1 x adult male (shed tail grown back) 1x adult 2x juvenile	8
7 and mat collection	Common lizard	5, 17, 23, 34, 73, 77, 225, 231	1x adult 1x adult male 7x sub-adult	9

A2 Incidental Reptile Records

Table A2. Incidental records of reptiles recorded during other ecological surveys in 2020.

Date	Reptile Refugia Number	National Grid Reference	Species	Comments
05/06/2020	N/A	SO 15954 12872	Common lizard	Observed under log pile
10/06/2020	N/A	SO 15648 12816	Common lizard	Adult female under old mat
18/08/2020	24	SO 16073 12630	Common lizard	Adult observed. No further details.
03/09/2020	26	SO 15899 12612	Common lizard	3x sub-adults on top of mat 26

Appendix B

Photographs

B1 Photographs



Photograph 1 – Showing adult male common lizard.



Photograph 2 – Showing adult female and juvenile (missing tail) common lizards



Photograph 3 – Showing common lizard skin

D8 Breeding Bird Survey Report

CiNER Glass Limited

**Dragon Glass Bottle
Manufacturing Facility**

Breeding Bird Survey Report 2020

DRAGON-ARUP-ENVE-XX-RP-YE-000012

Issue | 25 August 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927-00

Ove Arup & Partners Ltd
4 Pierhead Street
Cardiff CF10 4QP
United Kingdom
www.arup.com

ARUP

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7	Conclusions	12

Figures

Figure 1: Site Location

Figure 2: Study Area and Breeding Bird Survey Results

1 Introduction

1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by CiNER Glass Ltd to undertake a range of consultancy services in relation to the proposed Dragon Glass Bottle Manufacturing Facility, hereafter referred to as 'the Project'. The location of the Project is shown on Figure 1.

As part of that commission, a range of ecological surveys have been undertaken to identify the baseline ecological conditions of the site, to inform the assessment of impacts as part of the Ecological Impact Assessment (EcIA) that will inform the design and support a planning application for the Project.

This document describes the breeding bird surveys undertaken for the Project. Breeding bird surveys were a recommendation of the Preliminary Ecological Appraisal undertaken for the Project¹.

Nomenclature within this report follows the British (English) vernacular name within the British Ornithologists' Union (BOU) British List².

1.2 Objectives

The objectives of the surveys covered by this report were to provide data on the assemblage, numbers and distribution of breeding birds within the Study Area (Figure 2) and immediately adjacent areas.

¹ Arup (2020): *CiNER Glass Ltd; CiNER Glassworks, Rassau, Blaenau Gwent: Preliminary Ecological Appraisal Report*. April 2020.

² BOU (2017). *The British List; The official list of bird species recorded in Britain* [online] available at: <https://www.bou.org.uk/wp-content/uploads/2020/02/British-List-2020-01-24.pdf>

2 Project Description

The facility consists of a three-part operation for the production of glass bottles; the handling of raw material, the manufacturing of the glass containers and the product-inspection and packaging process. The proposed facility consists of a number of distinct components which are summarised below:

- 2No furnaces and associated filters and chimney stacks;
- 2No cullet buildings for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles;
- A printing area for applied decorations (14500 sqm);
- An automated warehouse for storage and distribution of glass bottles (17000 sqm);
- Utilities building which includes plant space, workshops, office space and welfare facilities;
- Visitor building;
- Waste stores;
- Standalone plant buildings;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The site will also include two attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site.

The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. The facility will also require the transportation of finished product glass bottles following production.

The facility is forecasted to create approx. 670 jobs and will operate 24 hours a day, 7 days a week via shift system.

3 Site Description

The proposed works are located within the Rassau Industrial Estate in the county borough of Blaenau Gwent, South Wales (centred on National Grid Reference 315582, 212801). The estate is located adjacent to the A465 dual-carriageway, approximately 700 m to the north of Rassau village and 3 km north of Ebbw Vale town centre (Figure 1).

The proposed site is the last development plot on the industrial estate and has remained undeveloped since its formation and is located on the north-east extent of the industrial estate. As a result of the lack of development the site currently supports grassland, scrub, broadleaved trees and coniferous woodland. Watercourses are located within the centre of the site and along the eastern boundary.

The watercourse along the eastern boundary is a tributary of the Ebbw River (Afon Ebwy) which appears to have been diverted around the northern extent of Rassau Industrial Estate as part of the industrial estate development. The Ebbw River is part of the South East Valleys catchment which eventually flow into the Usk Estuary.

The site contains an unadopted asphalt access road extending from the western boundary of the site. This road transitions into an unbound gravel track which provides temporary access to Carno reservoir, to the east.

The topography of the site falls gradually from north to south, with the terrain elevation ranging from 427.5 m AOD in the north down to 390 m AOD in the south-eastern corner.

4 Study Area

The study area (Figure 2) encompasses the land within the red line boundary of the Project site.

5 Methodology

5.1 Desk Study

An ecological data search was carried out to identify bird species recorded within 2 km of the site's boundary. These data were obtained from the South East Wales Biodiversity Records Centre (SEWBReC)³ on 6th April 2020. Data obtained is also presented within the Preliminary Ecological Appraisal Report⁴ in relation to the Project.

5.2 Field Survey

Field surveys broadly followed the 'territory mapping' or Common Bird Census (CBC) methodology^{5,6}, albeit with a reduced number of visits (four). CBC territory mapping is the most accurate practical way to determine the numbers and distribution of breeding birds where a high level of detail is required. Essentially, the method involves mapping all birds seen or heard during walkover visits to the site, paying particular attention to behaviour which indicates breeding (e.g. singing or carrying nesting material or food). By combining the results of all visits, it is possible to determine the species present within the survey area and derive an indication of the numbers of breeding territories within the survey area.

Four approximately evenly-spaced survey visits were completed between mid-May and the end of June 2020.

Surveys, which included all areas within the site (Figure 2), commenced within one hour after sunrise and were completed by noon. The start point of surveys was alternated between visits to ensure all parts of the survey area received adequate coverage during peak periods of bird activity. The surveyor walked to within 50m of all areas within the site and logged all bird observations within the site and outside the site on field maps using standard BTO coding, paying particular attention to behaviour which indicated breeding. However, observations of birds outside the survey area were also logged when seen. Dates of surveys, as well as weather conditions during each survey are presented in Table 1.

³ <http://www.sewbrec.org.uk/home.page> (accessed 03/04/20).

⁴ Arup (2020): *CiNER Glass Ltd. Preliminary Ecological Appraisal Report*. April 2020.

⁵ Bibby, C.J., Hill, D.A., Burgess, N.D. and Mustoe, S. (2000) *Bird Census Techniques*. 2nd Edition. Academic Press: London

⁶ Marchant, J. H. (1983) *BTO Common Birds Census Instructions*. BTO, Tring.

Table 1. Survey dates and weather conditions.

Survey Visit	Date	Surveyor	Time	Weather				
				Wind Speed (Beaufort)	Wind Direction	Cloud Cover (Oktas)	Temp (°C)	Precip.
1	13/05/2020	MO	06:40 – 10:45	1	E	8	5-8	Nil
2	26/05/2020	MO	05:50 – 09:10	0-1	W	2-4	12-15	Nil
3	01/06/2020	MO	05:55 – 09:20	1-2	NE	0-1	13-18	Nil
4	22/06/2020	MO	06:05 – 09:55	1-3	SW	1-4	16-19	Nil

5.3 Territory Mapping

Species observed within suitable breeding habitat were considered to represent breeding birds if a nest, eggs or young were located, if they were observed displaying or singing, if adults were observed carry food/faecal sacks or were observed in territory disputes. In addition, birds recorded in the same location on at least two visits were also considered to represent breeding birds.

Territory mapping was completed in relation to the following species, henceforth referred to as 'Target Species':

- Species included on the Red and Amber lists of Birds of Conservation Concern in Wales (BoCCW) 3.
- The Environment (Wales) Act 2016 Section 7 Priority Species (S7PS).
- Schedule 1 species of the Wildlife and Countryside Act 1981 (as amended).

5.4 Surveyors

All survey work was completed by Martyn Owen MCIEEM. Martyn is a highly experienced consultant ornithologist, former County Bird Recorder for Shropshire, current Rarity Committee Member and holds Schedule 1 survey licences issued by Natural Resources Wales, Natural England and Scottish Natural Heritage.

5.5 Limitations

Four CBC survey visits were completed. Whilst this does not conform to the requirements of a full CBC survey (eight-ten visits), it is deemed adequate in this instance to provide an appropriate indication of the breeding bird assemblage and numbers of pairs within the survey area.

During territory mapping, birds recorded in the same location on at least two visits were considered to represent breeding birds. Including birds recorded only on one date would have likely led to the overestimation of breeding numbers due to the potential inclusion of passage migrants. This may have led to some pairs which did breed being excluded during territory mapping, although such instances would likely be rare, and not compromise the overall conclusions of this report.

The locations of territories on Figure 2 should be viewed as approximate, with the locations shown indicating a location within the territory of a breeding pair, rather than a nest location.

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, factors such as the time of year and natural behaviour of the animals. Nevertheless, these surveys were conducted at the optimal survey periods and using methodologies which are in accordance with published guidelines.

Crossbill *Loxia curvirostra* were logged (in flight only) during the survey period. This species may start to breed as early as midwinter, with the timing of breeding depending upon the availability of conifer seeds⁷. Consequently, although this species was not found to be breeding within the Study Area during the surveys detailed within, it could have bred outside the survey period.

⁷ Marchant, J. H. (1983) *BTO Common Birds Census Instructions*. BTO, Tring.
entering birds of Briatin and Ireland. BTO, Birdwatch Ireland & SOC

6 Results

6.1 Field Surveys

The CBC results are presented below. Within the survey area territories of eight Target Species were identified, with a further two species breeding in close proximity. Details are provided within Table 2 and territory locations are shown on Figure 2.

Table 2. Breeding bird survey results – Target Species.

Species	Conservation Status	Number of Territories		Total Number of Territories	Comment
		Within Study Area	Outside Study Area		
Marsh tit <i>Poecile palustris</i>	Red List	1	0	1	One territory within a small clearing in wet coniferous woodland in the south of the Study Area.
Willow warbler <i>Phylloscopus trochilus</i>	Red List	5	6	11	The most abundant Target Species breeding within the Study Area.
Whitethroat <i>Sylvia communis</i>	Red List	2	3	5	Two territories in the north of the Study Area with the remaining three territories off site (two to the south and one to the north).
Goldcrest <i>Regulus regulus</i>	Amber List	2	1	3	Two territories located within coniferous woodland in the southeast of the study area. One territory outside the Study Area to the west.

		Number of Territories		Total	
Song thrush <i>Turdus philomelos</i>	Amber List S7PS	1	0	1	One territory in the centre of the Study Area.
Mistle thrush <i>Turdus viscivorus</i>	Amber List	1	1	2	One territory in the centre of the Study Area, with one to the north.
Tree pipit <i>Anthus trivialis</i>	Amber List	5	2	7	Two territories to the north of the Study Area boundary with five territories distributed across the Study Area.
Bullfinch <i>Pyrrhula pyrrhula</i>	Red List	1	0	1	Located near the northern Study Area boundary.
Greenfinch <i>Chloris chloris</i>	Amber List	0	3	3	Three territories to the west of the Study Area.
Lesser redpoll <i>Acanthis cabaret</i>	Amber List	0	1	1	One territory to the north of the Study Area in coniferous woodland.

Table 3 provides a summary of the non-breeding Target Species and all other species observed across the survey period.

Table 3. Breeding bird survey results – Non-breeding Target Species and other species

Species	Comment
Swift <i>Apus apus</i>	Logged in flight over the Study Area during Survey 4. No evidence of breeding.
Woodpigeon <i>Columba palumbus</i>	Bred within the Study Area; at least one territory.
Moorhen <i>Gallinula chloropus</i>	Noted on lagoon to the southwest of the Study Area during Survey 1. No evidence of breeding.
Herring gull <i>Larus argentatus</i>	Two birds logged in flight to the south of the Study Area during Survey 3. No evidence of breeding.
Lesser black-backed gull <i>Larus fuscus</i>	Recorded in flight over the Study Area during Surveys 2 and 3. Possibly bred on factory units to the south of the Study Area.
Buzzard <i>Buteo buteo</i>	Recorded in flight over the Study Area during Surveys 1 and 3. No evidence of breeding.
Jay <i>Garrulus glandarius</i>	At least one territory.
Magpie <i>Pica pica</i>	Recorded foraging within/near the Study Area during each survey Visit. No evidence of breeding.
Carrion Crow <i>Corvus corone</i>	Singletons logged in flight over the Study Area during Survey Visit 2 and 3. No evidence of breeding.
Coal Tit <i>Periparus ater</i>	Bred within the Study Area; approximately two territories.
Blue Tit <i>Cyanistes caeruleus</i>	Bred within the Study Area; approximately four territories.
Great tit <i>Parus major</i>	Bred within the Study Area; approximately three territories.
Swallow <i>Hirundo rustica</i>	Logged in flight over the site during each survey visit. No evidence of breeding.
Chiffchaff <i>Phylloscopus collybita</i>	Bred within the Study Area; approximately nine territories
Blackcap <i>Sylvia atricapilla</i>	Bred within the Study Area; approximately five territories.
Wren <i>Troglodytes troglodytes</i>	Bred within the Study Area; approximately 18 territories.
Blackbird <i>Turdus merula</i>	Bred within the Study Area; approximately two territories.

Species	Comment
Robin <i>Erithacus rubecula</i>	Bred within the Study Area; approximately six territories.
Stonechat <i>Saxicola rubicola</i>	Bred within the Study Area; one territory.
Dunnock <i>Prunella modularis</i>	Bred within the Study Area; approximately eight territories.
Meadow pipit <i>Anthus pratensis</i>	Present foraging in the west of the site during Survey 1 (one bird) and Survey 4 (five birds). No evidence of breeding.
Chaffinch <i>Fringilla coelebs</i>	Bred within the Study Area; approximately six territories.
Crossbill	Three birds logged in flight to the north of the Study Area during Survey 3. No evidence of breeding (although see Section 5.5).
Goldfinch <i>Carduelis carduelis</i>	Bred within the Study Area; approximately three territories.
Siskin <i>Spinus spinus</i>	Bred within the Study Area; approximately six territories.

7 Conclusions

A breeding bird surveys to inform the proposed development of the CiNER Glass site was completed during 2020.

During CBC surveys all species observed or heard were recorded. A total 34 species were logged with territories of ten Target Species identified, eight of which bred within the Study Area. The most abundant breeding Target Species was willow warbler (11 territories, five with the Study Area) followed by tree pipit (seven territories, five within the Study Area) and whitethroat (five territories, two within the Study Area).

The sole Schedule 1 (of the Wildlife and Country 1981 (as amended)) species observed during the survey period was crossbill, although no evidence of breeding was noted.

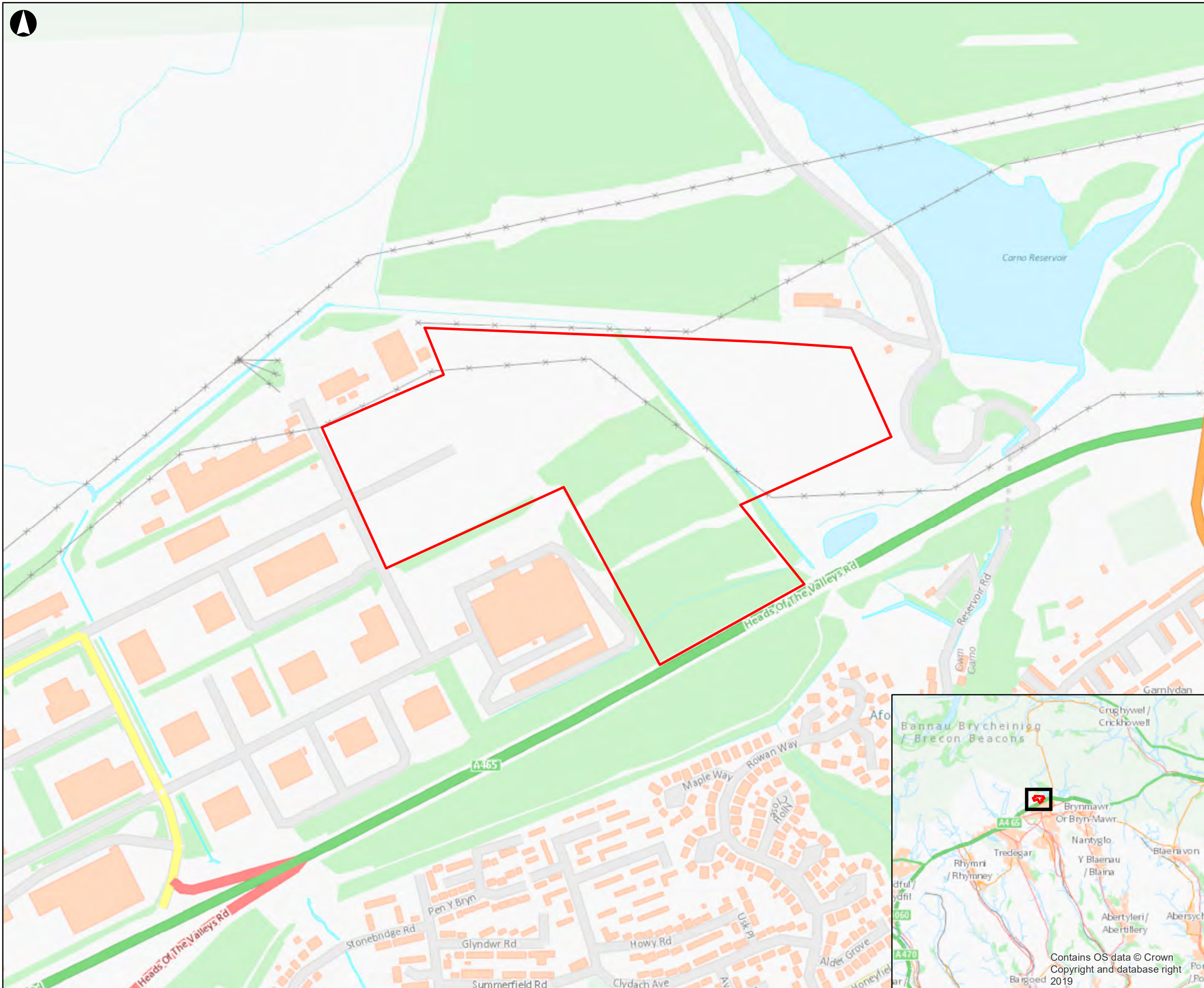
A full ecological impact assessment will be included within the planning application pack for the project and this will include an assessment of the significance of impacts from the project on breeding birds.

This report is the result of the survey work undertaken in May/June 2020. This report refers, within the limitations stated, to the condition of the site at the time of the surveys. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. No warranty is given as to the possibility of future changes in the condition of the site.

The results of these surveys are considered valid for a minimum of 18 months to a maximum of three years. If more than 18 months elapses before any planning application is submitted, the requirement for repeat surveys should be reviewed⁸.

⁸ Chartered Institute of Ecology and Environmental Management (2019). *Advice Note on the Lifespan of Ecological Reports and Surveys*.

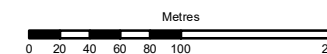
Figures



Legend

Study Area

F1	24/08/2020	JG	MO	PC
Issue	Date	By	Chkd	Appd



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Client
CINER Glass Ltd

Job Title
Breeding Bird Survey Report; 2020

**Figure 1
Site Location**

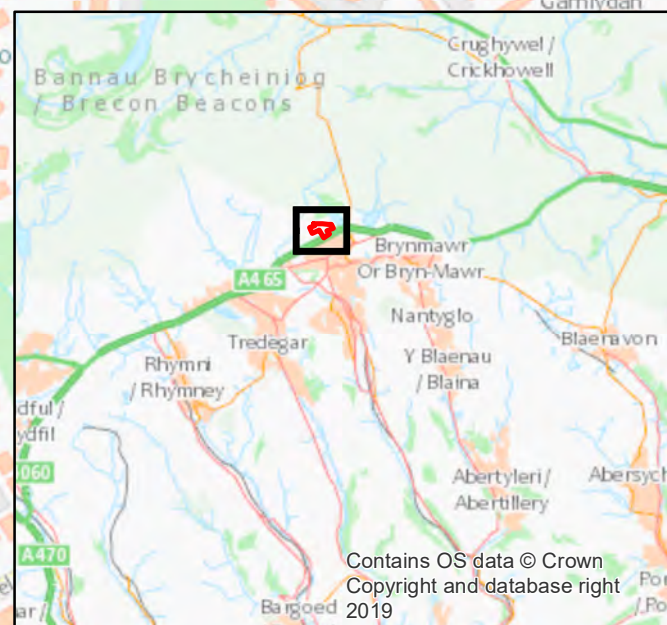
Scale at A3
1:5,000

Job No
273927-00

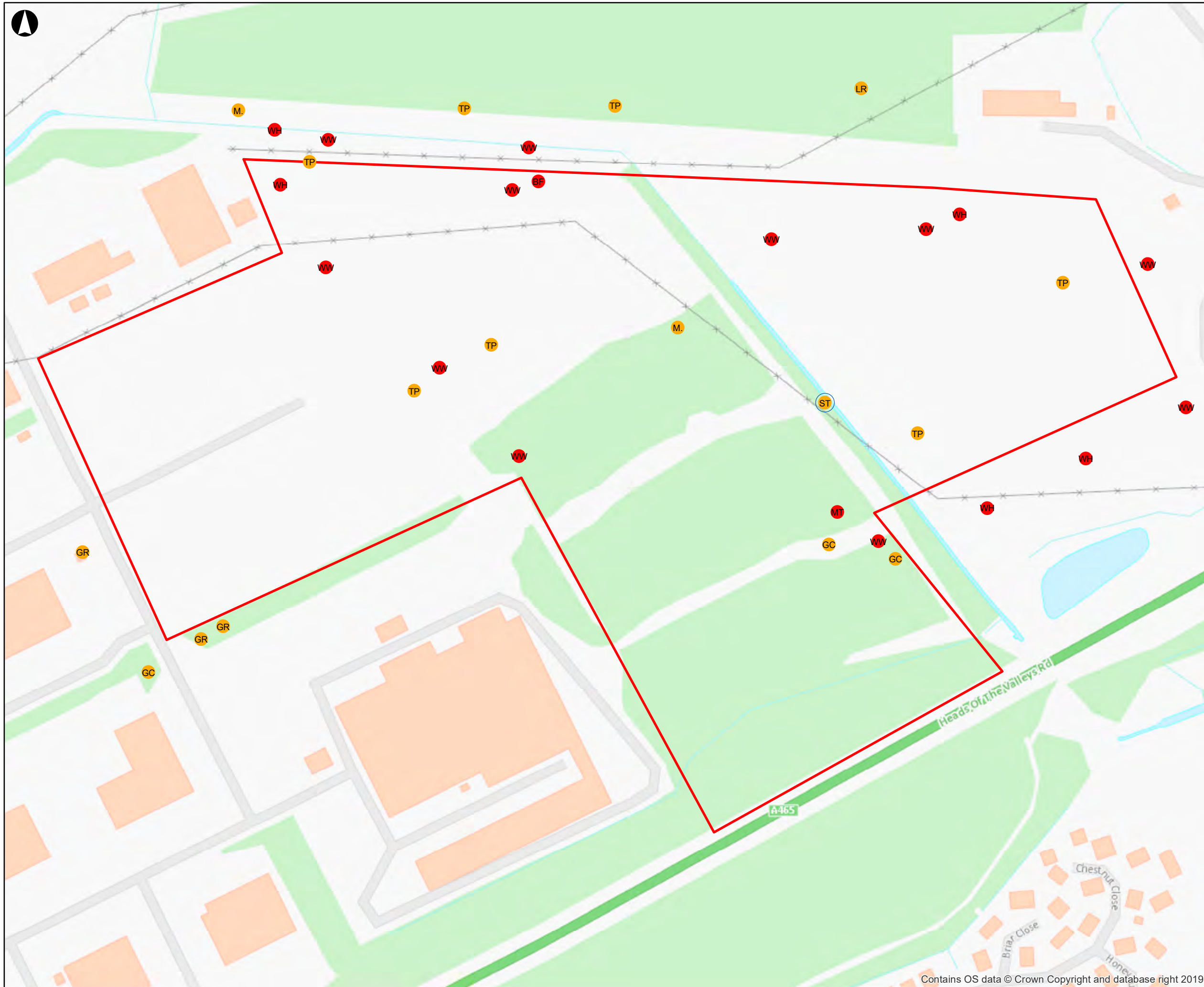
Drawing Status
FINAL

Drawing No
001

Issue
F1



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2019



Legend

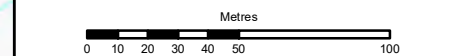
Birds of Conservation Concern (Wales)

Status

- Red List
- Amber List
- Environment (Wales) Act 2016; Section 7 Species
- Study

- BF, Bullfinch
- GC, Goldcrest
- GR, Greenfinch
- LR, Lesser Redpoll
- M., Mistle Thrush
- MT, Marsh Tit
- ST, Song Thrush
- TP, Tree Pipit
- WH, Whitethroat
- WW, Willow Warbler

F1	24/08/2020	JG	MO	PC
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Job Title

Breeding Bird Survey Report; 2020

**Figure 2
Study Area and Breeding Bird
Survey Results**

Scale at A3

1:2,500

Job No	Drawing Status
273927-00	FINAL

Drawing No	Issue
001	F1

D9 Otter and Badger Survey Report - CONFIDENTIAL

D10 Bat Roost Survey Report

CiNER Glass Limited
Dragon Glass Bottle
Manufacturing Facility
Bat Roost Survey Report

DRAGON-ARUP-ENVE-XX-RP-YE-000004

Issue | 20 November 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927

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ARUP

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Figures

Figure 1 Study Area

Figure 2: Ground level inspection survey

Figure 3: Preliminary roost assessment

Figure 4: Emergence survey

Appendices

Appendix A

Photographs

1 Introduction

1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by CiNER Glass Ltd to undertake a range of consultancy services in relation to the proposed Dragon Glass Bottle Manufacturing facility, hereafter referred to as ‘the Project’.

Further to the production of a Preliminary Ecological Appraisal Report¹, a range of ecological surveys were commissioned to identify the baseline ecological conditions of the site, and to inform the Ecological Impact Assessment (EcIA), which will support a subsequent planning application for the Project.

This document describes the bat roost surveys undertaken for the Project. It should be read in conjunction with the bat activity survey report² for the Project by Arup, in addition to a separate bat roost report by Bay Ecology Ltd³, which was produced under a separate commission for a proposed development on the Techboard buildings to the south of the site.

1.2 Objectives

The objectives of the surveys were to ascertain the following:

- The presence/likely absence of roosting bats within buildings/structures within the study area; and
- The presence/likely absence of roosting bats within trees in the study area.

¹ Arup (2020) CiNER Glass Ltd. Preliminary Ecological Appraisal

² Arup (2020) CiNER Glass Ltd. Bat Activity Report

³ Bay Ecology Ltd (2020) Techboard: Bat roost survey report

2 Project Description

The facility consists of a three-part operation for the production of glass bottles; the handling of raw material, the manufacturing of the glass containers and the product-inspection and packaging process. The proposed facility consists of a number of distinct components which are summarised below:

- 2No furnaces and associated filters and chimney stacks;
- 2No cullet buildings for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles;
- A printing area for applied decorations (14500 sqm);
- An automated warehouse for storage and distribution of glass bottles (17000 sqm);
- Utilities building which includes plant space, workshops, office space and welfare facilities;
- Visitor building;
- Waste stores;
- Standalone plant buildings;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The site will also include two attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site.

The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. The facility will also require the transportation of finished product glass bottles following production.

The facility is forecasted to create approx. 670 jobs and will operate 24 hours a day, 7 days a week via shift system.

3 Site Description

The site is allocated within the Ebbw Vale Enterprise Zone and occupies a strategic location adjacent to the A465 Heads of the Valleys Road in the head of the South Wales Valleys, approximately 700 m to the north of Rassau village and 3 km north of Ebbw Vale town centre. The site location is displayed on Figure 1.

The Rassau Industrial Estate, built in the late 1970s – early 1980s, currently comprises of purpose-built light industrial/manufacturing units with ancillary office accommodation. The industrial estate is situated on the foot slopes of Mynydd Llangynidr, approximately 500m south of the Brecon Beacons National Park (BBNP) boundary.

The proposed site is currently undeveloped and is located on the eastern extent of the industrial estate consisting of existing grass land, scrub, broadleaved and coniferous woodland. An unadopted asphalt access road extends from the western boundary of the site which transitions into an unbound gravel track providing access to the eastern site extents.

A tributary of the Ebbw River (Afon Ebwy) is located within the centre of the site which appears to have been diverted around the northern extent of Rassau Industrial Estate as part of the industrial estate development. The Ebbw River is part of the South East Valleys catchment which eventually flow into the Usk Estuary.

The topography of the site falls gradually from north to south, with the terrain elevation ranging from 427.5 m AOD in the north down to 390 m AOD in the south eastern corner.

4 Study Area

The Study Area comprised the project site boundary (and planning application boundary), as shown in Figure 1 and suitable adjacent habitats. This comprised adjacent trees and a building to the south of the Site, as shown in Figures 2 and 3.

5 Legislation

All British bat species are fully protected at national and European levels, through their inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)⁴ and in Schedule 2 of the Conservation of Habitat and Species Regulations 2017 (as amended)⁵. Under this legislation, it is an offence to deliberately kill, injure or take a bat as well as intentionally or recklessly damage, destroy or obstruct access to any structure or resting place used for shelter or protection by a bat or disturb an animal while it is occupying a structure or place which it uses for that purpose. It is also an offence to possess or advertise/sell/exchange a bat of a species found in the wild in the EU (dead or alive) or any part of a bat

Four species of bat, greater horseshoe bat *Rhinolophus ferrumequinum*, lesser horseshoe bat *R. hipposideros*, Bechstein's bat *Myotis bechsteinii* and western barbastelle *Barbastella barbastellus*, are included on Annex II of the Habitats Directive⁶, which requires the designation of Special Areas of Conservation to ensure the maintenance of favourable conservation status (and these are therefore generally considered as perhaps the most important UK species).

Eight bat species are included within Section 7 of the Environment (Wales) Act 2016, these being the list of living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. These species are Western barbastelle, Bechstein's bat, noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat and lesser horseshoe bat.

⁴ The Wildlife and Countryside Act 1981 (as amended).

⁵ The Conservation of Habitats and Species Regulations 2017 (as amended).

⁶ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

5.1 Desk Study

An ecological data search was carried out to identify records of bat species within 2 km of the site's boundary. Such data was obtained from the South East Wales Biodiversity Records Centre (SEWBreC)⁷ on 6th April 2020. Data obtained is also presented within the Preliminary Ecological Appraisal Report¹ in relation to the Project.

5.2 Field Surveys

All surveys were completed in line with Bat Conservation Trust (BCT) guidance⁸, detail in relation to which is provided below.

The preliminary roost assessment survey and tree/ground level inspection was led by Martyn Owen (Biome Ltd) MCIEEM (NRW bat licence no. S087840/1), an experienced bat surveyor, and the dusk emergence survey, by Kathryn Jones (Arup) ACIEEM and assistants, all experienced at undertaking such surveys.

5.2.1 Buildings/Structures

5.2.1.1 Preliminary Roost Assessment

The potential suitability of the buildings/structures for roosting bats within the study area was assessed and allocated to one of the categories detailed within Table 1. The buildings/structures were given an alphabetical reference, and their locations are shown on Figure 2.

A systematic search of the exterior of all buildings/structures within the study area was completed to identify potential or actual bat access points and roosting sites, and to locate any evidence of bats such as live or dead specimens, bat droppings, urine splashes, fur-oil staining and/or squeaking noises. The interior of the buildings were not inspected during these surveys due to access limitations.

The external inspection also included the examination of the ground, particularly beneath any potential bat access points, for example any windowsills, window panes, walls, behind any peeling paintwork or lifted rendering, hanging tiles, weatherboarding, eaves, soffit boxes, fascias, lead flashing, gaps under felt, and under tiles/slates where present and accessible.

It should be noted that occasionally bats leave no visible sign of their presence in a building's interior or on its exterior, particularly when there are hidden cracks, crevices and/or voids.

⁷ <http://www.sewbrec.org.uk/> (accessed 03/10/20).

⁸ Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London.

Table 1 Guidelines for assessing the potential suitability of roosting habitats for bats⁸.

Suitability	Description of Roosting Habitats
Negligible (0)	Negligible habitat features on site likely to be used by roosting bats.
Low (1)	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate (2)	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High (3)	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Table 2 Preliminary roost assessment survey weather details.

Date	Surveyors	Temp (°C) start of survey	Cloud Cover (/8)	Wind (Beaufort)	Precipitation
15/06/20	MO	21	5 / 8	1SW	Nil

5.2.1.2 Nocturnal Surveys

Following the preliminary roost assessment (PRA) inspections, a nocturnal bat activity survey (i.e. emergence) of all buildings within the study area assessed to be of at least 'Low' suitability (Table 1) for roosting bats was completed (Figure 2). At least one survey of all buildings/structures of low potential was completed, with further surveys to be completed depending upon the results of these initial surveys. No buildings/structures of high suitability were identified during the PRA.

Surveyors were equipped with electronic bat detectors (EchoMeter Touch Pro 2 and Elekon Batlogger M) and any sound files were analysed with appropriate bat analysis software (Kaleidoscope) once the surveys were completed, if required.

The nocturnal bat surveys were undertaken in weather conditions considered appropriate for surveys of this kind (Table 3).

Table 3 Nocturnal survey weather details.

Building Ref	Survey Number	Date	Dusk/ Dawn	Sunset/ sunrise	Survey Start	Survey End	Surveyors	Temp (°C) start of survey	Temp P (°C) end of survey	Cloud Cover (/8)	Wind (Beaufort)	Precipitation
B	1	30/07 /20	dusk	21.09	20.54	23.04	KJ, CP and AK	18	15	3	1SW	Nil

5.2.2 Trees

5.2.2.1 Preliminary Ground Level Assessment

To evaluate the potential suitability of trees in areas to be impacted (directly or indirectly) within the study area (Figure 3) for roosting bats a Preliminary Ground Level Assessment (PGLA) survey was completed in accordance with relevant guidelines⁹. This required the detailed inspection of the exterior of a tree from ground level to look for features that bats could use for roosting, in addition to any bat evidence. Details of this survey are provided within Table 4.

Table 4 Ground level inspection survey weather details.

Date	Surveyors	Temp (°C) start of survey	Cloud Cover (/8)	Wind (Beaufort)	Precipitation
22/06/20	MO	16-18	6 / 8	1SW	Nil

5.3 Limitations

Full inspection of building interiors was not possible although full external assessment and the presence of Potential Roosting Features (PRFs) was considered possible, and nocturnal surveys were completed. This is not therefore considered to represent a significant limitation, particularly considering the survey effort undertaken by the ecological consultants (Bay Ecology Ltd), as part of a separate study.

During the emergence survey, Bay Ecology Ltd were on site also undertaking an emergence survey of the main building. Upon discovering that a number of surveys were planned of all buildings within the site, agreements were made for Bay Ecology Ltd to share bat roost survey data with Arup, through the landowner, Welsh Government. This would therefore avoid the need to cause additional disturbance to any roosting bats, and ensure Arup were able to obtain survey data within the optimal window for bat roost surveys. Therefore, Arup undertook less than the required survey effort to confirm the presence of roosting bats (as shown in Table 3), based on the initial survey finding and best practice guidance⁸ but Arup has been able to access sufficient data to make conclusions on the status of these buildings for roosting bats.

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of flora and fauna, factors such as the time of year and natural behaviour of the animals. Nevertheless, these surveys

⁹ Bat Tree Habitat Key (2018). *Bat Roosts in Trees – A Guide to Identification for Tree-care and Ecology Professionals*. Exeter: Pelagic Publishing.

were conducted at the optimal survey periods and using methodologies which are in accordance with published guidelines.

6 Results

6.1 Desk Study Records

The data provided by SEWBRc on 6th April 2020 detailed records of bat species identified within 2 km of the site, as summarised below. The distance given is that to the closest point on the site boundary.

Table 5 Bat species recorded within 2 km of the site.

Species / Group	Scientific name	Status ¹⁰	Summary of records	Year of nearest record
Brown long-eared bat	<i>Plecotus auritus</i>	EPS, WCA, Section 7	Two records identified from an Anabat detector during a night survey 1334 m west.	2012
Noctule	<i>Nyctalus noctula</i>	EPS, WCA, Section 7	Three records identified from bat detectors. Closest record is 1334 m west.	2012
Natterer's bat	<i>Myotis nattereri</i>	EPS, WCA, Section 7	One record identified from an Anabat detector during a night survey 1334 m west.	2012
Daubenton's bat	<i>Myotis daubentonii</i>	EPS, WCA, Section 7	One record identified from an Anabat detector during a night survey 1334 m west.	2012
Myotis species	<i>Myotis</i> sp.	EPS, WCA, Section 7	Two records identified from an Anabat detector during night surveys 133 m west.	2012
Unidentified bat	<i>Chiroptera</i>	EPS, WCA, Section 7	One record identified from droppings 1972 m south.	2013
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	EPS, WCA, Section 7	80 records including live sightings of hibernating bats 569 m east.	2019

6.2 Field Surveys

6.2.1 Building/Structures

The results of the PRA and nocturnal surveys are presented within Table 6 below, with building/structure locations shown on Figure 2. Suitable habitat was recorded within both of the Techboard buildings (A and B). Roosting by a number of different bat species was also confirmed within the larger of the two Techboard buildings (Building A). There were no other buildings/structures suitable for bat roosts recorded within the study area.

¹⁰ EPS is European Protected Species; WCA is species protected under the Wildlife and Countryside Act 1981 (as amended); Section 7 is species listed in response to the Environment (Wales) Act 2016.

An initial emergence survey by Arup of Building B recorded a single brown long-eared bat emerging from the building, and another brown long-eared bat foraging within the building.

A number of nocturnal surveys were undertaken by Bay Ecology Ltd comprising several dusk emergence and one dawn re-entry, in addition to automatic monitoring using static detectors (undertaken in July and August). As detailed in a separate report³, the buildings within the site, have been found to support small numbers of common pipistrelle, small numbers of individual lesser horseshoe bats, individual brown long-eared bats, and potentially myotis bats (likely to be Daubenton's).

Bat roosts were present in segregated areas of the main building interior such as small offices. These species of bats were also recorded foraging within the main building.

Table 6 Building survey results.

Building Reference (Figure 2)	Preliminary Roost Assessment Results	Bat Roost Suitability Assessment	Number of Nocturnal Surveys Completed (Arup)	Additional surveys completed (Bay Ecology Ltd)	Roost/s identified?	Species roosting	Foraging activity
A	Main building (Techboard). Industrial building. Comprised breezeblock walls, with metal lining on exterior of top half. Metal, pitched roof and metal fascias. Large opening in southern and eastern walls, and gaps in breezeblocks where missing mortar.	1 (Low)	0	Emergence surveys Dawn re-entry Static	Yes	Small numbers of common pipistrelle, lesser horseshoe, brown long-eared, and myotis (likely Daubenton's) bats.	Yes
B	Industrial/factory building adjacent to main Techboard building. Large warehouse type building. Brick walls with metal covering. metal roof, varying aspects and metal fascias. Metal garage roller doors. large openings into building from northern aspect and gaps through ventilation.	1 (Low)	1	Emergence	No	Emergence of two brown long-eared bats (21.33 and 21.35)	Common pipistrelle passes throughout the survey, with social calls. Lesser horseshoe passes: 22.27, 22.33, 22.43, 22.49, 22.51

6.2.2 Trees

The results of the preliminary ground level assessment survey are presented within Table 7 below, with tree locations shown on Figure 3. There is one tree of low suitability for roosting bats within the site. One tree was found to support bat boxes but this is located outside of the site boundary, and at the same location another tree with low suitability for roosting bats was also recorded.

Table 7 Tree survey results.

Tree Reference	Grid Reference	Tree Species	DBH (m)	Feature Description	Height Above Ground (m)	Side of Tree	Feature Orientation	Distance from Trunk (m)	Bat Roost Potential	Comments
1	SO15683 12984	Dead	0.3	Peeling bark	0.0 – 0.25	All	All	0.0	0	Fully inspected, no evidence and negligible potential
2	SO1628712839	Conifer sp.	0.9	Split branch	2.0	S	W	0.9-1.3	1	Inspected most of split, although unable to access hole at top
3	SO1628812818	Conifer sp.		Cluster of bat boxes inc maternity	5.0	S	S	0.0	2-3	Off site.
4	SO1588512712	Dead	0.2	Large strips of peeling bark	1.0-6.0	All	all	0.0	1	Off Site.

7 Conclusions

The suite of bat roost potential surveys in relation to buildings and trees within the study area (undertaken by Arup and Bay Ecology Ltd) identified bat roosts within the two Techboard buildings, which are adjacent to the Site. These comprised common pipistrelle, brown long-eared, lesser horseshoe and myotis (likely Daubenton's) bat roosts. In addition, trees located east of the Site (outside the site boundary) supported bat boxes. Trees with low suitability for roosting bats were recorded within woodland on Site, and also adjacent to the Site.

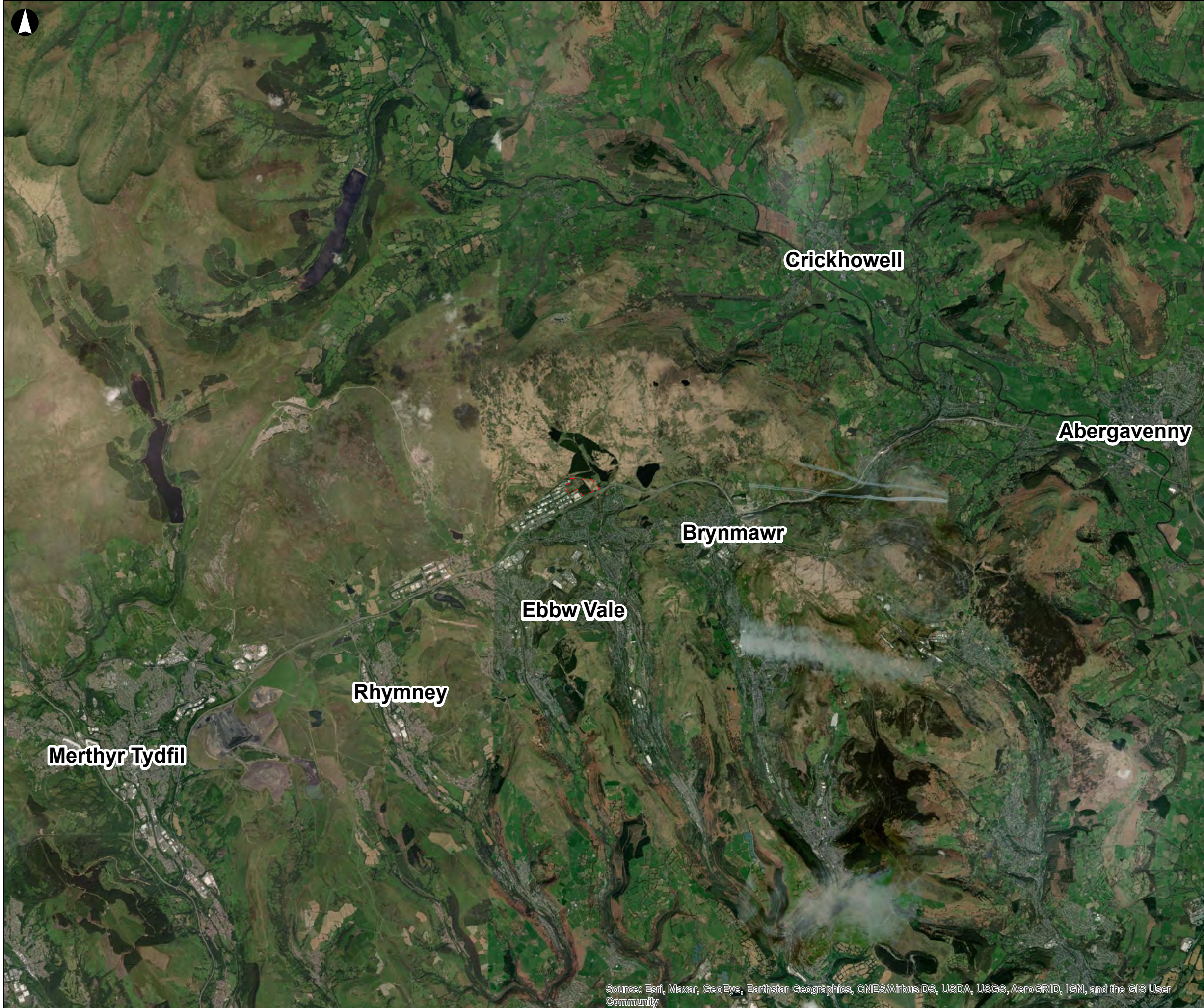
If any of the bat roosts were to be disturbed by the proposed works, a European Protected Species (EPS) mitigation licence application would be required to ensure compliance with legislation.

A full ecological impact assessment will be included within the Environmental Statement for the project and this will include an assessment of the significance of impacts from the project on bat species. This will also detail any mitigation or compensation measures required to ensure there is no significant effect on bat species within the site.

This report is the result of the survey work undertaken between April and July 2020. This report refers, within the limitations stated, to the condition or proposed works of the site at the time of the surveys. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. No warranty is given as to the possibility of future changes in the condition of the site.

The results of these surveys are considered valid for a minimum of 18 months to a maximum of 3 years. If more than 18 months elapses before any planning application is submitted, the requirement for repeat surveys should be reviewed.

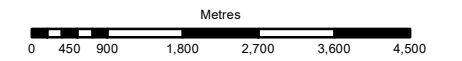
Figures



Legend

Site boundary

Coordinate System: British National Grid



F1	2020-11-20	KJ	CP	PC
Rev	Date	By	Chkd	Appd

ARUP

4 Pierhead Street
Cardiff CF10 4QP
Tel +44 29 2047 3727 Fax +44 29 2047 2277
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Client
CINER Glass Ltd.



Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Site Location

Scale at A3
1:90,000

Suitability
For Issue

Arup Job No 273927	Rev F1
------------------------------	------------------

Name
001

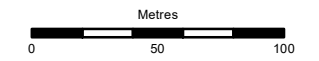
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Site boundary
- Building

Coordinate System: British National Grid



F1	2020-11-20	KSJ	CP	PC
Rev	Date	By	Chkd	Appd

ARUP

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Preliminary Roost Assessment Buildings

Scale at A3

1:3,000

Role

Suitability

For Issue

Arup Job No
273927

Rev
F1

Name
002

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



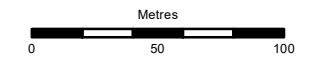
Legend

Site boundary

Bat Roost Suitability

- High
- Low
- Negligible

Coordinate System: British National Grid



F1	2020-11-20	KSJ	CP	PC
Rev	Date	By	Chkd	Appd

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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

**Preliminary Ground Level
Roost Assessment
Trees**

Scale at A3

1:3,000

Role

Suitability

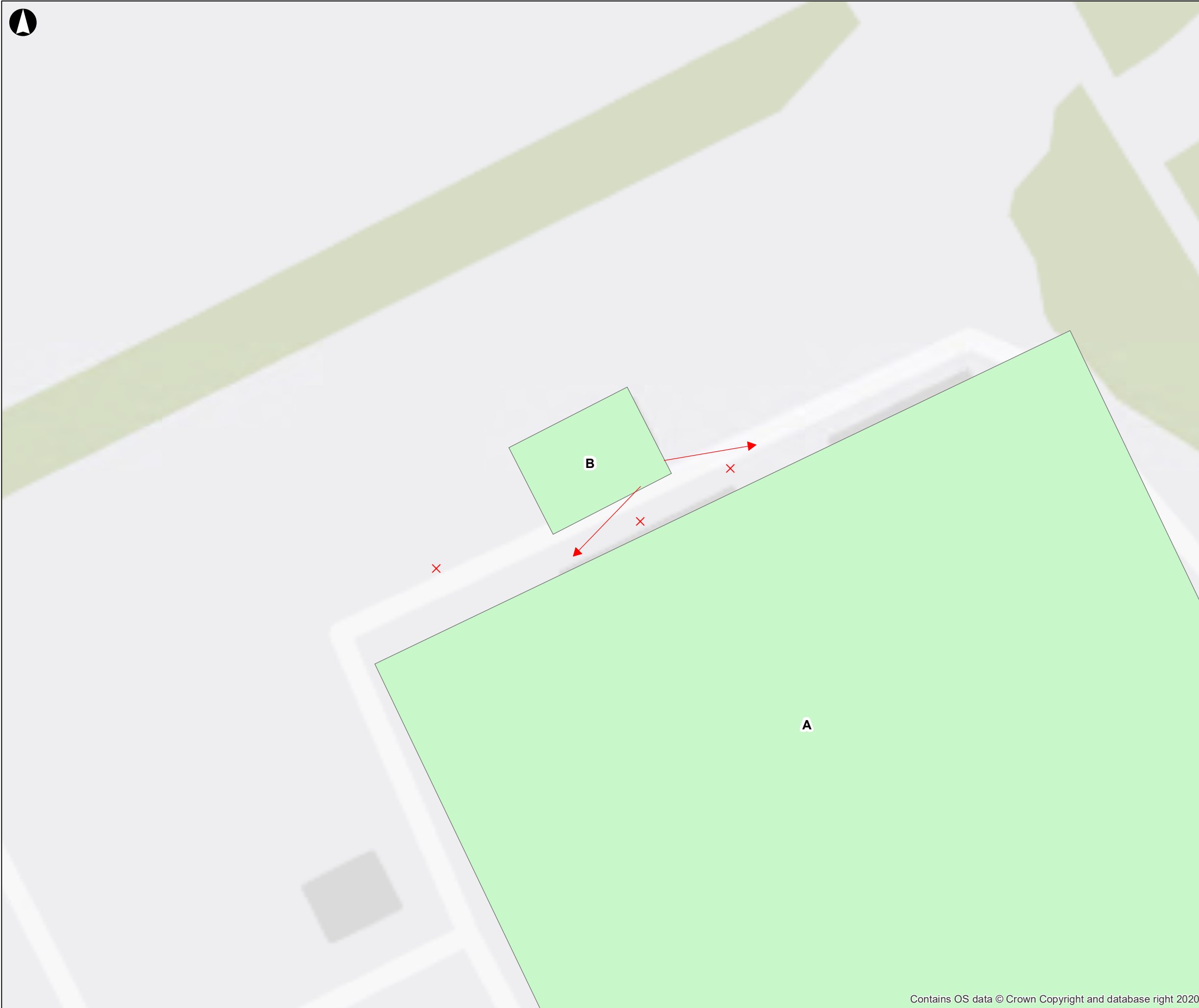
For Issue

Arup Job No
273927




Rev
F1

Name
003

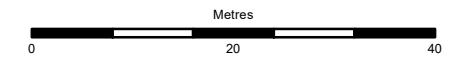
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

-  Surveyor
-  Emergence
-  Building

Coordinate System: British National Grid



F1	2020-11-20	KSJ	CP	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Emergence Survey Results

Scale at A3

1:750

Role

Suitability

For Issue

Arup Job No
273927

Rev
F1

Name
004

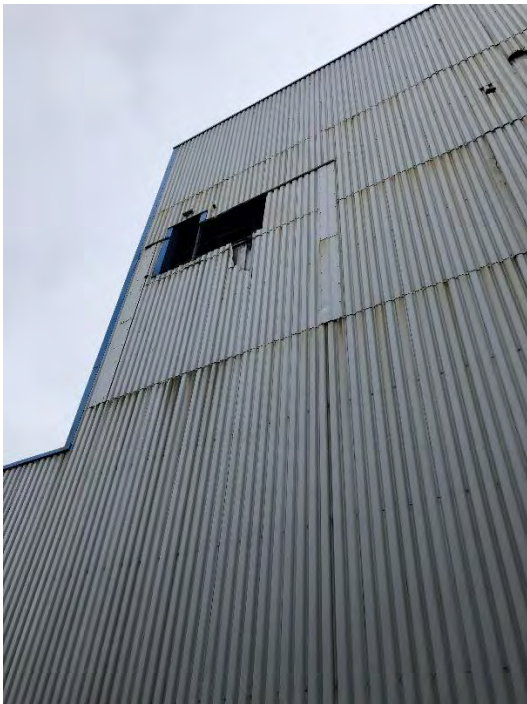
Contains OS data © Crown Copyright and database right 2020

Appendix A

Photographs



Photograph 1: View of the northern aspect of Building A.



Photograph 2: Example of large opening in metal wall on northern aspect of building A.



Photograph 3: Example of large opening on part of wall, on northern side of building A.



Photograph 4: Openings in wall on northern side of building A.



Photograph 5: large opening on eastern side of Building B.

D11 Bat Activity Survey Report

CiNER Glass Limited
**Dragon Glass Bottle
Manufacturing Facility**
Bat Activity Survey Report

DRAGON-ARUP-ENVE-XX-RP-YE-000003

Issue | 10 December 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927

Ove Arup & Partners Ltd
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Capital Waterside
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www.arup.com

ARUP

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Figure 2 Transect Survey Route & Static Detector Locations

Figure 3 (a-f) Transect Results

Figure 4 (a-f) Static Detector Bat Species Proportions

Figure 5 (a-f) Static Detector Bat Activity Index

Appendices

Appendix A

Bat Activity Indices

1 Introduction

1.1 Background

Ove Arup & Partners Ltd (Arup) was commissioned by CiNER Glass Ltd to undertake a range of consultancy services in relation to the proposed Dragon Glass Bottle Manufacturing facility near the village of Rassau in South Wales, hereafter referred to as ‘the Project’.

Further to the production of a Preliminary Ecological Appraisal Report¹, a range of ecological surveys were commissioned to identify the baseline ecological conditions of the site, and to inform the assessment of impacts as part of the Ecological Impact Assessment (EcIA), which will accompany a subsequent planning application for the Project.

This document describes the 2020 bat activity surveys undertaken for the Project. It should be read in conjunction with the 2020 Bat Roost Survey Report for the Project².

1.2 Objectives

The surveys were conducted with the following objectives:

- To record bat activity levels and make observations on bat behaviour along walked transects, sampling habitats within the Study Area;
- To record and identify levels of bat activity, using static bat detectors at different locations spaced within the Study Area; and
- To identify the range of species present and their relative abundance in terms of activity levels at these locations.

¹ Arup (2020) CiNER Ltd. Preliminary Ecological Appraisal.

² Arup (2020) CiNER Ltd. Bat Roost Survey Report.

2 Project Description

The facility consists of a three-part operation for the production of glass bottles; the handling of raw material, the manufacturing of the glass containers and the product-inspection and packaging process. The proposed facility consists of a number of distinct components which are summarised below:

- 2No furnaces and associated filters and chimney stacks;
- 2No cullet buildings for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles;
- A printing area for applied decorations (14500 sqm);
- An automated warehouse for storage and distribution of glass bottles (17000 sqm);
- Utilities building which includes plant space, workshops, office space and welfare facilities;
- Visitor building;
- Waste stores;
- Standalone plant buildings;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The site will also include two attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site.

The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. The facility will also require the transportation of finished product glass bottles following production.

The facility is forecasted to create approx. 670 jobs and will operate 24 hours a day, 7 days a week via shift system.

3 Site Description

The site is allocated within the Ebbw Vale Enterprise Zone and occupies a strategic location adjacent to the A465 Heads of the Valleys Road in the head of the South Wales Valleys, approximately 700 m to the north of Rassau village and 3 km north of Ebbw Vale town centre. The site is displayed on Figure 1.

The Rassau Industrial Estate, built in the late 1970s – early 1980s, currently comprises of purpose-built light industrial/manufacturing units with ancillary office accommodation. The industrial estate is situated on the foot slopes of Mynydd Llangynidr, approximately 500m south of the Brecon Beacons National Park (BBNP) boundary.

The site is currently undeveloped and is located on the eastern extent of the Rassau Industrial Estate consisting of existing grassland, scrub, broadleaved and coniferous woodland. An unadopted asphalt access road extends from the western boundary of the site which transitions into an unbound gravel track providing access to the eastern site extents.

A tributary of the Ebbw River (Afon Ebwy) is located within the centre of the site which appears to have been diverted around the northern extent of Rassau Industrial Estate as part of the industrial estate development. The Ebbw River is part of the South East Valleys catchment which eventually flow into the Usk Estuary.

The topography of the site falls gradually from north to south, with the terrain elevation ranging from 427.5 m Above Ordnance Datum (AOD) in the north down to 390 m AOD in the south eastern corner.

4 Study Area

The Study Area comprises the project site boundary (which also corresponds to the planning application boundary), which is shown in Figure 1.

5 Legislation

All UK bat species are afforded protection under both European and national law. All bats are listed as European Protected Species (EPS) under the provisions of the Conservation of Habitats and Species Regulations 2017 (as amended) (known as the 'Habitats Regulations'). Additionally, all bat species are afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA).

Together this legislation makes it an offence to:

- Intentionally or recklessly kill, injure or capture a bat;
- Intentionally or recklessly disturb a bat such as to affect its ability to survive, breed or rear its young;
- Damage, destroy or obstruct access to a breeding site or resting place (e.g. roost) used by a bat, or disturb bats while they are using such a place; and
- Possess or control a live or dead bat, or any part of a bat.

Four species of bat, greater horseshoe bat (*Rhinolophus ferrumequinum*), lesser horseshoe bat (*R. hipposideros*), Bechstein's bat (*Myotis bechsteinii*) and western barbastelle (*Barbastella barbastellus*), are included on Annex II of the Habitats Directive³, which requires the designation of Special Areas of Conservation to ensure the maintenance of favourable conservation status (and these are therefore generally considered as perhaps the most important UK species).

Various bat species are also listed as Species of Principal Importance for the conservation of biodiversity in Wales, under the provisions of Section 7 of the Environment (Wales) Act 2016 (Section 7 species). The Act includes a duty on all public authorities to have regard for the conservation of biodiversity in the exercise of their functions. This duty applies to government bodies, local authorities and statutory undertakers.

Actions that are prohibited by legislation can be made lawful on the approval and granting of a licence from Natural Resources Wales (NRW), subject to conditions.

³ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

6 Methodology

6.1 Desk Study

An ecological data search was carried out to identify bat species within 2 km of the site boundary. Such data was obtained from the South East Wales Biodiversity Records Centre (SEWBRc)⁴ on 6th April 2020. Data obtained is also presented within the Preliminary Ecological Appraisal Report¹ in relation to the Project.

In addition, online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)⁵, Natural Resources Wales website⁶ and the Joint Nature Conservation Committee (JNCC) website⁷ to identify any statutory designated sites up to 5 km from the site, and any designated European sites within 10 km; for which bats are a qualifying feature.

The full desk study results are provided in the Preliminary Ecological Appraisal Report for the Project¹.

6.2 Field Surveys

Details of transect and static detector monitoring are provided below. All surveys were undertaken in line with guidelines published by the Bat Conservation Trust (BCT)⁸.

6.2.1 Transect Surveys

Habitats within the site were assessed during the Extended Phase 1 Habitat Survey as having moderate suitability to support foraging and commuting bats. Therefore, in line with Good Practice Guidelines⁸, transect surveys were carried out once per month between May and October, with at least one visit comprising a dusk and a dawn survey. Due to timing of the commission of the work, a survey was not carried out in April.

A transect route was designed to sample bat activity around suitable habitat (e.g. hedgerows and treelines) within the site. The transect route was approximately 3 km in length and its location is shown on Figure 2.

The transect route was walked once per month, at a fairly constant speed, from May to October 2020 inclusive, with two surveys in September (within the same night), therefore it was each surveyed seven times. The dates of each survey,

⁴ <http://www.sewbrec.org.uk/>

⁵ <http://magic.defra.gov.uk/>

⁶ <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en>

⁷ <http://jncc.defra.gov.uk>

⁸ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

along with sunset times, survey start and finish times are given in Table 1. Table 2 details dates of the transect surveys, and weather conditions.

Transect surveys were undertaken at dusk and began at sunset and lasted for 2-2.5 hours after sunset. One of the surveys was undertaken at dawn and began 2 hours before sunrise and finished at sunrise. The start and end point and direction of travel was varied throughout the year to overcome the limitation of potentially missing bat activity due to only being in one location at any given time, as per good practice guidelines⁸.

Observations such as numbers and species of bats heard/seen, the direction of flight, height and the behaviour (e.g. foraging or commuting) were noted when seen.

Six suggested Listening Points (LP), also known as “stopping points,” were identified along the transect route, where surveyors would stop for 5 minutes, listening and watching for any bats flying past. The locations of these LPs are shown on Figure 2. Greater numbers of LPs were used depending upon the levels of bat activity, rather than altering the speed at which the transect was walked.

Batlogger M (Elekon) bat detectors were used to record bat calls during the surveys. Following the surveys, all bat recordings were analysed to identify species using the relevant bat analysis software packages (see further details below in section 6.2.4) to species level where possible.

Observations such as numbers and species of bats heard/seen, the direction of flight, height and the behaviour (e.g. foraging or commuting) were noted when seen.

Table 1. Dates and Times of Transect Surveys⁹

	Date	Sunset/ sunrise	Start	End	Notes
May	20 th	21:07	20:57	22:57	Started at “Start,” finished at “End,” walking anti-clockwise.
June	25 th	21:35	21:25	23:25	Started at “End,” finished at “Start,” walking clockwise.
July	16 th	21:23	21:23	23:27	Started and finished at “Static 2,” walking anti-clockwise.
August	13 th	20:38	20:38	22:45	Started at “End,” finished at “Start,” walking clockwise.
September Dusk	17 th	19:21	19:21	21:22	Started at “Start,” finished at “End,” walking anti-clockwise.
September Dawn	18 th	06:53	04:53	06:53	Started and finished at “Static 4,” walking clockwise.
October	14 th	18:19	18:19	20:20	Started and finished at “LP 5,” walking anti-clockwise.

⁹ See Figure 2 for locations of Start and End points.

Table 2. Weather Conditions During Transect Surveys

Date	Temperature (°C) at Start	Temperature (°C) at End	Wind Speed (Beaufort)	Wind Direction	Cloud Cover (%)	Conditions
20.05.2020	16	12	2	S	5	Dry
25.06.2020	28	18	2	S	20	Sunny / Dry
16.07.2020	17	14	3	NW	100	Dry
13.08.2020	18	18	2	SW	70	Dry
17.09.2020	15	10	3	NE	0	Dry
18.09.2020	9	9	2	NW	40	Dry
14.10.2020	11	9	2	NE	80	Dry

6.2.2 Static Detector Surveys

An automated static detector survey was carried out to supplement the transect surveys, to help to overcome the limitation of only being in one location at any given time during a transect survey, in accordance with good practice guidelines⁸. Song Meter SM2+ and SM4 BAT detectors (Wildlife Acoustics) were deployed at Locations 1 – 4 (shown in Figure 2) to record bat calls of species using the site. Static monitoring was completed for five nights per month during the months of May, June, July, August, September and October 2020.

Table 3. Static Detector Monitoring Periods

Month	Start	End
May	13.05.2020	18.05.2020
June	25.06.2020	30.06.2020
July	16.07.2020	21.07.2020
August	13.08.2020	18.08.2020
September	17.09.2020	22.09.2020
October	14.10.2020	19.10.2020

The detectors were set to record bat activity between approximately 30 minutes before sunset and 30 minutes after sunrise in line with good practice guidelines⁸.

Detector locations (Figure 2) remained consistent across the monitoring period. The locations were determined to provide good coverage of the site, and included a variety of habitats, as indicated within Table 4 below. The microphones were positioned towards open habitat at approximately 1.5 m high.

Table 4. Static Detector Location Details

Monitoring Location	Notes
1	South eastern part of the site, on edge of scrub and purple moor grass/marshy grassland, adjacent to a lagoon.
2	Centre of the site, along wooded watercourse which runs through the site.
3	Northern part of the site, north of watercourse and on edge of purple moor grass, adjacent to a conifer plantation.
4	In south west of site, along planted tree line which connects to larger area of woodland to the east.

6.2.3 Surveyors

The surveys were led by Arup ecologist Kathryn Jones ACIEEM with assistants Alexandra Kinsey ACIEEM, Adam Cross ACIEEM and Eloise Arif ACIEEM, all experienced in undertaking these surveys.

6.2.4 Data Processing and Analysis

The static detectors recorded bat activity in Wildlife Acoustics Compression files (.wac) for the SM2+, and standard audio files (.wav) for the SM4 BAT. These files were downloaded from the detectors and processed using Kaleidoscope Pro Software to produce audio files (.wav) and zero crossing files. The processing also included the automatic identification of bat species based on the classifiers developed by Wildlife Acoustics (Bats of Europe 5.2.1).

The detectors used for the transect surveys recorded bat activity in .wav files and were viewed and analysed using BatExplorer (Elekon) software.

The files produced by the processing were reviewed to ensure correct identification of species and to identify where possible the bat species for any calls which could not be recognised by the software (such as calls classed as “NoID” by Kaleidoscope Pro). All calls identified as being either common pipistrelle (*Pipistrellus pipistrellus*) or soprano pipistrelle (*P. pygmaeus*) were not reviewed, except where high levels of insect noise had been recorded leading to uncertainty over the accuracy of identification.

The number of files (sound clips) recorded by the static detectors each night were taken as a proxy value to the number of bat passes (each sound clip or track set by the autoID software to a length of 15 seconds each). This was then used to calculate a Bat Activity Index (BAI) by dividing the number of “passes” by five (the number of monitoring nights) for each species at each location during each month.

6.3 Limitations

The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys can be limited by factors affecting the presence of animals, such as the time of year and behaviour. The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, the likely presence of protected and/or other notable species could be adequately determined from the surveys carried out.

The identification of bat calls can be highly subjective based on decisions on the shape and characteristics of the calls. However, experienced bat ecologists have analysed the data. Kaleidoscope and BatExplorer software also assist in the identification of calls. No attempt to differentiate between the *Myotis*, *Plecotus* or *Nyctalus* species has been made as it was not deemed necessary for the purpose of this report.

Whilst every effort was made to programme and undertake surveys during suitable weather conditions, the long-term nature of the static activity monitoring surveys means that, on some occasions, these surveys included nights during which there were lower temperatures, periods of rainfall and strong winds. However, the number and range of recordings made provide a robust indication of bat activity levels across the site during the active season for bats.

One or more detectors recorded interference/noise but no bats in May, June, August & September. However, at least two detectors (the minimum advised in the good practice guidelines⁸) recorded bats in every month, except May where only one detector did not fail. Therefore, this likely detector malfunction is not seen as a significant limitation. Additionally, transect surveys were carried out in every month without any limitations.

7 Baseline Environment

7.1 Desk Study

7.1.1.1 Protected Species

The data provided by SEWBRc on 6th April 2020 detailed records of bat species identified within 2 km of the site, as summarised below. The distance given is that to the closest point on the site boundary.

Table 5. Bat Species Recorded within 2 km of the site

Species / Group	Scientific name	Status ¹⁰	Summary of records	Year of nearest record
Myotis species	<i>Myotis</i> sp.	EPS, WCA, Section 7	Two records identified from an Anabat detector during night surveys 133 m west.	2012
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	EPS, WCA, Section 7	80 records including live sightings of hibernating bats 569 m east.	2019
Brown long-eared bat	<i>Plecotus auritus</i>	EPS, WCA, Section 7	Two records identified from an Anabat detector during a night survey 1334 m west.	2012
Noctule	<i>Nyctalus noctula</i>	EPS, WCA, Section 7	Three records identified from bat detectors. Closest record is 1334 m west.	2012
Natterer's bat	<i>Myotis nattereri</i>	EPS, WCA, Section 7	One record identified from an Anabat detector during a night survey 1334 m west.	2012
Daubenton's bat	<i>Myotis daubentonii</i>	EPS, WCA, Section 7	One record identified from an Anabat detector during a night survey 1334 m west.	2012

¹⁰ EPS is European Protected Species; WCA is species protected under the Wildlife and Countryside Act 1981 (as amended); Section 7 is species listed in response to the Environment (Wales) Act 2016.

Species / Group	Scientific name	Status ¹⁰	Summary of records	Year of nearest record
Unidentified bat	<i>Chiroptera</i>	EPS, WCA, Section 7	One record identified from droppings 1972 m south.	2013

Bat activity surveys were also undertaken on Techboard buildings adjacent to the site by Arup² and Bay Ecology Ltd¹¹. These surveys identified bat roosts within the two buildings, which comprised small numbers of common pipistrelle, brown long-eared, lesser horseshoe and myotis (likely Daubenton's) bat roosts.

7.1.1.2 Statutory Designated Sites

A number of designated sites were identified within 5 km of the site. They comprise two Special Area of Conservations (SAC) and two Sites of Special Scientific Interest (SSSI). The identified sites are detailed within the PEA¹. The statutory sites which are protected for bats include:

- Usk Bat Sites SAC, lies approximately 900 m north-east of the site. Lesser horseshoe bat (*Rhinolophus hipposideros*) are the primary qualifying feature for the SAC. Annex 1 habitats which are a qualifying but not primary reason for selection of the site comprise: blanket bogs, tilio-Acerion forests of slopes, screes and ravines, calcareous rocky slopes with chasmophytic vegetation, caves not open to the public, degraded raised bogs still capable of natural regeneration and European dry heaths.
- Mynydd Llangatwg SSSI, which occurs within Usk Bat Sites SAC, also lies approximately 900 m north-east of the site, and is designated for its geology and biodiversity. The latter comprising base-rich grassland, heather dominated blanket mire and dry heath. Notable vascular plants, bryophytes and lichens are present, in addition to lesser horseshoe bats which roost in cave systems.

There are also five national sites designated for bats within 10 km:

- Cwm Clydach SSSI, lies approximately 4.3 km east of the site. Lesser horseshoe bats have been observed foraging within the woodland and several caves are known to be used as roosts;
- River Usk (Upper Usk) SSSI, lies approximately 7.5 km north and east of the site. The river and bankside trees support large populations of flying insects which provide an important food source for bats, including Daubenton's bat and lesser horseshoe bat;
- River Usk (Tributaries) SSSI, lies approximately 7.6 km north of the site. The Usk valley between Brecon and Abergavenny supports important populations of lesser horseshoe bat and several of the tributaries are known to provide important feeding areas and sheltered flight lines for this species;

¹¹ Bay Ecology Ltd (2020) Techboard: Bat roost survey report.

- Siambre Ddu SSSI, lies approximately 8.7 km east of the site. This cave is the third largest hibernation site in Gwent for the lesser horseshoe bat. In recent years, over 60 bats have been recorded in early winter; and
- Buckland Coach House & Ice House SSSI, lies approximately 8.8 km north of the site. The stable block and coach house provide an important breeding site for around 200 lesser horseshoe bats, and the ice house is used by the colony as a hibernaculum in winter and as a night roost in summer.

7.2 Field Survey

7.2.1 Transect Activity Surveys

The results of the transect surveys are shown on Figures 3a-3f. The bat species are labelled on the figures with the time that the bats were recorded. Tables 6 & 7 below provide a summary of the data obtained in relation to each transect during each month.

During the transect surveys common pipistrelle were by far the most abundantly logged species (88% of the total calls recorded), with records from every survey, except for the September dawn survey where no bats were recorded. Soprano pipistrelles, *Myotis* species, *Nyctalus* species, *Plecotus* species, serotine (*Eptesicus serotinus*) and lesser horseshoe bats were also recorded during the surveys.

The highest level of bat activity was recorded during the May survey, with 155 passes recorded, whilst the lowest activity was recorded during the September dawn survey (no bats), followed by 29 passes recorded in the October survey.

The greatest species diversity was recorded during the July survey, where five species were recorded, with the lowest diversity of just two bat species being recorded during the June survey.

A single pass of a lesser horseshoe bat was recorded during the May, September dusk and October surveys, which equated to 1% of the total calls recorded. The passes were all in recorded in close proximity to the plantation woodland in the south of the site.

Table 6. Summary of Transect Survey Results

Month	Bat Species Recorded	Bat Behaviour Observed	Total Number of Bat Passes	Additional Information
May	<p>First bat recorded was a common pipistrelle at 21:23 (16 minutes after sunset).</p> <p>All records were of common pipistrelles, with the exception of a lesser horseshoe bat pass at 22:08, two Myotis sp. passes at 22:08 & 22:17 and two pipistrelle sp. passes at 22:48 & 22:49.</p>	Pipistrelle seen at south-eastern corner of woodland.	155	Stopped at all 6 LPs.
June	<p>First bat recorded was a common pipistrelle at 21:59 (24 minutes after sunset).</p> <p>All records were of common pipistrelles, with the exception of two soprano pipistrelle passes at 23:20.</p>	N/A	70	Stopped at all 6 LPs & 3 additional LPs.
July	<p>First bat recorded was a common pipistrelle at 22:16 (43 minutes after sunset).</p> <p>All records were of common pipistrelles, with the exception of a serotine pass at 22:45, six Myotis sp. passes at 22:51, 22:56-22:58 & 23:19, Plecotus sp. passes at 23:11 & 23:25, six Nyctalus sp. passes between 23:12 & 23:15 and a pipistrelle sp. pass at 23:22.</p>	Pipistrelle seen and heard foraging south of the woodland, heading east.	74	Stopped at all 6 LPs & 2 additional LPs.
August	<p>First bat recorded was a common pipistrelle at 21:03 (25 minutes after sunset).</p>	Two pipistrelles seen flying east to west along southern boundary of the woodland. One	124	Stopped at all 6 LPs.

Month	Bat Species Recorded	Bat Behaviour Observed	Total Number of Bat Passes	Additional Information
	All records were of common pipistrelles, with the exception of <i>Nyctalus</i> passes at 21:15, 21:24, 22:24 & 22:27, a pipistrelle sp. pass at 22:00 and <i>Myotis sp.</i> passes at 22:18 & 22:25.	pipistrelle seen flying north to south along eastern boundary of woodland. Pipistrelle social calls recorded.		
September Dusk	First bat recorded was a common pipistrelle at 19:49 (28 minutes after sunset). All records were of common pipistrelles, with the exception of soprano pipistrelle passes at 19:52 & 19:53, a lesser horseshoe bat pass at 20:02 and four passes of an unidentified bat species at 20:32.	Common pipistrelle seen flying east to west along the track.	29	Stopped at all 6 LPs & 2 additional LPs.
September Dawn	No bats recorded.	N/A	0	Stopped at all 6 LPs & 1 additional LP.
October	First bat recorded was a common pipistrelle at 18:38 (19 minutes after sunset). All records were of common pipistrelles, with the exception of a soprano pipistrelle pass at 18:45, a pipistrelle sp. pass at 18:49 and a lesser horseshoe bat pass at 19:34.	Common and soprano pipistrelles seen and heard foraging north to south along eastern edge of the woodland.	22	Stopped at all 6 LPs & 4 additional LPs.

Table 7. Percentage of Bat Species Recorded During Transect Surveys

		Percentage (%) of Total Calls Recorded								
MONTH	SPECIES	Common pipistrelle	Soprano pipistrelle	Pipistrelle species	<i>Myotis</i> species	<i>Nyctalus</i> species	Serotine	<i>Plecotus</i> species	Lesser horseshoe	Unidentified bat
	May		95	1	2	1	0	0	0	1
June		97	3	0	0	0	0	0	0	0
July		79	0	1	8	8	1	3	0	0
August		92	0	1	3	4	0	0	0	0
September (Dusk)		76	7	0	0	0	0	0	3	14
September (Dawn)		0	0	0	0	0	0	0	0	0
October		85	5	5	0	0	0	0	5	0
Total		88	3	2	2	2	>1	>1	1	2

7.3 Static Detector Surveys

Static detector survey data are summarised within Tables 8-10. The same eight species/species groups that were identified during the transect surveys were also recorded in the static detector surveys. Figure 4 (a-f) shows the proportion of each bat species recorded at each static location in each month, while Figure 5 (a-f) shows the total BAI at each static location, in each month.

Table 8 summarises activity levels by species across all survey locations. Common pipistrelle was by far the most commonly recorded species, being logged at all monitoring locations and accounting for 84% of all bats recorded.

Soprano pipistrelle, pipistrelle sp., *Myotis* sp., *Nyctalus* sp., *Plecotus* sp. and lesser horseshoe bat were also recorded at every location. Serotine was only recorded at Location 2 and an unidentified bat species was only recorded at Location 3. Serotine, lesser horseshoe bat and pipistrelle sp. had the lowest recorded levels of activity. Lesser horseshoe bats were recorded at every monitoring location, but only during July, September and October. This species equated to 0.5% of the total calls recorded during the static monitoring surveys.

Table 8. Summary of all Bat Activity Indices by Species

Species	Total Bat Activity Index at all Monitoring Locations
Common pipistrelle	1277
Soprano pipistrelle	42
Pipistrelle species	9
<i>Myotis</i> species	58
<i>Nyctalus</i> species	83
Serotine	0.2
<i>Plecotus</i> species	36
Lesser horseshoe bat	8
Unidentified bat species	0.2

Table 9 summarises data by monitoring location, while Table 10 summarises the data by month. Tables showing the BAI for each species across all months and all monitoring locations are given in Appendix A.

As shown, the greatest level of activity was encountered at monitoring Location 3, closely followed by Location 2. Both of these locations were adjacent to conifer plantations. Locations 1 and 4 recorded similar levels of bat activity to one another, which was approximately 65% lower than the activity at Locations 2 and 3. Locations 1 and 4 were not adjacent to woodlands but were in more open grassland habitats. Overall, the month with the highest level of bat activity was July, whilst the lowest activity was recorded during October. It should be noted

that the total bat activity is likely an underestimation for the site due to data not being collected at every location during every month.

Table 9. Summary of all Bat Activity Indices by Monitoring Location

Monitoring Location	Total Bat Activity Index
1 (data obtained in 5 out of 6 months)	252
2 (data obtained in 4 out of 6 months)	517
3 (data obtained in 4 out of 6 months)	569
4 (data obtained in 4 out of 6 months)	175
Total	1513

Table 10. Summary of all Bat Activity Indices by Month

Total Bat Activity Index						
Month	Location 1	Location 2	Location 3	Location 4	Total	Mean ^{Error!} Bookmark not defined.
May	No data	No data	43	No data	43	43
June	5	32	No data	No data	37	19
July	108	307	435	142	992	248
August	73	148	No data	17	238	79
September	50	30	80	1	161	40
October	16	No data	11	15	42	14
Mean¹¹	50	129	142	44	-	-

¹¹ Calculated omitting the number of months/locations where no data were collected.

8 Conclusions

A desk study and comprehensive suite of transect surveys and static detector monitoring has been completed at the site. During all surveys common pipistrelle were by far the most abundantly logged species, with records from each transect and static monitoring location. The same species/groups of species were recorded during both the transect and static surveys and comprised: common pipistrelle, soprano pipistrelle, pipistrelle species, *Myotis* species, *Nyctalus* species, serotine, *Plecotus* species, lesser horseshoe bat and unidentified bat species.

Common pipistrelle accounted for 88% of all bats recorded during the transect surveys and 85% of all bats recorded during the static monitoring surveys. Activity levels of all of the other species were significantly lower than this, with the lowest levels recorded being of serotine (>1% of calls recorded in transects & statics), lesser horseshoe bat (1% of calls recorded in transects & 0.5% of calls recorded by statics) and unidentified bats (2% of calls recorded in transects & >1% of calls recorded by statics).

During static monitoring, bat activity levels increased through spring to peak in July and August before tailing off in the autumn. Bat activity was approximately three times higher in monitoring locations that were situated adjacent to plantation woodlands, compared with the monitoring locations that were situated in open grassland habitats. All of the recorded species were logged in all monitoring locations, with the exception of serotine, which was only recorded once at Location 2.

The transect surveys recorded peak levels of activity in May and August, with much activity concentrated around the plantation woodlands on and adjacent to the site. The highest diversity of bat species was recorded in July (five species), whilst the lowest diversity (two species) was recorded in June.

A full ecological impact assessment will be included with the Planning Application for the project and this will include an assessment of the significance of impacts from the project on bats. This will also detail any mitigation or compensation measures required to ensure there is no significant effect on bat species within the site.

This report is the result of the survey work undertaken between May and October 2020. This report refers, within the limitations stated, to the condition or proposed works of the site at the time of the surveys. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/additional survey. No warranty is given as to the possibility of future changes in the condition of the site.

The results of these surveys are considered valid for a minimum of 18 months to a maximum of 3 years. If more than 18 months elapses before any planning application is submitted, the requirement for repeat surveys should be reviewed.¹²

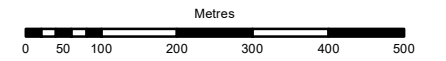
¹² Chartered Institute of Ecology and Environmental Management (2019) Advice Note on the Lifespan of Ecological Reports and Surveys.

Figures



Legend

Site Boundary



F1	2020-12-07	KSJ	CD	PC
Rev	Date	By	Chkd	Appd

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4 Pierhead Street
Cardiff CF10 4QP
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www.arup.com

Client
CINER Glass Ltd.



Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Site Location

Scale at A3
1:10,000

Role
For Issue

Arup Job No 273927	Rev F1
------------------------------	------------------

Name
001

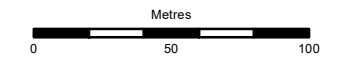
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Transect Route
- Listening Points
- Static Detectors

Coordinate System: British National Grid



Rev	Date	By	Chkd	Appd
F1	2020-11-18	KSJ	CP	PC

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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Transect Survey Route & Static Detector Locations

Scale at A3

1:2,750

Role

Suitability

For Issue

Arup Job No

273927

Name

002

Rev

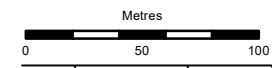
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Transect Route
- ▲ Pipistrellus pipistrellus
- ▲ Pipistrellus pygmaeus
- ▲ Pipistrellus spec.
- ★ Myotis spec.
- Rhinolophus hipposideros



F1	2020-12-04	KSJ	CD	PC
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Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
May Transect Results

Scale at A3
1:3,250

Suitability
For Issue

Arup Job No 273927	Rev F1
Name 003a	

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

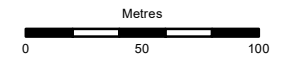


Legend

— Transect Route

Species

- ▲ Pipistrellus pipistrellus
- △ Pipistrellus pygmaeus



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Project Title

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Drawing Title

June Transect Results

Scale at A3

1:3,250

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

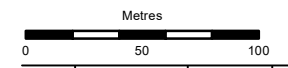
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Transect Route
- ▲ Pipistrellus pipistrellus
- ▲ Pipistrellus spec.
- ★ Myotis spec.
- Nyctalus spec.
- ◆ Eptesicus serotinus
- ◆ Plecotus spec.



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Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
July Transect Results

Scale at A3
1:3,250

Suitability
For Issue

Arup Job No 273927	Rev F1
Name 003c	

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

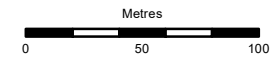


Legend

— Transect Route

Species

- ▲ Pipistrellus pipistrellus
- ▲ Pipistrellus spec.
- ★ Myotis spec.
- Nyctalus spec.



F1	2020-12-04	KSJ	CD	PC
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Project Title

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Drawing Title

August Transect Results

Scale at A3

1:3,250

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

003d

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

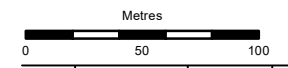


Legend

— Transect Route

Species

- ▲ Pipistrellus pipistrellus
- △ Pipistrellus pygmaeus
- Rhinolophus hipposideros
- Unidentified bat spec.



F1	2020-12-04	KSJ	CD	PC
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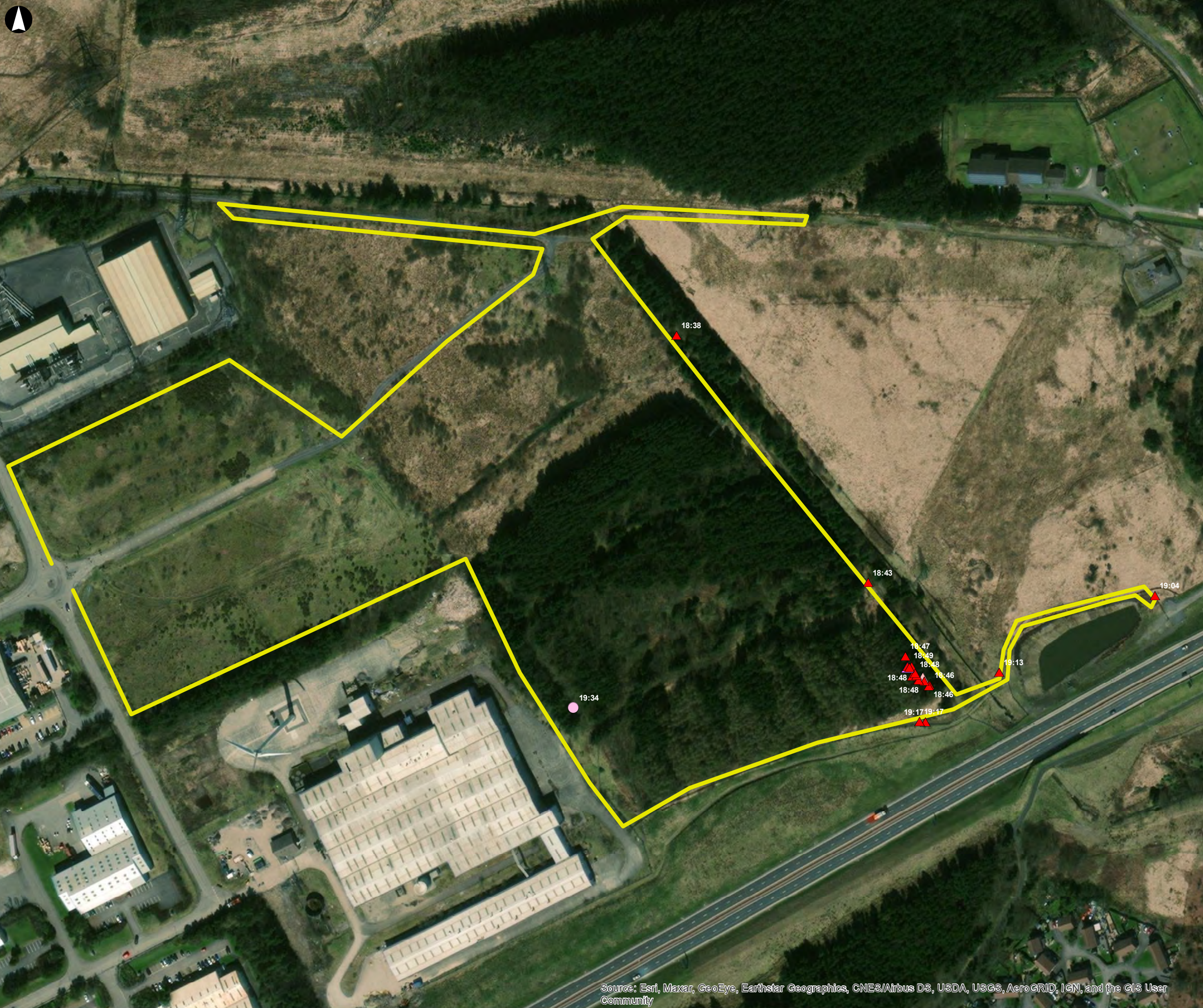
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Scale at A3
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Suitability
For Issue

Arup Job No 273927	Rev F1
Name 003e	

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



Legend

- Transect Route
- ▲ Pipistrellus pipistrellus
- ▲ Pipistrellus pygmaeus
- ▲ Pipistrellus spec.
- Rhinolophus hipposideros

Metres

0 50 100

F1	2020-12-04	KSJ	CD	PC
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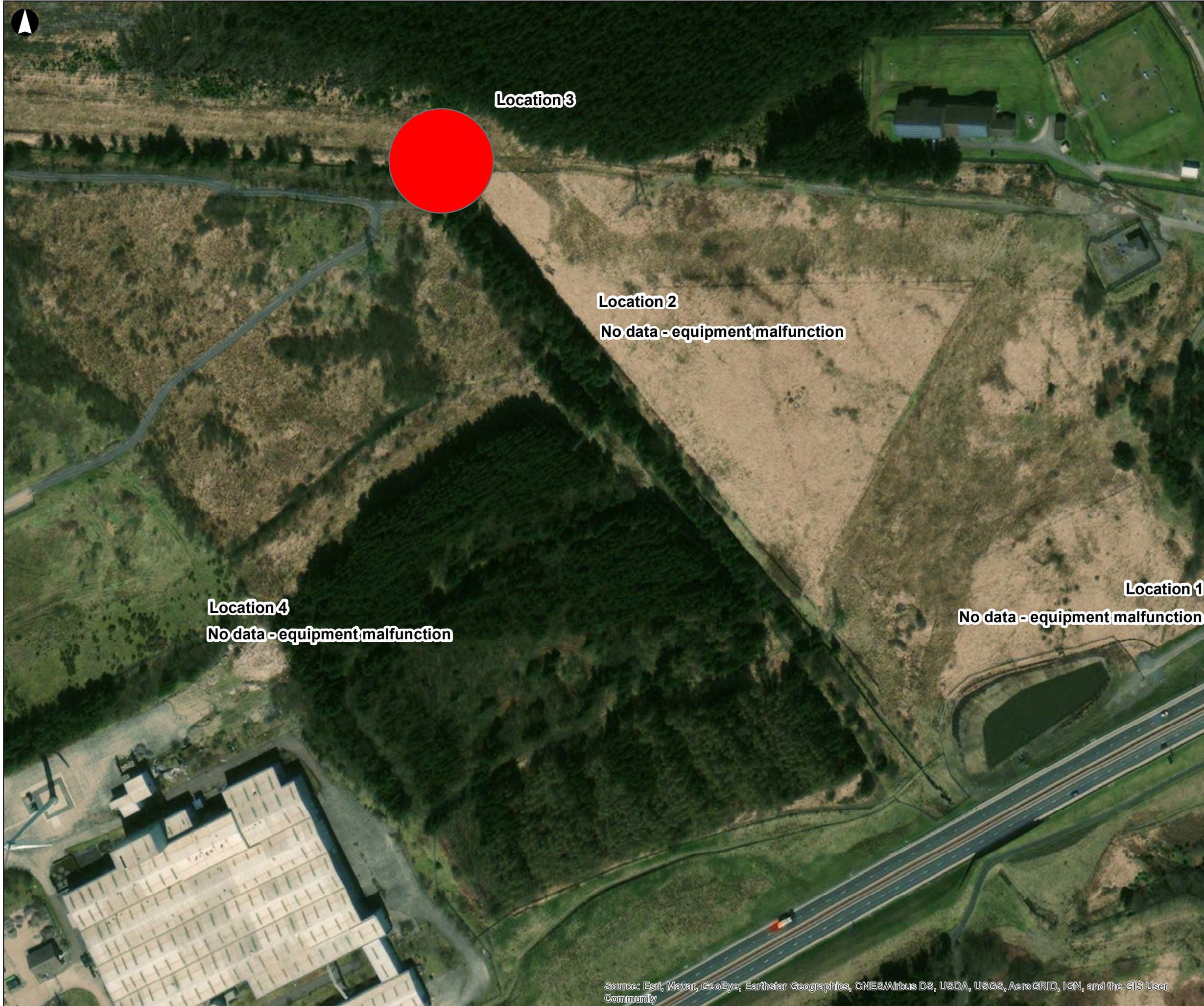
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October Transect Results

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Suitability
For Issue

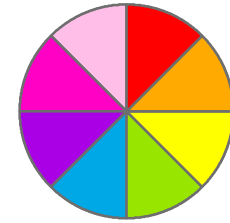
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Name 003f	

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



Legend

May Species



- PIPPIP
- PIPPYG
- PIPSPE
- MYOTIS
- NYCSPE
- EPTSER
- PLESPE
- RHIHIP

Metres

0	50	100
F1	2020-12-04	KSJ CD PC
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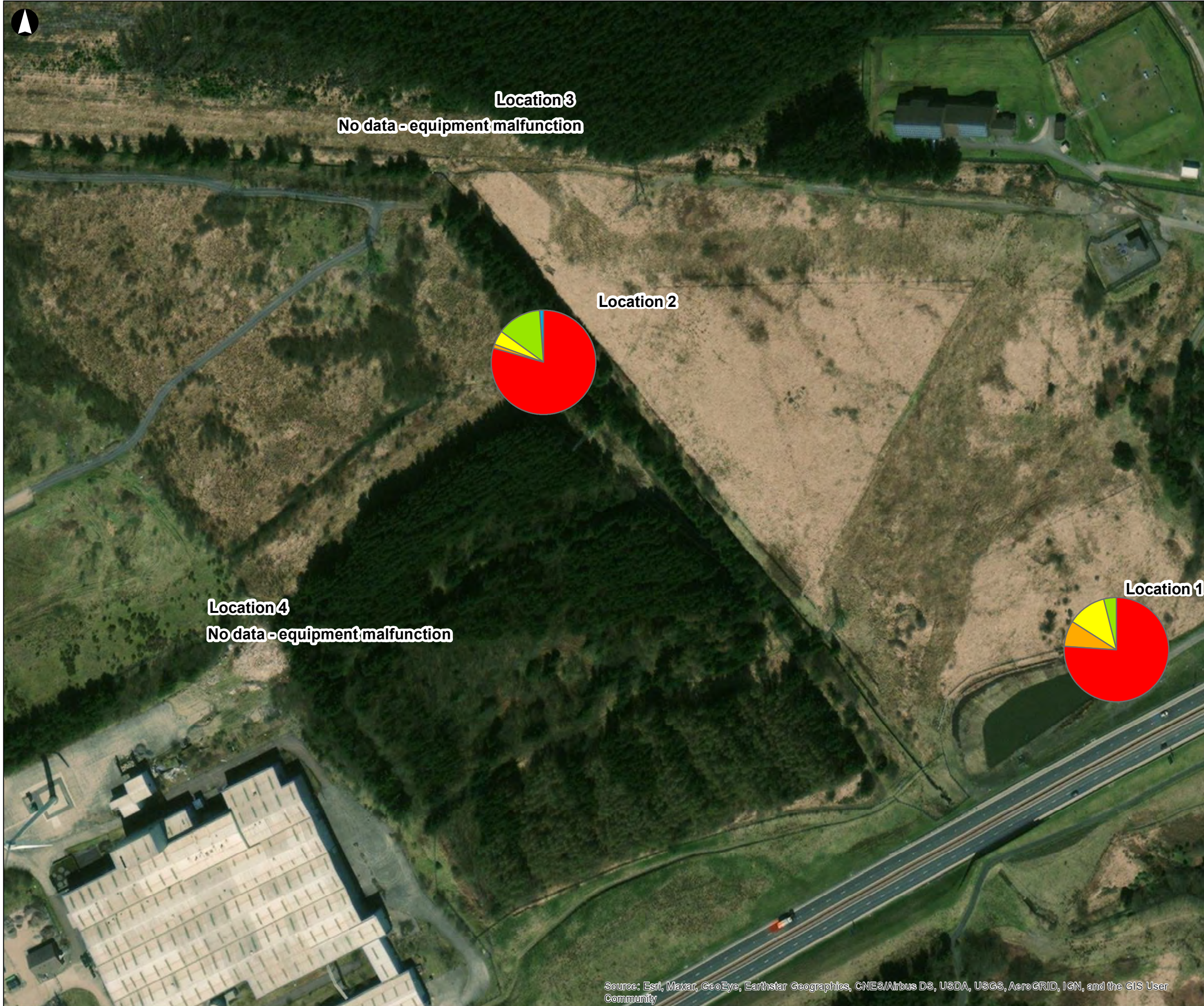
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Scale at A3
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Suitability
For Issue

Arup Job No 273927	Rev F1
Name 004a	

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

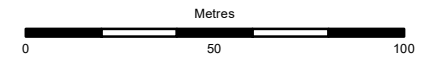


Legend

June Species



- PIPPIP
- PIPPYG
- PIPSPE
- MYOTIS
- NYCSPE
- EPTSER
- PLESPE
- RHIHIP



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Project Title

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Drawing Title

Static Detector Bat Species Proportions June Results

Scale at A3

1:2,000

Role

Suitability

For Issue

Arup Job No

273927

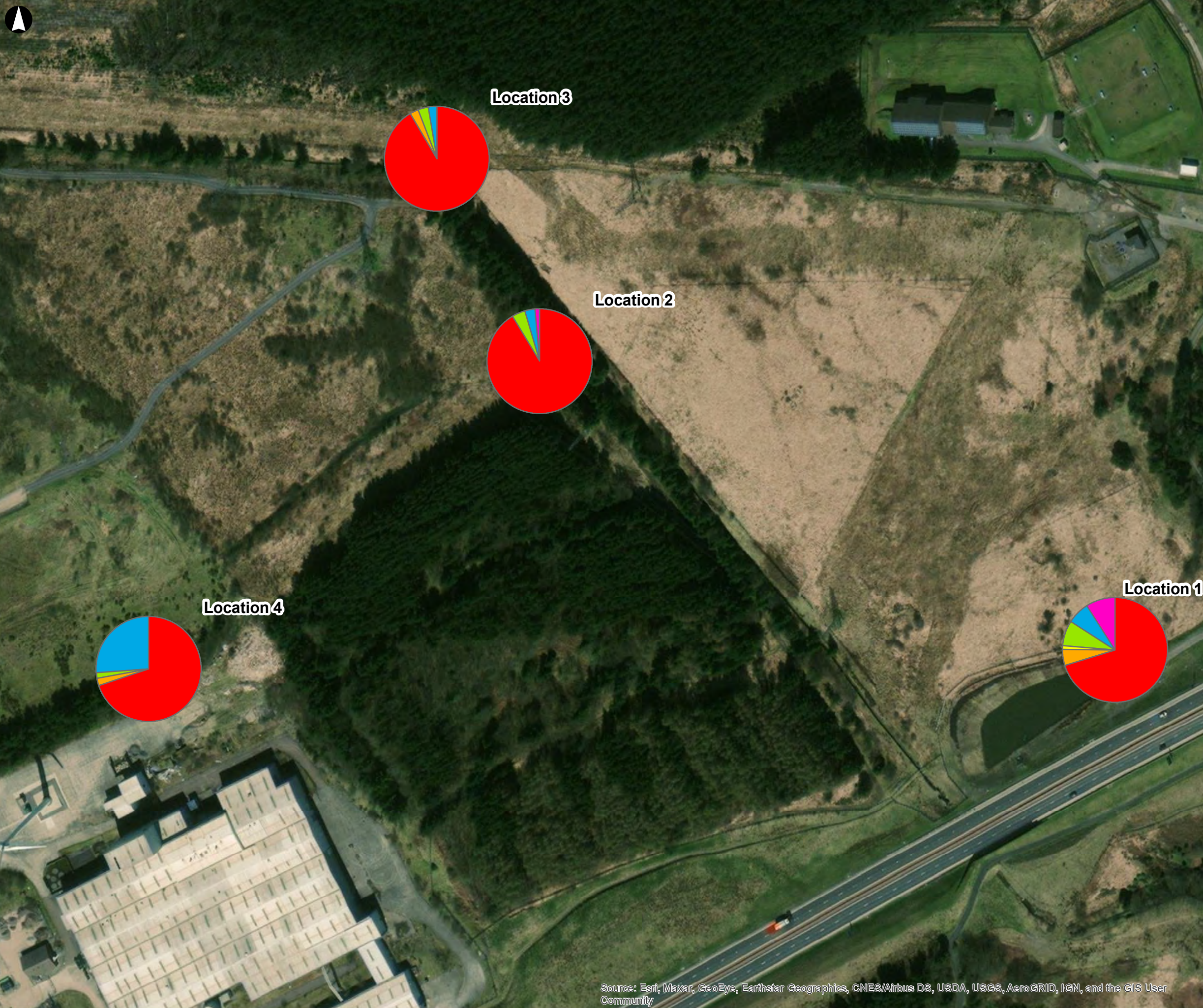
Rev

F1

Name

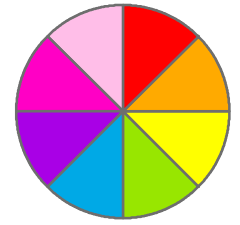
004b

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



Legend

July Species



- PIPPIP
- PIPPYG
- PIPSPE
- MYOTIS
- NYCSPE
- EPTSER
- PLESPE
- RHIHIP

Metres

0	50	100
F1	2020-12-04	KSJ CD PC
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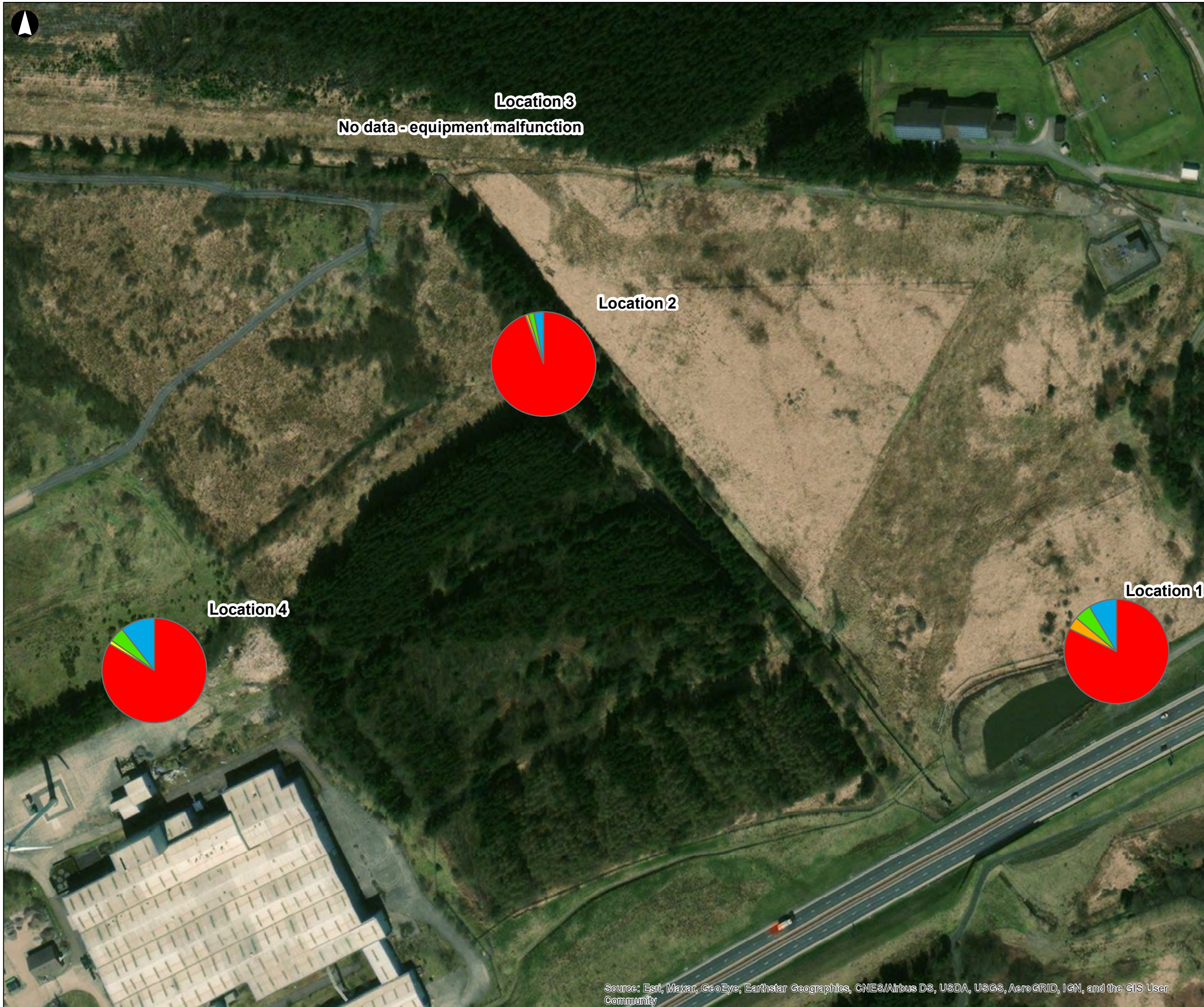
Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Static Detector Bat Species Proportions July Results

Scale at A3
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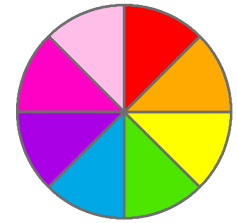
Suitability	
For Issue	
Arup Job No 273927	Rev F1
Name 004c	

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

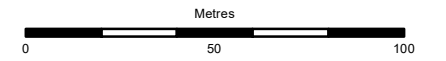


Legend

August Species



- PIPPIP
- PIPPYG
- PIPSPE
- MYOTIS
- NYCSPE
- EPTSER
- PLESPE
- RHIHIP



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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Static Detector Bat Species Proportions August Results

Scale at A3

1:2,000

Role

Suitability

For Issue

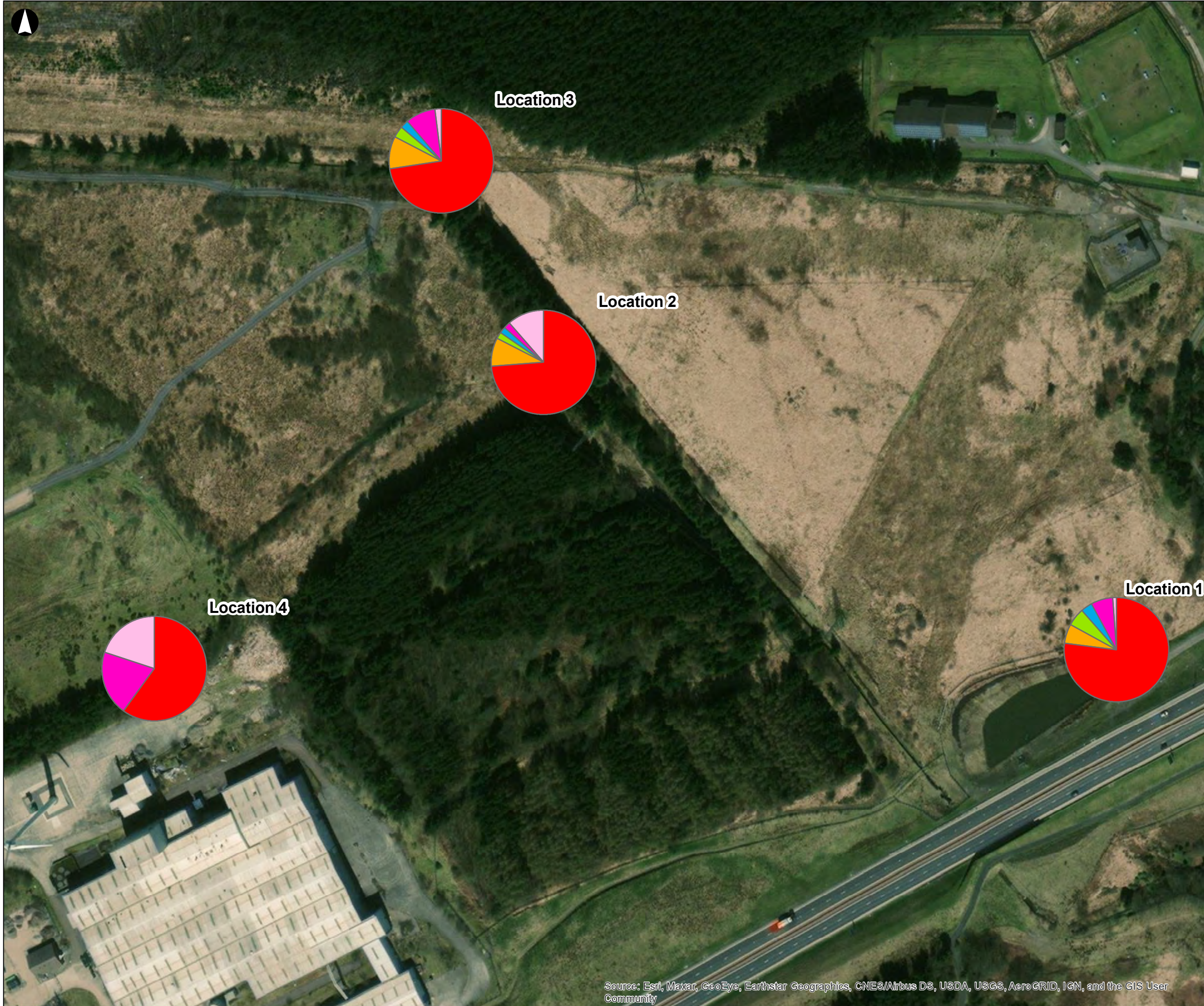
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273927

Rev
F1

Name

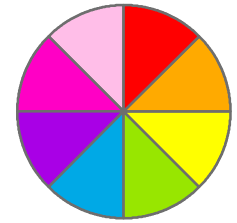
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

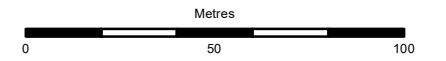


Legend

September Species



- PIPPIP
- PIPPYG
- PIPSPE
- MYOTIS
- NYCSPE
- EPTSER
- PLESPE
- RHIHIP



F1	2020-12-04	KSJ	CD	PC
Rev	Date	By	Chkd	Appd

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Client

CINER Glass Ltd.



Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

Static Detector Bat Species Proportions September Results

Scale at A3

1:2,000

Role

Suitability

For Issue

Arup Job No

273927

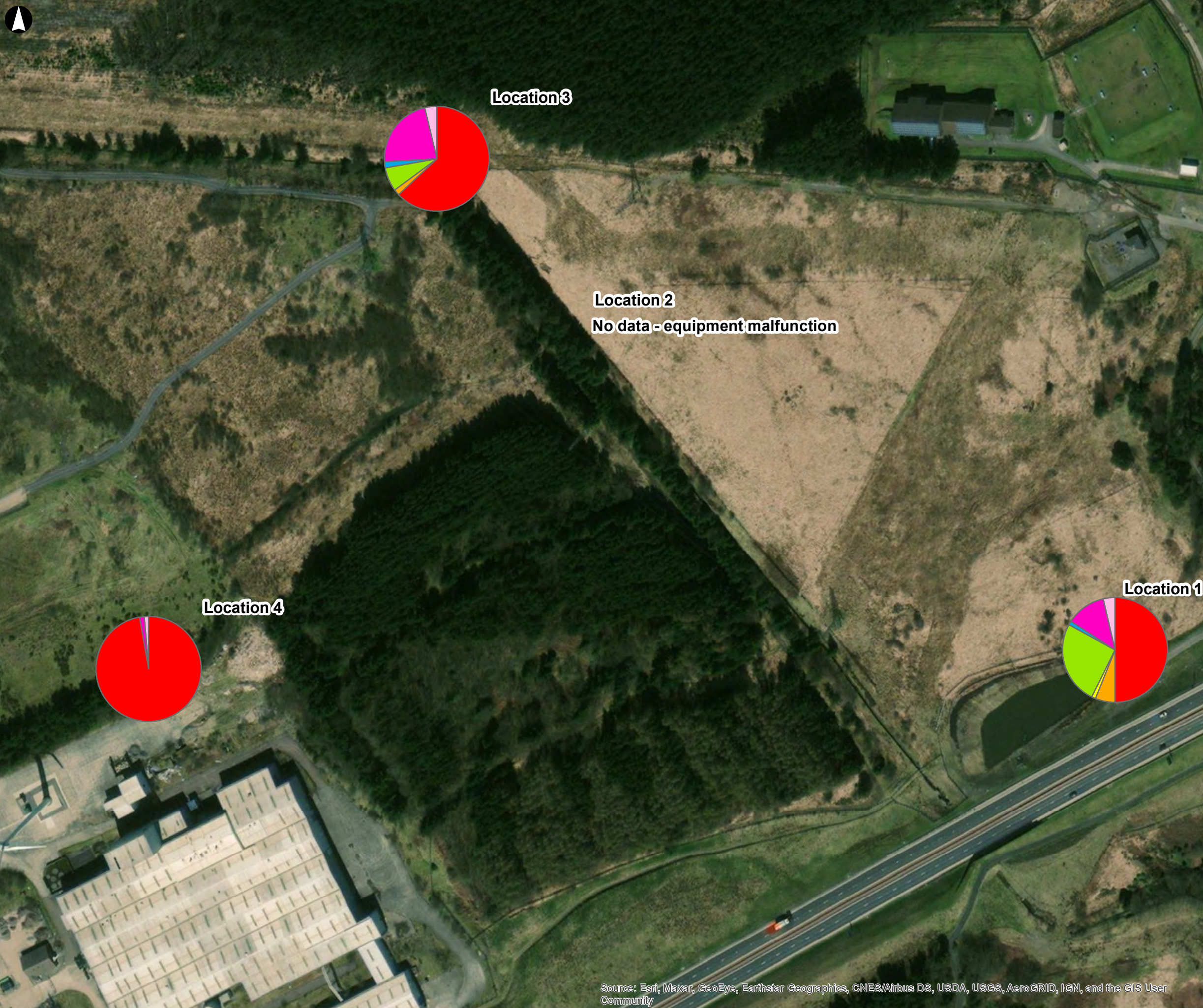
Rev

F1

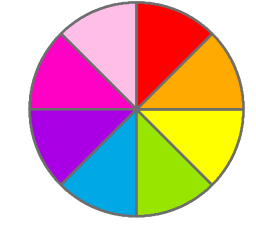
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004e

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



Legend
October Species



- PIPPIP
- PIPPYG
- PIPSPE
- MYOTIS
- NYCSPE
- EPTSER
- PLESPE
- RHIHIP

Metres

0 50 100

Rev	Date	By	Chkd	Appd
F1	2020-12-04	KSJ	CD	PC

ARUP

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www.arup.com

Client
CINER Glass Ltd.



Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Static Detector Bat Species Proportions October Results

Scale at A3
1:2,000

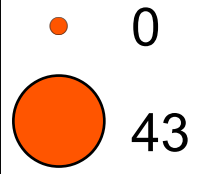
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Arup Job No 273927	Rev F1
Name 004f	

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



Legend

BAI



Metres

0	50	100
F1	2020-12-04	KSJ CD PC
Rev	Date	By Chkd Appd

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Project Title
Dragon Glass Bottle Manufacturing Facility

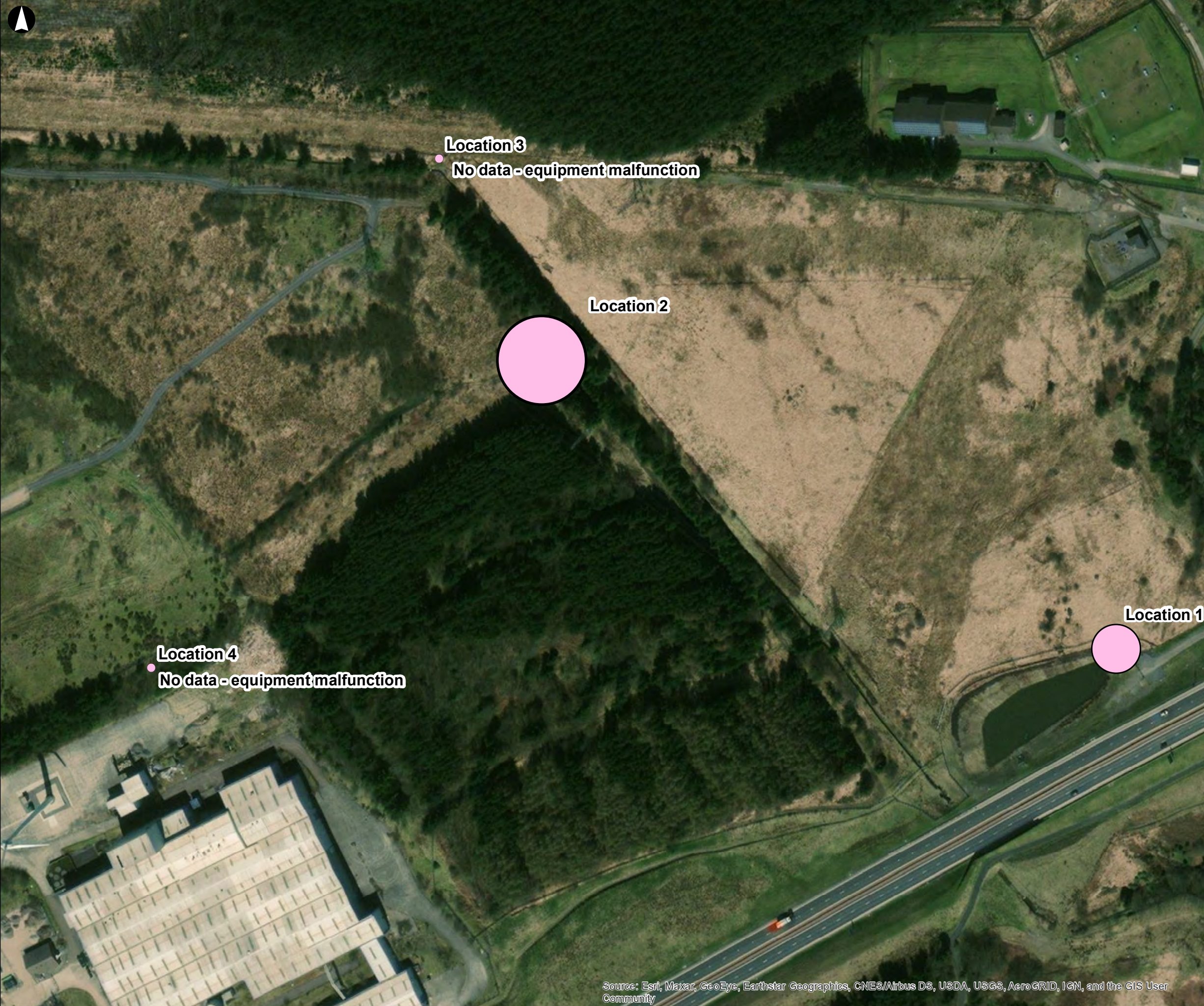
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Suitability
For Issue

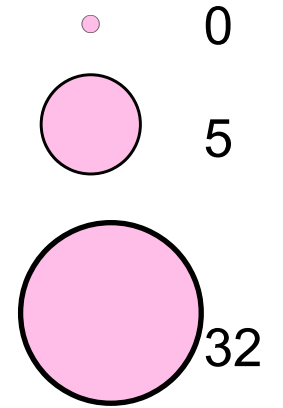
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Name 005a	

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



Legend

BAI



Metres

0	50	100
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Rev	Date	By	Chkd	Appd
F1	2020-12-04	KSJ	CD	PC

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Project Title
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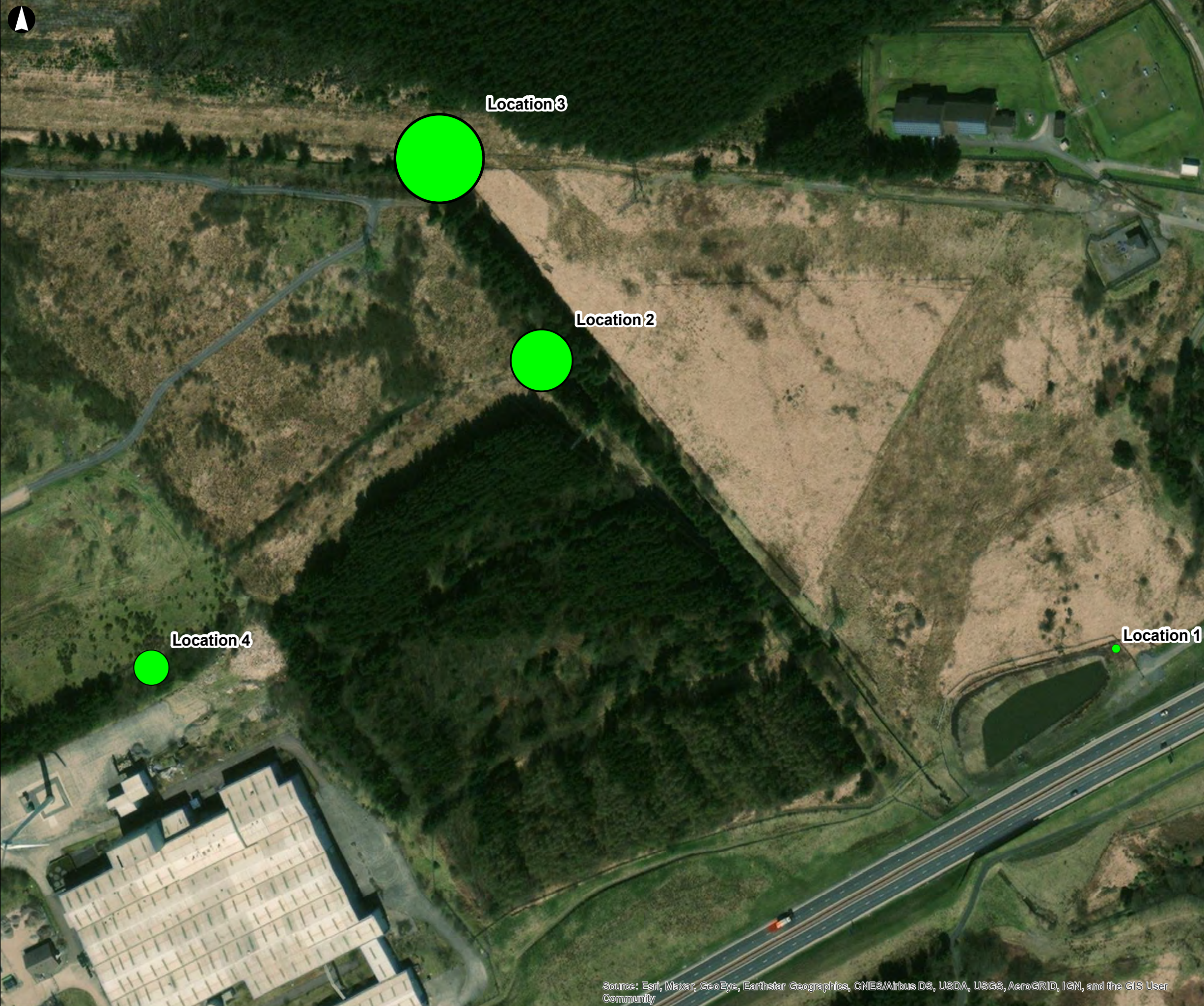
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Role
For Issue

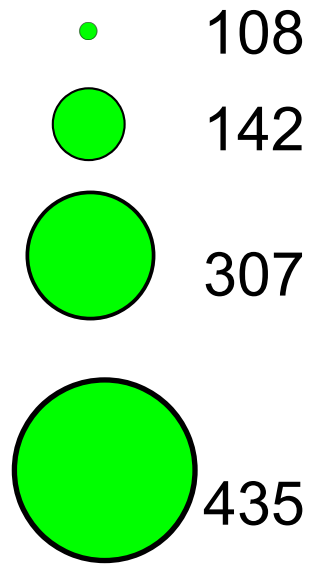
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

BAI



Metres

0	50	100
F1	2020-12-04	KSJ CD PC
Rev	Date	By Chkd Appd

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Project Title
Dragon Glass Bottle Manufacturing Facility

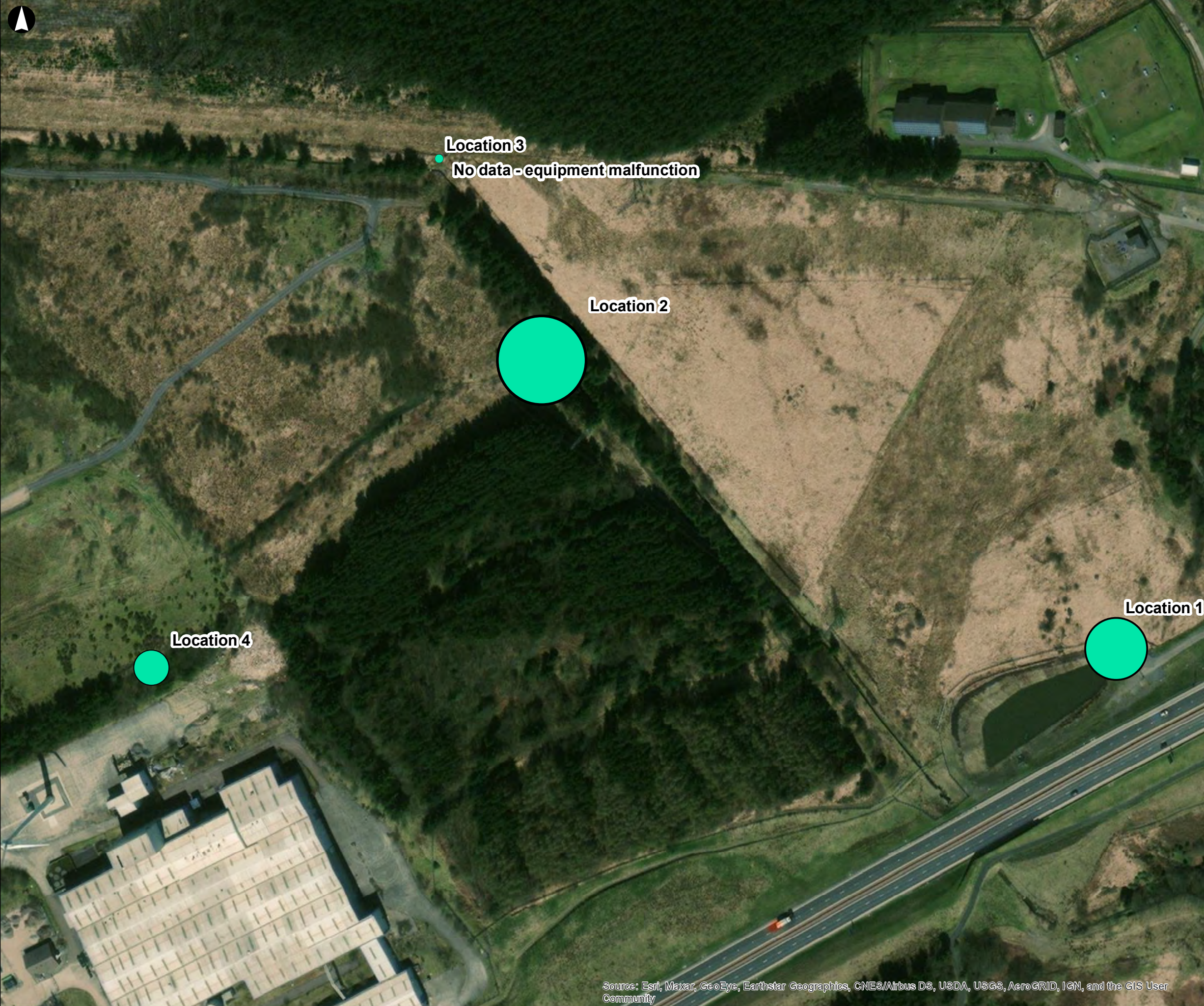
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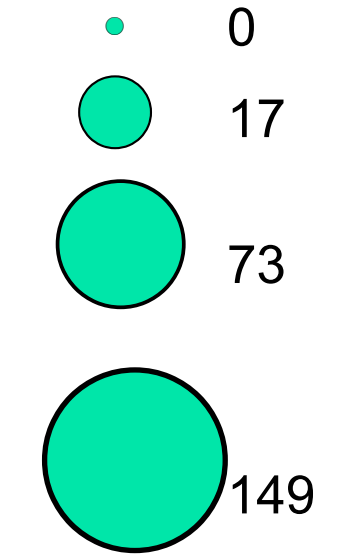
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Legend

BAI



Metres

0	50	100
F1	2020-11-18	KSJ CP PC
Rev	Date	By Chkd Appd

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Client
CINER Glass Ltd.



Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
Static Detector Bat Activity Index August Results

Scale at A3
1:2,000

Suitability
For Issue

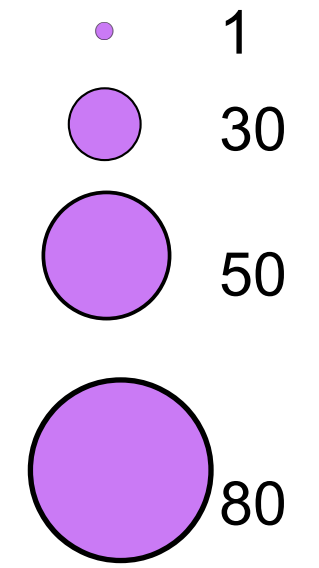
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

BAI



Metres

0	50	100
F1	2020-12-04	KSJ CD PC
Rev	Date	By Chkd Appd

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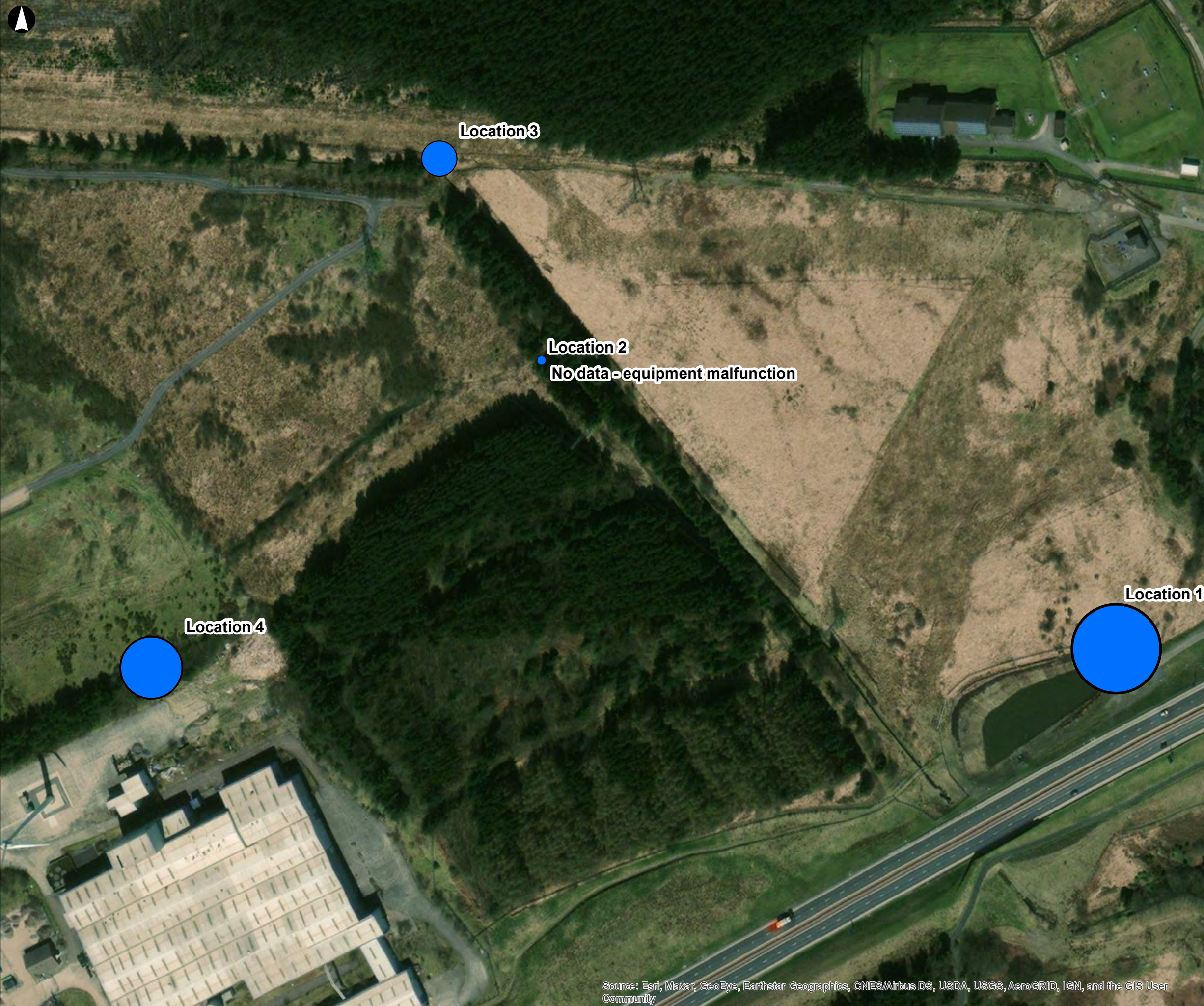
Project Title
Dragon Glass Bottle Manufacturing Facility

Drawing Title
**Static Detector Bat Activity Index
 September Results**

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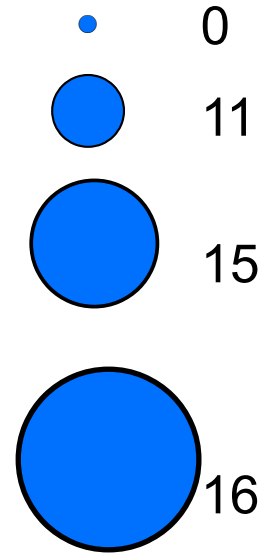
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

BAI



Metres

0	50	100
F1	2020-11-18	KSJ CP PC
Rev	Date	By Chkd Appd

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Project Title

Dragon Glass Bottle Manufacturing Facility

Drawing Title

**Static Detector Bat Activity Index
October Results**

Scale at A3

1:2,000

Role

Suitability

For Issue

Arup Job No

273927

Rev

F1

Name

005f

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

Appendix A

Bat Activity Indices

A1 Static Detector Survey Results - BAI

Table A1: Common pipistrelle BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	42	N/A
June	3.8	25.4	N/A	N/A
July	75.8	276	393	99.2
August	59.2	140	N/A	14.2
September	38.8	22	57.8	0.6
October	8.2	N/A	6.8	14.2

Table A2: Soprano pipistrelle BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0	N/A
June	0.4	0.4	N/A	N/A
July	5.4	2.6	11	3.2
August	2.8	1.6	N/A	0
September	3	2.6	8	0
October	1	N/A	0.2	0

¹³ 0 = not bats recorded. N/A = detector malfunction.

Table A3: Pipistrelle species BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0.2	N/A
June	0.6	1.4	N/A	N/A
July	1.2	1	3.4	0
August	0	0.2	N/A	0.2
September	0	0	0.6	0
October	0.2	N/A	0	0

Table A4: Myotis species BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0.4	N/A
June	0.2	4.4	N/A	N/A
July	8.4	12.4	14	2.4
August	3.8	2.6	N/A	0.8
September	0	0.6	2.8	0
October	4.2	N/A	0.8	0

Table A5: *Nyctalus* species BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0	N/A
June	0	0.4	N/A	N/A
July	7.4	9.4	11.2	37.2
August	6.2	4.4	N/A	1.8
September	1.8	0.6	2	0
October	0.2	N/A	0.2	0

Table A6: *Serotine* BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0	N/A
June	0	0	N/A	N/A
July	0	0.2	0	0
August	0	0	N/A	0
September	0	0	0	0
October	0	N/A	0	0

Table A7: *Plecotus* species BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0	N/A
June	0	0	N/A	N/A
July	9.8	4.4	2.4	0
August	0.6	0	N/A	0
September	3.4	0.6	7.4	0.2
October	2	N/A	2.4	2.4

Table A8: Lesser horseshoe bat BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0	N/A
June	0	0	N/A	N/A
July	0	1	0.2	0.2
August	0	0	N/A	0
September	0	3.4	1.6	0.2
October	0.6	N/A	0.4	0.2

Table A9: Unidentified bat species BAI¹³

LOCATION MONTH	Location 1	Location 2	Location 3	Location 4
May	N/A	N/A	0.2	N/A
June	0	0	N/A	N/A
July	0	0	0	0
August	0	0	N/A	0
September	0	0	0	0
October	0	N/A	0	0

D12 Habitat Regulations Assessment

CiNER Glass Ltd

**Dragon Glass Bottle
Manufacturing Facility**

Habitats Regulations Assessment
(HRA)

Final 13 July 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 273927-00

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ARUP

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Figures

Figure 1 Site location

Figure 2 European Sites

Appendices

No table of contents entries found.

1 Introduction

Ove Arup & Partners Ltd (Arup) was commissioned by CiNER Glass Ltd. to provide planning and environmental consultancy services including the production of a Habitat Regulations Assessment (HRA), in relation to the proposed Dragon Glass Bottle Manufacturing Facility hereafter referred to as ‘the proposed development’. The site is located at NGR: SO158128 and the site location plan and red line boundary is provided in Figure 1.

CiNER Glass Ltd. propose to develop an undeveloped site on the Rassau Industrial Estate, Blaenau Gwent, into the proposed Dragon Glass Bottle Manufacturing Facility. The site will produce container glass which requires a three-part operation; the handling of raw material, the manufacturing of the glass containers and the product inspection and packaging process.

The proposed development will require the delivery of raw materials to the site during operation, including sand and sofa ash, alongside other raw materials required in the production process. The proposed facility will also require the transportation of glass bottles off site following production.

This HRA accompanies an Environmental Impact Assessment (EIA) application (required in accordance with the under Regulation 6 of Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017) and is submitted to Blaenau Gwent County Borough Council (BGCBC) who will be the Competent Authority, in accordance with Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended).

This HRA should be read alongside the ecology chapter within the Environmental Statement for the proposed development along with associated appendices produced, which details the ecological baseline of the site, and an assessment of all likely effects from the proposed development on ecological receptors.

1.1 Purpose of this Document

This document has been prepared by Arup on behalf of our client, to provide information to inform a HRA for the proposed development in compliance with the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended); hereafter referred to as the ‘Habitats Regulations’.

The formal assessment required by the Habitat Regulations will be undertaken by the Planning Department of BGCBC in the process of determining the application in their role as Competent Authority.

1.2 The HRA Process

Regulation 63 of the Habitats Regulations requires a Competent Authority to make an ‘Appropriate Assessment’ of the implications of the plan or project for that site in view of its conservation objectives, before deciding to undertake or give consent for a plan or project which (a) is likely to have a significant effect on a European Site (either alone or in combination with other plans or project), and

(b) is not directly connected with or necessary to the management of that site. In light of the conclusions of the assessment, the Competent Authority may proceed with or consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the European Site.

All plans and projects should identify any likely significant effects early in the plan/project making process and then either alter the plan/project to avoid them or introduce mitigation measures to the point where no adverse effects remain. The 'Competent Authority' shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned, and if appropriate having obtained the opinion of the general public.

The assessment of a project under the Habitats Regulations can be split into several sections as shown in Figure 3; however, there are effectively four stages to the assessment as described below.

Stage 1 is the assessment of the likelihood of a plan or project having a significant effect on a European Site or its features. If a likely significant effect cannot be ruled out this is the trigger for the need for an Appropriate Assessment as set out in Regulation 63(1).

The Appropriate Assessment (Stage 2) is the detailed consideration of the potential effects of the plan or project in relation to the conservation objectives for the European Site(s) to determine if there is likely to be an adverse effect on the integrity of the site (i.e. an effect that would compromise the site meeting its conservation objectives). Providing it can be demonstrated that with appropriate mitigation measures the plan or project would not give rise to an adverse effect on the integrity of the European Site, the plan or project can proceed.

Where this cannot be demonstrated or there is uncertainty, the assessment would then need to consider if there were any other alternatives to the plan or project (Stage 3) that would not give rise to adverse effects on the integrity of the European Site.

If there are no alternatives, Stage 4 would then consider if there are any Imperative Reasons of Overriding Public Interest (IROPI), only at this stage can Compensatory Measures be considered.

1.3 Consideration of Mitigation

With regards to recent case law (Coillte vs People Over Wind¹) the inclusion of mitigation during Stage 1 is no longer considered appropriate. Mitigation, as considered by the Centre Européen de Coopération Juridique (CECJ) in regard to the case law, is interpreted to mean measures that are intended to avoid or reduce the harmful effects of the envisaged project on the site concerned.

Consequently, any project where a likely significant effect on a European Site cannot be ruled out and where avoidance and mitigation are applicable will need to progress to Stage 2 Appropriate Assessment.

¹ People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

1.4 EU Exit

The 2017 Regulations have been updated most recently by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, to ensure that they operate efficiently post Brexit. These changes include reference to National Site Network.

The Habitat Regulations provide for the designation and protection of sites of European importance known as European Sites or the National Site Network.

1.5 Structure of this Report

This report uses the following structure:

- Section 2 provides information on the proposed works (the ‘proposed development’) including the environmental baseline and a brief description of the development;
- Section 3 provides information on the data and methodology used in the assessment;
- Section 4 details the European Sites that are considered within the assessment;
- Section 5 provides a screening assessment for the potential pathways for effects;
- Section 6 provides the Appropriate Assessment of the potential effects on the designated sites;
- Section 7 details any proposals for monitoring; and
- Section 8 provides the conclusion.

2 Project Description

The proposed development would comprise the following elements:

- 2No furnaces and associated filter buildings and chimney stacks;
- 2No cullet buildings and stores for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles including workshops and storage areas;
- Office space and welfare facilities including canteen, infirmaries and changing facilities;
- An automated warehouse for storage and distribution of glass bottles;
- Utilities building which includes plant space and workshops;
- Waste material stores;
- Substation facilities;
- Liquefied petroleum gas (LPG) stores;
- Regulating and Metering Station (RMS);
- Back up fuel storage facilities;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The proposed development would also include three attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site, amenity space and an ecological pond.

The proposed development is approximately 21.5ha and is shown in Figure 1. The proposed works are located within the Rassau Industrial Estate in the county borough of Blaenau Gwent, South Wales. The site is located adjacent to the A465 Heads of the Valleys dual carriageway.

The proposed development consists of a three-part operation to produce glass bottles; the handling of raw materials, the manufacturing of the glass containers and the product-inspection, packaging and storage process. The proposed works will require the delivery of raw materials to the site including sand and soda ash to produce glass alongside other raw materials required for the production process, including the use of recycled glass. This will require approximately 60 daily HGV movements to and from site (Monday-Friday).

The facility will also require the transportation of finished product glass bottles following production. During the low season months (October to April) the transportation of finished product would result in approximately 65 daily HGV movements. During peak months (May to September, and December) movements

are likely to increase to approximately 130 daily HGV movements to and from site due to increased demand.

The facility is forecasted to create approx. 671 jobs associated with the operation of the facility that will run 24 hours a day, 7 days a week via a shift system.

2.1 Environmental Baseline

The site is located on a vacant plot within the Rassau Industrial Estate. Due to the length of time since the creation of the site, the area has developed a range of habitats including, grassland, scrub, broadleaved trees and coniferous woodland. A tributary of the Ebbw River (Afon Ebwy) runs along the eastern boundary of the site and appears to have been diverted around the northern extent of the industrial estate. This river is part of the South East Valleys Catchment which flows into the Usk Estuary.

The environmental baseline set out below is informed by the desk-based and field surveys undertaken as part of the EIA.

The ecology chapter within the EIA produced in support of the planning application identified four statutory designated sites within 5km of the site. These include:

- Usk Bat Sites SAC (circa 900m north east of the site) – designated for the lesser horseshoe bat (*Rhinolophus hipposideros*) populations.
- Cwm Clydach Woodlands SAC (circa 4.3km east of the site) – designated for the *Asperulo-Fagetum* beech forests.
- Mynydd Llangatwg Site of Special Scientific Interest (SSSI) (circa 900m north east of the site) – designated for the geology and biodiversity due to the base rich grassland, heather dominated blanket mire and dry heath. The site is also noted for its vascular plants, bryophytes and lichens, as well as lesser horseshoe bats, which roost in the cave systems.
- Mynydd Llangynidr SSSI (circa 1.5km north west of the site) – which is designated for the geomorphology of the site.

A further five SSSIs were also identified as designated for bats within 10km of the site:

- Cwm Clydach SSSI (circa 4.3km east of the site).
- River Usk (Upper Usk) SSSI (circa 7.5km north and east of the site).
- River Usk (Tributaries) SSSI (circa 7.6km north of the site).
- Siambre Ddu SSSI (circa 8.7km east of the site).
- Buckland Coach and Ice House SSSI (circa 8.8km north of the site).

The desk-based search also identified twenty-three non-statutory designated sites within 2km of the proposed development including Sites of Importance for Nature Conservation (SINCs) and Local Nature Reserves (LNRs). There are also two areas of ancient woodland within 2km of the site.

Qualifying Species associated with Designated sites

The buildings within the adjacent Tech-board Site were found to support small numbers of lesser horseshoe bats (*Rhinolophus hipposiderous*), which are a qualifying feature of the Usk Bat SAC. Lesser horseshoe bats were also recorded foraging within the building and adjacent habitats.

Other Species

Surveys identified the presence of several notable invertebrate species including a rove beetle (*Philonthus parvicornis*) and dingy skipper butterfly (*Thymelicus Sylvestris*), which although are listed as being nationally scarce and species of importance for conservation, respectively, are relatively common and widespread across Wales.

The water bodies on site contained very little water during the surveys. Due to the low water levels and lack of connectivity, it is considered unlikely that the waterbodies support fish.

All waterbodies on site were found to be below average suitability for great crested newts (*Triturus cristatus*). eDNA surveys were undertaken of the water bodies on site, which returned one positive result, and an inconclusive result. However, as no evidence of great crested newts were identified during further surveys, great crested newts are considered likely to be absent from the site. The site supports a breeding palmate newt (*Lissotriton helveticus*) population and is likely to support common frog and common toad. The waterbodies on site were also considered to be sub-optimal for otters (*Lutra lutra*) and water voles (*Arvicola amphibius*) and no evidence of these species were found during the surveys.

A 'Good' population of common lizard (*Zootoca vivipara*) were recorded on site during surveys. In addition, adders (*Vipera berus*) have been recorded at the nearby Carno Reservoir.

The habitats present on site were identified to be suitable for nesting birds and a number of notable species were recorded breeding on site including marsh tit (*Poecile palustris*), willow warbler (*Phylloscopus trochilus*), whitethroat (*Sylvia communis*), goldcrest (*Regulus regulus*), song thrush (*Turdus philomelos*), mistle thrush (*Turdus viscivorus*), tree pipit (*Anthus trivialis*), bullfinch (*Pyrrhula pyrrhula*), greenfinch (*Chloris chloris*) and lesser redpoll (*Acanthis cabaret*).

One tree within the site was identified as being of low suitability for roosting bats during surveys. Another tree off-site supported several bat boxes. The two buildings to the south of the site were assessed to be of low suitability for roosting bats. During surveys both undertaken as part of the CiNER EIA and to inform an alternative development, the buildings were found to support small numbers of common pipistrelle (*Pipistrellus pipistrellus*), lesser horseshoe bats (*Rhinolophus hipposiderous*), brown long-eared bats (*Plecotus auratus*) and myotis bats. The site was also found to be used for bat foraging for a number of species.

Four badger (*Meles meles*) setts were recorded during the surveys, two were disused, and two are active. The setts were considered to be outlier setts. The surveys also identified signs of rabbit and foxes, and the site is considered to be

suitable for European polecat (*Mustela putorius*), West European hedgehog (*Erinaceus europaeus*) and brown hare (*Lepus europaeus*).

The site is considered to be sub-optimal for dormice and due to the lack of connectivity to the wider habitat, dormice are considered unlikely to be present.

Rhododendron (*Rhododendron ponticum*) was recorded within the site and a number of other non-native invasive species were also recorded including hollyberry cotoneaster (*Cotoneaster bullatus*) and Himalayan cotoneaster (*Cotoneaster simonsii*).

A number of rare and notable fungi species have been recorded within the site, associated with banks of the conifer plantation and broadleaved/mixed woodland (within the plantation). This includes *Gomphidius glutinosus*, *Hypoxylon stygium*, *Coryne cf tasmanica* and *Rimbachia bryophila*.

3 Guidance and Methodology

This section sets out the guidance and evidence base used in assessing the potential effects of the proposed development.

3.1 Guidance and Policy

This document been informed by the following guidance and policy documents:

- Planning Policy Wales - Technical Advice Note (TAN) 5: Nature Conservation and Planning²;
- The Planning Series: 16 – Habitats Regulations Assessment. National Assembly for Wales 2017³;
- Assessment of plans and projects significantly affecting Natura 2000 sites, European Commission 2001⁴;
- Managing Natura 2000 sites, European Commission 2000⁵; and
- The Habitats Regulations Assessment Handbook, May 2019 edition, UK: DTA Publications Limited⁶.

These documents and publications are intended to improve understanding of how projects are regulated under the Habitats Directive.

3.2 Desk Study Information

In addition to the guidance noted above, the following websites were used to gather information on the European Protected Sites;

- Natural Resources Wales (NRW) website⁷;
- MAGIC (Multi-Agency Geographic Information for the Countryside) website⁸: and
- Joint Nature Conservation Committee (JNCC)⁹.

² Welsh Government. (2009). Planning Policy Wales - Technical Advice Note 5: Nature Conservation and Planning. Cardiff: Welsh Government.

³ Research Briefing: The Planning Series: 16 – Habitats Regulations Assessment. December 2017. National Assembly for Wales.

⁴ Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. (2001) European Commission.

⁵ Managing Natura 2000 sites. The provisions of Article 6 of the ‘Habitats’ Directive 92/43/CEE. (2000). European Commission.

⁶ Tyldesley & Chapman, 2017. The Habitats Regulations Assessment Handbook, January 2017 Edition, UK: DTA Publications Limited.

⁷ <http://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/find-protected-areas-of-land-and-seas/designated-sites/?lang=en>

⁸ <https://magic.defra.gov.uk/>

⁹ <https://jncc.gov.uk/our-work/special-areas-of-conservation-overview/>

The Core Management Plans for European Sites, and Regulation 35 information¹⁰ containing advice on European Sites were also obtained and have been used to inform this assessment. These documents provide the main elements of NRW's management plan for European Sites along with the Conservation Objectives for the qualifying features. The qualifying features will be considered to be in Favourable Conservation Status only when the conservation objectives are being met. These objectives therefore provide an indication of the type of effects which could affect the features of European Site. An effect which could affect the ability of a site or feature meet its objective could be considered to be an adverse effect on the integrity of the European Site concerned.

3.3 Habitats Regulations Assessment Methodology

3.3.1 Identifying sites

A European Site is a terrestrial or marine area which is protected under the following European and International Legislation: The Habitats Directive (92/43/EEC), The Birds Directive (09/147/EC) and The Ramsar Convention.

The following list outlines the types of European Sites:

- Special Areas of Conservation (SAC);
- Special Protection Areas (SPA);
- Candidate Special Areas of Conservation (cSAC);
- Potential special Protection Areas (pSPA);
- Ramsar Sites; and
- Proposed Ramsar Sites.

To understand the potential implications for European Sites from the proposed development, it is necessary to identify those sites that are located close to the proposed development or are linked by pathways such as hydrological connections.

All European Sites within 10km and all Special Areas of Conservation (SACs) designated for the presence of marsh fritillary (*Euphydryas aurinia*) or Annex II bat species within 10-15km and for the presence of Annex II bat species within 10-30km of the proposed development were identified using Geographic Information Systems (GIS) data from datasets downloaded from the JNCC and NRW.

¹⁰ <http://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/find-protected-areas-of-land-and-seas/advice-for-developers-and-marine-planners/?lang=en>

3.3.2 Understanding qualifying interests and conservation objectives

For each of the European Sites identified, the qualifying features were established and the conservation objectives for each feature were obtained. Information was also sought to understand the potential vulnerability of the features to any potential effects that might arise from the proposed development.

3.3.3 Identification of the potential effects of the project

Any potential pathways for effect on European Sites resulting from the proposed development were identified prior to consideration of best practice procedures (for example, Guidelines for Pollution Prevention¹¹ and Construction Industry Research and Information Association (CIRIA) guidance) or the integration of any mitigation measures.

3.3.4 Identification of plans or projects considered for in-combination effects

An ‘in-combination’ assessment is required where the project may have an effect on a European site, but on its own the effects would not be significant. The potential effects of the project should be considered in-combination with other plans or projects that similarly may have an effect, but where on their own those effects would not be significant. The combined effects may therefore become significant.

Details of other plans and projects which are currently proposed or consented within the vicinity of the European Sites identified were obtained to inform the in-combination assessment of the proposed project.

3.3.5 Consideration of the significance of potential effects

The significance of potential effects was assessed in the absence of avoidance or other mitigation measures other than those which are standard construction practices such as pollution control or those incorporated into the scheme. The assessment has been made with awareness of the conservation objectives for the features of the European Sites, although as stated in the relevant guidance, the assessment of the project against the conservation objectives is not required until the Appropriate Assessment stage of the HRA process.

In the assessment of the significance of effects, professional judgement was applied using the following criteria, as often insufficient information about the elements and interests is available:

- The vulnerability/sensitivity of the receiving environment/features of interest;
- When the risk of effects is likely to occur (e.g. construction and/or operation);

¹¹ <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppps-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

- The likely geographical extent of the effects; and
- Likelihood of significant effects (e.g. those above negligible in magnitude) occurring based on previous experience with similar elements, where available.

Where there was not enough information about the risk of qualifying interest being present, or of the risk of effects, the assessment used the precautionary principle to inform the judgement. This principle means that the conservation objectives should prevail where there is uncertainty or that harmful effects will be assumed in the absence of evidence to the contrary.

3.4 Limitations

Information provided by third parties, including publicly available information and databases, is considered correct at the time of publication. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this report, and the construction and operation of the project.

The HRA has been undertaken in as detailed a way as possible, using available data sources. However, the conclusions drawn from this is necessarily limited by the age, type, coverage and availability of data. Any uncertainties and the limitations of the assessment process are acknowledged and highlighted. Recommendations for mitigation measures to address the potential adverse effects on the European Site's integrity identified by this report are also based on the information available at the time of the assessment.

A search of all planning applications submitted for sites within 500m of the proposed development in the past year was undertaken. The local planning authority BGCBC does not provide mapping of planning applications. As such, a search of planning records was undertaken with the distance from the proposed development estimated.

4 European Sites Potentially Affected by the Proposal

A 10km search area is considered sufficient to identify any potential impacts on the majority of European Sites, except those which have mobile qualifying features (and which may have ranges that extend beyond 10km).

The European Sites identified within 10km of the proposed works are as follows (distances and direction are measured as a straight line from the location of the proposed development to the European Site):

- Usk Bat Sites SAC (Safleodd Ystlumod Wysg): approximately 900m north east;
- Cwm Clydach Woodlands (Coedydd Cwm Clydach): approximately 4.8km to the east of the site; and
- River Usk SAC (Afon Wysg): approximately 7.8km to the north east.

In addition, a search was undertaken of European Sites designated for marsh fritillary, within 10-15km of the proposed development, since this species is known to range up to 15km from its primary habitat (and due to records of this species being present in vicinity of the site). European Sites designated for marsh fritillary are detailed below.

- Aberbargoed Grasslands SAC: approximately 12.8km to the south of the site.

In addition, a search was undertaken of European Sites designated for Annex II bat species within 10-30km of the proposed development, since some species of bats are known to range up to 30km from roost site locations. No additional SACs, designated for Annex II bat species, are within 30km of the site.

Figure 2 shows the location of the proposed development in relation to European Sites within 15km of the proposed development. The features for which these Sites are designated are summarised in Table 1.

Table 1 Qualifying Features of the European Sites identified within 10 km, and 10-15 km for marsh fritillary SAC.

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
<p>Usk Bat Sites SAC (Safleodd Ystlumod Wysg): approximately 900m north east;</p>	<p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • European dry heaths • Degraded raised bogs still capable of natural regeneration • Blanket bogs (* if active bog) * Priority feature • Calcareous rocky slopes with chasmophytic vegetation • Caves not open to the public • <i>Tilio-Acerion</i> forests of slopes, screes and ravines * Priority feature <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>). 	<p>European dry heaths for which the area is considered to support a significant presence.</p> <p>Degraded raised bogs still capable of natural regeneration for which the area is considered to support a significant presence.</p> <p>Calcareous rocky slopes with chasmophytic vegetation for which the area is considered to support a significant presence. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares.</p> <p>Caves, not open to the public, for which the area is considered to support a significant presence.</p> <p><i>Tilio-Acerion</i> forests of slopes, screes and ravines for which the area is considered to support a significant presence. Blanket bogs for which the area is considered to support a significant presence.</p>	<p>Feature 1 – Lesser Horseshoe Bats:</p> <ul style="list-style-type: none"> • The site will support a sustainable population of lesser horseshoe bats in the River Usk area. • The population will viable in the long term, acknowledging the population fluctuations of the species. • Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range. • Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat. • There will be no loss or decline in quality of linear features (such as hedgerows and tree lines) which the bats use as flight lines - there will be no loss of foraging habitat use by the bats or decline in its quality, such as due to over-intensive woodland management. <p>Feature 2 – Blanket Bog</p> <ul style="list-style-type: none"> • The extent, quality and species richness of the blanket bog vegetation is maintained and, where 	<p>Invasive non-native species, Grazing, air pollution and air borne pollutants, problematic native species, human induced changes in hydraulic conditions, urbanisation, industrial and similar activities, and interspecific floral relations.</p>

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
		<p>The Usk Valley area in south-east Wales contains one of the largest maternity roosts for lesser horseshoe bat as well as a number of important hibernacula in caves in the area. The area contains up to 5% of the UK population, though counts in hibernation sites suggest this may be an underestimate.</p>	<p>possible, degraded bog is restored to good condition so that this habitat occupies its full potential range within the site.</p> <ul style="list-style-type: none"> • The bog vegetation is largely a mixture of dwarf shrubs, hare’s-tail cottongrass (<i>Eriophorum vaginatum</i>) and mosses, including bog-mosses. • Extensive areas of purple moor-grass (<i>Molina caerulea</i>) or hare’s-tail cottongrass (<i>Eriophorum vaginatum</i>) show signs of recovery towards a more mixed dwarf shrub sward. • The natural hydrological regime is maintained and there is continued peat formation and thus carbon storage. • Areas of bare peat are not extensive, and most areas show signs of recovery. • Peat profiles containing important pollen records are maintained. <p>Feature 3 – Tilo-Acerion forests of slopes, screes and ravines</p> <ul style="list-style-type: none"> • There are extensive patches of semi-natural woodland on the cliffs of Llangatwg escarpment and hillsides in the Clydach gorge. • The woodland canopy is dominated by locally native species, including lime (<i>Tilia spp</i>), ash (<i>Fraxinus excelsior</i>), pedunculate oak (<i>Quercus robur</i>), hazel (<i>Corylus avellana</i>), birch (<i>Betula spp.</i>), whitebeams (<i>Sorbus spp.</i>) and, in the Clydach gorge, beech (<i>Fagus sylvatica</i>). Rare 	

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
			<p>whitebeams are a significant component of the canopy.</p> <ul style="list-style-type: none"> • Saplings of locally native species dominate the tree regeneration and there is evidence of sufficient regeneration to maintain the canopy in the long term. • There is an accumulation of standing and fallen deadwood as the woodland develops. • The woodland ground flora is composed of a range of typical native plants including enchanters-nightshade (<i>Circaea lutetiana</i>), dog's-mercury (<i>Mercurialis perennis</i>), wood-sorrel (<i>Oxalis acetosella</i>), hart's-tongue (<i>Phyllitis scolopendrium</i>) and wood sage (<i>Teucrium scorodonia</i>). • The populations of rare whitebeams are stable or increasing. • Plants indicating disturbance and nutrient enrichment, such as nettles, cleavers and weeds, are not dominant in the ground flora of the woodland. <p>Feature 4 – Calcareous rocky slopes with chasmophytic vegetation</p> <ul style="list-style-type: none"> • Sufficient vegetation within crevices remains free from disturbance to support typical plants, including mosses, ferns and rare hawkweeds (<i>Hieracium</i> spp.) and allow them to sustain their populations into the future. 	

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
			<ul style="list-style-type: none"> • Areas accessible to grazing animals should free from being smothered by ivy or heavily shaded by trees. <p>Feature 5 – Caves not open to the public</p> <ul style="list-style-type: none"> • The cave system provides a winter hibernation site for large numbers of lesser horseshoe bats and other bat species, including Brandt’s, whiskered, Daubenton’s (<i>Myotis daubentonii</i>), Natterer’s (<i>Myotis nattereri</i>), brown long-eared and, occasionally, greater horseshoe bats. • Numbers of roosting bats are stable or increasing in the system as a whole. <p>Feature 6 – Degraded raised bogs still capable of natural regeneration</p> <ul style="list-style-type: none"> • The extent, quality and diversity of raised bog vegetation is maintained and, where possible, restored to good condition, with active moss and peat growth across the raised bog surface. • The vegetation consists of a mixture of dwarf shrubs, hare’s-tail cottongrass (<i>Eriophorum vaginatum</i>), deergrass (<i>Trichophorum cespitosum</i>) and bog mosses, grading at the edges into acid and alkaline flushes influenced by acidic water draining from the bog and springs rising in the limestone catchment. <p>Feature 7 – European Dry Heaths</p> <ul style="list-style-type: none"> • The extent, quality and diversity of heath vegetation within the constituent sites is 	

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
			<p>maintained and, where possible, degraded heath is restored to good condition.</p> <ul style="list-style-type: none"> The main heathland areas have a varied age structure with a mosaic of young heath, mature heath and degenerate heath. 	
<p>Cwm Clydach Woodlands (Coedydd Cwm Clydach): approximately 4.5km to the east of the site.</p>	<p>Annex I habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <i>Asperulo-Fagetum</i> beech forests <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>).</p>	<p>Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>) for which the area is considered to support a significant presence.</p> <p>Asperulo-Fagetum beech forests for which this is considered to be one of the best areas in the United Kingdom.</p>	<p>Feature 1 – <i>Asperulo-fagetum</i> beech forests:</p> <ul style="list-style-type: none"> At least 75% of the woodland vegetation meets the criteria for intact acid beech wood. At least 50% of the canopy-forming trees are beech. The canopy cover is at least 80% (excluding areas of crag) and composed of locally native trees, and the woodland has trees of all age classes with a scattering of standing and fallen dead wood. Regeneration of trees is sufficient to maintain the woodland cover in the long term. The shrub layer and ground flora can be quite sparse, but where present consist of locally native plants such as yew (<i>Taxus beccata</i>), hawthorn (<i>Crataegus monogyna</i>), wych elm (<i>Ulmus glabra</i>), ash (<i>Fraxinus excelsior</i>), hazel (<i>Corylus avellane</i>), field maple (<i>Acer campestre</i>) and elder (<i>Sambucus nigra</i>), bramble (<i>Rubus fruticosus</i>), dog’s mercury (<i>Mercurialis perennis</i>), enchanter’s-nightshade (<i>Circaea lutetiana</i>), lords-and-ladies (<i>Arum maculatum</i>), woodruff (<i>Galium odoratum</i>), male fern (<i>Dryopteris filix-mas</i>), sanicle (<i>Sanicula europaea</i>), wood melick (<i>Melica</i> 	<p>Hunting and collection of wild animals, including damage caused by game and taking/removal of terrestrial animals. Invasive non-native species.</p>

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
			<p><i>uniflora</i>), ivy (<i>hedera</i>), false brome (<i>Brachypodium sylvaticum</i>), violets (<i>Viola odorata</i>), herb robert (<i>Geranium robertianum</i>), wood avens (<i>Geum urbanum</i>), and tufted hair-grass (<i>Deschampsia cespitosa</i>).</p> <ul style="list-style-type: none"> • Scarcer plants, such as soft-leaved sedge (<i>Carex montana</i>) and bird’s-nest orchid (<i>Neottia nidus-avis</i>) are locally frequent and, more rarely, yellow bird’s-nest orchid can be found. <p>Feature 2 – Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer: At least 75% of the woodland vegetation meets the criteria for intact acid beech wood, where:</p> <ul style="list-style-type: none"> • At least 10% of the canopy forming trees are beech. • The canopy cover is at least 80% and composed of locally native species. • The woodland has trees of all age classes with a scattering of standing and fallen dead wood. • Regeneration of trees is sufficient to maintain the woodland cover in the long term. <p>The shrub layer and ground flora can be quite sparse, but where present consist of locally native plants.</p>	
<p>River Usk SAC (Afon Wysg): approximately 7.8km to the</p>	<p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • Water courses of plain to montane levels with the 	<p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation for which</p>	<p>Conservation Objectives for the watercourse:</p> <ul style="list-style-type: none"> • The capacity of the habitats in the SAC to support each feature at near-natural population levels, as determined by predominantly unmodified ecological and hydromorphological processes and characteristics, should be 	<p>Invasive non-native species, Forestry Activities including forest plantation</p>

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
<p>north east of the site.</p>	<p><i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation.</p> <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • Sea lamprey (<i>Petromyzon marinus</i>) • Brook lamprey (<i>Lampetra planeri</i>) • River lamprey (<i>Lampetra fluviatilis</i>) • Twaite shad (<i>Alosa fallax</i>) • Atlantic salmon (<i>Salmo salar</i>) • Bullhead (<i>Cottus gobio</i>) • Otter (<i>Lutra lutra</i>) <p>Annex II species present as a qualifying feature, but not a primary reason for site selection:</p> <ul style="list-style-type: none"> • Allis shad (<i>Alosa alosa</i>) 	<p>the area is considered to support a significant presence.</p> <p>Sea lamprey: for which this is considered to be one of the best areas in the United Kingdom.</p> <p>River lamprey: for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Brook lamprey: for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Alosa alosa: for which the area is considered to support a significant presence.</p> <p>Twaite shad: for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Atlantic salmon: for which this is considered to be one of the best areas in the United Kingdom.</p>	<p>maintained as far as possible, or restored where necessary.</p> <ul style="list-style-type: none"> • The ecological status of the water environment should be sufficient to maintain a stable or increasing population of each feature. • Flow regime, water quality and physical habitat should be maintained in, or restored as far as possible to, a near-natural state, in order to support the coherence of ecosystem structure and function across the whole area of the SAC. • All known breeding, spawning and nursery sites of species features should be maintained as suitable habitat as far as possible, except where natural processes cause them to change. • Flows, water quality, substrate quality and quantity at fish spawning sites and nursery areas will not be depleted by abstraction, discharges, engineering or gravel extraction activities or other impacts to the extent that these sites are damaged or destroyed. • The river planform and profile should be predominantly unmodified. • Artificial factors impacting on the capability of each species feature to occupy the full extent of its natural range should be modified where necessary to allow passage, e.g. weirs, bridge sills, acoustic barriers. • Flows during the normal migration periods of each migratory fish species feature will not be depleted by abstraction to the extent that passage upstream to spawning sites is hindered. 	<p>management, ecosystem modifications, soil pollution and solid waste, pollution to surface waters (limnic & terrestrial, marine & brackish), grazing and problematic native species.</p>

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
		<p>Bullhead: for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Otter: for which this is considered to be one of the best areas in the United Kingdom.</p>	<ul style="list-style-type: none"> • Flow objectives for assessment points in the Usk Catchment Abstraction Management Strategy will be agreed between EA and CCW as necessary. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 1 of this document. • Levels of nutrients, in particular phosphate, will be agreed between EA and CCW for each Water Framework Directive water body in the Usk SAC, and measures taken to maintain nutrients below these levels. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 2 of this document. • Levels of water quality parameters that are known to affect the distribution and abundance of SAC features will be agreed between EA and CCW for each Water Framework Directive water body in the Usk SAC, and measures taken to maintain pollution below these levels. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 3 of this document. • Potential sources of pollution not addressed in the Review of Consents, such as contaminated land, will be considered in assessing plans and projects. • Levels of suspended solids will be agreed between EA and CCW for each Water Framework Directive water body in the Usk 	

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
			<p>SAC. Measures including, but not limited to, the control of suspended sediment generated by agriculture, forestry and engineering works, will be taken to maintain suspended solids below these levels.</p> <p>Conservation Objectives for qualifying species:</p> <ul style="list-style-type: none"> • Conservation objectives of the water course will be met. • The populations will be stable or increasing • The natural range of the species is neither being reduced nor is likely to be reduced. • There is and will probably continue to be sufficiently large habitat to maintain the features population in the SAC. 	
<p>Aberbargoed Grasslands SAC (approximately 12.8km from the site.)</p>	<p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • Marsh fritillary butterfly 	<p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) for which the area is considered to support a significant presence.</p> <p>Marsh fritillary: for which this is considered to be one of the best areas in the United Kingdom. A large and relatively isolated population of marsh fritillary is present on a series of damp pastures and heaths in Gwent,</p>	<p>Feature 1 – Marsh Fritillary Butterfly</p> <ul style="list-style-type: none"> • The site will support a sustainable metapopulation of the marsh fritillary in the Aberbargoed area. This will require at least 50ha of suitable habitat, although not all of this will be within the SAC • The population will be viable in the long term, acknowledging the extreme population fluctuations of the species. • Habitats on the site will be in optimal condition to support the metapopulation. • At least 25ha of the total site area will be marshy grassland suitable for supporting marsh fritillary, with <i>Succisa pratensis</i> present and only a low cover of scrub. 	<p>Air pollution and air-borne pollutants, biocenotic evolution and succession, grazing and other ecosystem modifications.</p>

European Site	Qualifying Features	Importance	Conservation Objectives Summary	Vulnerability
		<p>representing the species on the eastern edge of its range in Wales.</p>	<ul style="list-style-type: none"> • At least 6.25ha will be good marsh fritillary breeding habitat, dominated by purple moor-grass (<i>Molinia caerulea</i>), with <i>S. pratensis</i> present throughout and a vegetation height of 10-20cm over the winter period. <p>Feature 2 – <i>Molina</i> meadows on calcareous, peaty or clayey-silt-laden soils:</p> <ul style="list-style-type: none"> • <i>eu-Molinion</i> marshy grassland will occupy at least 70% of the total site area. • The remainder of the site will be other semi-natural habitat or areas of permanent pasture. • The following plants will be common in the <i>eu-Molinion</i> marshy grassland: purple moor-grass (<i>Molinia caerulea</i>); meadow thistle (<i>Cirsium dissectum</i>); devil’s bit scabious (<i>Succisa pratensis</i>); carnation sedge (<i>Carex panicea</i>); saw wort (<i>Serratula tinctorial</i>); and lousewort (<i>Pedicularis Sylvestris</i>). • Cross-leaved heath (<i>Erica tetralix</i>) and common heather (<i>Calluna vulgaris</i>) will also be common in some areas. • Rushes and species indicative of agricultural modification, such as perennial rye grass (<i>Lolium perenne</i>) and white clover (<i>Trifolium repens</i>) will be largely absent from the <i>eu-Molinion</i> marshy grassland. • Scrub species such as willow (<i>Salix</i> spp) and birch (<i>Betula</i> spp) will also be largely absent from the <i>euMolinion</i> marshy grassland. 	

4.1 Identification of Other Plans and Projects

In June 2021, planning applications submitted within the last year for sites within 500m of the proposed works were searched using the Local Planning Authority's (BGCBC) website¹². The applications identified are detailed below:

- C/2020/0145 22/06/20 Single storey garage, 17 Rowan Way, Rassau, Ebbw Vale NP23 5TH.
- C/2020/0137* 17/06/20: application for discharge of Condition 5 (Details of foundations/piling design) of planning permission C/2020/0059 (Erection of a synchronous condenser, plant control building and auxiliary equipment, access, landscaping and associated works), land adjacent to Unit 18, Rassau Industrial Estate, Ebbw Vale, Blaenau Gwent, NP23 5SD
- C/2020/0132* 09/06/20: application for discharge of condition 6 (construction environmental management plan) of planning permission C/2020/0059 (erection of a synchronous condenser, plant control building and auxiliary equipment, access, landscaping and associated works), land adjacent to Unit 18, Rassau Industrial Estate, Ebbw Vale, Blaenau Gwent NP23 5SD.
- C/2020/0134 10/06/20: full application, single storey extension, 11 Winterson Close, Rassau, Ebbw Vale, Blaenau Gwent, NP23 5SP.
- C/2020/0124** 01/06/20: application for Discharge of Conditions: 2 (Ground contamination investigations) & 3 (verification contamination) of planning permission C/2020/0059 (erection of a synchronous condenser, plant control building and auxiliary equipment, access, landscaping and associated works), land adjacent to Unit 18 Rassau Industrial Estate, Ebbw Vale Blaenau Gwent NP23 5SD
- C/2020/0015 17/01/20: proposed rear extension, 5 Hazel Court, Rassau, Ebbw Vale, Blaenau Gwent NP23 5SB.
- C/2020/0018** 22/01/20: application for non-material amendment of planning permission C/2019/0009 (Construction of new business units (class B1/ B2/B8 & ancillary uses) & associated parking areas, external works) – Proposed changes to Unit A including changes to eaves height and roof pitch, minor change to locations of pedestrian doors and minor changes to building position on site, land to north east of Unit 29, Rassau Industrial Estate, Ebbw Vale, Blaenau Gwent, NP23 5SD.
- C/2020/0059 26/02/20: erection of a synchronous condenser, plant control building and auxiliary equipment, access, landscaping and associated works. land Adjacent to Unit 18 Rassau Industrial Estate, Ebbw Vale, Blaenau Gwent, NP23 5SD.
- C/2020/0071 06/03/20: demolition of ancillary buildings and tower, re-cladding and repair of existing elevations, new canopy and curtain walling to front elevation, new canopy to rear elevation and ancillary works. Full

¹² <https://www.blaenau-gwent.gov.uk/en/resident/planning/recent-applications/>

Application Former Tech-Board Building & Site, Rassau Ind Est Main Spine Road North Rassau, Ebbw Vale, Blaenau Gwent NP23 5TQ.

- C/2020/0072 06/03/20: fascia sign advertisement consent former Tech-Board building & site, Rassau Ind Est, Main Spine Road, North Rassau, Ebbw Vale, Blaenau Gwent, NP23 5TQ.
- C/2020/0093 06/04/20: conversion of existing residential property to a 2 bed children's care home, 37 Howy Road, Rassau, Ebbw Vale Blaenau Gwent NP23 5TW.
- C/2019/0326 25/11/19: full planning application for the construction of 2no. battery storage containers an associated works to store surplus energy Unit 16, Rassau Industrial Estate Rassau Ebbw Vale.

5 Screening Assessment

5.1 Screening of European Sites

The European Sites identified in Section 4 have been screened to assess the potential effects and pathways of the proposed works. These Sites include:

- Usk Bat Sites SAC (Safleodd Ystlumod Wysg);
- River Usk SAC (Afon Wysg);
- Cwm Clydach Woodlands (Coedydd Cwm Clydach); and
- Aberbargoed Grasslands SAC.

5.2 Potential Effects of the Proposed Works

During construction, there is predicted to be a potential pathway for effect on the features of the European Sites. The potential effects are in the form of:

- Habitat loss and or degradation e.g. from physical damage and or impacts from changes in air/water quality, and or water volume; during construction and operation;
- Habitat severance e.g. from construction design; during construction and operation;
- Disturbance/displacement of fauna e.g. from visual impact, noise, lighting; during construction and operation; and
- Species mortality/injury; during construction and operation.

The potential effects and potential pathways are considered in Table 2 and in Section 5 and 6 below.

5.3 Summary of Effects

Table 2 summarises the potential effects from the proposed works on the features of the SACs from construction and operation.

Table 2: Potential effect pathways

Pathway for Effect	Features of SACs							
	Usk Bat Sites/ Safleodd Ystumod Wysg SAC		Cwm Clydach Woodlands SAC	River Usk / Afon Wysg SAC			Aberbargoed Grasslands SAC	
	Lesser horseshoe bat	Annex I habitats	Annex I habitats	Annex II fish species	Otter	Annex I habitats	Annex I Habitats	Marsh Fritillary Butterfly
Construction								
Habitat loss	Pathway for effect (on contributing habitat only)	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Habitat degradation	Pathway for effects	Pathway for effects (air quality effects only)	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Habitat severance/fragmentation	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect

Disturbance	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Species mortality/injury	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Operation								
Habitat loss	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Habitat degradation	Pathway for effects	Pathway for effects (air quality effects only)	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Habitat severance/fragmentation	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Disturbance	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect
Species mortality/injury	Pathway for effects	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect	No pathway for effect

5.4 Justification for Screening Out European Sites

5.4.1 Cwm Clydach SAC

Cwm Clydach SAC is approximately 4.3m east of the proposed development, and is designated primarily for its *Asperulo-Fagetum* beech forests.

There is no direct hydrological connection between the site and the Cwm Clydach SAC, as such there is no direct pathway for negative effects on the water quality of the designated site, or as a result of increases in flow during construction or operation.

Potential effects on the Cwm Clydach SAC are therefore limited to air quality effects due to increased vehicle movements and dust during construction and vehicle and factory emissions during the site's operation (as detailed within Chapter 5: Air quality). However, due to the distance/spatial separation of the SAC from the proposed works it is considered that any changes in air quality would not result in any effects to qualifying habitats of Cwm Clydach SAC; therefore, no likely significant effect is predicted.

Since no likely significant effect is predicted, there is no mitigation considered to be necessary to avoid or reduce impacts on the Cwm Clydach SAC during construction or operation of the proposed development, and this European Site is not considered further within the Appropriate Assessment stage.

5.4.2 River Usk SAC

The River Usk SAC is located approximately 7.8km from the proposed site at its closest point. The SAC is designated for the Annex II fish species and otter which it supports, as well as the riverine habitats it provides.

There is no direct hydrological connection between the site and the River Usk SAC, as such there is no direct pathway for negative effects on the water quality of the designated site, or as a result of increases in flow during construction or operation. Surveys have found no evidence of otter using the site and habitats within the site were considered to be sub-optimal for this species; although occasional presence is not ruled out, the potential for any otter to be using the site, to be connected with the River Usk SAC population, is considered to be highly unlikely due to the lack of habitat connectivity.

Potential effects on the River Usk SAC are therefore limited to air quality effects due to increased vehicle movements and dust during construction and vehicle and factory emissions during the site's operation (as detailed within Chapter 5: Air quality). However, due to the distance/spatial separation of the SAC from the proposed works it is considered that any changes in air quality would not result in any effects to qualifying habitats or species of the River Usk SAC; therefore, no likely significant effect is predicted.

As such, there is no mitigation considered to be necessary to avoid or reduce impacts on the River Usk SAC during construction or operation of the proposed

development, and this European Site is not considered further within the Appropriate Assessment stage.

5.4.3 Aberbargoed Grasslands SAC

Aberbargoed Grasslands are designated for the presence of marsh fritillary, for which the site is considered one of the best habitats in the UK, and marshy grassland. The site, at its closest point, is located approximately 12.8km from the proposed development.

As is best practice, potential impact pathways on all sites which are designated for the presence of marsh fritillary butterfly, within 15km of the proposed development, should be considered within the HRA. There may be a potential effect on the species should they occur within the site or in the habitats immediately adjacent. The desk-study did not return any records of the species in the areas immediately surrounding or on the site, and the species or their larval food plant were not recorded during the surveys carried out. Therefore, it is considered unlikely that any metapopulations of marsh fritillary, associated with Aberbargoed Grasslands SAC, would occur within the Site and be negatively affected during construction; therefore, no likely significant effect is predicted.

Operational effects on Aberbargoed Grasslands SAC are also considered to be unlikely, due to the distance at which marsh fritillary presence has been recorded and their assumed absence from the Site. If retained habitats on the site, such as marshy grassland to the east of the factory, are subject to long term management, it may increase the suitability for marsh fritillary, although due to the distance and small extent of potential habitat, it is considered unlikely that this species would utilise the site, and therefore be subject to potential adverse effects during operation. In addition, due to the spatial separation of the designated site and the proposed development, and lack of hydrological connections, there is not considered to be a likely significant effect on the qualifying habitats of Aberbargoed Grasslands SAC, as a result of changes in air and or water quality.

No mitigation is required to be integrated into the construction or operation stages of the proposed development to avoid reduce or cancel effects on Aberbargoed Grasslands SAC, and this European site is not considered further within the Appropriate Assessment stage.

5.5 Consideration of the effects and significance

The Usk Bat Sites SAC have been included in the Appropriate Assessment due to potential impacts on the qualifying species and habitats, in the absence of mitigation. Potential effects are considered in more detail in Section 6, the Appropriate Assessment Stage, and where they are assessed against the Conservation Objectives of each of the relevant European Sites.

Due to the distance from the site and the lack of hydrological connections to the Usk Bat Site SAC and Cwm Clydach SAC, there is not considered to be a pathway for effects due to changes in water quality.

Furthermore, changes in air quality are not considered to result in significant effects (as discussed within Chapter 5: Air quality). Air quality modelling has screened out potential effects on all European sites with the exception of operational effects on the Usk Bat SAC.

Air quality modelling results show that there are marginal exceedances of the 1% critical load¹³ threshold for nitrogen deposition (at 1.06%). This is when compared with the lower critical load (5 kg N/ha/yr) however, and due to high levels of precipitation at this location¹⁴ (which limits effects of nitrogen deposition as a result of leaching) comparing against the higher critical load is considered more appropriate. When compared with the higher critical load (10 kg N/ha/yr) total nitrogen deposition is below the 1% threshold.

Total acidity (SO₂) is over the 1% threshold when compared against the minimum critical load, at both the Usk bat SAC and when compared to the maximum critical load however, total acidity is less than the 1% threshold.

As such, when considering a range rather than just a minimum critical load, potential effects from acidity and nitrogen deposition, are considered to be minor to negligible, and not likely to result in a significant effect on the Usk bat SAC.

Furthermore, background levels of both pollutants are very high at the location of Usk bat SAC, with levels of nitrogen deposition at 19.3 (kg N/ha/yr) and acid deposition at 1.38/0.29 (kg N/ha/yr), and guidance states that where baselines are already high, scope for further declines in air quality will necessarily be limited¹⁵; since if a site is currently exceeding its critical loads and not achieving its relevant biodiversity objectives, then damage to the site is already likely to be occurring or has already happened.

Therefore, it is considered, that these small changes in air quality would not result in further deterioration of the designated sites and their qualifying habitats. No Likely Significant Effect would occur.

¹³ Defined as: "the highest load that will not cause chemical changes leading to long-term harmful effects in the most sensitive ecological systems". Critical loads are the maximum amount of pollutants that ecosystems can tolerate without being damaged.

¹⁴ Metrological data (2015-2019) indicated that it rained on 43% of days at the met station location

¹⁵ CIEEM (2021) Advisory note: Ecological Assessments of Air Quality Impacts

6 Appropriate Assessment

6.1 Usk Bat Sites/Safleodd Ystlumod Wysg SAC

There are potential pathways for habitat degradation as a result of the proposals, due to impacts on air quality during construction and or operation. Due to the distance from the site, the proposed development is not considered likely to directly impact the designated site, and so direct habitat loss within the SAC is not considered here.

As discussed above, potential effects on water quality have been screened out due to the absence of hydrological connections. In addition, effects on the Usk Bat SAC from changes in air quality, whilst likely to occur, are not considered to have a likely significant effect on qualifying habitats of the SAC.

Potential impacts on lesser horseshoe bats, as a qualifying feature of the SAC, have been considered in regard to potential habitat loss (of contributing habitat outside the SAC boundary), habitat fragmentation, disturbance and species mortality due to the presence of lesser horseshoe within the site, and adjacent habitats.

6.1.1 Habitats

6.1.1.1 Conservation Objectives

The conservation objectives of the qualifying habitats aim to ensure the habitats are in favourable conservation status by meeting the criteria set out in the management plans. Specific conservation objectives for the qualifying habitats are set out in Table 1.

The conservation objectives for the habitat features state that the habitat features will be considered to be in favourable conservation status when the following are met:

- Its natural range and area it covers within that range are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The habitat features of the site are vulnerable to land use changes due to changes in management and urbanisation, unauthorised vehicle use, invasive species, air and water pollutants. These habitats may be threatened by the potential impacts both during construction and operation of the site.

6.1.2 Lesser Horseshoe Bats

The conservation status of a lesser horseshoe is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. Further details of the species-specific conservation objectives are included in Table 1.

The conservation status will be taken as ‘favourable’ when:

- Population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The specific conservation objectives for the species are set out in Table 1 and include ensuring the appropriate foraging habitat is available for the species.

6.1.2.1 Habitat Loss and Degradation

The lesser horseshoe bats within the Usk Bat sites SAC utilise the cave systems within the SAC. The site provides one of the largest maternity roosts for the species within the country as well as a number of important hibernation roosts. The site supports up to 5% of the UK population, although this is thought to potentially be an underestimation¹⁶. Lesser horseshoe bats also utilise the wider habitats for foraging and commuting.

Low numbers of individual lesser horseshoe bats (approximately two individuals) have been recorded roosting within the Tech-board building to the south of the site (approximately 85 m) and foraging infrequently within the site. Roosting evidence was found in the form of droppings on the floor of office rooms in the west and east of the main building (Building A), and single bats were observed roosting in a room on the first floor in the west of the building, and a single bat was observed within a room in the northern part of the building (on two survey visits). Foraging activity by lesser horseshoe bats was focused along edges of woodland and scattered trees within the site, as well as within the adjacent Tech-board building and connecting habitats. No suitable roosting sites for lesser horseshoe bats were recorded within the site.

It is not possible to rule out that the individual lesser horseshoe bats found within and adjacent to the site, contribute to the Usk Bat SAC, as the core sustenance zone for lesser horseshoe bats is 2km. However, the presence of small numbers of non-breeding female/male lesser horseshoe bats recorded roosting and foraging during summer months, suggests that species of this bat occurring within the site are not a significant component of the SAC population.

¹⁶

<https://naturalresources.wales/media/674281/Usk%20Bat%20Sites%20Management%20Plan%20Feb%202008.pdf>

There will be no lesser horseshoe roosting sites lost as a result of the proposed development. There is a potential minor loss of foraging habitat as a result of the proposed development due to the loss of species rich grassland, marshy grassland, scrub and woodland, as a result of the proposed development. In addition, there is a potential for the deterioration of adjacent foraging habitats during construction or operation due to air/water pollution. However, these habitats occur extensively within the local area, and can easily be utilised by any displaced foraging bats. Furthermore, only low numbers of lesser horseshoe bats were recorded foraging within habitats on the site.

As such, while there may be a minor loss of foraging habitat and potential deterioration of the quality of adjacent habitat, due to the low numbers recorded and the likelihood that these bats do not significantly contribute to the lesser horseshoe bat populations within the SAC, the proposals are therefore not considered likely to have a significant effect on this feature of the European Site.

In addition, mitigation is considered below which would further reduce any potential habitat loss or degradation effects on lesser horseshoe bat populations associated with the Usk Bat Site SAC.

6.1.2.2 Habitat Fragmentation

Habitat fragmentation during construction is considered likely to occur along the southern part of the site, due to the loss of tree/woodland habitat in this area, which provide connectivity for foraging/commuting bats around/through the site. As such, the minor loss of this foraging/commuting habitat for lesser horseshoe bats, could lead to habitat fragmentation, with the proposed development separating the site from the known bat roost located on the Rassau Industrial Estate, the Usk Bat Sites SAC and wider landscape. Considering the presence of other suitable commuting/foraging habitats, to the north and east of the site which would continue to provide connectivity for lesser horseshoe in the area to the SAC, it is likely that the small extent of habitat fragmentation within the site would not have a significant effect on the designated site.

Mitigation is considered below which would further reduce any potential habitat fragmentation effects on lesser horseshoe bat populations, which may be associated with the Usk Bat SAC.

6.1.2.3 Disturbance

As a result of the proposed construction there is a potential for minor disturbance to roosting lesser horseshoe bats within the adjacent Tech-board site. However, due to the distance of the site from the known roosts (approximately 85m), the potential disturbance as a result of noise or vibration during construction and operation are considered to be minimal and not significant (see also Chapter 10: Noise). In addition, the existing planting along the Tech-board site is likely to buffer the potential effects of any noise.

The Tech-board site is also proposed for redevelopment with a compensatory roost being provided to the south west (>300 m). Should the proposed Tech-board works go ahead, the roost will be located further from the site, and therefore will

reduce the likelihood of disturbance to roosting bats, assuming the bats use the compensatory roost provided.

The proposed development may also result in disturbance to foraging or commuting bats during construction and operation. Disturbance to foraging/commuting bats, could occur since retained habitats (which will continue to provide a foraging/commuting corridor through the site during construction) will be in close proximity to potential disturbance sources during construction and operation. However, as there are extensive areas of suitable foraging and commuting habitat to the north and east of the site, which provide connectivity to the SAC, this is not expected to have a significant effect on the population of lesser horseshoe bats that form the qualifying feature of the Usk Bat Sites SAC.

In addition, mitigation is considered below which would further reduce any potential for disturbance effects on lesser horseshoe bat populations, which may be associated with the Usk Bat Site SAC.

6.1.2.4 Species Mortality

There is a potential for species mortality during construction due to collisions with vehicles. As there is not expected to be any night working during construction, construction phase mortality due to vehicle collision is not expected to be a likely risk to bats. There is also the potential for vehicle collision during operation, as the factory will be in operation 24hrs a day.

Mitigation is considered below which would reduce any potential for species mortality effects on lesser horseshoe bat populations, which may be associated with the Usk Bat Site SAC.

6.1.2.5 Mitigation

Tree lines along the southern periphery of the site, and along the retained stream which runs through the site, will be retained during construction to maintain habitat connectivity for foraging/commuting bats. As a result of the proposed development, species rich habitats will be created around the sites periphery including woodland and grassland, In addition marshy grassland within the east of the site will be enhanced through management, increasing its value as a foraging resource for bats and other species.

Sustainable Drainage Systems have also been incorporated into the design, utilising ponds of varying sizes with shallow slopes and ledges. These ponds, as well as ensuring appropriate drainage and water treatment at the site, will also provide micro-climates for a variety of species such as the invertebrate populations which support foraging bats.

In addition, best practice construction mitigation measures, incorporated into a (Construction Environmental Management Plan) CEMP (Appendix A3), will be implemented to mitigate the risk of any adverse effects on the lesser horseshoe bats of the Usk Bat Sites SAC including:

- The provision of toolbox talks by a qualified ecologist to highlight the ecological features on site to all site staff. A list of all attendees will be signed and recorded with the site office as record of the talk;
- Measures to protect trees to be retained within and immediately adjacent to the Site and access route in line with the British Standard BS5837:2012;
- In order to ensure minimal lighting of adjacent habitats and disturbance to nocturnal species, any lighting required outside of daylight hours will be directional towards the ground;
- Construction noise and vibration will be minimised as far as possible in line best practice;
- All vehicles and machinery will be switched off when not in use;
- All traffic on site will be restricted to low speeds during construction;
- A sensitive lighting plan will be produced to demonstrate how retained landscape habitats within and adjacent to the site will not be illuminated during operation. This will follow best practice guidance by the Bat Conservation Trust¹⁷;
- Retained and created habitats as part of the site's landscaping will be subject to long term maintenance and monitoring; and
- A traffic management plan for the site's operation will ensure traffic on site is restricted to low speeds.

6.1.2.6 Residual Effects

Subject to the implementation of the above mitigation and best practice working methodologies, it is not considered that there would be a significant residual effect on lesser horseshoe bats, roosting or foraging in the vicinity of the site or local bat populations including any associated with the Usk Bat Site SAC, and therefore adverse effects on the integrity of the SAC will not occur.

6.2 In-Combination Assessment

The small-scale residential developments within 500m of the site are not considered likely to result in in-combination effects due to the minor nature of the proposed developments, and the spatial separation from the CiNER site.

There are a number of applications for redevelopment of the units on the Rassau Industrial Estate. The majority of these involve minor redevelopment works or extensions to existing sites. This includes redevelopment of the Tech-Board site, which is known to support a number of roosting bats including lesser horseshoe bats. Separately from the CiNER development detailed here, appropriate mitigation and protection of bats has been agreed through the Tech-Board development in the form of a compensatory roost and mitigation during clearance, to ensure the maintenance of the favourable status of the lesser horseshoe species.

¹⁷ <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>

All work at the Tech-Board site will be carried out under licence to ensure no effects from the proposals at the site.

As a result, there are not expected to be any significant adverse impacts on the lesser horseshoe bats due to the Tech-Board development, and it is not considered likely that there would be any in-combination effects from this or any other projects.

7 Proposals for Monitoring

7.1 Pre-Construction Monitoring

If more than 18 months have elapsed since the surveys were undertaken to inform this assessment, further monitoring will be undertaken to provide up to date information on the presence of any SAC qualifying features.

7.2 Monitoring During Construction

The contractor undertaking these works will incorporate all recommended mitigation from this HRA into the Outline CEMP (Appendix A3).

It is assumed that an ecologist will be retained to act as an Ecological Clerk of Works (ECoW) during the construction period. The ECoW will be available to monitor any potential aspects of the works as required and advise on potential constraints relating to qualifying features of the SAC that may arise.

7.3 Post-Construction Monitoring

The retained and newly created habitats as part of the site's landscaping will be subject to long term maintenance and monitoring, as detailed in the EIA Ecology Chapter (7).

7.4 Reporting

The final CEMP and all correspondence between NRW and/or BGCBC, and the contactors, where undertaken, should be retained.

8 Conclusion

CiNER Glass Ltd. is proposing to develop the remaining undeveloped unit of the Rassau Industrial Estate, Blaenau Gwent, for the creation of the Dragon Glass Bottle Manufacturing Facility.

A number of European Sites were identified in proximity to the proposed works including Usk Bat Sites/Safleodd Ystumod Wysg SAC, Cwm Clydach Woodlands SAC, and River Usk/Afon Wysg SAC. In addition, the potential pathways of impact on the Aberbargoed Grasslands SAC were also considered.

There were found to be no effects on the Aberbargoed Grasslands SAC and the River Usk SAC, due to the distance from the sites and the lack of potential impact pathways. As such, these sites were excluded from the Appropriate Assessment. In addition, due to the lack of hydrological connection, potential habitat degradation due to water quality changes at Cwm Clydach woodland and the Usk Bat Sites SACs was screened out, as there is not expected to be any likely significant effects on water quality. Air quality effects on the at Cwm Clydach woodland were also screened out based on modelling results.

Due to the potential for effects on lesser horseshoe bats, as a qualifying feature of the Usk Bat Sites SACs, an Appropriate Assessment has been undertaken which considers the potential effects due to species disturbance and species mortality in addition to loss and degradation of habitats within the site which support lesser horseshoe bats. In the absence of mitigation, there could be potential significant effects on lesser horseshoe bats as a qualifying feature of the Usk Bat SAC. However, the Appropriate Assessment has identified that with the appropriate mitigation measures, the proposed works are considered to be sufficient to ensure that the construction and operation of the proposed development do not lead to any adverse effects on the integrity of the European Site, either alone or in combination with other plans or projects.

Figures

Figure 1: Site Location



Figure 2: European Sites

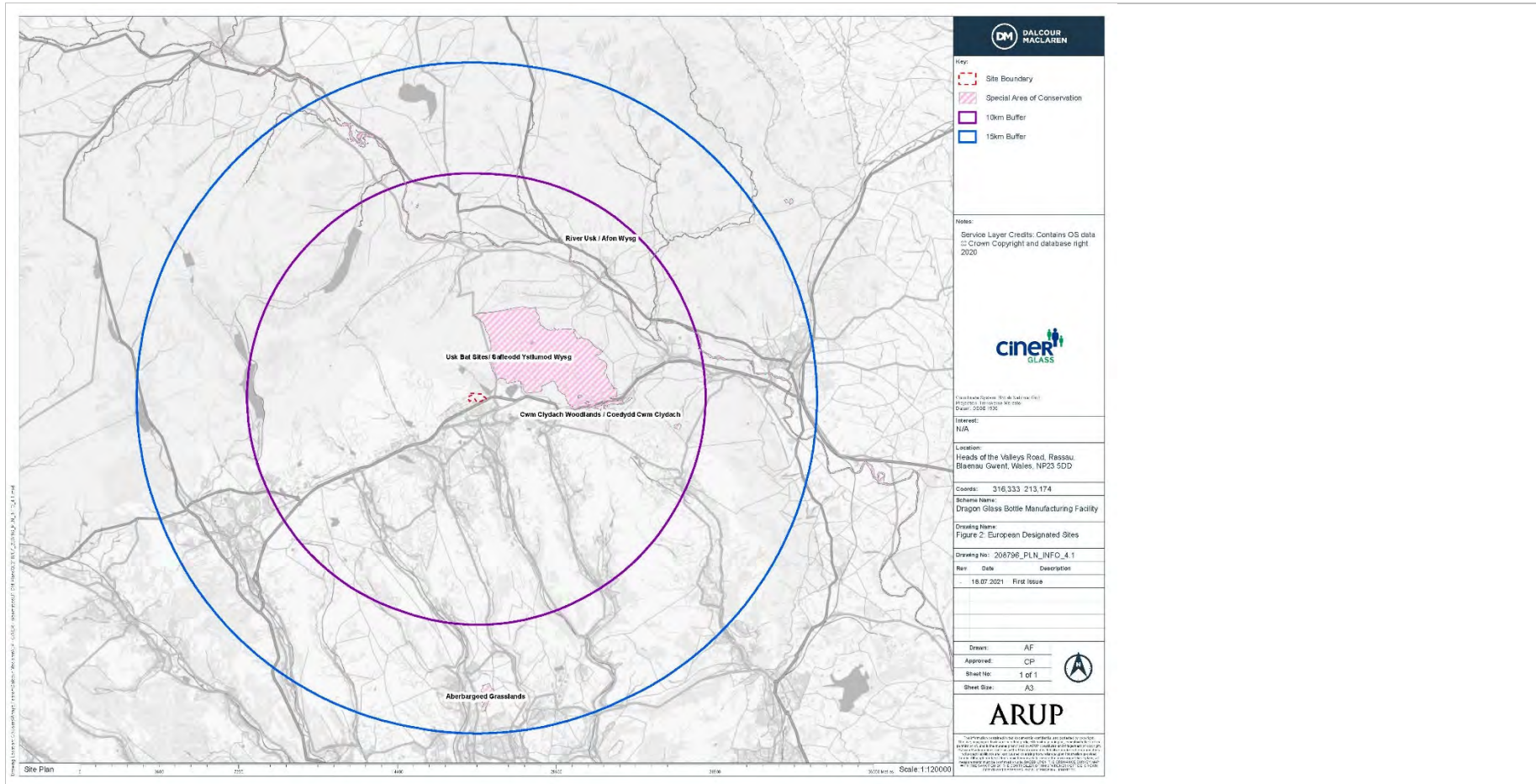
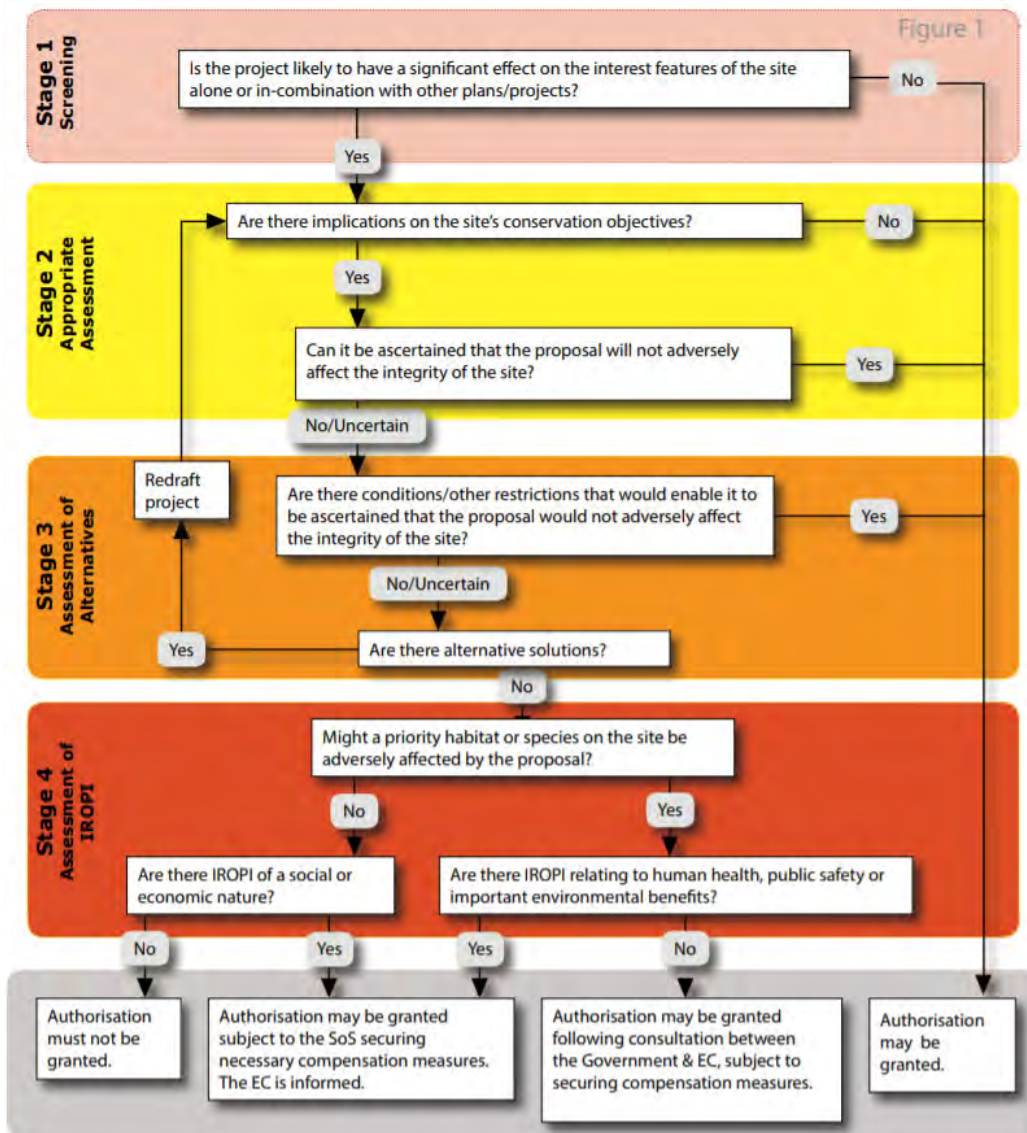


Figure 3: Habitats Regulation Assessment Process



Copied from: The Planning Inspectorate, 2017. Habitat Regulations Assessment relevant to nationally significant infrastructure projects. Version 8, November.

D13 Ecosystems Resilience Assessment

Table D13.1 Ecosystem resilience assessment on broad habitat types

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
Grassland (species rich open mosaic and marshy grassland)	5.88 ha species rich on post-industrial habitat with good assemblage of flora, qualifying as SINC habitat. Limited opportunities for fauna. Value for common and widespread invertebrates, and foraging resource for other species such as bats and birds. Common and widespread fungi species also present.	Circa 5.88 ha lost as a result of the development. New habitats to be created on site will be circa 3.22 ha, and offsite habitat provision will be also be provided circa 158 ha woodland and grassland habitats. Expected decrease (-ve) as overall loss of habitats as a result of the proposed	Species rich grassland will be created around the site's periphery and off-site. Potential for deterioration of quality as a result of lack of management in the long term (to prevent encroachment by ruderals, scrub and invasive species). Also potential disturbance during operation from increased human activity.	Unlikely to be affected by the scheme. No change as a result of the final design (0).	Over population/over use, non-native invasive species, pollution, habitat change, inadequate management

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	<p>Will be lost as a result of the development. Species rich grassland will be established in areas around the site's periphery, and of site habitats will be enhanced and subject to long term management. In addition, circa 158 ha woodland and grassland habitats within off site LNRs will be subject to long term management.</p> <p>Expected increase as a result of the proposed landscaping and</p>	<p>development, although condition and connectivity will be enhanced.</p>	<p>Expected increase as a result of the proposed landscaping and management of this and off site LNRs (+ve).</p>		

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	management of this and off site LNRs (+ve).				
Marshy Grassland (species poor)	<p>2 ha species poor marshy grassland lost.</p> <p>3.45 ha species poor marshy grassland, with deep peat, retained and subject to long term management to restore peat and enhance species diversity.</p> <p>Expected increase as a result of the proposed enhancements on site (+ve)</p>	<p>3.45 ha species poor marshy grassland, with deep peat, retained and subject to long term management to restore peat and enhance species diversity. In addition, offsite habitat provision will be also be provided.</p> <p>Expected decrease (-ve) as overall loss of habitats as a result of the proposed development, although condition</p>	<p>Species rich marshy grassland will be created adjacent to the site and managed to enhance condition.</p> <p>Potential for deterioration of quality as a result of lack of management in the long term, and from increased human disturbance and pollution during operation.</p> <p>Expected increase as a result of the proposed landscaping and</p>	<p>Not anticipated to be affected.</p> <p>No change as a result of the preferred design (0).</p>	<p>Over population/over use, non-native invasive species, pollution, habitat change, inadequate management</p>

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	dependant on long term management.	and connectivity will be enhanced.	management of this on site habitat (+ve).		
Ponds, ditches and watercourses	<p>Species poor habitats, with limited opportunities for fauna. Limited aquatic flora. No signs of otter have been recorded. Small numbers of palmate newt recorded in ephemeral waterbodies on site.</p> <p>Majority of waterbodies on site to be lost as a result of the development (Circa 0.31 ha). Main watercourse will be retained and enhanced however,</p>	<p>The majority of waterbodies will be lost as a result of the development although the main watercourse running through the site will be retained (circa 0.15 ha). These waterbodies comprise ephemeral ponds and ditches with limited flora/fauna.</p> <p>A number of SUDS ponds will be created on site (circa 0.3 ha pond) including permanent waterbodies, and the main watercourse</p>	<p>Potential for deterioration of quality as a result of pollution during construction and operation but will be managed through use of best practice measures.</p> <p>Potential lack of management in the long term and disturbance from increased human activity on site, could also degrade habitats.</p> <p>Expected increase as a result of the proposed</p>	<p>Not anticipated to be affected.</p> <p>No change as a result of the preferred design (0).</p>	<p>Economic development, increasing water, abstraction, pollution, over population, chemical use/waste disposals/agricheicals, climate change, inadequate, management/channel, modification, recreation, overuse</p>

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	<p>and new SUDS ponds created which will also comprise permanent waterbodies.</p> <p>Potential indirect impacts such as pollution will be mitigated for through the implementation of best practice pollution control measures.</p> <p>Expected increase as a result of the proposed enhancements on site (+) dependant on long term management.</p>	<p>enhanced post construction.</p> <p>Expected increase as a result of the proposed landscaping within the site (+ve), dependant on long term management.</p>	<p>landscaping and management of this and off site LNRs (+ve).</p>		

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
Woodland	<p>Conifer and mixed plantation. All woodland habitat is suitable for nesting birds. Areas rich in fungi and support rare/notable species.</p> <p>The majority of conifer and mixed plantation woodland will be lost as a result of the development although lines of broadleaved and conifer tree species will be retained along the watercourse and in the southern periphery of the site. Landscaping will comprise the</p>	<p>Landscaping will comprise the creation of native broadleaved woodland including an area of wet woodland. Trees will comprise native, locally sourced species. In addition, woodland management is proposed off-site within a number of local woodlands.</p> <p>Expected decrease (-ve) as overall loss of habitats as a result of the proposed development, although condition and connectivity will be enhanced.</p>	<p>Majority of woodland is conifer plantation, with limited value, although mixed woodland has value for fungi</p> <p>Small area of mixed plantation woodland provides good condition for fungi.</p> <p>New planting and long term woodland management should introduce more species diversity, and fungal diversity including through relocation of dead wood.</p> <p>Expected increase as a result of the</p>	<p>Not anticipated to be affected.</p> <p>No change as a result of the preferred design (0).</p>	<p>Economic development, increasing water, abstraction, pollution, over population, chemical use/waste disposals/agricchemicals, climate change, inadequate, management/channel, modification, recreation, overuse</p>

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	<p>creation of native broadleaved woodland including an area of wet woodland. Trees will comprise native, locally sourced species. In addition, circa 158 ha woodland and grassland habitats within off site LNRs will be subject to long term management.</p> <p>Expected increase as a result of the proposed landscaping and management of this and off site LNRs (+ve).</p>		<p>proposed landscaping and management of this and off site LNRs (+ve).</p>		

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
Scrub/ruderal	<p>Dense and scattered scrub across grassland. Limited value for nature conservation though supports nesting birds, and habitat mosaic for reptiles. The encroachment of scrub across species rich grassland within the site will also result in the deterioration of the grassland in the long term.</p> <p>Majority of scrub to be lost from the site as a result of the development including circa 1.3 ha dense scrub and</p>	<p>Majority of scrub to be lost from the site as a result of the development including circa 1.3 ha dense scrub and 1.17 ha scattered scrub.</p> <p>Long term management will aim to keep grasslands open and free of scrub to encourage floral diversity. Likely to be a small amount of scrub which establishes naturally, and formal planting around the building will comprise shrubs which will be beneficial to invertebrates.</p>	<p>Majority of scrub to be lost from the site as a result of the development including circa 1.3 ha dense scrub and 1.17 ha scattered scrub.</p> <p>Long term management will aim to keep grasslands open and free of scrub to encourage floral diversity. Likely to be a small amount of scrub which establishes naturally, and formal planting around the building will comprise shrubs which will be beneficial to invertebrates.</p>	<p>Majority of scrub to be lost from the site as a result of the development including circa 1.3 ha dense scrub and 1.17 ha scattered scrub.</p> <p>Long term management will aim to keep grasslands open and free of scrub to encourage floral diversity. Likely to be a small amount of scrub which establishes naturally, and formal planting around the building will comprise shrubs which will be</p>	<p>Economic development, increasing water, abstraction, pollution, over population, chemical use/waste disposals/agricheicals, climate change, inadequate, management/channel, modification, recreation, overuse</p>

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	<p>1.17 ha scattered scrub.</p> <p>Long term management will aim to keep grasslands open and free of scrub to encourage floral diversity. Likely to be a small amount of scrub which establishes naturally, and formal planting around the building will comprise shrubs which will be beneficial to invertebrates.</p> <p>Decrease in diversity as result of the proposed landscaping and</p>	<p>Decrease in extent/size as result of the proposed landscaping and long term management (-ve).</p>	<p>Decrease in condition as result of the proposed landscaping and long term management (-ve).</p>	<p>beneficial to invertebrates.</p> <p>Decrease in connectivity as result of the proposed landscaping and long term management (-ve).</p>	

Ecosystem Natural asset	Diversity	Extent/size	Condition	Connectivity	Expected Future Change Drivers/Risks for broad habitats
	long term management (-ve).				

Appendix E

Health

E1 Health and health determinants baseline

The health and health determinants baseline is presented on the basis of the wards within the study area, i.e. Rassau (W05000945), Beaufort (W05000937), Badminton (W05000936), Sihowy (W05000764) and Ebbw Vale North (W05000942). The project site sits within the ward of Rassau, but is surrounded by the other wards listed (see Figure 9.1).

E1.1 Demographics

Across each of the wards, there is a split between male and female that is similar to the national average with slightly more females than males (Table 1). The total population in the wards represents 21% of the population within Blaenau Gwent and 0.5% of the population of Wales.

Table E1.1 Population in study area wards, regional and national (Census, 2011)

Area	Males		Females		Total population
	number	%	number	%	
W05000936 : Badminton ward	1,518	48.8	1,592	51.2	3,110
W05000937 : Beaufort ward	1,893	49.0	1,973	51.0	3,866
W05000942 : Ebbw Vale North ward	2,171	47.6	2,390	52.4	4,561
W05000764) ; Sihowy ward	2,756	49	2,874	51	5,630
W05000945 : Rassau ward	1,590	49.2	1,644	50.8	3,234
Blaenau Gwent	34,325	49.2	35,489	50.8	69,814
Wales	1,504,228	49.1	1,559,228	50.9	3,063,456

E1.2 Age distribution

The average age within the four wards is slightly higher than the regional and national average with the Badminton ward being three years higher than the regional average. Within the Badminton ward there are a higher number of people aged 65+ than other wards, in particular when compared to Ebbw Vale North. Table 6 below sets out the age distribution within each ward that falls within the specified age ranges.

Older people and younger people are more susceptible to health issues such as respiratory diseases and therefore the age distribution is an important consideration in a health assessment. For the study area, the population is considered to be of medium vulnerability in terms of age profile.

Table E1.2 Age distribution within each ward (Census, 2011)

Area	Average age	Age range			
		0-4	5 to 17	18 to 65	65+
W05000936 : Badminton ward	43.2	3.5	14.3	60.7	21.6
W05000937 : Beaufort ward	40.8	5.9	15.3	60.9	18
W05000942 : Ebbw Vale North ward	39.3	5.8	16.1	61.9	16.3
W05000764) ; Sihowy ward	40.9	6.0	15.0	60.8	18.1
W05000945 : Rassau ward	40.8	6.4	14.4	60	19.2
Blaenau Gwent	40.5	5.8	14.9	61.3	17.9
Wales	40.6	5.8	14.8	61	18.3

E1.3 Health deprivation

E1.3.1 Welsh Index of Multiple Deprivation

The Welsh Index of Multiple Deprivation (WIMD) looks at relative deprivation levels for small areas within Wales. It is designed to identify where there are small areas with the highest concentrations of several different types of deprivation

which includes eight domains (the green highlighted ones are those that are particularly relevant to this assessment):

- Income (the proportion of people within income below a defined level)
- Employment (percentage of working age population in receipt of employment related benefits)
- Health (limiting long term illness, all-cause death rates, cancer incidence and low weight single births)
- Education (indicators capture low attainment among children and young people and the lack of qualifications in adults)
- Access to services (average public and private travel times to food shops, GPs, primary and secondary schools, post offices, public libraries, pharmacies, petrol stations and leisure centres)
- Community safety (police recorded burglary, police recorded criminal damage, police recorded theft, police recorded violent crime, fire incidence, anti-social behaviour)
- Physical environment (air emissions, proximity to waste disposal and industrial sites)
- Housing (proportion of people living in overcrowded households (bedroom measure), proportion of population living in households with no central heating)

The index is a group of separate measurements which are combined into a single number. The WIMD ranks all small areas in Wales from 1 (most deprived) to 1,909 (least deprived). The smallest area measured is Lower Super Output Area (LSOA) which is a smaller area than a ward, usually containing about 1,500 people.

Within the study area for this development, the most relevant measure is the overall measure, plus the more granular measure in relation to health, employment, physical environment and education. The 2019 WIMD outcomes are set out in Table 7. Where LSOAs are within the 10-20% most deprived and 10% most deprived areas in respect to a particular domain, these have been highlighted amber and red respectively. From the data it can be seen that in terms of health, the population within the study area is below the national average, with 3 of the 13 LSOAs being in the 10% most deprived areas in relation to health. The population is considered to be of high vulnerability in terms of health, medium vulnerability in terms of employment, high vulnerability in terms of education and low vulnerability in terms of physical environment. Baseline data which further supports these values is in the sections below.

Table E1.3 WIMD for the study area in relation to selected domains (2019)¹⁹

Area	Overall (out of 1909)	Health (out of 1909)	Employment (out of 1909)	Physical Environment (out of 1909)	Education (out of 1909)
Rassau 1	1103 (50% least deprived)	1219 (50% least deprived)	698 (50% least deprived)	403 (20-30% most deprived)	802 (30-50% most deprived)
Rassau 2 (W01001471)	211 (10-20% most deprived)	248 (10-20% most deprived)	16 (10-20% most deprived)	640 (30-50% most deprived)	90 (10% most deprived)
Beaufort 1 (W01001144 0)	595 (30-50% most deprived)	383 (30%- 50%) most deprived)	419 (20-30% most deprived)	1337 (50% least deprived)	393 (20-30% most deprived)
Beaufort 2 (W01001441)	235 (10-20% most deprived)	169 (10% most deprived)	292 (10-20% most deprived)	1379 (50% least deprived)	208 (10-20% most deprived)
Beaufort 3 (W01001442)	1462 (50% least deprived)	1228 (50% least deprived)	1255 (50% least deprived)	616 (30-50% most deprived)	1378 (50% least deprived)
Badminton 1 (W01001438)	597 (30-50% most deprived)	456 (20-30% most deprived)	479 (20-30% most deprived)	1077 (50% least deprived)	555 (20-30% most deprived)
Badminton 2 (W01001439)	1176 (50% least deprived)	656 (30-50% most deprived)	1136 (50% least deprived)	886 (30-50% most deprived)	812 (30-50% most deprived)
Ebbw Vale North 1 (W01001456)	46 (10-20% most deprived)	451 (20-30% most deprived)	284 (10-20% most deprived)	1041 (50% least deprived)	542 (20-30% most deprived)
Ebbw Vale North 2 (W01001457)	86 (10% most deprived)	86 (10% most deprived)	104 (10% most deprived)	1417 (50% least deprived)	126 (10% most deprived)

¹⁹ <https://wimd.gov.wales>

Area	Overall (out of 1909)	Health (out of 1909)	Employment (out of 1909)	Physical Environment (out of 1909)	Education (out of 1909)
Sirhowy 1 (W01001472)	1089 (50% least deprived)	989 (50% least deprived)	916 (30-50% most deprived)	391 (20-30% most deprived)	1318 (50% least deprived)
Sirhowy 2 (W01001473)	53 (10% most deprived)	17 (10% most deprived)	61 (10% most deprived)	903 (30-50% most deprived)	86 (10% most deprived)
Sirhowy 3 (W01001474)	437 (20-30% most deprived)	566 (20-30% most deprived)	354 (10-20% most deprived)	798 (30-50% most deprived)	514 (20-30% most deprived)
Sirhowy 4 (W01001475)	799 (50% least deprived)	768 (30-50% most deprived)	784 (30-50% most deprived)	317 (10-20% most deprived)	1164 (50% least deprived)

E1.4 Respiratory disease

E1.4.1 Death from respiratory disease

The smallest area in which deaths from respiratory diseases are measured by Public Health Wales (PHW) are Upper Super Output Areas which are larger areas than wards (usually including populations averaging 31,000). Blaenau Gwent U001 and Blaenau Gwent U002 are the areas covering the study area. These show death rates from respiratory disease (age standardised) per 100,000 population (2017) of 215.7 and 142.1 respectively. This compares with 155.9 per 100,000 population across Wales²⁰. The proposed development site is within the USOA U001 which has a significantly higher rate of deaths from respiratory disease than the Wales average.

E1.4.2 Hospital admissions due to respiratory diseases

In 2017-18 Blaenau Gwent had emergency admission rates (age standardised) per 100,000 population of 2103.3 in Blaenau Gwent U001 and 1987.9 in Blaenau Gwent U002. This compares with 1798.2 across Wales as a whole. This data demonstrates that the health of the population within the study area, and particularly in the areas immediately surrounding the proposed project site is poorer than in other parts of Wales, particularly in relation to respiratory diseases.

²⁰ Health Maps Wales (www.healthmapswales.wales.nhs.uk)

These statistics of death and hospital admissions due to respiratory disease means that the population is highly vulnerable to any changes that may increase risk of respiratory disease.

E1.5 General health of the community

The national census asks people to report on their health in order to gain an estimated understanding of general perceived health. Table 8 reports the findings from 2011 with wards reporting higher than Welsh national percentages of a particular health status being shaded in grey. This gives a clear indication that the general health of the population within the study area is lower than the Welsh average, but similar to the rest of the Blaenau Gwent region.

Table E1.4 Self-reported health status (Census 2011)

Area	Very good health (%)	Good health (%)	Fair health (%)	Bad health (%)	Very bad health (%)
W05000936 : Badminton ward	42.6	30	17	8.4	2.0
W05000937 : Beaufort ward	44.7	31.2	14.7	7.6	1.9
W05000942 : Ebbw Vale North ward	40.9	32.4	16.8	7.1	2.8
W05000764) ; Sihowy ward	41.8	29.1	16.9	9.3	2.9
W05000945 : Rassau ward	41.8	31.2	16.2	7.3	3.4
Blaenau Gwent	41.9	30.6	16.8	8.2	2.5
Wales	46.6	31.1	14.6	5.8	1.8

E1.6 Percentage of community with long term illness or disability

Related to the self-reported health status discussed above is the proportion of people with long term illness or disability which affects day to day activities (Table 9). As for general health, the national census identified the number/proportion of people falling into these categories by asking people to self-report. There therefore remains some level of subjectivity to the measure.

The outcomes point to there being a significantly higher proportion of people within all of the wards (and across Blaenau Gwent) with day-to-day activities being limited a lot compared to Wales as a whole. The figures are slightly less

stark for those within the wards of Blaenau Gwent with day-to-day activities limited a little, but they are higher than the Welsh national average. These concur with the WIMD data which places the study community as high vulnerability in terms of levels illness and disability.

Table E1.5 Percentage of community with long term illness or disability

Area	Day to day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited
W05000936 : Badminton ward	16.3	11.3	71.8
W05000937 : Beaufort ward	14.3	11.2	74.6
W05000942 : Ebbw Vale North ward	14.9	11.3	73.8
W05000764) ; Sihowy ward	17.4	11.9	70.7
W05000945 : Rassau ward	15.0	10.7	74.3
Blaenau Gwent	15.7	11.5	72.8
Wales	11.9	10.8	77.3

E1.7 Life expectancy

Statistics from 2010-12 show that life expectancy within each of the wards and Blaenau Gwent is lower than the Welsh national average. Table 10 sets out the data from the office of national statistics which includes data on how long a person can expect to live in health, before their life starts to become adversely affected by poor health (although comparative data is not available for the county or nationally). Life expectancy in the study area is lower than the national average for both males and females across all wards, except Rassau where females have a higher life expectancy (by one year).

Table E1.6 Life expectancy (2011)

Area	Life expectancy male	Healthy life years male	Life expectancy females	Healthy life years female

W05000936 : Badminton ward	76.4	58.8	79.4	59.5
W05000937 : Beaufort ward	76.1	58.4	79.9	60.3
W05000942 : Ebbw Vale North ward	77.6	57.8	79.2	55
W05000764) ; Sihowy ward	75.8	54.8	81.7	57.0
W05000945 : Rassau ward	76.3	57.8	83.2	58.2
Blaenau Gwent	75.7	Not available	79.9	Not available
Wales	78.2	Not available	82.2	Not available

E1.8 Income deprivation

Data on income deprivation is most usually measured through statistics on the number of people who claim benefits. In August 2020, there were more people in Blaenau Gwent as a whole claiming universal credits (7.2% compared to 6.3% nationally). However, this masks large differences between the wards with Badminton being below the county average (4.7%). Table 11 sets out the number of claimants within each ward, in Blaenau Gwent and Wales. The study population is considered to be of medium vulnerability in terms of changes to income.

Table E1.7 Claimants as a proportion of residents aged 16-64 (August 2020)²¹

Area	Claimants as a proportion of residents aged 16-64
W05000936 : Badminton ward	4.7
W05000937 : Beaufort ward	7.1
W05000942 : Ebbw Vale North ward	7.9
W05000764) ; Sihowy ward	7.2

²¹ NOMIS, 2020

Area	Claimants as a proportion of residents aged 16-64
W05000945 : Rassau ward	7.0
Blaenau Gwent	7.2
Wales	6.3

E1.9 Employment categories

The 2011 census gathered data related to people's employment type and categorised them into eight categories. Table 12 below identifies these categories along with the number of people (aged 16 and over in employment) within each of the categories.

Table E1.8 Industry of employment; all residents over 16 (2011)

Industry	Badminton	Beaufort	Ebbw Vale North	Rassau	Sirhowy	Gwent
All categories: Industry	1,410	1,597	1,795	1,275	2,152	28,400
A, B, D, E Agriculture, energy and water	26	54	32	40	57	749
C Manufacturing	239	312	367	275	468	5,697
F Construction	96	120	116	97	195	2,248
G, I Distribution, hotels and restaurants	281	295	394	243	415	5,615
H, J Transport and communication	62	52	84	54	113	1,394
K, L, M, N Financial, Real Estate, Professional and Administrative activities	115	140	161	120	180	2,483

Industry	Badminton	Beaufort	Ebbw Vale North	Rassau	Sirhowy	Gwent
O, P, Q Public administration, education and health	532	562	552	405	655	9,149
R, S, T, U Other	59	62	89	41	69	1,065

E1.10 Qualifications

Table 13 below identifies the highest level of qualifications attained by residents in the study area (2011 census). This clearly shows that the attainment levels in the study area, as well as Blaenau Gwent are significantly lower than elsewhere in Wales. This is mirrored by the WIMD figures for 2019 which places several of the areas within the study area within the 20% most deprived areas in Wales in terms of the education domain. The study population are considered to be of high vulnerability in terms of education/qualification attainment.

Table E1.9 Highest level of qualifications (2011)

Area	No qualifications	Level 1 qualification	Level 2 qualification	Apprenticeship	Level 3 qualification	Level 4 qualification	Other qualifications
W05000936 : Badminton ward	30.2	13.8	16.1	4.7	10.8	20.5	3.9
W05000937 : Beaufort ward	31	14.6	17.2	4.5	10.2	18.3	4.2
W05000942 : Ebbw Vale North ward	36.4	17.5	15.3	4.0	9.2	13.1	4.5
W05000764) ; Sirhowy ward	38.0	14.7	14.1	4.8	9.4	15.0	4.0
W05000945 : Rassau ward	35.7	15.3	16.0	3.8	9.5	15.8	3.8

Area	No qualifications	Level 1 qualification	Level 2 qualification	Apprenticeship	Level 3 qualification	Level 4 qualification	Other qualifications
Blaenau Gwent	36.0	15.8	15.5	3.5	9.8	15.2	4.2
Wales	25.9	13.3	15.7	3.9	12.3	24.5	4.3

E1.11 Crime

The latest crime statistics reported by Gwent Police for Rassau which includes the area of Rassau Industrial Estate, and the adjacent Beaufort, are set out in Table 14. The Rassau statistics are visually represented in Figure 1. Anti-social behaviour, and violence and sexual offences are the most reported crime within the study area.

Police UK also provide data on how crime rates in areas compare across similar areas. This is based on the number of crimes over a twelve-month period per thousand residents. Figure 2 compares Blaenau Gwent with crime rates across similar areas. However, within the Gwent force area, Blaenau Gwent had slightly higher crime rates than average. These data would suggest that the study area is of medium vulnerability to any changes in crime rates.

Table E1.10 Crime statistics for the last 12 months and annual average (3 yr) in Rassau and Beaufort²²

Crime types	Rassau - Last 12 months	Rassau - Last three year (annual average)	Beaufort - Last 12 months	Beaufort - Last three year (annual average)
Anti-social behaviour	109	94	149	115
Violence and sexual offences	82	72	123	86
Public order	26	33	41	39
Vehicle crime	22	25	26	21

²² Police.UK <https://www.police.uk/your-area/gwent-police/rassau/?tab=Statistics>

Other theft	15	18	17	16
Criminal damage and arson	11	10	15	17
Burglary	9	12	14	15
Drugs	4	3	2	4
Possession of weapons	1	1	0	0.3
Robbery	1	2	0	0.3
Theft from the person	1	0.3	0	0.7
Shoplifting	0	1	0	1.6
Other crime	1	0.3	7	5.6
Total reported crime	282	271.6	394	321.5

Figure E1.1 Rassau Crime statistics for last 12 months (August 2019-2020)11

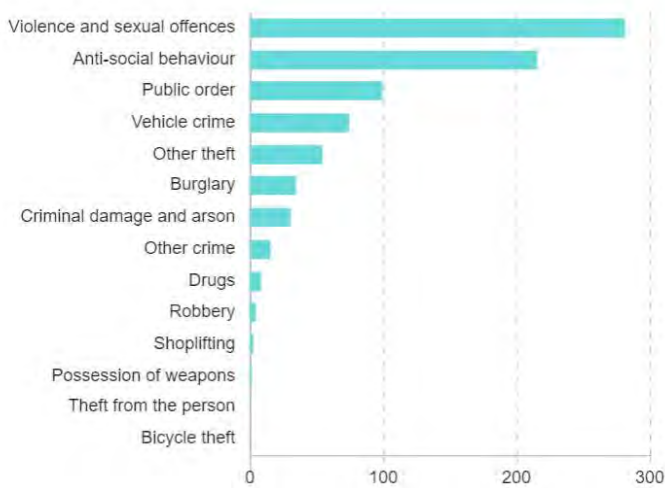
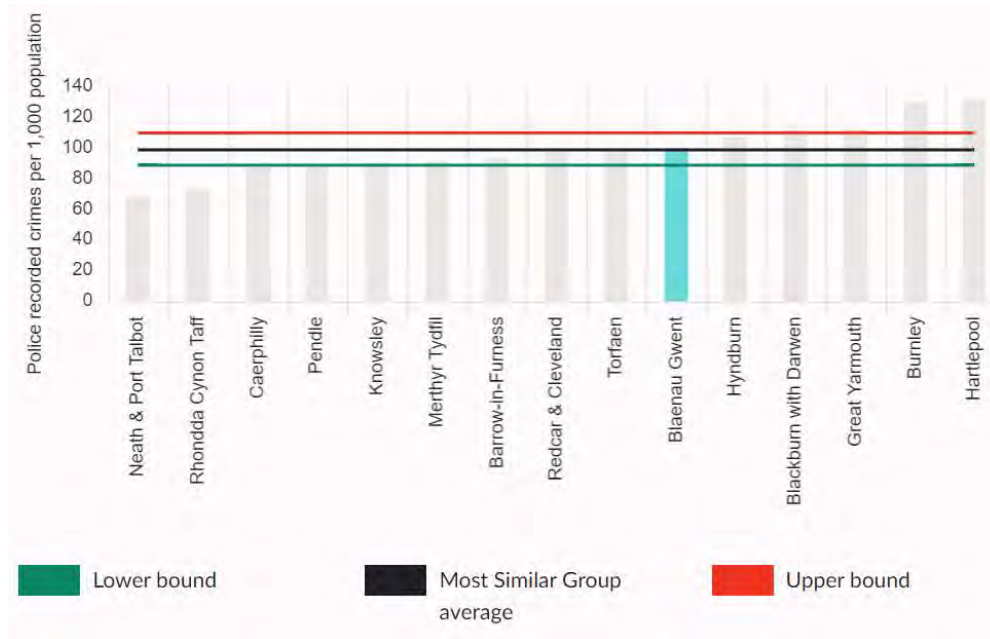


Figure E1.2 Crime in Blaenau Gwent compared with crime in similar areas (year ending March 2020)²³



²³ Police UK, Compare your area. Available at: <https://www.police.uk/pu/your-area/gwent-police/performance/compare-your-area/?tc=GE85> [Accessed on 01.10.20]

E2 Evidence base

The evidence base set out in this appendix is taken from peer reviewed academic journals, papers and other published health reports such as those from the World Health Organisation. The purpose is to define how each of the health determinants affects general population health, and for this reason it is not specifically focused on the local population of the study area for which the health assessment is undertaken.

E2.1 Air quality Evidence base

The World Health Organisation (WHO) recognises outdoor air pollution as a major environmental health problem for all countries, including high-income countries²⁴. There is a wealth of evidence showing the association of nitrogen dioxide (NO₂) and particulate matter on poor health outcomes. Epidemiological studies have shown that long-term exposure to air pollution (over years or a lifetime) reduces life expectancy, due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to increased levels of air pollution can also have a range of health effects, including effects on lung function, asthma, as well as increases in respiratory and cardiovascular hospital admissions, and mortality²⁵. Additionally, outdoor air pollution can influence productivity and contribute to social costs such as increasing days off work and school due to restricted health.²⁶

A Public Health England review of interventions to improve outdoor air quality and public health²⁷ found clear evidence that air pollution is the largest environmental risk to the health of the public in the UK. The review found that:

- It is estimated that between 28,000 and 36,000 deaths each year are attributed to human made air pollution;
- There is a close association with cardiovascular and respiratory disease, including lung cancer;
- There is emerging evidence that other organs may also be affected, with possible effects on dementia, low birth weight and diabetes; and
- It concluded that the most impactful interventions would be those that reduce emissions of air pollution at source.

Evidence on the links between road traffic emissions and health is well established, based on numerous research studies. Similar to the PHE review

²⁴ WHO Topic Sheet. (2018) Ambient (outdoor) air quality and health. [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)

²⁵ Public Health England (2018). Guidance: Health Matters: air pollution.

<https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution>

²⁶ IOM Working for a Healthier Future. Scotland's Environment (2015) Air Quality, Health, Wellbeing and Behaviour, <https://www.environment.gov.scot/media/1133/iom-seweb-aq-health-behaviour-review.pdf>

²⁷ Public Health England (2019), Review of interventions to improve outdoor air quality and public health.

Available from:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/795185/Review_of_interventions_to_improve_air_quality.pdf

mentioned above, a WHO report in 2000 suggested that about 36,000–129,000 adult deaths a year are brought forward due to long-term exposure to air pollution generated by traffic in European cities. The main health damaging pollutants released as emissions from road traffic are Particulate Matter (PM10²⁸) and nitrogen dioxide (NO₂).

PM10, which is an important pollutant with regard to health effects, comprises atmospheric particles that are less than 10µm in diameter. Road transport is a major source of PM10, which is emitted from the combustion of vehicle fuels. There is growing evidence that smaller respirable particulate matter may be more relevant to health than larger particles. Recent studies have found that ultra-fine particles (less than 0.1 µm) have been associated with stronger effects on the lung function and symptoms in asthmatics than either PM10 or PM2.5²⁹.

According to the Lancet Commission on pollution and health³⁰ children are at high risk of pollution related disease and even extremely low-dose exposures to pollutants during windows of vulnerability in utero and in early infancy can result in disease, disability, and death in childhood and across their lifespan. Research has shown that exposure to PM affects children's lung development, including reversible deficits in lung function as well as chronically reduced lung growth rate and a deficit in long-term lung function.

Whilst there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects, there is sufficient evidence available to demonstrate that the adverse effects of air pollution on health outcomes is widely accepted. There is consensus that lowering levels of NO₂ and particulate matter will bring additional health benefits. Therefore, the evidence is judged to be strong.

Defra commissioned a study in 2006 to review recent research evidence on links between air quality and social deprivation in the UK³¹. The analysis for England showed that there is a tendency for higher relative mean annual concentrations of nitrogen dioxide (NO₂) and particulate matter (PM10) in the most deprived areas of the country. This distribution can largely be explained by the high urban concentrations driven by road transport sources, and the higher proportion of deprived communities in urban areas. If exceedances of National Air Quality Standards are considered, the correlation between poor air quality and deprivation is stronger, showing that when the most polluted areas are considered, the greatest burden is on the most deprived communities, and very little on the least deprived.

A review of local air quality monitoring in the vicinity of the CiNER site has been carried out and shows that BGCBC carries out passive diffusion tube monitoring in the vicinity of the site. Details of the nearest monitoring locations are outlined

²⁸ Particulate Matter up to 10 micrometers in size

²⁹ World Health Organization. (2000) Transport, environment and health. WHO Regional Publications, European Series. No.89

³⁰ Landrigan, P.J., et al (2018), The Lancet Commission on pollution and health, The Lancet 391:462-512

³¹ Defra, Netcen, Department for Communities and Local Government, National Statistics. Air Quality and Social Deprivation in the UK: an environmental inequalities analysis - Final Report to Department of Environment, Food and Rural Affairs AEAT/ENV/R/2170, June 2006

in Appendix B3.1 in Volume II Appendices, Table B3.1. The locations of the monitoring sites are shown in Figure 5.9 in Volume III Figures.

Annual mean NO₂ concentrations for 2015 to 2019 are shown in Appendix B3.1, Table B3.2. Results show that concentrations were well below the 40µg/m³ objective at all monitoring locations in all years.

E2.2 Noise evidence base

According to the WHO³², 'excessive noise seriously harms human health and interferes with people's daily activities at school, at work, at home and during leisure time. It can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance and provoke annoyance responses and changes in social behaviour'.

A literature review by van Kamp and Davies in 2013³³ looked at 62 papers published from April 2006 to April 2011, which included the impact of environmental noise on the health of vulnerable people, including primary school children, young adolescents, preschool children, the elderly, and children with autism, asthma and attention deficit hyperactivity disorder. This found that, while vulnerable groups of people may be more at risk from exposure to environmental noise than healthy adults, there is comparatively little research focusing on the adverse health effects of noise on vulnerable people.

A European Commission publication in 2015³⁴ cited evidence that 'living in a quiet area has a positive impact on health. A study assessed quality of life for people living in quiet and noisy locations and found that those who lived in quiet locations – particularly in rural areas – had a better quality of life'.

The recently published 2018 WHO guidelines on Environmental Noise for the European Region³⁵ undertook a series of systematic reviews synthesising exposure and associated impacts on health in order to develop a set of guidelines on how to protect human health. Recommendations were formulated based on the strength of evidence from various noise sources which are road traffic noise, railway noise, aircraft noise, wind turbine noise and leisure noise. The systematic reviews concluded that there was evidence for an association of railway noise and road traffic noise on cardiovascular disease (CVD), sleep disturbance, annoyance, and cognitive impairment, with suggestive but weaker evidence (often due to lack of studies) for effects on mental health and birth weight. Whilst these relate to rail and road noise, it can be assumed that other types of noise affects people in similar ways.

Based on the evidence reviews, the 2018 WHO guidelines set a recommended level for road noise at 53dB Lden and 45dB Lnight. However, the WHO states that recommended levels are not LOAEL (Lowest Observed Adverse Effect

³² World Health Organization (2017), Noise, <http://www.euro.who.int/en/health-topics/environment-and-health/noise>.

³³ van Kamp, I. and Davies, H. (2013), *Noise and health in vulnerable groups: A review*, Noise and Health

³⁴ European Commission, Science for Environment Policy, Thematic issues: Noise impacts on health (2015), <http://ec.europa.eu/environment/integration/research/newsalert/pdf/47si.pdf>.

³⁵ World Health Organisation Regional Office for Europe (2018) Environmental Noise Guidelines for the European Region. http://www.euro.who.int/data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf

Level) values and there is currently no policy requirement to implement these values in the UK.

E2.3 Crime and community safety evidence base

A literature review by Lorenc et al. BMC literature review³⁶ included 40 studies to review and synthesize qualitative evidence from the UK on fear of crime and the environment. The review found that, while environmental factors may influence fear of crime, including visibility and signs of neglect, factors in the local social environment appear to be more important as drivers of fear of crime.

The Department for Communities and Local Government's 2008 Place Survey³⁷ showed that personal safety and low levels of crime are highly valued; respondents were asked to identify up to 5 priorities for a good place to live, and 61% identified low levels of crime as a priority. A study by Stafford et al. in 2007 in the American Journal of Public Health³⁸ found evidence to suggest that fear of crime was a contributory factor in some adverse health outcomes. The study suggested that fear of crime can impact mental health by increasing anxiety and decreasing trust and community participation and has been linked to reducing people's willingness to participate in physical activity³⁹.

In 2012, Lorenc et al.⁴⁰ highlighted that crime and fear of crime have a substantial impact on health but the pathways are often indirect and mediated by environmental factors. For example, the built environment may affect wellbeing by increasing fear of crime due to poor design or quality.

A US literature review of studies of older people's health outcomes in relation to neighbourhood safety identified 32 studies on health status and health behaviours in relation to crime and safety.⁴¹ A systematic review of 22 longitudinal cohort studies of childhood obesity and physical activity⁴², found that children were less likely to undertake physical activity if living in an unsafe environment.

³⁶ Lorenc, T., Petticrew, M., Whitehead, M., Neary, D., Clayton, S., Wright, K., Thomson, H., Cummins, S., Sowden, A. and Renton, A. (2013), *Fear of crime and the environment: systematic review of UK qualitative evidence*, BMC Public Health

³⁷ Department for Communities and Local Government, Place Survey (2008), <http://webarchive.nationalarchives.gov.uk/20120919132719/http://www.communities.gov.uk/documents/statistics/pdf/1326142.pdf>.

³⁸ Stafford, M., Chandola, T. and Marmot, M. (2007), *Association Between Fear of Crime and Mental Health and Physical Functioning*, American Journal of Public Health

³⁹ Jackson, J. and Stafford, M. (2009), *Public health and fear of crime*, British Journal of Criminology Advance

⁴⁰ Lorenc, T., Clayton, S., Neary, D., Whitehead, M., Petticrew, M., Thomson, H., Cummins, S., Sowden, A. and Renton, A. (2012), *Crime, fear of crime, environment, and mental health and wellbeing: mapping review of theories and causal pathways*, Health Place

⁴¹ J. Won et al (2016) *Neighbourhood safety factors associated with older adults' health-related outcomes: A systematic literature review*. Social Science and Medicine 165: 177-186

⁴² R. An et al (2017) *Influence of Neighbourhood Safety on Childhood Obesity: A Systematic Review and Meta-analysis of Longitudinal Studies*. Obesity Reviews. Nov;18(11):1289-1309

E2.4 Access to work and training evidence base

There is a large body of evidence linking employment and income levels with health. The World Health Organization (WHO) identifies a list of health determinants⁴³ that combine to affect the health of individuals and communities. Included in this list is: ‘income and social status - higher income and social status are linked to better health. The greater the gap between the richest and poorest people, the greater the differences in health’.

The Marmot Review, published in 2010⁴⁴, was commissioned by the Department of Health to investigate health inequalities in England and focused on correlations between health and wellbeing and the socio-economic status of communities. The report identified six evidence-based policy objectives to reduce health inequalities, one of which was to create fair employment and good work for all. The Review stated that ‘being in good employment is protective of health. Conversely, unemployment contributes to poor health’. This study also identifies links between educational attainment and physical and mental health.

Much of the literature relating to unemployment and health outcomes is focused on the increased likelihood of poor health in low income groups, often referred to as the social gradient in health. For example, a large-scale study by Wapner in 2015⁴⁵ showed that disadvantaged adolescents reported lower levels of physical activity and higher levels of bodily aches and pains, sleeplessness and emotional difficulties, such as nervousness and irritability, than more advantaged teenagers. In addition, a Spanish study undertaken in 2015⁴⁶ found that the impact of unemployment, particularly long-term unemployment, had a negative impact on self-reported health and mental health.

A study by Clark and Lepinteur⁴⁷ in 2019 explored the causes and consequences of early-adult unemployment. Findings showed that past unemployment can negatively impact on life satisfaction later in life. A Policy Brief for the LEAD Centre⁴⁸ presented evidence to suggest a positive correlation between employment and health for working age people with disabilities.

⁴³ World Health Organization (2017), *Health Impact Assessment - The determinants of health*, <http://www.who.int/hia/evidence/doh/en/>.

⁴⁴ Marmot, M., Allen, J., Goldblatt, P., Boyce, T., McNeish D., Grady, M. and Geddes, I. (2010), *Fair society, healthy lives: Strategic review of health inequalities in England post-2010*, The Marmot Review

⁴⁵ Wapner, J. (2015), *Money is driving a wedge in teen health*, Scientific American

⁴⁶ R.M. Urbanos-Garrido and B.G.Lopez-Valcarcel (2015) *The influence of economic crisis on the association between unemployment and health: an empirical analysis for Spain*. The European Journal of Health Economics. Vol 16(2) 175-184.

⁴⁷ Clark, AE and Lepinteur, A (2019), *The Causes and Consequences of Early-Adult Unemployment: Evidence from Cohort Data*, Paris School of Economics, Working Paper 2019:29

⁴⁸ N. Goodman (2015). *The Impact of Employment on the Health Status and Health Care Costs of Working-age People with Disabilities*. Lead Centre Policy Brief.

http://www.leadcenter.org/system/files/resource/downloadable_version/impact_of_employment_health_status_health_care_costs_0.pdf

A review of longitudinal study literature by Reche et al.⁴⁹ in 2019 suggested that the direct association between income and self-rated health is small. Most studies of this topic have used cross-sectional data and only considered self-rated health as the decisive factor. Moreover, the study was unable to find a statistically significant link between income and morbidity.

A wide range of mechanisms for the health benefits of employment, as well as the negative effects of unemployment, have been suggested. For example, a study by Olesen et al. in 2013⁵⁰ cites numerous references indicating that the health benefits of employment ‘are believed to reflect a combination of material (e.g., income and the resulting access to resources) and psychological outcomes, such as social role and status, access to social networks and support, and a sense of purpose/achievement’ and that ‘in contrast, excluded individuals experience a set of multiple, and often entrenched, disadvantages including limited social support and networks, inadequate financial resources, and poor employment and health’. A literature review by Kim et al. in 2015⁵¹ identified higher incidence of poor self-rated health, mental illness, physical complaints such as coronary heart disease, and higher all-cause mortality in unemployed people compared with those in employment.

There is a large body of evidence linking education, employment and income levels with health. The WHO identifies a list of health determinants⁵² that combine to affect the health of individuals and communities. Included in this list is: ‘education – low education levels are linked with poor health, more stress and lower self-confidence’.

The majority of evidence linking education with health outcomes looks at educational attainment in the context of broader socio-demographic status. An evidence review by the Joseph Rowntree Foundation⁵³ states that improved qualifications can lead to better wages and employment, providing greater access to the health benefits associated with good and secure employment. A University of London report by Feinstein et al. in 2008⁵⁴ on the social and personal benefits of learning states that ‘people with better qualifications are more likely to have healthy lifestyles, to be fitter and slimmer – and such health advantages can be transferred to the next generation at the earliest age’.

⁴⁹ Reche E., Konig, H-H., and Hajek, A. *Income, Self-Rated Health, and Morbidity: A Systematic Review of Longitudinal Studies*. International Journal of Environmental Research and Public Health. Vol 16:2884; doi:10.3390/ijerph16162884.

⁵⁰ Olesen, S., Butterworth, P., Leach, L., Kelaher, M. & Pirkis, J. (2013), *Mental health affects future employment- as job loss affects mental health: findings from a longitudinal population study*, BMC Public Health

⁵¹ Kim, T. and Knesbeck, O. (2015), *Is an insecure job better for health than no job at all? A systematic review of studies investigating the health-related risks of both job insecurity and unemployment*, BMC Public Health

⁵² World Health Organization (2017), *Health Impact Assessment- The determinants of health*, <http://www.who.int/hia/evidence/doh/en/>.

⁵³ Rowntree, J. (2014), *Reducing Poverty in the UK: A collection of evidence reviews*, Joseph Rowntree Foundation

⁵⁴ Vorhaus, J., Duckworth, K., Budge, D. and Feinstein, L. (2008), *The Social and personal benefits of learning: A summary of key research findings*, Centre for Research on the Wider Benefits of Learning, Institute of Education, University of London, London

An evidence review by the Economic and Social Research Council ⁵⁵ suggests that the level of education a person has correlates with positive life outcomes including health and wellbeing.

⁵⁵ Economic and Social Research Council. Evidence Briefing: The wellbeing effect of education. July 2014.
<https://esrc.ukri.org/files/news-events-and-publications/evidence-briefings/the-wellbeing-effect-of-education/>

Appendix F

Noise and vibration

F1 Baseline survey

F2 Construction noise assumptions

F3 Traffic modelling assumptions

F4 Operational assumptions model

F1 Baseline surveys

F1.1 Introduction

An environmental baseline noise survey was undertaken in 2020 to determine the existing noise climate and character in and around the proposed Dragon Glass Bottle Manufacturing Facility in Rassau. This appendix details the baseline noise survey and results. Owing to Covid-19 restrictions on travel and movement across England and Wales at the time of the survey in 2020, there is the potential that noise levels measured during this period could be less representative of noise levels. The results from the survey in 2020 are presented alongside a summary of measurements taken in the locale in 2019 in support of the A465 Heads of the Valleys (Section 3) project, prior to restrictions being put in place. Comparison of the two surveys has been used in the main ES chapter to provide confidence that the levels used are likely to be representative.

F1.2 2020 noise survey

The noise survey work was carried out by Arup, between 17th and 18th September 2020 for the attended measurements, and between 17th and 23rd November 2020 for the unattended measurements.

F1.2.1 Instrumentation

The sound level meters (SLMs), microphones and sound pressure level calibrators used by Arup are Class 1 instruments, conforming to BS EN 61672-1:2013. All Arup instrumentation is calibrated annually and has full traceable calibration to national and international standards, which are undertaken by an accredited calibration laboratory. Calibration certificates can be provided upon request.

The SLM was checked for correct calibration before and after each series of measurements. The fluctuation of level was less than 0.5dB, which is considered not significant.

All of the SLMs and other related noise monitoring instrumentation used to undertake the survey is described in Table F1.1 below.

Table F1.1: Attended measurement instrumentation

Description	Serial Number	Item Type
Bruel & Kjaer 2270 Kit A	3027537	Sound level meter
Bruel & Kjaer 4189	3180885	Microphone
Bruel & Kjaer 4231	3024648	Acoustic calibrator
Bruel & Kjaer ZC 0032	28144	Preamplifier
Rion NL - 32	01182976	Sound level meter
Rion UC53A	318798	Microphone
Rion NC74	35173565	Acoustic calibrator
Rion NH21	28589	Preamplifier

Table F1.2: Unattended measurement instrumentation

Description	Serial Number	Item Type
RION NC74	35173566	Calibrator

RION NH 21 preamp	29980	Microphone
Rion NL-32	00493038	Sound level meter
Rion UC53A	315944	Equipment

F1.2.2 Measurement methodology

At each location, the L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} metric parameters were measured and recorded. All broadband measurements were A-weighted and used a fast time constant (0.125s).

At each measurement location, the SLM was mounted on a tripod with the microphone set between 1.2m to 1.5m above local ground level. All measurements were taken under acoustically free-field conditions, except where otherwise stated. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

The sound level meter was set to record noise levels over 15 minute periods during the daytime (between 07:00 and 19:00), evening time (between 19:00 and 23:00) and night-time (between 23:00 and 07:00) at three locations, R1, R2 and R3. At location R4 and R5, the sound level meter was set to record noise levels over 15 minute periods during the daytime only.

In each case, the time period was appropriate to provide a good representation of the typical noise climate at each measurement location.

F1.2.3 Attended measurement results

The summary tables for each measurement location provide an arithmetic average of the individual measurements during each time period for L_{A90} and L_{A10} , a logarithmic average for L_{Aeq} and a range of the values for L_{Amax} .

Location Description:

At the junction between Rowan Way and Maple Way. SLM was positioned approx. 7m from the curve of Rowan Way.

Environment and Observations:

Generally quiet, with the occasional vehicle pass-by. Road traffic from the A465 was the dominant noise source. There were some unusual noises such as a helicopter and a car alarm, as well as some pedestrians walking by.

Measurement Duration:

Thu 17/09/2020 13:19
to
Fri 18/09/2020 02:45

Weather Conditions:

Wind Speed: 5m/s
Wind Direction: Easterly
Summary: A little windy but considered acceptable

Additional Comments:

Soundscape in this location is perceived as pleasant with light wind in trees with distance traffic noise. There was no nature sound present such as bird calls.

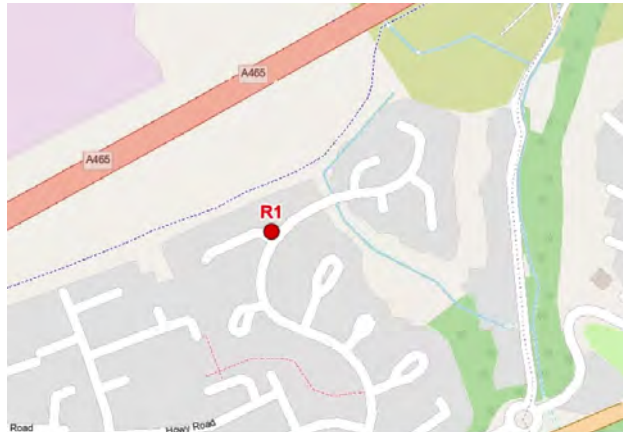


Table F1.3: Summary of averaged sound pressure levels at Location R1

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-19:00)	44	56	54	67 - 71
Evening (19:00-23:00)	39	52	48	66 - 69
Night (23:00-07:00)	34	43	43	50 - 56

Table F1.4: Measured sound pressure levels at Location R1

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							
17/09/2020	13:19	00:15:00	43.7	56.5	53.1	70.8	Helicopter hovering audible, small number of cars passing on Rowan Way and Maple Way. Road traffic noise from the A465 is dominant.
17/09/2020	14:49	00:15:00	44.4	56.0	55.3	67.5	Less wind in trees, no helicopter. Distance road traffic noise (A465)
17/09/2020	16:07	00:15:00	43.6	55.7	54.4	66.5	As above.
Evening							
17/09/2020	19:52	00:15:00	40.1	51.1	50.0	65.5	Less road traffic in comparison to day-time, still dominant noise source
17/09/2020	21:02	00:15:00	40.2	53.3	49.9	69.1	As above.
17/09/2020	22:15	00:15:00	37.3	49.3	45.4	66.7	As above.
Night							
18/09/2020	00:10	00:15:00	36.3	44.8	44.1	56.4	Overall quiet, single vehicle movement on the A465 noticeable.
18/09/2020	01:18	00:15:00	31.5	40.7	40.5	53.2	As above.
18/09/2020	02:30	00:15:00	34.1	42.5	43.4	50.1	As above.

Location Description:

Approximately 6m west from the edge of LLangyndidr road, approximately 85m south of the A465.

Environment and Observations:

Road traffic was the dominant noise source, from Llangynidr Road (B4560) and the A465. Vehicles, including HGV, on Llangynidr Road travels faster than 30mph (speed limit). As there is a bridge over the A465, HGV and car engine noise when they drive up and wheel noise when they drive down is dominant when present.

Measurement Duration:

Thu 17/09/2020 13:54

to

Fri 18/09/2020 03:09

Weather Conditions:

Wind Speed: 5m/s

Wind Direction: Easterly

Summary: due to the exposed nature of the location, windy but considered acceptable.

Additional Comments:

Soundscape in this location is heavily dominated by road traffic noise at relatively high speed.

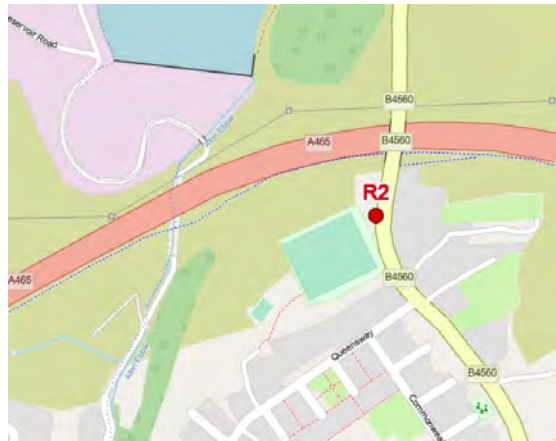


Table F1.5: Summary of averaged sound pressure levels at Location R2

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-19:00)	48	70	70	80 - 84
Evening (19:00-23:00)	38	63	54	75 - 78
Night (23:00-07:00)	28	47	41	49 - 71

Table F1.6: Measured sound pressure levels at Location R2

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							
17/09/2020	13:54	00:15:00	48.2	68.9	68.8	80.1	Road traffic noise from Llanynidr Road is dominant source and A465.
17/09/2020	15:16	00:15:00	47.9	69.2	69.4	84.2	As above
17/09/2020	16:31	00:15:00	48.3	70.3	71.1	83.1	As above.
Evening							
17/09/2020	20:14	00:15:00	43.4	65.3	63.6	76.2	Noticeable less traffic.
17/09/2020	21:30	00:15:00	36.1	60.6	51.1	75.0	As above
17/09/2020	22:37	00:15:00	33.9	59.6	47.4	77.8	As above
Night							
18/09/2020	00:32	00:15:00	27.2	40.3	40.4	50.9	As above
18/09/2020	01:41	00:15:00	28.5	51.1	44.4	70.9	As above
18/09/2020	02:54	00:15:00	27.0	38.7	39.3	49.3	As above

Location Description:

SLM was positioned approximately 14m from the nearest facade of one of the houses on the northernmost section of Pen Y Bryn, approximately 100m to the south-east of the A465.

Measurement Duration:

Thu 17/09/2020 14:23
to
Fri 18/09/2020 03:33

Weather Conditions:

Wind Speed: 1-3m/s
Wind Direction: Easterly
Summary: Light wind, acceptable

Additional Comments:

Soundscape in this location is driven by road traffic noise (attenuated by the earth bund) and domestic noise.

Presence of nature sound, bird calls makes this location more favourable.

Environment and Observations:

Road traffic from the A465 was the dominant noise source. It is noticeable that the existing earth bund long the A465 effectively reduces road traffic noise, however road traffic noise is considered as dominant noise source effecting this location.

During the evening measurements it was noted some domestic noise from the residential properties in the surrounding area, including conversation, dogs, a car horn and a distant car alarm.

During the night-time measurements, dominant sources were single vehicle movements from a far distance. Tonal noise from north (industrial estate) was just audible when there was no traffic pass-by.

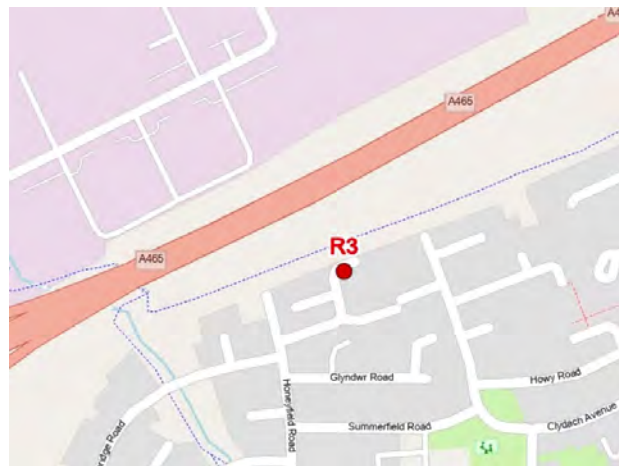


Table F1.7: Summary of averaged sound pressure levels at Location R3

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-19:00)	45	55	52	57 - 74
Evening (19:00-23:00)	39	52	49	59 - 68
Night (23:00-07:00)	36	48	44	52 - 71

Table F1.8: Measured sound pressure levels at Location R3

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							
17/09/2020	14:23	00:15:00	45.0	57.0	52.3	74.3	Dominated by road traffic noise from the A465 with occasional vehicle passing on local road (Pen Y Bryn), people talking and passing
17/09/2020	15:42	00:15:00	44.4	50.3	50.2	56.8	As above with bird twitting.
17/09/2020	16:56	00:15:00	47.0	54.8	52.8	68.9	As above
Evening							
17/09/2020	20:39	00:15:00	39.1	54.5	51.1	68.3	Less traffic noise from the A465 and domestic noise such as dog barking and people talking and passing, car horn and alarm went off.
17/09/2020	21:53	00:15:00	39.3	47.4	46.4	59.1	Road traffic noise from the A465, no domestic noise noticed.
Night							
18/09/2020	00:55	00:15:00	38.1	51.6	46.1	71.0	Less traffic noise, occasional dog barking.
18/09/2020	02:05	00:15:00	35.7	44.0	43.6	57.5	Road traffic noise only, tonal from north was just noticeable.
18/09/2020	03:18	00:15:00	34.7	42.3	40.9	51.7	As above.

Location Description:

On a dirt track leading to the Carno reservoir, approximately 21m from the water, and 135m from the B4560

Environment and Observations:

Generally dominated by the B4560 road where cars travel at high speed. Noise from the reservoir works are also audible. Occasional aircraft flying by.

Measurement Duration:

Fri 18/09/2020 12:42
to
Fri 18/09/2020 12:57

Weather Conditions:

Wind Speed: Less than 5m/s
Wind Direction: West
Summary: Strong wind

Additional Comments:

Soundscape in this area is dominated by road traffic noise. This location is surrounded by green spaces and water feature. It is surveyor’s opinion that it does not look like this track is commonly used by public.



Table F1.9: Summary of averaged sound pressure levels at Location R4

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-19:00)	44	51	50	59 - 59

Table F1.10: Measured sound pressure levels at Location R4

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							
18/09/2020	12:42	00:15:00	43.5	50.6	50.2	59.2	Road traffic noise from Llangynidr Road (B4560) dominant.

Location Description:

The northern tip of the Rassau industrial estate, approximately 34m from Rassau substation, and 24m from the Envirowales Limited office.

Environment and Observations:

Frequent lorry movements and reversing beeps. Tonal noise from surrounding industrial estate.

Measurement Duration:

Fri 18/09/2020 13:38

to

Fri 18/09/2020 13:53

Weather Conditions:

Wind Speed: 3-4m/s

Wind Direction: Easterly

Summary: light wind, acceptable.

Additional Comments:

Sound scape in this location heavily driven by the activities associated with the neighbouring light industries, such as lorry movements and industrial plant.



Table F1.11: Summary of averaged sound pressure levels at Location R5

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-19:00)	53	60	57	74 - 74

Table F1.12: Measured sound pressure levels at Location R5

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							
18/09/2020	13:38	00:15:00	52.5	60.1	57.2	74.0	Tonal/hum noise from immediate light industrial site is clearly audible. Activities associate with them such as lorry movement is clearly audible. Only noise sensitive receptor might be exposed from the proposed development is the office space, however already exposed to noise from existing activities within their site.

F1.2.4 Unattended measurement results

Location Description:

R1 – back garden of residence to the north

Measurement Duration:

Tue 17/11/2020 15:23
to
Mon 23/11/2020 14:08

Environment and Observations:

The soundscape is dominated by distanced road traffic noise arising from the A465 road. There is an embankment along the road. No other specific noise was noted.

The sound level meter was installed in the garden which is partially patio, concrete and little of green space.

Logging Interval:

00:15:00

Weather Conditions:

The weather conditions were acceptable for most of the survey however there may have been instances where there was light rain and wind gusts higher than 5m/s

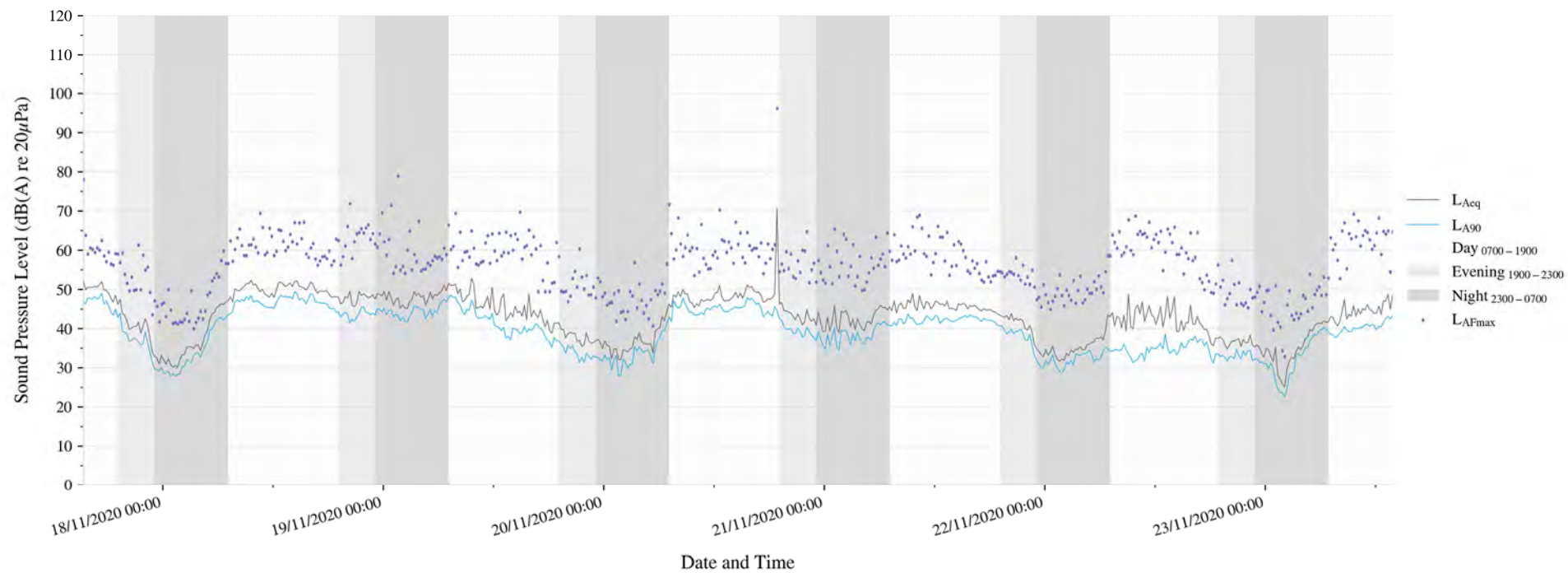


Additional Comments:

N/A



Figure 1: Time history for the unattended measurement at Location R1



F1.3 2019 noise survey

Arup was requested to undertake a 'Post Opening' environmental noise survey at key locations along the recently opened A465 Section 3, between Brynmawr and Tredegar Junction. The noise survey work was carried out by Arup between 13th August 2019 and 5th September 2019.

Noise measurements were undertaken during specific weather conditions compliant with the measurement protocol as stipulated within the 'Calculation of Road Traffic Noise 1988' (CRTN), to undertake the 'shortened CRTN methodology'.

The relevant locations for the proposed development are:

- Location 8 – Briar Close (Rassau)
- Location 11 – Llangynidr Rd, closest properties south of A465 Overbridge (Garnlydan)
- Location 16 – Chestnut Close
- Location 18 – Pen-y-Crug (between property No.31 and 38)

Table F1.13: Summary of averaged sound pressure levels at Location 8

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (10:00-17:00)	42	54	50*	69-73

Table F1.14: Summary of averaged sound pressure levels at Location 11

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (10:00-17:00)	54	71	71*	85-88

Table F1.15: Summary of averaged sound pressure levels at Location 16

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (10:00-17:00)	47	56	54*	69-81

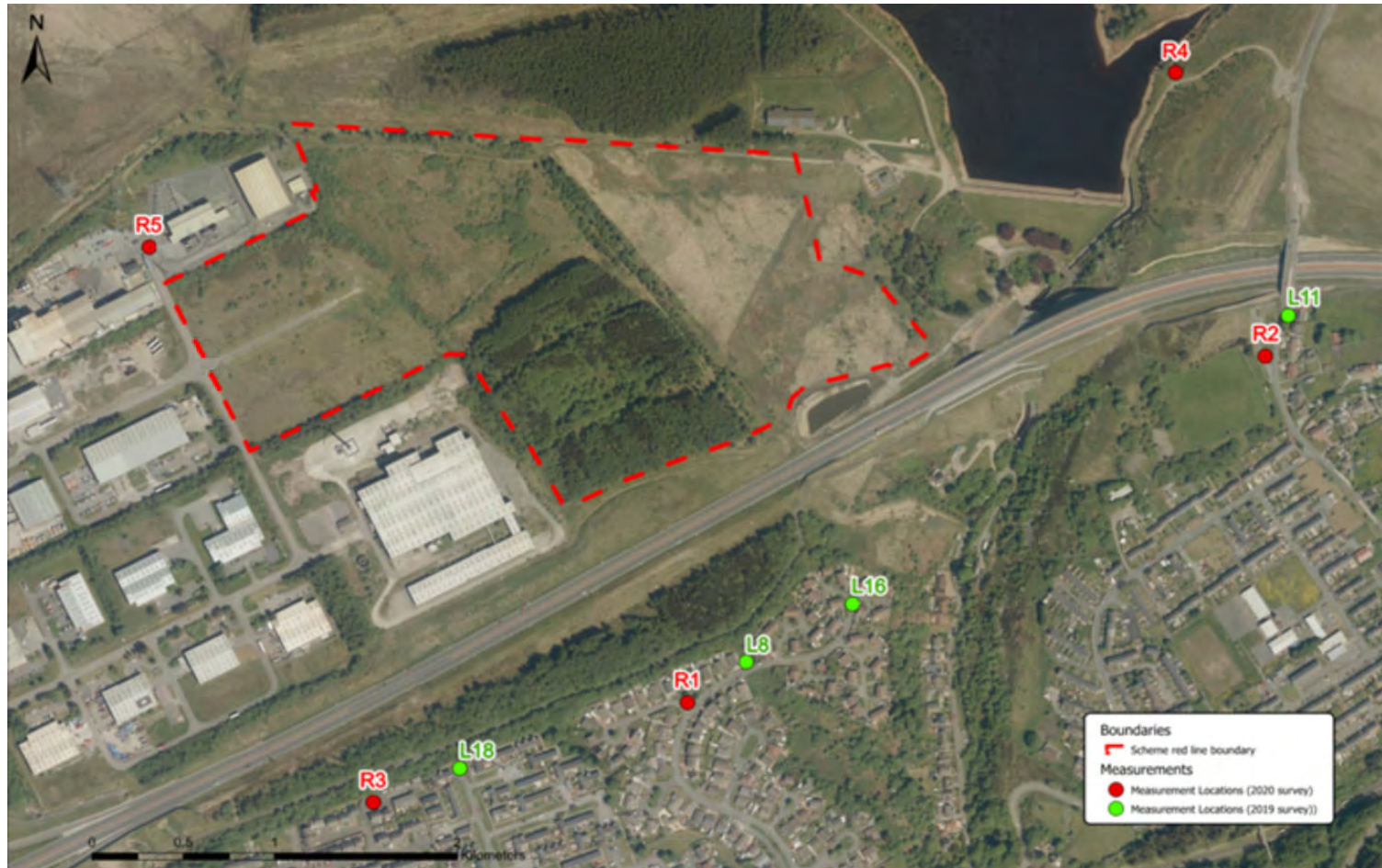
Table F1.16: Summary of averaged sound pressure levels at Location 18

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (10:00-17:00)	49	59	54*	77-78

*CRTN shortened method $L_{A10,18hr}$ correction (-1dB) applied

Figure 2 shows the location of the 2020 survey and the 2019 measurement locations.

Figure 2: Location of measurements locations for the 2020 survey (red circles) and the 2019 surveys (green circles)



F2 Construction noise assumptions

This section provides the construction activity assumptions that form the basis for the prediction of construction noise in accordance with the BS5228 standard. All construction activities are anticipated to take place during the daytime.

The selected construction activities are based on the available information at this stage of the project and are outlined as following:

- Activity A Preliminaries: Includes site clearance, tree felling and vegetation removal;
- Activity B Earthworks: Includes forming various plateaus for building, demolition of existing road, material handling and constructing haul roads around the perimeter of the site;
- Activity C Demolition: Demolition of existing road: Includes breakers mounted on excavators;
- Activity D Piling works: Includes piling foundations of approximately 750mm diameter bored piles, fed by concrete supplied from off site;
- Activity E Drainage works: Includes excavation and breaking of ground;
- Activity F Hardstanding: Includes laying of asphalt or concrete roads; and
- Activity G Erection of structures: Includes cranes and hand tools to erect structures such as sheds, roofs, etc.

Table F2.17: Construction plant items assumptions

Activity name	Source	Sound power dBL _{WA}	Number	On-time (%)
Activity A - Preliminaries				
Tracked Excavator	BS5228 Table C 2-7	98	4	80
Dozer	BS5228 Table C 2-1	103	4	50
Dump Truck (Tipping Fill)	BS5228 Table C 2-30	107	2	50
Dump Truck (Empty)	BS5228 Table C 2-31	115	2	50
Hydraulic Breaker Power Pack	BS5228 Table C 1-8	102	1	20
Chainsaw	Estimated	117	1	20
Veg Mulcher	Estimated	115	1	20
Activity B - Earthworks				
Tracked Excavator	BS5228 Table C 2-19	105	4	40
Dozer	BS5228 Table C 2-11	107	4	40
Dump Truck (Tipping Fill)	BS5228 Table C 2-30	107	4	40
Wheeled Backhoe Loader	BS5228 Table C 2-8	96	2	40
Grader	BS5228 Table C 6-31	114	1	40
Activity C - Demolition				
Breaker Mounted on Excavator	BS5228 Table C 1-9	118	1	40
Activity D - Piling				
Large Rotary Bored Piling Rig	BS5228 Table C 3-14	111	1	85
Mini Tracked Excavator	BS5228 Table C 3-20	96	1	10

Activity name	Source	Sound power dBL _{wA}	Number	On-time (%)
Concrete Pump	BS5228 Table C 3-25	106	1	15
Crane Mounted Auger	BS5228 Table C 3-16	107	1	50
Activity E – Drainage works				
Breaker Mounted on Excavator	BS5228 Table C 1-9	118	1	10
Wheeled Backhoe Loader	BS5228 Table C 2-8	96	1	50
Tracked Excavator	BS5228 Table C 2-7	98	4	50
Activity F - Hardstanding				
Asphalt Paver (+Tipper Lorry)	BS5228 Table C 5-31	105	1	25
Activity G – Erection of structures				
Wheeled mobile Crane	BS5228 Table C 4-43	98	1	80
Electric Drill	BS5228 Table D 6-54	97	1	80
Handtools	Estimated	94	1	80

F3 Traffic modelling assumptions

This section provides road traffic flow information and assumptions which form the basis for the road traffic noise assessment presented in the main chapter of this report.

F3.1 Construction traffic flows

The Arup traffic team have advised that construction traffic access to the development will occur using the existing A645 and access roads to the Rassau Industrial Estate, which is composed by links shown in Figure F3.3.

The traffic consultants have advised that the construction traffic is very unlikely to exceed 280 vehicle movements in one day. As noted in the main report, the average number of construction HGV trips is expected to vary depending upon each construction stage, but it is very unlikely the increase of vehicles would be larger than 280 per day. This is a worst-case scenario figure which is unlikely to be exceeded during construction but is used for the purpose of this assessment.

F3.2 Operational road traffic flows

The road links which the potential to be impacted by the operation of the proposed development are those shown in . Table C.1 below provides details of the predicted traffic flows including the average speed and percentage of HGVs for the following scenarios:

- Do-Minimum Opening Year 2025 (without proposed development); and
- Do-Something Opening Year 2025 (with proposed development).

The night-time flows are presented in Table C.2 for the Do-Minimum Opening Year and in Table C.3 for the Do-Something Opening Year.

The calculation of BNLs is undertaken following the guidance provided in CRTN. Correction to low flows have been applied where appropriate. Where traffic flows

are below 50 vehicles per hour, the basic noise level is calculated using 50 vehicles per hour. This is done, in order to assess a robust worst-case scenario and valid as per CRTN methodologies.

Figure F3.3: Assessed road traffic links



Table F3.18: Operational road traffic flow assumptions for daytime assessment

Link Ref	Link Name	Vehicle Speed (kph)	DM Opening Year (2018)				DS Opening Year (2024)				Short-term (Baseline minus Opening)
			18-hr AAWT	HGV (No)	HGV (no%)	BNL	18-hr AAWT	HGV (No)	HGV (no%)	BNL	
1	Alan Davies Way (SB)	48.3	4011	105	3%	62.1	4423	217	5%	62.6	0.4
2	Alan Davies Way (NB)	48.3	2825	75	3%	60.6	3238	187	6%	61.2	0.6
3	A4046 (SB)	48.3	5458	141	3%	63.5	5751	253	4%	63.7	0.2
4	A4046 (NB)	48.3	5139	138	3%	63.2	5431	250	5%	63.5	0.2
5	A465 (WB)	96.6	8343	681	8%	70.5	8629	759	9%	70.7	0.1
6	A465 (EB)	96.6	6940	653	9%	69.7	7227	731	10%	69.9	0.2

Table F3.19: Operational road traffic flow assumptions for the night-time assessment – Do-Minimum Opening Year 2025

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
23:00-00:00	1	Alan Davies Way (SB)	48	28	1	53.9	55.2
23:00-00:00	2	Alan Davies Way (NB)	48	20	1	53.8	55.1
23:00-00:00	3	A4046 (SB)	48	38	2	54.1	55.3
23:00-00:00	4	A4046 (NB)	48	36	2	54.1	55.3
23:00-00:00	5	A465 (WB)	97	58	8	61.3	59.4
23:00-00:00	6	A465 (EB)	97	48	9	60.2	58.8
23:00-00:00	13	A465 (WB)	97	101	6	64.8	61.4
23:00-00:00	14	A465 (EB)	97	94	6	64.5	61.2
00:00-01:00	1	Alan Davies Way (SB)	48	13	1	53.6	55.0
00:00-01:00	2	Alan Davies Way (NB)	48	10	1	53.5	55.0
00:00-01:00	3	A4046 (SB)	48	18	1	53.7	55.1

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
00:00-01:00	4	A4046 (NB)	48	17	1	53.7	55.1
00:00-01:00	5	A465 (WB)	97	28	5	59.4	58.3
00:00-01:00	6	A465 (EB)	97	23	4	59.4	58.3
00:00-01:00	13	A465 (WB)	97	49	5	59.6	58.5
00:00-01:00	14	A465 (EB)	97	46	6	59.7	58.5
01:00-02:00	1	Alan Davies Way (SB)	48	9	0	53.5	55.0
01:00-02:00	2	Alan Davies Way (NB)	48	6	0	53.5	54.9
01:00-02:00	3	A4046 (SB)	48	12	1	53.6	55.0
01:00-02:00	4	A4046 (NB)	48	11	1	53.6	55.0
01:00-02:00	5	A465 (WB)	97	18	3	59.1	58.2
01:00-02:00	6	A465 (EB)	97	15	3	59.1	58.2
01:00-02:00	13	A465 (WB)	97	32	4	59.3	58.3
01:00-02:00	14	A465 (EB)	97	30	4	59.3	58.3
02:00-03:00	1	Alan Davies Way (SB)	48	8	0	53.5	55.0
02:00-03:00	2	Alan Davies Way (NB)	48	6	0	53.5	54.9
02:00-03:00	3	A4046 (SB)	48	11	1	53.6	55.0
02:00-03:00	4	A4046 (NB)	48	10	1	53.6	55.0
02:00-03:00	5	A465 (WB)	97	16	3	59.1	58.1
02:00-03:00	6	A465 (EB)	97	14	3	59.1	58.1
02:00-03:00	13	A465 (WB)	97	29	3	59.2	58.2
02:00-03:00	14	A465 (EB)	97	27	3	59.2	58.2
03:00-04:00	1	Alan Davies Way (SB)	48	10	1	53.5	55.0
03:00-04:00	2	Alan Davies Way (NB)	48	7	0	53.5	54.9
03:00-04:00	3	A4046 (SB)	48	13	1	53.6	55.0
03:00-04:00	4	A4046 (NB)	48	12	1	53.6	55.0
03:00-04:00	5	A465 (WB)	97	20	3	59.2	58.2

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
03:00-04:00	6	A465 (EB)	97	17	3	59.2	58.2
03:00-04:00	13	A465 (WB)	97	35	4	59.4	58.3
03:00-04:00	14	A465 (EB)	97	33	4	59.4	58.3
04:00-05:00	1	Alan Davies Way (SB)	48	19	1	53.7	55.1
04:00-05:00	2	Alan Davies Way (NB)	48	13	1	53.6	55.0
04:00-05:00	3	A4046 (SB)	48	25	1	53.9	55.2
04:00-05:00	4	A4046 (NB)	48	24	1	53.9	55.2
04:00-05:00	5	A465 (WB)	97	39	6	59.7	58.5
04:00-05:00	6	A465 (EB)	97	32	6	59.7	58.5
04:00-05:00	13	A465 (WB)	97	59	6	61.2	59.3
04:00-05:00	14	A465 (EB)	97	58	7	61.1	59.3
05:00-06:00	1	Alan Davies Way (SB)	48	62	3	56.1	56.4
05:00-06:00	2	Alan Davies Way (NB)	48	44	2	54.3	55.4
05:00-06:00	3	A4046 (SB)	48	84	3	58.4	57.7
05:00-06:00	4	A4046 (NB)	48	79	3	58.0	57.5
05:00-06:00	5	A465 (WB)	97	129	8	66.7	62.5
05:00-06:00	6	A465 (EB)	97	107	9	65.8	62.0
05:00-06:00	13	A465 (WB)	97	224	6	69.0	63.8
05:00-06:00	14	A465 (EB)	97	209	6	68.8	63.7
06:00-07:00	1	Alan Davies Way (SB)	48	147	3	61.8	59.7
06:00-07:00	2	Alan Davies Way (NB)	48	104	3	59.8	58.5
06:00-07:00	3	A4046 (SB)	48	200	3	63.2	60.5
06:00-07:00	4	A4046 (NB)	48	189	3	63.0	60.4
06:00-07:00	5	A465 (WB)	97	306	8	70.8	64.8
06:00-07:00	6	A465 (EB)	97	255	9	70.2	64.5
06:00-07:00	13	A465 (WB)	97	532	6	72.8	66.0

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
06:00-07:00	14	A465 (EB)	97	497	6	72.6	65.8

Table F3.20: Operational road traffic flow assumptions for the night-time assessment – Do-Something Opening Year 2025

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
23:00-00:00	1	Alan Davies Way (SB)	48	31	2	49.8	52.9
23:00-00:00	2	Alan Davies Way (NB)	48	81	1	57.3	57.1
23:00-00:00	3	A4046 (SB)	48	40	2	52.3	54.3
23:00-00:00	4	A4046 (NB)	48	73	1	56.8	56.9
23:00-00:00	5	A465 (WB)	97	100	5	64.6	61.3
23:00-00:00	6	A465 (EB)	97	50	9	60.2	58.8
23:00-00:00	13	A465 (WB)	97	103	5	64.9	61.5
23:00-00:00	14	A465 (EB)	97	131	4	66.2	62.2
00:00-01:00	1	Alan Davies Way (SB)	48	82	0	57.4	57.2
00:00-01:00	2	Alan Davies Way (NB)	48	11	2	37.9	46.1
00:00-01:00	3	A4046 (SB)	48	87	1	57.8	57.4
00:00-01:00	4	A4046 (NB)	48	18	3	44.3	49.7
00:00-01:00	5	A465 (WB)	97	29	8	54.9	55.8
00:00-01:00	6	A465 (EB)	97	71	3	61.9	59.8
00:00-01:00	13	A465 (WB)	97	117	2	65.2	61.6
00:00-01:00	14	A465 (EB)	97	47	6	59.1	58.1
01:00-02:00	1	Alan Davies Way (SB)	48	10	0	53.5	55.0
01:00-02:00	2	Alan Davies Way (NB)	48	7	0	53.5	54.9
01:00-02:00	3	A4046 (SB)	48	13	1	53.6	55.0
01:00-02:00	4	A4046 (NB)	48	12	1	53.6	55.0
01:00-02:00	5	A465 (WB)	97	19	3	59.1	58.2

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
01:00-02:00	6	A465 (EB)	97	16	3	59.1	58.2
01:00-02:00	13	A465 (WB)	97	33	3	59.3	58.2
01:00-02:00	14	A465 (EB)	97	30	3	59.3	58.2
02:00-03:00	1	Alan Davies Way (SB)	48	9	0	53.5	55.0
02:00-03:00	2	Alan Davies Way (NB)	48	6	0	53.5	54.9
02:00-03:00	3	A4046 (SB)	48	11	1	53.6	55.0
02:00-03:00	4	A4046 (NB)	48	11	1	53.6	55.0
02:00-03:00	5	A465 (WB)	97	17	3	59.1	58.1
02:00-03:00	6	A465 (EB)	97	14	3	59.1	58.1
02:00-03:00	13	A465 (WB)	97	29	3	59.2	58.2
02:00-03:00	14	A465 (EB)	97	27	3	59.2	58.2
03:00-04:00	1	Alan Davies Way (SB)	48	11	1	53.5	55.0
03:00-04:00	2	Alan Davies Way (NB)	48	8	0	53.5	54.9
03:00-04:00	3	A4046 (SB)	48	14	1	53.6	55.0
03:00-04:00	4	A4046 (NB)	48	13	1	53.6	55.0
03:00-04:00	5	A465 (WB)	97	21	3	59.2	58.2
03:00-04:00	6	A465 (EB)	97	18	3	59.2	58.2
03:00-04:00	13	A465 (WB)	97	36	4	59.3	58.3
03:00-04:00	14	A465 (EB)	97	34	4	59.3	58.3
04:00-05:00	1	Alan Davies Way (SB)	48	21	1	53.7	55.1
04:00-05:00	2	Alan Davies Way (NB)	48	15	1	53.6	55.0
04:00-05:00	3	A4046 (SB)	48	27	1	53.9	55.2
04:00-05:00	4	A4046 (NB)	48	25	1	53.9	55.2
04:00-05:00	5	A465 (WB)	97	40	6	59.7	58.5
04:00-05:00	6	A465 (EB)	97	34	6	59.7	58.5
04:00-05:00	13	A465 (WB)	97	17	7	59.9	58.6

Time	ID	Link Name	Vehicle speed (kmp)	Total hourly flow (AAWT)	%HGV	BNL L _{A10,1hr}	BNL L _{Aeq,1hr} (TRL method 1)
04:00-05:00	14	A465 (EB)	97	18	7	60.0	58.6
05:00-06:00	1	Alan Davies Way (SB)	48	68	2	56.8	56.8
05:00-06:00	2	Alan Davies Way (NB)	48	50	2	54.3	55.4
05:00-06:00	3	A4046 (SB)	48	89	2	58.6	57.9
05:00-06:00	4	A4046 (NB)	48	84	3	58.3	57.7
05:00-06:00	5	A465 (WB)	97	133	8	66.9	62.6
05:00-06:00	6	A465 (EB)	97	112	9	66.0	62.1
05:00-06:00	13	A465 (WB)	97	228	5	69.1	63.8
05:00-06:00	14	A465 (EB)	97	214	6	68.9	63.7
06:00-07:00	1	Alan Davies Way (SB)	48	173	2	62.4	60.1
06:00-07:00	2	Alan Davies Way (NB)	48	119	2	60.5	58.9
06:00-07:00	3	A4046 (SB)	48	222	2	63.6	60.7
06:00-07:00	4	A4046 (NB)	48	199	3	63.2	60.5
06:00-07:00	5	A465 (WB)	97	317	8	70.9	64.9
06:00-07:00	6	A465 (EB)	97	273	9	70.4	64.6
06:00-07:00	13	A465 (WB)	97	553	5	72.9	66.0
06:00-07:00	14	A465 (EB)	97	508	6	72.6	65.9

F4 Operational assumptions model

The modelled noise sources are listed in Table F4.21 below and presented in the schematic diagram of Figure F3.3 in plan view and Figure F4.4 in three-dimensional perspective.

Figure F3.3 shows all the sources modelled for all scenarios during the day, evening and night. For details on the sources and their operational time, refer to Table F4.21.

The resulting noise levels of the proposed development in the form of a grid map are also presented in Figure F4.5 (daytime normal operation), Figure F4.6 (evening normal operation) and Figure F4.7 (night-time normal operation). The grid map is calculated at a height of 4m above ground and it shows the predicted specific noise levels. It is noted that the noise grid maps only include noise emissions from the sources associated with the glass manufacturing facility.

For details on the rating level, refer to Chapter 10 of the main Environmental Statement.

Table F4.21: Noise sources assumptions

ID	Source	Location	Operation	Estimated sound power level (Lw) per unit / Sound pressure Level Lp, dB(A) per unit	Quantity	Ducted	Louvre location	Louvre size	Mitigation Assumed / Additional Comments
1	Vacuum Pumps	Furnace Building	24hr 7d	95.3 dB Lw	4 per furnace	NO	Furnace Building Roof and façade	3x5 (66 louvres approx. per furnace)	Acoustic louvre
2	IS machines	Furnace Building	24hr 7d	113.7 dB Lw	4 per furnace	NO			
3	Blend feeder	Furnace Building	24hr 7d	99.6dB Lw	4 per furnace	NO			
4	Cullet rotation system	Furnace Building	24hr 7d	103.5 dB Lw	1 system	NO			
5	Ventilation fans (Furnace cooling)	Furnace Building	24hr 7d	108 dB Lw	2 per furnace	YES	Furnace Building Roof	3x5m	Acoustic louvre
6	Ventilation fans (Furnace exhaust)	Stack	24hr 7d	115.1 dB Lw	1 per stack	YES	Stack	4sqm	Acoustic louvre
7	Compressors	Utility Building	24hr 7d	72dB(A) Lp @ 1m from louvre Sound Pressure	2 units	YES	Utility Building	5x4m (8 louvres)	Sound pressure level not to exceed 72dB(A) measured at 1m from outlet/inlet
8	Compressors	Utility Building	24hr 7d	72dB(A) Lp @ 1m from louvre Sound Pressure	4 units	YES	Utility Building	5x4m (8 louvres)	Sound pressure level not to exceed 72dB(A) measured at 1m

ID	Source	Location	Operation	Estimated sound power level (Lw) per unit / Sound pressure Level Lp, dB(A) per unit	Quantity	Ducted	Louvre location	Louvre size	Mitigation Assumed / Additional Comments
									from outlet/inlet
9	Generators	Utility Building	Emergency/testing only	70dB(A) Lp @ 1m from louvre Sound Pressure	4 units	YES	South wall	3.8x4m (4 louvres) for intake 1x1m (4 louvres) for exhaust on roof"	Attenuators on inlet and outlet and flue
10	Transformers	Utility Building	24hr 7d	80 dB Lw	28	NO	YES	1.6x0.7m (56 louvres, 2 per transformer)	-
11	ADAC (cooling)	Utility Building Roof	24hr 7d	83 dB Lw	5 units	NO	NA	NA	-
12	Chiller (418kW)	Utility Building Roof	Daytime	89 dB Lw	2 units	NO	NA	NA	-
13	AHU	At grade, adjacent to office space	Daytime	70.8 dB Lw	1 unit	NO	NA	NA	-
14	Chiller	At grade, adjacent to office space	Daytime	103.3 dB Lw	1 unit	NO	NA	NA	-
15	Cullet building	Cullet Building	24hr 7d	55.7 dB Lw	Various	NO	NA	NA	-
16	Mechanical Maintenance Workshop	Furnace Building	24hr 7d	81.2 dB Lw	Various	YES	Furnace Building Roof	2x1.5m (26 louvre)	-

ID	Source	Location	Operation	Estimated sound power level (Lw) per unit / Sound pressure Level Lp, dB(A) per unit	Quantity	Ducted	Louvre location	Louvre size	Mitigation Assumed / Additional Comments
17	Mould Repair Workshop	Furnace Building	24hr 7d	81.2 dB Lw	Various	YES	Furnace Building Roof	2x1.5m (16 louvre)	-
18	Lorry - Loading sand to lorry	Batch Plant Outdoor	Daytime / 25% of evening as worst-case scenario	108.3 dB Lw	2 lorries	NA	NA	NA	From BS5228 Part 1 Table C.10 ref no 8
19	Lorry - Picking sand from stockpile	Batch Plant Outdoor	Daytime / 25% of evening as worst-case scenario	105.8 dB Lw	2 lorries	NA	NA	NA	From BS5228 Part 1 Table C.10 ref no 13
20	Hopper - Face Shovel loading hopper	Batch Plant Outdoor	Daytime / 25% of evening as worst-case scenario	107.8 dB Lw	2 hoppers	NA	NA	NA	From BS5228 Part 1 Table C.10 ref no 5
21	Lorry movements	Warehouse Outdoor	Daytime	108.6 dB Lw	10 lorries per hour (worst-case scenario, 100-110 a day during peak time of year) for daytime	NA	NA	NA	From BS5228 Part 1. Table C.11 General sound level data (Reference item 5 for a 33t lorry movement with a power rating of 350kW)
22	Lorry movements	Warehouse Outdoor	Evening	108.6 dB Lw	5 lorries per hour (worst-case scenario,	NA	NA	NA	From BS5228 Part 1. Table C.11 General

ID	Source	Location	Operation	Estimated sound power level (L _w) per unit / Sound pressure Level L _p , dB(A) per unit	Quantity	Ducted	Louvre location	Louvre size	Mitigation Assumed / Additional Comments
					100-110 a day during peak time of year for evening				sound level data (Reference item 5 for a 33t lorry movement with a power rating of 350kW)

Figure F4.4: Plan view of the proposed development and modelled noise sources

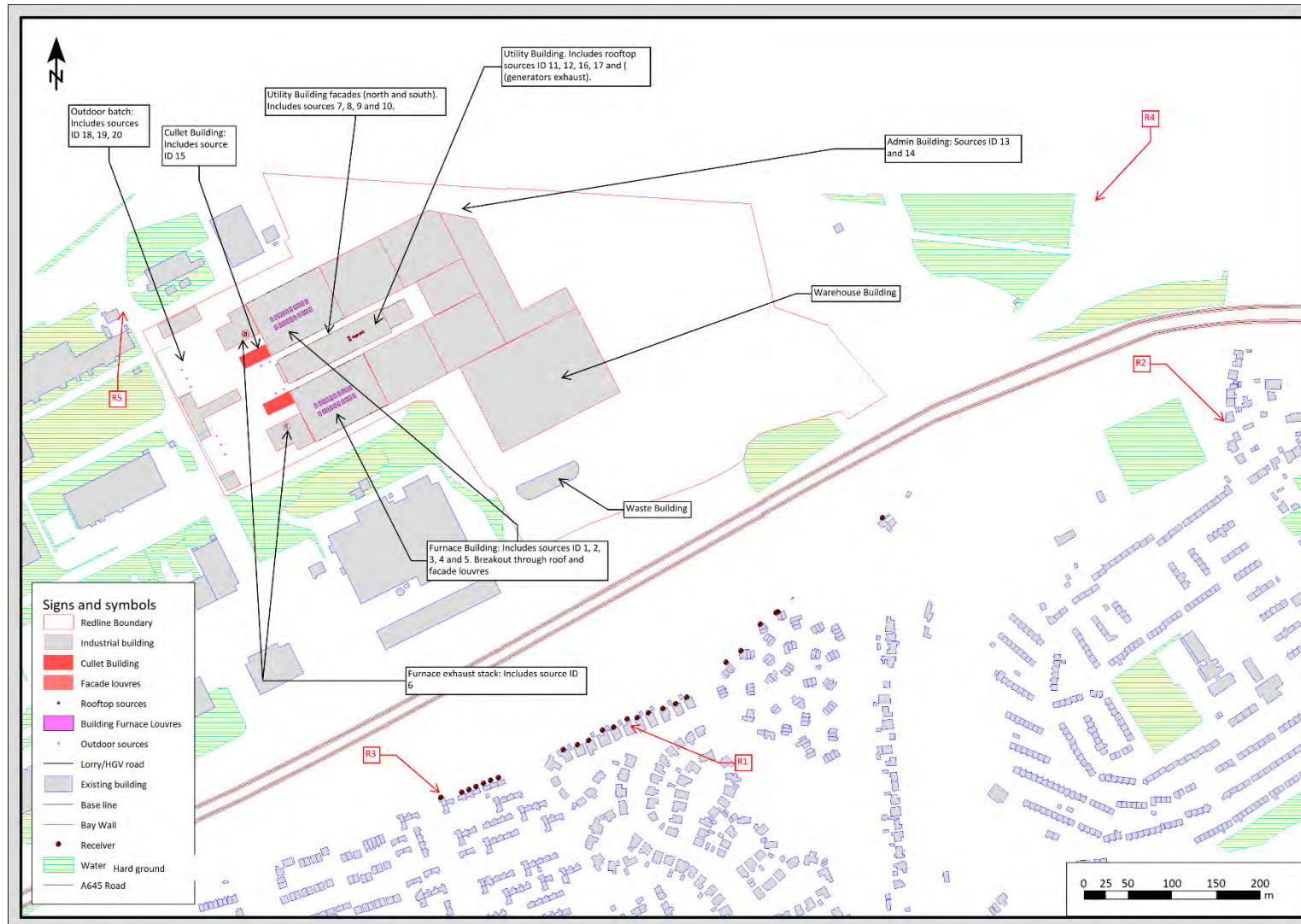


Figure F4.5: Perspective view of the proposed development and modelled noise sources



Figure F4.6: Grid noise map of the proposed development during normal daytime operation - only proposed facility noise sources



Figure F4.7: Grid noise map of the proposed development during normal evening operation - only proposed facility noise sources



Figure F4.8: Grid noise map of the proposed development during normal evening operation - only proposed facility noise sources

