



FCC Environment

**Proposed Modifications to Planning Permissions P/2002/1016 and
P/2011/0537 – Pwllfawatkin Landfill Site, Pontardawe, Neath Port**

Talbot, SA8 4RX

ECOLOGICAL APPRAISAL

October 2018

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CONTENTS

1.0	INTRODUCTION.....	4
2.0	AIMS AND OBJECTIVES	4
3.0	LEGISLATION	5
4.0	METHODOLOGY.....	6
5.0	RESULTS.....	17
6.0	DISCUSSION AND RECOMMENDATIONS.....	35

TABLES

Table 1:	Transect survey dates and weather conditions
Table 2:	Scoping bird survey date and weather conditions
Table 3:	Great crested newt habitat suitability index
Table 4:	Description of Possible Results of eDNA Analysis
Table 5:	Great crested newt survey weather conditions
Table 6:	Key reptile site survey assessment categories
Table 7:	Statutory sites
Table 8:	Non-statutory sites
Table 9:	Species records
Table 10:	Waterbody descriptions
Table 11:	Bird species recorded during scoping bird survey
Table 12:	Reptile survey results

PHOTOGRAPHS

Photograph A: Southern tip area (Tip 871) viewed south showing sparse sward.

Photograph B: Southern tip area (Tip 871) viewed northeast showing wetter area dominated by common rush species, greater and lesser willowherb. Pioneer downy birch, goat and grey willow saplings in the foreground.

Photograph C: Showing access track into southern tip area (Tip 871) and colonisation by woodland and ephemeral plants.

Photograph D: Typical water vole burrows (from waterbody one)

FIGURES

Figure 1: Site Location and Statutory Designated Sites Plan

Figure 2: Protected Species and Non-statutory Designated Site Plan

Figure 3: Phase 1 Habitat Survey Plan

Figure 4: Waterbody Location Plan

Figure 5: Riparian Mammal Survey Results Plan

Figure 6: Reptile Tin Location Plan

Figure 7: Static Detector Results Plan

Figure 8: Bat Transect Plan – Barbastelle activity

Figure 9: Bat Transect Plan – Brown long-eared activity

Figure 10: Bat Transect Plan – Common pipistrelle activity

Figure 11: Bat Transect Plan – Soprano pipistrelle activity

Figure 12: Bat Transect Plan – *Nyctalus species* activity

APPENDICES

Appendix A: Nature Conservation Legislation

Appendix B: Non-WCA / EPS Species Records

Appendix C: Botanical Species List

Appendix D: Summary of Great Crested Newt Survey Results

1.0 INTRODUCTION

- 1.1 This document has been prepared by FPCR Environment and Design Ltd on behalf of FCC Environment Ltd following pre-application discussions with the Local Planning Authority.
- 1.2 The document concerns the proposed modifications to extant planning permissions P/2002/1016 and P/2014/0693 both of which relate to Pwllfawatkin Landfill restorations operation that expire on 30th September 2018. FCC Environment Ltd seek to extend the period for completion of the restoration of Tips 890 and 871 and amend the restoration profile in each case.

2.0 AIMS AND OBJECTIVES

Phase 1 Habitat and Preliminary Protected Species Survey

- 2.1 The aim was to conduct an extended Phase 1 Habitat and Preliminary Protected Species Survey of the application sites using both a desk study and a walk over survey, to present and discuss the results and recommend any further surveys that may be required.
- 2.2 The objectives were to:
- Map the broad habitat types within the survey area;
 - Determine the presence or potential presence of legally protected, rare or otherwise notable species;
 - Assess the potential nature conservation importance of the recorded habitats;
 - Identify designated sites of nature conservation value; and
 - Identify the potential legal ecological constraints on development and propose any further surveys that may be required.

Further Protected Species Surveys

- 2.3 The aim of further protected species work is to establish the presence or absence, and if possible / appropriate a population estimation, of legally protected, rare or notable habitats / species identified as being present or potentially present during the initial extended Phase 1 Habitat and Preliminary Protected Species Survey; and to determine if the proposed application is likely to adversely affect these species. Suitable mitigation will be outlined where appropriate to minimise impact on these species to a level considered acceptable by the local planning authority.
- 2.4 The objectives were to:
- Survey the site / suitable habitats using recommended survey guidelines where appropriate for each of the protected species / habitats identified for further survey during the Phase 1 Habitat and Preliminary Protected Species Survey.
 - Use the results and desk study data to determine the likely presence or otherwise of protected species, and if possible / appropriate estimate population size.
 - Determine the likelihood of the proposed application affecting protected, rare or notable habitats / species.

- Produce an Ecological Appraisal that presents the results gathered and details appropriate mitigation and / or enhancements to reduce any potential impact from the proposed application on protected, rare or notable habitats / species to an acceptable level.

Rationale for collation of baseline ecological data

- 2.5 The following report relies upon field survey data collected by FPCR over the wider FCC land ownership at Pwllfawatkin since May 2017, desk study, local consultation and documents provided to FCC (commissioned by Waste Recycling Group Ltd acquired by FCC Environment in 2006) that details surveys undertaken over the wider FCC land ownership by SLR (Ecological Appraisal, SLR 2010 Ref: 410.0197.00780). As such this report seeks to draw together the baseline ecological information from these separate sources in a composite, summary document as supporting information for the Section 73 applications. This is in-line with British Standard *Biodiversity – Code of practice for planning and development* specifically relating to compilation of composite documents (BS 42020:2013 Sect. 6.12 & 6.13).
- 2.6 This report has been updated since initial submission in March following initial consultation responses from the Local Planning Authority (06.04.18) and Natural Resources Wales (23.07.18) to include the results of any survey work undertaken/completed within the interim period and to address some of the points raised by consultees in their initial responses.

3.0 LEGISLATION

- 3.1 Detail on the relevant national policy and legislation for ecology in relation to development sites are provided *Appendix A*. The national policy and legislation most relevant here are:
- The Conservation of Habitats and Species Regulations (“The Habitats Regulations”) (Amendment) 2017 in relation to the European Protected Species (EPS) great crested newt, (GCN), bats (all species) and dormouse; and European protected sites i.e. Special Areas of Conservation (SAC), Special Protection Areas (SPAs) and Internationally protected “Ramsar Sites” (collectively known as “Natura 2000 sites”). Annex II bat species of particular relevance in relation to SACs designated for bats.
 - The Wildlife and Countryside Act 1981 (WCA) (as amended) in relation to all wild birds (including Schedule 1 species), other animals (notably Schedule 5 species), flora (those listed in Schedules 8 and 9) and Sites of Special Scientific Interest (SSSI);
 - Protection of Badgers Act 1992;
 - Environment (Wales) Act (EW) 2016 in relation to various priority species and habitats;
 - Hedgerow Regulations 1997 made under Section 97 of the Environment Act 1995;
 - Planning Policy Wales (PPW) (2018);
 - Local Nature Reserves (LNR) as designated most recently by the EW Act 2016;
 - Non-statutory protected local sites including County Wildlife Sites (CWS), Sites of Importance for Nature Conservation (SINC), Local Wildlife Sites (LWS) and Ancient Woodland Inventory (AWI) sites;
 - Local Biodiversity Action Plans (LBAP) i.e. Neath Port Talbot Biodiversity Action Plan; and
 - Birds of Conservation Concern (BoCC).

4.0 METHODOLOGY

Desk study

- 4.1 In order to compile existing baseline information, relevant ecological information was requested from both statutory and non-statutory nature conservation organisations including:
- Multi Agency Geographic Information for the Countryside (MAGIC); and
 - South East Wales Biodiversity Records Centre (Canolfan Gofnodion, Bioamrywiaeth De Ddwyrain Cymru). Unique Reference Code 0178-066.
- 4.2 Further inspection of colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk) was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.
- 4.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- European Protected Sites - 5km search around the site for sites of International Importance (e.g. SACs, SPAs and Ramsar sites).
 - Nationally Protected Sites - 2km search around the site for sites of National Importance (e.g. SSSIs). Sites of importance outside of the 2km range may also be highlighted if a potential impact is perceived.
 - Local Protected Sites - 1km search around the site for locally protected sites (e.g. LNRs).
 - Non-statutory Designated Sites - 1km search around the site.
 - Legally Protected and Notable Species - 1km search around the Survey Area.
- 4.4 When handling species data:
- a) All results were filtered to include records from the previous ten years only (since 2008).
 - b) Results are plotted to identify any records falling within the site boundary.
 - c) The remainder of results are filtered, separating (from those listed in d.) all WCA Schedule 5 species, all likely breeding or over wintering WCA Schedule 1 birds, any EPS species and any Nationally Rare and scarce plants.
 - d) All remaining species including, but not limited to non-WCA / EPS, EW S7 (Section 7 of the Environment (Wales) Act, 2016), BoCC Red and Amber listed species are listed in *Appendix B*.

Field survey

Habitats/flora

Phase 1

- 4.5 A field survey was conducted on 9th May 2017 and subsequently updated with visits to the site throughout 2017 and 2018, most recently on 30th August 2018 at which time a more targeted survey of habitats present on the southernmost tip area (Tip 871) and restored cells of the northern tip area (Tip 890) was undertaken.

- 4.6 The survey was conducted using the methodology outlined in the Handbook for Phase 1 Habitat Survey (JNCC 2010)¹. This involved a systematic walkover of the site to classify the habitat types present (using the standardised Phase 1 Habitat classification system) and mapping these onto an OS base map. Each habitat was described based on the botanical merits and target notes used to record features of habitats of particular interest, as well as any sightings, evidence of, or potential for protected or notable species. A full botanical species list (*Appendix C*) was compiled during the survey (and updated following each visit to site), and a Phase 1 plan of all major habitat types produced (*Figure 3.0*). Where necessary, the abundance of species was quantified using the DAFOR scale, ranging from Dominant (>75%) to Abundant (75-51%), through Frequent (50-26%) and Occasional (25-11%) to Rare (10-1%).

Invasive plants, notifiable weed species and other notable flora

- 4.7 Consideration was given as to the presence of invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (WCA 1981)⁴ and the presence of any notable weeds including those covered under the Weed Act 1959⁵ (where population is significant enough to be considered injurious).
- 4.8 In addition, any rare or notable flora including those listed in the following policies as priorities were duly noted:
- Post 2010 UK Biodiversity Framework⁶ priority species;
 - EW S7 species of principal importance;
 - COUNTY (Neath Port Talbot) Biodiversity Action Plan (BAP) priority species;
 - International Union for the Conservation of Nature (IUCN) Red listed⁷ species;
 - Red Data Book (RDB)⁸ species; and
 - National, regional, county or vice-county (VC41 - Glamorganshire) rarities.

Fauna

Badger

- 4.9 A survey of the site for the presence of badgers was conducted on 9th May 2017 and subsequently updated with visits to the site throughout 2017 and 2018.
- 4.10 As part of the survey all hedgerows, woodlands, scrub and other suitable habitats within the site and immediately adjacent to the site boundary, were searched for evidence of badger activity. The standard methodology was used, as outlined by Harris, Creswell and Jefferies (1991)⁹. This involved a thorough search for evidence indicating the presence of badgers, including:
- setts, including earth mounds, evidence of bedding and runs between setts;
 - latrines, often located close to setts, at territory boundaries or adjacent to favoured feeding areas;

1 JNCC, (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit, ISBN 0861396367.

4 Act of Parliament, (1981). The Wildlife and Countryside Act 1981 (as amended), London: HMSO.

5 Act of Parliament. (1959). The Weed Act 1959. London: HMSO.

6 JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). (2012). UK Post-2010 Biodiversity Framework. July 2012.

7 International Union for Conservation of Nature (IUCN), (2012). Red List 2012.

8 Cheffings, C.M. & Farrell, L. (Eds), Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J., Taylor, I. (2005). The Vascular Plant Red Data List for Great Britain. Species Status 7: 1-116. Joint Nature Conservation Committee, Peterborough.

9 Harris, S., Cresswell, P. and Jefferies, D., (1991). (Report) Surveying Badgers. The Mammal. Society, Bristol.

- prints and paths or track ways;
 - hairs caught on rough wood or fencing; and
 - other evidence including snuffle holes, feeding and playing areas and scratching posts.
- 4.11 The identification of snuffle holes, scratching posts or feeding signs on their own is not necessarily conclusive evidence of the presence of badgers. A number of such signs may need to be seen in conjunction before they can be said to be conclusive of badger activity.
- 4.12 Where setts are found, their status and level of activity is noted. Sett status is broadly categorised as follows:
- *Main sett* – usually continuously used with many signs of activity around, a large number of holes and conspicuous spoil mounds.
 - *Annexe sett* – usually located close to a main sett and connected to it by well used paths. Annexes may not be continuously occupied.
 - *Subsidiary sett* – lesser used setts comprising a few holes and without associated well-used paths. Subsidiary setts are not continuously occupied.
 - *Outlier sett* – one or two holes without obvious paths. These are used sporadically.
- 4.13 Level of activity is described as:
- *Well used* – clear of debris, trampled soil mounds and obviously active, with signs of activity such as presence of prints, dislodged guard hairs around the entrances.
 - *Partially used* – some associated debris or plants at the entrance. Could be used with minimal excavation and usually with signs of activity within the vicinity, for example, badger pathways.
 - *Disused* – partially or completely blocked entrances.

Bats

Manual Activity Survey

- 4.14 The manual surveys were undertaken by appropriately experienced ecologists from FPCR Environment and Design Ltd. Each transect was walked at a steady pace using full spectrum Wildlife Acoustic Inc. Echo Meter Touch bat detectors in conjunction with Echo Meter Touch app and Apple Inc. iPad to provide back-up information and enable identification of bats encountered. When a bat pass was registered, the species, time and behaviour was recorded manually on a site plan.
- 4.15 The detector is set to record all noise files to ensure no data is lost. Where bats are heard but no calls are seen on the screen and the auto ID has failed, the location, time and “bat sp.” is recorded and is later checked. Wildlife Acoustic’s Kaleidoscope software also picks out noise and “no-ID” files as zero-crossing files when the transects are manually analysed and any bats not seen or recorded can be added to the analysis.
- 4.16 Post-survey bat calls were analysed using Kaleidoscope (Wildlife Acoustics) software by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. Analysis was undertaken by experienced ecologists from FPCR Environment and Design Ltd. From

this, the level of bat activity across the application site in relation to the number of foraging and commuting registrations were assessed.

- 4.17 Surveys were conducted in suitable conditions (little or no rain / wind and temperatures above 10°C) in order to provide a full cross-section of the use of the site by bats. Transects were started at sunset and lasted for three hours. See *Table 1* for survey dates and weather conditions.

Table 1: Manual activity survey dates and weather conditions

Date	Sunset	Wind	Temperature	Cloud Cover	Rain
14.09.2017	20:05	0-1	13	50	0
17.10.2017	18:25	1	14	100	0
26.04.2018	20:30	1	11	100	1
23.05.2018	21:13	2	17	50	0
11.06.2018	21:33	1	16	30	0
19.07.2018	21:23	0	17	5	0
20.07.2018	05:21	0	16	10	0

- 4.18 Transect routes were chosen that incorporated as many favourable habitat features for bats as possible. Point counts were included at staggered intervals, usually around suitable features for bat activity such as connecting hedgerows and tree-lines.

Automated (Passive) Activity Survey

- 4.19 Static (passive) recording broadband detectors were deployed to supplement the manual activity surveys. These automated logging systems Wildlife Acoustics Inc. Song Meter SM4BAT FS detectors, (herein referred to as SM4BAT detectors) save all recordings onto an internal storage device for analysis. These were positioned at locations where habitats would likely be impacted as a result of development, and at any locations where habitats would likely be impacted as a result of development, and at locations that provide suitability for navigation/ foraging routes.
- 4.20 The devices were placed in a location for five nights of suitable and/or typical weather conditions. The units were programmed to activate 30 minutes before dusk and record continuously until 30 minutes following sunrise. The output from this was subject to analysis using the Kaleidoscope software package was undertaken by experienced ecologists from FPCR Environment and Design Ltd.
- 4.21 The analysis of the SM4BAT files recorded can highlight the presence of more than one bat if they are recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as a single bat registration. The number of bat registrations does, however, reflect the relative importance of the location of the detector by calculating the number of bat registrations per hour.

Birds

Scoping bird survey

- 4.22 The survey was conducted to ascertain the sites potential to support breeding or overwintering bird species with an associated conservation status as WCA Schedule 1, EW S7 species and/or BoCC Red or Amber list species. These species are likely to be of the greatest threat in relation to further decline and are commonly referred to as 'notable' species.
- 4.23 The site was walked over by an ecologist experienced in bird surveying. A route was mapped out prior to the surveys being undertaken, and surveys paid particular attention to linear features, such as hedgerows and tree lines, and natural features such as areas of scrub and waterbodies. Bird surveys were not undertaken in unfavourable conditions such as heavy rain or strong wind, which may negatively affect the results. *Table 2* details the dates and weather conditions observed during surveys.

Table 2: Scoping bird survey date and weather conditions

Date	Cloud Cover (%)	Rain	Wind	Visibility
09/05/18	15	0	2	Good
10/05/18	0	0	1	Good
11/05/18	15	0	0-2	Good

Great Crested Newt (GCN)

- 4.24 A total of 24 waterbodies were identified within 500m of the site boundary for (see *Figure 3.0* & *Figure 4.0*). All waterbodies were subject to Habitat Suitability Index (HSI) assessments. In addition, presence/absence surveys were conducted on all water bodies subject to access.

Habitat Suitability Index (HSI)

- 4.25 The HSI instrument (Oldman *et al.* 2000)¹⁰ assesses waterbodies against ten pre-determined criteria, producing a score which indicates the degree of suitability for occupation by great crested newts. In general, waterbodies with a higher HSI score are more likely to support great crested newts than those with a lower score and there is a positive correlation between HSI scores and waterbodies with newts recorded. The ten separate attributes assessed for each waterbody are as follows:
- geographic location;
 - waterbody area;
 - frequency of drying;
 - water quality;
 - shade;
 - presence of waterfowl;

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

- presence of fish;
- number of linked waterbodies;
- terrestrial habitat; and
- macrophytic coverage.

4.26 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Suitability is then determined according to the following scale shown in *Table 3*. It should be noted that a low HSI does not necessarily rule out the possibility great crested newts are present, although it does aid in informing the decision as to whether a given waterbody should be selected for further survey, or the likely presence of populations within the wider area.

Table 3: Great crested newt habitat suitability index

HSI	Waterbody Suitability
<0.5	Poor
0.5 - 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

eDNA Sampling and Analysis

4.27 eDNA sampling was undertaken on four ponds in accordance with the protocol recommended by Natural England¹¹ and adopted as an accepted method of detecting GCN presence in Wales by Natural Resources Wales¹².

4.28 Sampling was undertaken on 29th June 2017 by an appropriately licenced and experienced ecologist who collected a sample of water from around ponds 1-21. This comprised taking samples of agitated water from 20 locations around each pond and mixing thoroughly; 15 ml of this water was then placed into each of the 6 sterile sample tubes containing preservative, precipitates and a DNA sequence that was used for degradation control. This was then transported under suitable conditions to the Food and Environment Research Agency (Fera) laboratory at Sand Hutton, York for analysis. Following analysis, results provided by the laboratory could have one of three outcomes which are described in *Table 4* below.

Table 4: Description of Possible Results of eDNA Analysis

Result	Description
Positive	A positive result means that eDNA from GCN was detected and they have been present within the water in the 20 days preceding sampling. An eDNA score would be provided indicating the number of positive replicates from a series of twelve.

11 Biggs J, et. al, (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.

12 <https://naturalresourceswales.gov.uk/media/3509/guidance-on-use-of-dna-sampling-of-great-crested-newts.pdf>

Result	Description
Negative	DNA from GCN was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided. Degradation can occur through poor storage of the samples or kits and inhibition can occur through unexpected chemicals in the sample.

Presence/absence (aquatic) survey

- 4.29 Aquatic surveys were conducted between mid-March and mid-June 2018 on all waterbodies identified within 500m of the site boundary, where access was permitted and the previous HSI assessment warranted further surveys. NE and NRW guidance was followed, as detailed in the Great Crested Newt Mitigation Guidelines (English Nature 2001)¹³. To determine the presence or absence of great crested newts an initial four surveys were performed, with an additional two conducted if great crested newts were recorded. The two further surveys are required to assess the size of the population present.
- 4.30 Appropriately experienced ecologists from FPCR Environment and Design Ltd. completed all surveys. All surveys were undertaken during suitable weather conditions i.e. ambient air temperature of 5°C minimum and with little/no rain, see *Table 5* below.

Table 5: Great crested newt survey weather conditions

Survey Date	Survey Conditions						
	Turbidity	Wind	Rain	Evening temp °C		Morning temp °C	
	(1-5)	(1-5)	(1-5)	Air pm	Water pm	Air pm	Water pm
09/05/2018	2-3	2	3	8	14	10	14
10/05/2018	2-4	1-2	0	10	12	10	12
14/05/2018	1-3	0-1	0	16	17	13	16
15/05/2018	1-3	0-4	0	16	17	12	15
23/05/2018	1-3	0-2	0	21	20	15	19
24/05/2018	1-2	0-1	0-1	15	21	15	20
29/05/2018	1-3	1	0-1	18	14	16	13
30/05/2018	1-3	1	1	16	20	17	18

- 4.31 On each survey occasion it is the intention that three of four survey techniques should be employed (egg search, sweep net, bottle trap and torch) where possible. A summary of these techniques is detailed below.

¹³ English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough. (Under Revision).

Bottle trapping

- 4.32 Bottle traps were set within the waterbody in the evening at densities of one trap per two metres of shoreline (where feasible) and left overnight for inspection in the morning. Traps were partially submerged in the water leaving an air bubble in the bottle and secured by a cane marked with a high visibility tape to ensure relocation the following day. Care was taken to ensure that trapping did not occur during excessively warm weather, when the temperature inside the trap could rise considerably, reducing oxygen levels and potentially suffocating the newts.

Sweep netting

- 4.33 Long handled sweep-nets were used to sample the margins of the pond for great crested newts, with approximately 15 minutes of netting per 50m of shoreline.

Torching

- 4.34 Torching involved searching the water body after dusk using high-powered torches to scan the margins and potential display areas for newts. The perimeter of the pond was walked slowly spending approximately 15 minutes torching each 50m of shoreline recording any newts observed. Torch surveys are unsuitable within heavily vegetated and/or turbid ponds or after periods of heavy rain as visibility is diminished.

Egg searching

- 4.35 Newts lay single eggs on leaves of aquatic plants or other suitable pliable material, after which the material is folded over the egg to protect it. Great crested newt eggs can be distinguished from those of the other newts by their size, shape and colour. Submerged vegetation was examined for newt eggs and folded leaves gently opened to check for eggs. Once a great crested newt egg is identified, no further leaves need to be examined to minimise any further potential disturbance.

Reptiles

- 4.36 Presence/absence surveys have been undertaken in specific locations identified as offering potential habitat. Surveys were based on methodology detailed in the Herpetofauna Workers Manual (2003)¹⁴ and the Froglife Advice Sheet 10 (1999)¹⁵. The survey consists of seven survey visits in suitable weather conditions for recording reptiles. Methods involved a search for basking reptiles on/under naturally occurring and strategically positioned artificial refugia (0.5 x 0.5 metre roofing felt). These were placed in locations that offered the most suitable habitat for common reptiles, i.e. structurally diverse grassland habitats with areas of bare ground/short vegetation, wetland or scrub features.
- 4.37 A total of 110 artificial refugia were deployed within the wider survey area in habitats considered most suitable for reptiles (*Figure 6.0*) and left to bed for a minimum of 2 weeks prior to surveying.
- 4.38 A further 120 artificial refugia were deployed in August 2018 in suitable habitats affected by the proposed habitat restoration works which are the subject of these Section 73 Applications, specifically, Tip 871, the northern edges of restored Tip 891 and restored cells of Tip 890 to the north of currently active landfill cells.

¹⁴ Gent, T. and Gibson, S. (2003). Herpetofauna Workers Manual.

¹⁵ Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

- 4.39 All survey visits to date have been undertaken in suitable weather conditions within the recommended survey period by suitably experienced FPCR ecologists. On each of these occasions the number of reptiles associated with each artificial refuge was recorded.
- 4.40 Surveys also followed the guideline recommendations by:
- approaching refugia downwind and avoiding casting a shadow and with care so as to not disturb basking animals when checking; and
 - that lifting and replacing the refugia in hot weather is undertaken with care, to avoid potential harm or injury to animals beneath.
- 4.41 Any alternative basking material present within the site (e.g. fallen deadwood, tipped and demolition materials etc) were also checked for the presence of reptiles.
- 4.42 Reptile populations were assessed in accordance with population level criteria as stated in the Key Reptile Site Register. This system classifies populations of individual reptile species into three population categories assessing the importance of the population (*Table 6*). These categories are based on the maximum total number of adult animals observed during an individual survey occasion across the seven or more surveys. This method is considered suitable for measuring the relative abundance of reptiles.

Table 6: Key reptile site survey assessment categories

Species	Low Population (No. of individuals)	Good Population (No. of individuals)	Exceptional Population (No. of individuals)
Adder	<5	5 - 10	>10
Common lizard	<5	5 - 20	>20
Grass snake	<5	5 - 10	>10
Slow worm	<5	5 - 20	>20

Riparian mammals

- 4.43 Water vole surveys were undertaken using the standard methodology of Strachan and Moorhouse (2007)¹⁶. This involved identification of evidence of activity including:
- *Latrine sites* – distinct piles of wolverole droppings found near nest sites, at the ranges of territorial boundaries and where the animals enter and leave the water;
 - *Feeding stations* – areas with distinct neat piles of chewed lengths of vegetation along pathways or haul out platforms along the water's edge;
 - *Burrows* – burrow entrances are typically wider than high with a diameter between 4 - 8cm. Generally, these burrow entrances are located at the water's edge;
 - *Lawns* – short grazed areas at the entrances to burrows;
 - *Prints* – identifiable prints in soft margins of the watercourse;

¹⁶ Strachan R, and Moorhouse, T. (2006). Water Vole Conservation Handbook. 2nd edition. Wildlife Conservation Research Unit: Oxford.

- *Runways* – low tunnels that are pushed through the vegetation and often leading to burrows or feeding stations.
- 4.44 Survey for otters comprised a comprehensive search of all suitable habitats along water courses and adjacent areas following best practice guidelines (Holmes *et al.* 2001)¹⁷. Survey was carried out in conjunction with the water vole survey on 9th, 10th, 23rd and 24th May 2018 and comprised a search for characteristic field signs in suitable habitat such as spraints, prints, slides/haul-outs and potential holt/couch sites.

Limitations and assumptions

Desk study

- 4.45 The species data collated for the desk study is derived from records submitted by members of the public and from specialist volunteer group surveys. It does not represent a definitive list of species that occur in the local area, and the absence of records does not necessarily imply absence of such species.

Field survey

- 4.46 Ecological baseline information included within this report, specifically the information relating to the Phase 1 Habitats, birds and bats has been collected over an area exceeding that which is the subject of the Section 73 applications relating to the restoration i.e. both the tip areas themselves (Tip 871 & Tip 890). Ecology baseline data including both fieldwork undertaken on the wider FCC ownership and records received following consultation will be included for context within the discussion section where necessary and observations made by SLR in 2012 will also be referred to where relevant.
- 4.47 With regards great crested newt eDNA and presence/absence surveys, efforts have been made to gain access to all of the 24 waterbodies. Notwithstanding waterbodies eight and 19 which were found no longer to be present and waterbody 18 that was determined to be unsuitable, access was not possible to waterbodies five, six and 13. Given that eDNA and presence/absence survey by conventional methods have been employed and the former has been undertaken on waterbodies where physical access for the purpose of presence/absence surveys was not possible, coverage is considered sufficient to determine any likely significant impacts and the lack of survey data for the three waterbodies (five, six & 13) not considered a significant limitation in this instance.
- 4.48 Surveys undertaken for reptiles are sufficient to confirm presence/absence of reptiles from the areas where they have been surveyed. Whilst initial surveys were not conducted on the areas subject to this application, they have since been extended to include the southern tip area Tip 871, habitats of which will be temporarily lost as material is removed to cap closed cells of the northern tip area (Tip 890) as part of the restoration scheme. In addition to Tip 871, artificial refugia have also been positioned on the northern edge of restored Tip 891 and peripheral habitats and restored cells of Tip 890. These are not yet complete. Seven survey visits are considered sufficient enough to provide an indication of the relative abundance of a species using population size class categories specified in the Key Reptile Site Register. Whilst this is not an 'actual' population estimate or a measure of population density both of which would require more intensive survey effort, the measure of relative abundance is sufficient to indicate the likely size of populations

¹⁷ Holmes, N., Ward, D. and Jose, P. (2001), *The new rivers and wildlife handbook*, RSPB, NRA and RSNC. The Royal Society for the Protection Of birds, Sandy.

present and represents the standard method of doing so; and for assessing likely potential impacts on common reptile populations and determining appropriate mitigation measures. Increasing survey effort in order to provide population densities or a true population estimate would neither be considered appropriate or proportional in this instance.

- 4.49 Given the areas subject to the Section 73 applications relate primarily to an extension of time and changes to the final profiles of the restored areas (Tip 890 and Tip 871), that there is little change to the consented restoration schemes in terms of habitat creation measures and that the requirements for management, monitoring and retained habitat/species protection are to be secured through pre-existing conditions attached to consent which will be carried forward – the restoration schemes are considered low risk. As such a bird scoping survey rather than a full breeding bird survey was considered appropriate in this instance.

Modifications to methodology and limitations

- 4.50 Whilst no modifications to methodologies have been made as such, the recent capping and/or restoration of cells within the northern tip area (Tip 890) and the colonising pioneer habitats present on the southern tip area (Tip 871) resulting from the recycling of spoil material as landfill cell capping are considered of relatively low potential value in the context of protected species. Therefore, baseline ecological surveys commenced in May 2017 by FPCR have concentrated on the habitats of greater value within the wider FCC ownership, i.e. those most likely to support populations of protected species which are not necessarily the core areas which are the subject of these Section 73 applications. Surveys have subsequently been extended to include habitats within the habitats to be affected by proposed habitat restoration works which are the subject of these Section 73 applications. There are also Health and Safety considerations that have had to be taken into consideration with regards feasibility of surveying areas of, or close to active landfill.
- 4.51 Given the similarity between the original consented and the proposed restoration schemes for the northern tip and southern tip areas (Tips 890 and Tip 871 respectively) the fact that coverage of the two areas subject to the Section 73 applications is not 'total' with respect protected species, this is largely based on the unsuitability of habitats for the support of protected species and is not considered a limitation.
- 4.52 A comprehensive Phase 1 Habitat Survey has been undertaken over the whole site and this together with the desk study information and subsequent protected species survey information for adjacent habitats over the wider FCC land ownership are considered sufficient to determine the likely significant effects of the amendments to the existing planning consent.
- 4.53 This approach is in-line with BS42020:2013¹⁸ which states that work involved in preparing and implementing all ecological surveys, impact assessments and measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development. Given the low number of common and widespread species found upon site (largely associated with habitats within the wider FCC ownership and not the two areas subject to these Section 73 applications), that the ecological baseline conditions are not significantly different from when assessed at the time of the original applications and that the variations sought under the Section 73 applications are again, not significantly different from the original consent (Section 73 of the Town and Country Planning Act (1990) being reserved for only minor material amendments to consented schemes) it is in our

¹⁸ BSI Standards Publication, (2013), Biodiversity – Code of practice for planning and development

professional judgement that the degree of risk posed to biodiversity is no greater than at the time of the original restoration applications.

5.0 RESULTS

Desk study

Statutory designated sites of nature conservation interest

- 5.1 Hafod Wennol grasslands SSSI, according to the relevant SSSI citation, consist of an extensive series of hay meadows, pastures and rough grazing at an altitude of 210-260m on Mynydd-y-Betwys. The meadows and pastures represent the third largest example of lowland neutral grassland in West Glamorgan managed using low intensity, traditional farming methods. The SSSI supports a wide range of grassland and mire communities ranging from dry hay meadows through rush pasture, flushes, purple moor-grass mire, fen meadow and swamp. Examples of these types of unimproved grassland supporting such a range of uncommon plant species are increasingly scarce not just in Wales but throughout the UK.

Table 7: Statutory sites

Site Name	Site Reference	Proximity to site (approximate)	Description
Hafod Wennol Grasslands SSSI	33WMB	1.5km northwest of site	This site consists of hay meadows, pastures and rough grazing's. Unimproved grasslands such as this lead to plant species that are becoming increasingly scarce in Wales.

Non-statutory sites of nature conservation interest

- 5.2 Identified non-statutory sites of nature conservation interest together with a brief description of the sites and their location in relation to the Section 73 applications are provided below.

Table 8: Non-statutory sites

Site Name	Site Reference	Proximity to site (approximate)	Description
Abernant SINC	SN 701082	150.4m east of site	Former colliery site to the east of the Pwllfawatkin recycling centre and landfill site.
Ancient Semi Natural Woodland SINC	SN 697077	Just outside of FCC ownership boundary to the northwest.	Ancient woodland.
Banc John SINC	SN 675088	1.8km west of site	Open moorland mosaic habitat.

Site Name	Site Reference	Proximity to site (approximate)	Description
Carn Llechart SINC	SN 689085	Southwest of the site outside of the FCC ownership boundary.	Ancient burial Cairn / stone circle on the Mynydd Carnllechart south of Bryn Mwr.
North Port Talbot (NPT) Watercourses SINC	SN 698083	East of and through site.	Lower Clydach and tributaries running through the east of the FCC ownership boundary.

Protected rare and otherwise notable species

- 5.3 Records of all protected (WCA, EPS), rare and otherwise notable species as defined in *Paragraph 4.4* are presented below in *Table 9*.

Table 9: Species records

Species	Conservation Status	Total Number of Records within 1km	Location / Minimum distance of records from site boundary
Birds			
<i>Turdus pilaris</i> Fieldfare	WCA Sch1, Red status, LBAP	2	Two records, one within the site boundary and one approximately 957m west of the site boundary
<i>Milvus milvus</i> Red kite	WCA Sch1, Amber status, LBAP	7	Seven records, five within the site boundary, one approximately 329m east and one 930m west of the site boundary.
<i>Turdus iliacus</i> Redwing	WCA Sch1, Red status, LBAP	2	Two records, one within the site boundary and one approximately 908m west of the site boundary.

Status Key: EPS = European Protected Species. WCA = Wildlife and Countryside Act 1981 (as amended). Sch5 = Schedule 5 of WCA, Sch1 Schedule 1 of the Wildlife and Countryside Act, 1981.

Field survey

Habitats and flora

- 5.4 Whilst a Phase 1 Habitat survey has been undertaken over the wider FCC land ownership boundary, the results within this report relate solely to the areas subject to this Section 73 application. Whilst observations of note made on the wider ownership may be referred to, in particular where they relate to the presence of protected, rare or otherwise notable species that may provide constraints, the habitat descriptions below relate to Tip 871, Tip 890 and habitats immediately adjacent to these. For the location of broad habitats both within the areas subject to the Section 73 applications and the wider FCC land ownership are shown at *Figure 3.0*.

5.5 Generally, over the whole of the FCC ownership boundary at Pwllfawatkin, the site remains largely as described in the Ecological Appraisal prepared by SLR on behalf of Waste Recycling Group in 2010 (Ecological Appraisal, SLR 2010 Ref: 410.0197.00780). Key differences are in the status of active and restored landfill are:

- The completed restoration of the southern landfill area Tip 891;
- The partial restoration of the northern landfill area Tip 890 cells 1-2;
- Capping of Tip 890 cell 3;
- Tip 890 cell 4 only current active area of landfill; and
- Sequential removal of spoil material from the southernmost area Tip 871 for the purpose of restoration to date (cells 1-3) on landfill Tip 890.

Habitats forming the areas core to the Section 73 applications

Tip 890 phases 1 & 2 (Restored grassland)

5.6 The grassland sward that has established on Tip 890 cells 1-2 can broadly be described as neutral semi-improved grassland with a sparse, rather than tight sward as is to be expected for an establishing grassland of this young age. Grass species recorded from this restored grassland upon cells 1-2 of Tip 890 included (in order of dominance) creeping bent *Agrostis stolonifera*, red fescue *Festuca rubra* and perennial rye-grass *Lolium perenne*. Other grasses present but less abundant included Yorkshire fog *Holcus lanatus*, false oat-grass *Arrhenatherum elatius* with infrequent soft rush *Juncus effusus*. Broadleaved species included colt's-foot *Tussilago farfara* cut-leaved-cranesbill *Geranium dissectum*, creeping buttercup *Ranunculus repens*, ribwort plantain *Plantago lanceolata*, curled dock *Rumex crispus* and meadow vetchling *Lathyrus pratensis*.

5.7 Surrounding the capped landfill cells 1-2 of Tip 890 towards the lower contours the grassland is more established and although dominated by grasses of similar species to those present within the establishing grassland upon restored, capped cells 1-2 of Tip 890, has a greater proportion of broadleaved herbaceous species within the sward which is in itself much tighter. Additional species of broadleaved herbaceous plants included meadow buttercup *Ranunculus acris*, grass vetch *Lathyrus nissolia*, greater bird's-foot trefoil *Lotus uliginosus* and greater burnet *Sanguisorba officinalis*.

Tip 871 (pioneer/colonising acid and marshy grassland)

5.8 The majority of this area remains bare ground, in most areas comprising 60-80%. Areas exceptional to this include a central strip running north-south through the tip connecting waterbodies 17 and 24 via a seasonally wet ditch. Along this section, the grassland has become more established to include a more diverse range of plant species including marginal aquatic plants and species more tolerant of wet conditions. The areas surrounding both waterbodies 17 and 24 are also more established than the plateau of the tip area itself.

5.9 Species recorded here were similar to when assessed previously by SLR in 2010; sheep's fescue *Festuca ovina*, purple moor-grass *Molinia caerulea*, creeping bent *Agrostis capillaris* and tufted hair-grass *Deschampsia cespitosa* with soft rush *Juncus effusus*, compact rush *J. conglomeratus* and green-ribbed sedge *Carex binervis* although some plants, including purple moor-grass and sedge species had cover-abundance of at most of 4% and were considered rare or occasional

within the sward. The most commonly recorded and dominant broadleaved plant was colt's-foot *Tussilago farfara* with additional commonly recorded species including common tormentil *Potentilla erecta* and mouse-ear hawkweed *Hieracium pilosella*.

- 5.10 Given the early colonising/pioneer nature of this area of wet grassland on previously disturbed ground, few indicator species were present that would contribute to the habitat meeting either *H6:1 Lowland Dry Acid* or *H6:2 Upland Acid Grassland* SINC selection criteria. Neither do the habitats present on the southern tip (Tip 871) area currently qualify as S7 priority habitats.
- 5.11 Where wetter i.e. on the banks adjacent to waterbodies 17 and 24 the interconnecting drainage ditch resembled more established, marshy grassland or marginal habitats with more rush and grass species recorded (included jointed rush *J. articulatus*, hard rush *J. inflexus*, reed canary grass *Phalaris arundinacea* and common reedmace *Typha latifolia* in addition to common herb species such as broadleaved willowherb *Epilobium hirsutum* were also observed to have patchy dominance of the shoreline. Photographs below show the typical recolonising vegetation present on this southern tip (Tip 871).

Photograph A – southern tip area (Tip 871) viewed south showing sparse sward



Photograph B – Southern tip area (Tip 871) viewed northeast showing wetter area dominated by common rush species, greater and broadleaved willowherb. Pioneer downy birch and grey willow saplings in foreground.



Southernmost extent of southern tip area (Tip 871)

- 5.12 The only characteristic difference between this section of the southern tip area where effectively the land parcel tapers to a point, is that there is some establishing areas of scattered scrub. This exists in a matrix of colt's foot dominated ephemeral/pioneer habitat as described in previous paragraphs and comprises scattered plants of downy birch *Betula pubescens*, goat willow *Salix caprea* and both European gorse *Ulex europaea*; and western gorse *U. gallii*.

Access track to southern tip area (Tip 871)

- 5.13 The main access track from Pwllfawatkin Farm road off the A474 into the southern tip area (Tip 871) experiences only light and occasional vehicular use currently and therefore has been partially colonised at the edges by ruderal species or those associated with woodland understorey communities, woodland being adjacent to the track itself. Species common to the trackside included Canadian fleabane *Conyza canadensis*, mouse-ear hawkweed *Pilosella officinarum*, ribbed melilot *Melilotus officinalis*, pendulous sedge *Carex pendula*, broadleaved willowherb *Epilobium montanum*, wood avens *Geum urbanum* and false wood-brome *Brachypodium sylvaticum*.

Photograph C – Showing access track into Tip 871 and colonisation by ruderal and woodland plants.



Habitats adjacent or surrounding areas core to the Section 73 applications (within wider FCC land ownership boundary)

Marsh/marshy grassland and reedbed

- 5.14 Present to the north of the northern tip area (Tip 890) and a smaller area around a flush to the west of the restored tip area (Tip 891). Characterised by the dominance of rushes, large sedges and conspicuous damp tolerant/loving plants such as common reedmace and larger willowherbs such as rosebay *Chamerion angustifolium* and great *Epilobium hirsutum*. Occasional meadowsweet *Filipendula ulmaria* and marsh marigold were also present within the shallower realms. Reedbed is classified as EW S7 priority habitat. Given the broad SINC selection criteria for 'H9:4 Reedbed' this habitat will likely qualify.

Semi improved neutral grassland

- 5.15 Semi improved neutral grassland fields were present in the west of the wider FCC ownership surrounding the former Pwllfawatkin Farm buildings. The fields were grazed by sheep and cattle and the swards varied in height depending on how recently they have been grazed. Grass species included Yorkshire fog *Holcus lanatus*, meadow foxtail *Alopecurus pratensis*, red fescue *Festuca rubra*, rough meadow grass *Poa trivialis*, smooth meadow grass *Poa pratensis* and Timothy *Phleum pratense*. Broadleaved species included common mouseear *Cerastium fontanum*, creeping buttercup *Ranunculus repens*, common sorrel *Rumex acetosa*, broadleaved dock *Rumex obtusifolius*, a dandelion *Taraxacum officinale* agg. and ivy leaved speedwell *Veronica hederifolia*. In wetter areas, lady's smock *Cardamine pratensis*, soft rush *Juncus effusus* and marsh thistle *Cirsium palustre* were also recorded. These fields are representative of 'Neutral Grassland' and as such can be considered EW S7 priority habitats. When the composition of the grassland is assessed against the SINC selection criteria for Lowland Meadows, grassland to be more representative of the lower value neutral grassland communities and unlikely to qualify. Undoubtedly though the grassland provide good linkage habitat between other habitats present within the FCC ownership.

Scrub

- 5.16 Contiguous scrub is present on the majority of the peripheries of wider FCC land ownership and in the context of the northern and southern tip areas, to the east of Tip 890 and surrounding Tip 871 on the east, south and west. The dominant canopy forming species in these areas are goat willow *Salix caprea*, grey willow *Salix cinerea* and silver birch *Betula pendula* with smaller proportions of common ash *Fraxinus excelsior*, downy birch *Betula pubescens*, European gorse *Ulex europaeus* and scots pine *Pinus sylvestris*. Where adjacent to the Upper Clydach River, some sections of the contiguous scrub habitat could be categorised as wet woodland and this is also the case for much of the contiguous scrub habitat to the east of the northern tip area (Tip 890).

Wet woodland

- 5.17 As mentioned above, along some sections of the Upper Clydach River and areas within the wider FCC land ownership to the east of the northern tip area the contiguous scrub is more characteristic of wet woodland with willow dominating the canopy and less damp tolerant species conspicuously absent; this area is therefore considered an EW S7 priority habitat and given the broad SINC selection criteria for H3.3 'wet woodland' is also likely to qualify. The scrub canopy is dominated

by goat and grey willow with a ground flora dominated by damp tolerant species such as common reedmace *Typha latifolia* common reed *Phragmites australis*, great willowherb *Epilobium hirsutum* with less frequent reed canary grass *Phalaris arundinacea*, tufted hair grass *Deschampsia cespitosa*, greater tussock sedge *Carex paniculata* and pendulous sedge *Carex pendula*.

Semi-natural broadleaved woodland

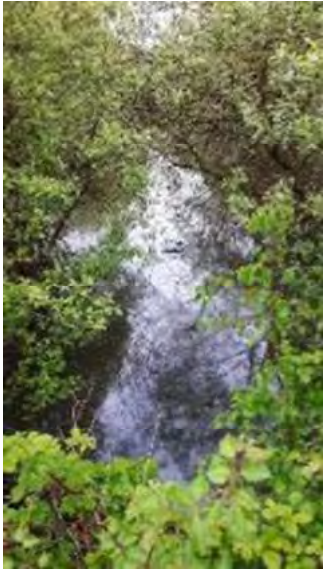
- 5.18 To the west of the wider FCC land ownership and west of the northern tip area (Tip 890) is a large area of semi-natural broadleaved woodland. The main canopy forming species in this woodland are pedunculate oak *Quercus robur* with an understorey of hazel *Corylus avellana*, silver birch *Betula pendula*, holly *Ilex aquifolium*, hawthorn *Crataegus monogyna* and rowan *Sorbus aucuparia*. The eastern portion of the woodland becomes wetter and both grey and goat willow, and alder *Alnus glutinosa* become more prominent in the canopy.
- 5.19 The ground flora of the woodland is reasonably diverse with honeysuckle *Lonicera periclymenum*, dog rose *Rosa canina*, wood anemone *Anemone nemorosa*, wood false-brome *Brachypodium sylvaticum*, bluebell *Hyacinthoides non-scripta*, dewberry *Rubus ceasius*, lesser celandine *Ficaria verna*, herb Robert *Geranium robertianum* and greater stitchwort *Stellaria holostea*. There are core areas of woodland with a generous diversity of both ground flora, high canopy and understorey species including many Ancient Woodland Indicator species together with pockets of woodland that are clearly more characteristic of secondary woodland. Generally, though this woodland would represent an S7 priority habitat and would likely qualify under the broad selection criteria for semi natural broadleaved woodland.

Waterbodies

- 5.20 A total of 24 waterbodies (*Table 10*) were present within the FCC ownership at Pwllfawatkin or close to the boundary of the wider FCC ownership so all within 500m of the areas subject to the Section 73 restoration applications. Two waterbodies (waterbodies three and two) fall within land to be affected by proposed restoration works in the north (Tip 890) and a further two (waterbodies 17 and 24) the south (Tip 871). The latter, waterbody 24, will be lost under restoration proposals. For locations please refer to *Figure 4.0*. These are considered EW S7 priority habitats and meet broad SINC selection criteria for *H13 Standing Open Water and Canals*, *H13:2 Ponds*.
- 5.21 The Upper Clydach River forms the southern section of the eastern boundary which is a designated SINC under the criteria *H12 Rivers and Streams* (Neath Port Talbot Watercourses SINC). This SINC will not be directly affected by any works subject to the Section 73 applications.

Table 10: Waterbody descriptions

Waterbody reference	Photo & Description	Size (m)
1	 A large rectangular settling pond in the centre of the site with steep sloping banks of meadow grass and marginal vegetation namely soft rush. Aquatic vegetation was abundant, dominated by broad-leaved pondweed <i>Potamogeton natans</i> with occasional water hawthorn (<i>Aponogeton distachyos</i>). The southern bank was covered in scrub that primarily consisted of willow (<i>Salix sp.</i>) with occasional European gorse, providing little to no shade.	50 x 20
2	 A rectangular lagoon, located in the centre of the site, south of the active landfill, with steep bare banks and minimal marginal vegetation consisting of soft rush. No aquatic vegetation was visible. Scrubby sections of willow, European gorse and bramble adorn the eastern and southern bank.	100 x 50
3	An oval pond that was southerly adjacent to waterbody 2. Largely surrounded by willow, steep grassy banks give way to marginal soft rush. Aquatic vegetation present included broad-leaved pondweed and bulrush.	40 x 40
4	 A rectangular settling pond on the eastern site boundary. All banks were heavily shaded by willow scrub. Deep layers of silt line the shallow marginal banks of the pond which then drop off suddenly. Marginal vegetation included occasional willowherb, meadowsweet, colt's-foot (<i>Tussilago farfara</i>), marsh marigold (<i>Caltha palustris</i>), sedge spp, tufted hair-grass and fool's-water-cress (<i>Apium nodiflorum</i>) Water hawthorn was present within the pond.	15 x 40

Waterbody reference	Photo & Description	Size (m)
5	 A rounded pond with steep banks and layers of deep silt, connected to waterbody 6. The banks comprise a mixture of European gorse, soft rush, tufted hair grass and willow scrub on the upper slopes. No aquatic vegetation was visible and no marginal vegetation present. The extremely steep sides, silt and drop off point within the pond meant that the waterbody was unsafe to survey.	15 x 20
6	 A linear pond on the eastern site boundary, connected to waterbody 5. The western bank is a mixture of scrub, bulrush, gorse, tufted hairgrass, and willow. Most of the banks are heavily shaded by willow scrub and European gorse. Marginal / aquatic vegetation is limited to the northern end of the waterbody, which included patches of common bulrush, and scattered specimens of soft-rush, sedges and water horsetail (<i>Equisetum fluviatile</i>). Similarly to waterbody 5, the waterbody was unsafe to survey due to the extremely steep sides, silt and drop off point within the pond.	10 x 50
7	 A linear pond on the eastern site boundary and the southern continuation of waterbody 9. The shallow eastern bank is rather bare, with a fringe of common bulrush, meadowsweet and soft rush, while the banks were heavily shaded by willow scrub. The eastern bank lacked marginal and aquatic vegetation whereas the western bank was bordered with pockets of soft rush.	120 x 15
8	Originally created by landfill run off, no longer exists.	N/A

Waterbody reference	Photo & Description	Size (m)
9	 A linear pond on the eastern site boundary and the northern continuation of waterbody 7. The shallow eastern bank was rather bare other than small pockets of soft rush under willow scrub; while the western bank had a substantial fringe of common bulrush, meadowsweet and soft rush.	120 x 15
10	 An oblong waterbody situated within dense scrub with marshy grassland to the south. The banks were dominated by willow, European gorse, bramble and soft rush. Water hawthorn dominated the pond	50 x 12
11	 The northern bank of this small rounded pond was formed by a steep, almost vertical bank topped with hardstanding where a public tip is located. The remaining sloped banks are dominated by bramble and encroaching scrubland. With exception to pondweed <i>Lemna sp</i>, no aquatic vegetation was present.	10 x 10

Waterbody reference	Photo & Description	Size (m)
12	 A large rectangular waterbody separated from the majority of the site by dense scrub. Immediately surrounded by semi-improved grassland with soft rush and encroaching willow and gorse scrub, the waterbody has sloping banks and is populated by substantial pockets of bulrush, pond sedge and water hawthorn.	80 x 20
13	 A large pond dedicated to high concentrations of leachate and as such, was deemed unsafe to survey.	20 x 20
14	 A rectangular settling pond to the east of the southernmost spoil heap, separated from the majority of the site by the Upper Clydach River which forms the eastern boundary. Surrounded by dense scrub, the pond lacked any marginal or aquatic vegetation.	50 x 6
15	 A small oblong pond bordered the north of waterbody 14 and shared much of its properties as dense scrub surrounded the pond and aquatic vegetation was absent.	6 x 4

Waterbody reference	Photo & Description	Size (m)
16	 A small pond to the east of the southernmost spoil heap. It is well vegetated by a stand of bulrush, with willowherb, pond sedge, soft rush, water star-wort and pondweed. Willow, European gorse and silver birch are present around the margins of the pond. Surrounding habitats include dense scrub to the north, south and west, a telegraph pole to the south, grassland with scattered scrub and bare earth to the east.	60 x 15
17	 A large rounded pond situated to the north of the southernmost spoil heap with mostly bare banks and sparse marginal vegetation of reedmace, pond sedge and soft rush around the northwest corner. The pond was linked to an ephemeral ditch which consisted largely of bare earth and sparsely distributed marginal vegetation.	70 x 70
18	 A marshy bog located to the west of the sites centre. Water runs from west to east through the very shallow marshland and directed into a stream to the west of the waterbody. Three mature willows are situated within the marshy area. The running water and shallow nature of this waterbody meant that it was highly unlikely to support newts and as such was not subjected to further surveys.	N/A
19	Ephemeral pond present in 2007 no longer exists.	N/A
20	<i>Unable to photograph due to proximity to landfill during active daylight hours.</i> A linear pond on the western boundary of the site. It is heavily shaded along much of its western edge by oak (<i>Quercus sp.</i>), silver birch, hazel (<i>Corylus avellana</i>) in the adjacent broadleaved woodland, and grey willow which is encroaching into the pond itself. Nonetheless it is well vegetated by water star-wort (<i>Callitriche sp.</i>), floating sweet grass, sedges, bulrush, soft rush, common reed and spearwort. The waterbody was very shallow, swallowed up by silt and aquatic vegetation, combined with the drying effects of the season.	4 x 30

Waterbody reference	Photo & Description	Size (m)
21	 A substantial crescent shaped pond extending around the north-eastern most corner of the site. The steep banks are topped with a dense sward of perennial rye and annual meadow grass, with soft rush, European gorse, bramble and pond sedge scattered along the pond's margins. A mature willow and scrub encroaches the western end of the pond. Water hawthorn dominated the aquatic vegetation present.	200 x 20
22	 A rectangular pond on the eastern site boundary, originally for leachate. The top of the banks were vegetated with a dense sward of amenity grassland dominated by perennial rye-grass and annual meadow-grass, which were encroached by European gorse and bramble. Bulrush dominated the waterbody and water hawthorn was also present. Dense willow scrub ran parallel to the waterbody to the east.	80 x 20
23	 A well-established rectangular pond on the eastern site boundary. The banks are covered with willow dominated scrub. Marginal and aquatic vegetation is abundant in the northern end, including bulrush, pondweed (<i>Potamogeton sp.</i>), water plantain (<i>Alisma plantago-aquatica</i>), soft-rush, water mint (<i>Mentha aquatica</i>), tufted hair-grass, watercress (<i>Rorippa nasturtium-aquaticum</i>), meadowsweet, willowherb and water horsetail. The pond then tapers to more of a shallow channel towards the southern end and is likely to be ephemeral.	3 x 80

Waterbody reference	Photo & Description	Size (m)
24	 Situated atop the southernmost Tip 871, a droplet shaped pond ran north to south. The southern end of the pond consisted of a thick bulrush fringe with soft rush and pond sedge lining the sloping east and steep west banks. Amenity grassland scattered with soft rush and bare ground immediately surrounds the waterbody.	65 x 15

Waterbody references in **bold** indicate their location within the restoration application boundary i.e. the waterbodies most likely to be affected.

Field survey

Fauna

Badger

- 5.23 No evidence of the use or occupation of the site by badgers has been recorded over the course of survey work undertaken over the wider FCC land ownership at Pwllfawatkin although it is acknowledged that substantial and extensive potentially suitable habitat exists.

Bats

Manual and Automated (Static) Activity Survey

- 5.24 Manual bat activity surveys undertaken over the wider FCC ownership recorded the following species (in order of abundance) covering the following habitats; mixed broadleaved/deciduous woodland, wet/marsh grassland, semi-improved pastoral grassland and indigenous hedgerows: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, *Myotis sp.*, Nathuius pipistrelle *P. nathusii*, noctule *Nyctalus noctula*, brown long-eared *Plecotus auritus*, *Nyctalus sp.*, Daubenton's *Myotis daubenontii*, and Annex II barbastelle *Barbastella barbastellus* (Figure 7-12).
- 5.25 Barbastelle bat, common pipistrelle bat, brown long-eared bat, noctule bat and soprano pipistrelle bat are all EW S7 species of principal importance.

Bat Tree Roost Potential Assessment

- 5.26 No mature trees of age and stature required to exhibit features potentially suitable for the support of roosting bats were present within either the northern tip area or southern tip area (Tip 890 and Tip 871 respectively) with most woody vegetation limited to scattered scrubby willow species (mostly goat willow) and occasional European gorse therefore no further assessment of the suitability of features was considered necessary.

Birds

Scoping Bird Survey

- 5.27 The following bird species detailed in *Table 11* were recorded during a breeding bird scoping survey undertaken recently across the northern tip area (Tip 890) and the southern tip area (Tip 871).

Table 11: Bird species recorded during scoping bird survey

Species	Scientific name	Conservation Status
Blackcap	<i>Sylvia atricapilla</i>	Green
Bullfinch	<i>Pyrrhula pyrrhula</i>	Amber, EW S7
Chiffchaff	<i>Phylloscopus collybita</i>	Green
Cuckoo	<i>Cuculus canorus</i>	Red, EW S7
Red kite	<i>Milvus milvus</i>	Green, WCA 1
Reed Bunting	<i>Emberiza schoeniclus</i>	Amber, EW S7
Reed Warbler	<i>Acrocephalus scirpaceus</i>	Green
Song thrush	<i>Turdus philomelos</i>	Red, EW S7
Whitethroat	<i>Sylvia communis</i>	Green
Willow Warbler	<i>Phylloscopus trochilus</i>	Amber

Great Crested Newt (GCN)

- 5.28 *Appendix D* details the results of the four presence/absence surveys undertaken on 18 of the 24 waterbodies identified from either within the two areas subject to the Section 73 applications or within the wider FCC land ownership and <250m from either. Owing to the number of waterbodies and the on-site terrain, each survey was completed over the course of two consecutive nights with approximately half of the waterbodies surveyed on the first night and the remainder on the following night. For clarity, the first survey visit was on 09.05.2018 and 10.05.2018; the second on 14.05.2018 and 15.05.2018; the third on 23.05.2018 and 24.05.2018; and the fourth on 29.05.2018 and 30.05.2018.
- 5.29 Six of the 24 waterbodies were not subject to either eDNA survey (2017) or subsequent presence/absences survey (2018) for the following reasons:
- Waterbody 5. Very steep, near vertical, densely vegetated banks. Unstable silt shelves and exceptionally deep water. Physical access and H&S grounds.
 - Waterbody 6. Very steep, near vertical, densely vegetated banks. Unstable silt shelves and exceptionally deep water. Physical access and H&S grounds.
 - Waterbody 8. Waterbody no longer present.
 - Waterbody 13. A leachate collection pond. No access permitted.
 - Waterbody 18. Running/flowing water rather than standing water/not considered suitable.
 - Waterbody 19. Waterbody no longer present.

- 5.30 The only waterbody which tested positive for GCN eDNA following survey undertaken in 2017 was waterbody twelve. However, no individual GCN have been confirmed after the four presence/absence surveys undertaken in 2018, nor following a further two surveys carried out as a precautionary approach.
- 5.31 Following the presence/absence surveys undertaken to date on 18 of the 24 waterbodies identified no GCN have been confirmed. Common toad *Bufo bufo*, common frog *Rana temporaria* and palmate newt *Lissotriton helveticus* were recorded within waterbodies one, two, and ten supporting 'large' populations of the latter (size class categories taken from 5.8.3.1 *Rapid assessment of population size class*), GCNMG (2001)²⁰. Common toad is an EW S7 species of principal importance. no habitat suitable for the support of natterjack toad *Epidalea calamita* is present within the Section 73 application area or the wider FCC land ownership and the site's location is outside of the UK distribution of the species.

Reptiles

- 5.32 Reptile surveys undertaken in suitable habitat within the wider FCC land ownership recorded common lizard. Full results including incidental recording of amphibians are provided in *Table 12* below.
- 5.33 A single adult common lizard was observed under a piece of redundant rubber conveyor present on the southern tip area Tip 871. Artificial refugia were distributed on 30th August 2018 in order to extend reptile presence/absence surveys into the Section 73 application areas. Surveys of suitable habitats over the whole of the Section 73 application areas (i.e Tip 871, Tip 890 and non-active landfill areas between Tip 890 & the restored Tip 891) are underway but not yet complete.
- 5.34 FPCR have received verbal anecdotal evidence of adder *Vipera berus* being present within both the Section 73 application area and the wider FCC land ownership although presence has not been confirmed to date. Anecdotal sightings had been made on the western boundary to the FCC ownership which is conceivable with heathland existing further west of this boundary.
- 5.35 Suitable habitat for both slow worm *Anguis fragilis* and grass snake *Natrix natrix* is present within the Section 73 application area and the wider FCC land ownership at Pwllfawatkin although neither species has been recorded over the course of surveys completed to date.
- 5.36 All common reptile species are EW S7 species of principal importance. No habitat suitable for the support of sand lizard *Lacerta agilis* was present within the Section 73 application areas or the wider FCC ownership boundary.

²⁰ Whitehurst, J. Great Crested Newt Mitigation Guidelines (2001) English Nature, Peterborough.

Table 12: Reptile survey results

Visit Number	Date	Weather	Species Recorded
1	15.09.17	Cloud 60-70%, Beaufort - 1/2, rain earlier in the day, 10:00, 12°C	Reptiles= 2 common lizards (1 male, 1 female) Amphibian= 1 juvenile common toad, 4 smooth newts (3 juvenile, 1 adult) 1 juvenile common frog
2	26.09.17	Cloud 90-100%, Beaufort - 1/2, drizzle, 11:00, 15°C	Reptiles= No species present Amphibian= 2 juvenile common toads
3	28.09.17	Cloud 70-80%, Beaufort - 2/3, bright, 11:00, 15°C	Reptiles= No species present Amphibian= 1 juvenile common toad
4	04.10.17	Cloud 90-100%, Beaufort - 1/2, bright, 11:30, 13°C	Reptiles= No species present Amphibian= 7 common toad (6 juveniles, 1 adult)
5	06.10.17	Cloud 30-40%, Beaufort - 0, clear, bright, sunny, 12:30, 14°C	Reptiles= No species present Amphibian= 4 common toads (3 juveniles, 1 adult)
6	09.10.17	Cloud 90-100%, Beaufort - 1/2, bright, 10:30, 14°C	Reptiles= No species present Amphibian= 2 adult common toads
7	12.10.17	Cloud 60-70%, Beaufort - 1/2, clear, bright, rain earlier in the day, 11:00, 15°C	Reptiles= No species present Amphibian= No species present

Riparian mammals

- 5.37 Signs of otter (EW S7 Priority Species) have been observed at several points along the Upper Clydach River with recent spraints positively identified on the banks of waterbody one. Anecdotal evidence was also received confirming the regular use of habitat immediately adjacent to waterbody one (and likely waterbodies two and three also) by a single male otter for laying up during operational hours of the landfill site. See Target Note on *Figure 3.0* and *Figure 5.0*. Waterbodies two and three are located at the southern extent of the northern tip area (Tip 890) which is within the Section 73 application boundary. Waterbody one is within the already restored area to the south (Tip 891). No holts or permanent resting places were identified onsite.
- 5.38 Numerous small mammal burrows were recorded from the banks of the Upper Clydach River and the waterbodies although in many cases these were difficult to definitively identify as being those of water vole. Many of the holes, although exhibiting the characteristic shape of those made by water vole also contained snail shell debris usually associated with burrows made by brown rat *Rattus norvegicus*. No other characteristic signs of water vole were noted in association with or in close proximity to the burrows. See Target Note on *Figure 3.0*.

Photograph D - showing typical burrows observed (from waterbody one)



Dormice

- 5.39 Suitable habitat for the support of dormice is present in the form of ancient semi-natural woodland, wet woodland, scattered and contiguous scrub across the FCC ownership boundary at Pwllfawatkin. The Section 73 applications for amendments to the restoration of capped landfill cells following the cessation of landfill operations at the site do not require the removal of anything but small areas of scrub (limited to scattered gorse, willow and birch) in the south of the Tip 871 area. Any potential impacts to individual dormice resulting from such small volumes of scrub removal can be adequately avoided by the timing and method of removal and a full presence/absence survey of suitable habitats within the wider FCC ownership boundary, in particular given these habitats are not to be affected was considered to be disproportionate.

6.0 DISCUSSION AND RECOMMENDATIONS

General

- 6.1 The requirement for Section 73 applications for varying the planning consent for the restoration scheme on the northern and southern tip areas (Tip 890 and Tip 871 respectively) is necessary as because of a reduction in landfill operations and therefore resultant differences in the final profile for the capped landfill cells that are to subsequently undergo a scheme of habitat restoration. As the consented restoration scheme for Tip 890 and Tip 871 is still to continue but to a slightly different contour profile to that of the consented scheme it is not considered materially different. Furthermore, the restoration scheme and five year after plan will be in accordance with those already approved.

Sites

- 6.2 Given the Section 73 applications concern restoration of habitats on areas subject to landfill operations and temporary storage of colliery shale spoil prior to capping closed landfill cells there will be no impact on local statutory or non-statutory designated sites of nature conservation importance.

Habitats

- 6.3 There are unlikely to be any significant long-term adverse effects in the context of the restoration of the northern tip area (Tip 890) given that the vast majority of the area to be affected comprises currently active and recently capped landfill with occasional small areas of scattered scrub and pioneer grassland on the edges of access routes etc. All waterbodies (waterbodies two and three) are to be retained under proposals.
- 6.4 The dominant habitat occupying the southern tip area (Tip 871) is pioneer acid grassland that has slowly began to colonise the former colliery shale spoil area since the last removal of horizons to cap earlier closed landfill cells of the northern tip area (Tip 890). Although loosely referred to here as pioneer acid grassland, very few acid grassland indicator species were recorded over the course of surveys at Pwllfawatkin and in the context of Phase 1 Habitat descriptions, the majority of habitat on Tip 871 falls neither neatly into grassland nor ephemeral/short perennial habitat types given the dominance of a few species including, most commonly, colt's-foot. In addition to the early colonising grassland, marsh grassland and marginal habitats are also present associated with the two waterbodies (17 and 24) and the interconnecting ditch; and scattered indigenous scrub.
- 6.5 Consideration must also be given to potential access for substrate haulage and excavation traffic during the phased stages of restoration that require material to be removed and transported between the southern tip area Tip 871 and closed landfill cells of the northern tip area Tip 890. Access routes will follow existing access from the north of the southern tip area (Tip 871) onto
- 6.6 In terms of the evaluation of these existing habitats, some have broadly equivalent EW S7 habitats of principal importance and those that would qualify under the relevant criteria as EW S7 habitats would include the waterbodies 2, 3, 17 and 24 that represent EW S7 *Standing Open Water / Ponds* and the southern tip area (Tip 871) as a EW S7 *Open Mosaic Habitat on Previously Developed Land* (although 'previously developed' in this instance would be a term loosely applied). Both are also reflected in Local Biodiversity Action Plans as *Previously Developed Land of Biodiversity Interest* and *Ponds & Lakes*.
- 6.7 The Section 73 applications will see the restoration of the site in accordance with the submitted restoration scheme, which will deliver biodiversity gain post landfill operation at the Pwllfawatkin site. In restoration of both the northern and southern tip areas (Tip 890 and Tip 871 respectively) there is sufficient room to accommodate both EW S7 and LBAP Habitats. Furthermore, the five-year aftercare scheme would secure any biodiversity benefits delivered by the restoration scheme.
- 6.8 In summary, the residual impact of any amendment to the restoration schemes will still result in net beneficial gain for diversity.
- 6.9 The implementation of protection measures secured through appropriate condition will ensure that there are no adverse impacts upon habitats of greater value adjacent to the areas subject to the Section 73 applications (Tip 890 and Tip 871). For full details of conditions attached to planning

consents P/2002/1016 and P/2014/0693 that will be amended and incorporated into any varied consent (see respective Planning Statements of Section 73 applications).

Habitat resilience and ecological context

- 6.10 The restoration scheme; and the habitats within the Section 73 application boundaries span two core areas within the centre of the wider FCC ownership boundary and the implementation of the restoration scheme will affect two key areas that have been referred to throughout this report as the southern tip area (Tip 871) and the northern tip area (Tip 890). These two areas are separated by restored Tip 891 and the Pwllfawatkin Far Road that bisects the FCC land ownership east-west from the A474 to Bryn Mawr.
- 6.11 Habitats within the wider FCC Ownership completely envelope the Section 73 application areas with a mosaic of habitats down the eastern boundary of the FCC ownership providing a valuable corridor for the movement of wildlife whilst buffering the Upper Clydach, and biodiversity supported by it from Pwllfawatkin Landfill and waste recycling operations. So, whilst there is a relatively wide diversity of habitats present within the wider FCC land ownership at Pwllfawatkin, the active landfill and waste recycling operations largely maintain the Section 73 application areas, certainly the northern trip area (Tip 890), as low biodiversity value and limit the potential for connectivity between habitats, to the periphery.
- 6.12 With the restoration of the entire central tip (Tip 891) and some cells of the northern tip (Tip 890) implemented under former restoration consents, inevitably the potential connectivity of habitats across the FCC land ownership and indeed the wider local area will have increased historically. However, the active landfill areas subject to the Section 73 applications remain of low value to biodiversity and where there are habitats of greater value such as waterbodies two and three (within the Tip 890 area) and waterbody one (adjacent to these in the central Tip 891 area) landfill operations maintain these in relative isolation from peripheral habitats of higher value (woodland, the Upper Clydach River corridor, reedbeds, marsh grassland etc.).
- 6.13 The southern tip area (Tip 871) is dominated by pioneer acid grassland / ephemeral short perennial communities that are indicative of historically high levels of disturbance. The fact that such habitats have begun to recolonise despite repeated, regular grading and removal of substrate material to cap sealed landfill cells, arguably also demonstrates the resilience and replicability of such habitats in the context of disturbance. One of the key variations that the Section 73 applications seek to agree is the change in the topographical profile of the final restored scheme as a result of the active landfill at cessation of operations being significantly smaller than originally intended. Consequently, substantially lower volumes of substrate material will need to be removed from the southern tip (Tip 871) in order to provide capping material for the final cells of the active landfill in the northern tip area (Tip 890) in order to implement the restoration scheme. Therefore, given the capacity for the pioneer acid grassland / ephemeral short perennial communities to recolonise combined with the continued presence of suitable substrate material following removal of that required for capping, the loss of these habitats from Tip 871 can only be considered temporary.
- 6.14 It should be noted here that currently; the habitats present on the southern tip (Tip 871) area are unmanaged and scrub encroachment is likely to prevent these habitats from reaching a more optimum condition in the absence of appropriate management.
- 6.15 Restoration already implemented within the northern tip area (Tip 890) has included the seeding of grassland, planting of indigenous scrub and native hedgerows on sealed, capped landfill cells

and all newly created habitats have in the most part successfully established. The western slope of the restored area of Tip 890 has suffered from the invasion of pernicious weeds that has hindered the establishment of a species rich grassland sward; however, following management including removal and annual mowing the situation over the last two seasons has improved.

- 6.16 The entirely restored central tip area (Tip 891) which does not form part of the Section 73 applications has been a success with well established blocks of indigenous scrub/woodland planting, good native hedgerows developing and grassland with a relatively diverse range of grasses and broadleaved forbs present and only relatively small numbers of pernicious weeds in the form of occasional clumps of common nettle, creeping thistle or broadleaved dock.

Species

Badger

- 6.17 No evidence of badger has been recorded from the northern tip area or the southern tip area (Tip 890 and Tip 871), or indeed from the wider FCC ownership boundary following surveys undertaken since FPCR from May 2017. It should be noted, however, that with such large areas of woodland and scrub present adjacent to the two areas subject to Section 73 applications within the wider FCC ownership boundary and given the mobile nature of badger and fluctuating levels of badger activity, that the presence of badger setts cannot be completely discounted. Currently badgers are not considered to pose a constraint to either restoration scheme.
- 6.18 The proposed restoration schemes include the creation of varied grassland, indigenous hedgerow and native woody species planting that will provide potentially suitable habitat for future use by local badger populations.

Bats

- 6.19 With the exception of the waterbodies 2, 3, 17 and 24 and associated habitats, the northern and southern tip (Tip 890 and Tip 871) areas are generally considered of low value in the context of foraging and commuting bats with habitats of greater value existing outside of these and within the wider FCC land ownership. Activity surveys undertaken over 2017 and 2018 of some of these other habitats within the wider land ownership have recorded species considered common and widespread both locally and nationally.
- 6.20 The exception to this was the western barbastelle which was recorded in exceptionally low numbers. As this species is associated with woodland edge it is considered very highly unlikely that amendments to either restoration scheme would have any potential adverse impact on the use of the wider site by the species and no suitable habitat for foraging or commuting barbastelle currently exists on either the northern or southern tip areas (Tip 890 and Tip 871).
- 6.21 A particular concern for other kinds of projects in relation to barbastelle bats is the impact of increased levels of illuminance. As there is to be no increase in lighting as a result of the restoration schemes subject to the Section 73 applications, no adverse impacts are expected in this respect.
- 6.22 Current proposals do not include the removal of any mature trees with features that would be suitable for the support of bat roosts. Should the situation change then any mature tree marked for removal should be checked prior to the commencement of any felling works for the presence of bat roosts. Should bats be found to be present then an EPS licence would be required in order to legitimise works.

- 6.23 The proposed restoration schemes include the creation of varied grassland, indigenous hedgerow and native woody species planting that will increase the habitats available as a foraging and commuting resource for local bat populations. The drainage scheme and five year aftercare of water resources across the site will also likely have a beneficial effect on invertebrate assemblages and increase available prey resources for local bat populations.

Birds

- 6.24 The bird scoping survey recorded a number of bird species typical of a site with such a wide variety of habitats and the presence of cuckoo in particular is known to be a good indicator for habitat that supports a diverse range of bird species²¹. A number of records of notable bird species were also returned following consultation with SEWBERC for the Pwllfawatkin site.
- 6.25 As the restoration schemes only involves the temporary loss of habitats of low value no adverse impact upon bird populations is expected to occur providing that precautionary measures are taken to reduce the risk of committing any offence during the initial clearance phases. Such measures include the removal of any vegetation potentially suitable for nesting birds (including ground nesting species) outside of the bird breeding season (March to September) where possible. Where this is not possible, all vegetation should be checked by a suitably experienced ecologist to identify the presence of any nesting birds. Should presence be confirmed then a suitable buffer will be implemented around the nest to reduce disturbance and vegetation removal delayed until such time as the young birds have fledged, which will need to be confirmed by a suitably experienced ecologist.
- 6.26 Grassland provisioned in accordance with the restoration scheme can easily be modified through relatively minor changes to management practices to provide a diverse range of resources to ground nesting, seed eating and farmland birds. Invariably, the significant areas of native woodland planting and indigenous hedgerows provided in accordance with the restoration scheme will provide and increase potential nesting sites within the immediate local area whilst also increasing year-round foraging resources for birds through the inclusion of flower and fruit bearing species within the planting schedules.

GCN

- 6.27 The results of the presence/absence surveys and the eDNA surveys undertaken in June 2017 are conflicting with regards the presence/absence of GCN populations within the wider FCC ownership. The only positive record of GCN (eDNA, 2017) was recorded at waterbody 12 which exists to the east of the Upper Clydach River that could present a substantial barrier to dispersal. However, no GCN were recorded after six presence/absence surveys undertaken at waterbody twelve. After four presence absence surveys undertaken in 2018 of the remaining waterbodies onsite and west of the Upper Clydach, GCN were confirmed to be absent.
- 6.28 No records of GCN were returned from within 1km of the wider Pwllfawatkin FCC ownership boundary and the Ecological Appraisal produced by SLR in 2010 ((Ecological Appraisal, SLR 2010 Ref: 410.0197.00780) states also that:
- “Whilst the high density of ponds and availability of high quality terrestrial habitats provide suitable conditions to support a breeding population of great crested newt, it is understood that the site was*

²¹ Morelli, F., Pape-Moller, A., Nelson, E., Benedetti, Y., Liang, W., Simova, P., Moretti, M & Tryjanowski, P. (2017) The common cuckoo is an effective indicator of high bird species richness in Asia and Europe. Scientific Reports 7, 4376.

fully surveyed for this species in 2005 by Jacobs Babbie. No great crested newt was recorded during this survey, however the presence of smooth newt (Triturus vulgaris) and palmate newt (Triturus helveticus) was noted."

- 6.29 Which would concur with the results that we have recorded for all of the waterbodies surveyed to the west of the Upper Clydach River. Based on the results of the presence/absence surveys undertaken by FPCR we believe that it is reasonable to conclude from our survey work in conjunction with historic results of surveys undertaken by Jacobs Babbie, the lack of existing records of GCN presence within the local area (SEWBERC) and the knowledge that GCN distribution is limited in southeast Wales; that the likelihood of GCN populations being present is low risk and that the species poses no constraint.
- 6.30 Given the large population of palmate newt recorded on site and the presence of common toad (a EW S7 Priority Species) we would concur with the recommendations made in the previous report with regard the requirements for removal of waterbodies. It is therefore recommended that where removal of waterbodies is required works are timed outside of the core breeding season for amphibians (March to June inclusive) when destruction of such features would have the greatest impacts on these populations, the majority of breeding age having converged on the features for the purpose of breeding. In the case of common toad peak breeding time would be earlier and therefore any works would ideally take place between September and January when most amphibians will be in hibernation.
- 6.31 The restoration scheme for the northern tip area (Tip 890) involves the replacement of unsuitable active landfill and sealed unrestored landfill cells with various forms of grassland, indigenous hedgerow planting and native woody species plantings that will provide an increase in foraging and refuge resources available to local amphibian populations in the terrestrial phases of their lifecycle. The restoration of this northern tip area will also bridge a current 'gap' between high suitability wet woodland and contiguous scrub on the east of the wider FCC land ownership with high value broadleaved woodland habitat on the west of the FCC land ownership which will improve the long-term connectivity across the site and within the wider local area.
- 6.32 The restoration scheme for the southern tip area (Tip 871) following the removal of former colliery shale spoil required for the capping and restoration of the active landfill sites in the northern tip area will also include the creation of various forms of grassland, indigenous hedgerow planting and native woody species planting in accordance with the restoration scheme that will provide an increase in foraging and refuge resources available to local amphibian populations in the terrestrial phases of their lifecycle. Although the complete removal of waterbodies may not be needed in this area, the degree of reprofiling that will result on removal of material for the capping and restoration of the currently active landfill on the northern tip area may require engineering works to existing bodies if these are to be retained with the capacity to hold water. Where works are required to existing waterbodies, these waterbodies will be restored, marginal vegetation planted or allowed to regenerate and subject to the five-year aftercare commitment.

Reptiles

- 6.33 The northern tip area (Tip 890) that will be affected by restoration works currently provides unsuitable habitat for reptiles although more suitable habitat including the already restored cells 1-2 which provide suitable habitat for basking and refuge exists to the north.

- 6.34 The southern tip area (Tip 871) provides some areas of suitable habitat with the most optimal associated with the central drainage ditch, marsh grassland and marginal areas around waterbodies; with more optimal habitat also being present on the peripheries of the tip itself i.e. adjacent.
- 6.35 Surveys of habitats in the wider FCC land ownership in 2017 recorded common lizard *Lacerta vivipara* (EW S7 Priority Species) with incidental sighting of adult common lizard from the southern tip area Tip 871 and anecdotal evidence has also received that adder *Vipera berus* are present within habitats in the west of the wider FCC land ownership. Also, habitat within the wider FCC land ownership is likely to support populations of grass snake. No records of reptile species were returned following consultation.
- 6.36 It is our recommendation that following completion of the extended reptile presence/absence surveys in the areas to be directly affected by the Section 73 applications that a strategy for the avoidance and mitigation of potential impacts to reptile presence is agreed in writing with the LPA in order to reduce the risk of harm or injury to reptiles, in particular on the southern tip area (Tip 871). Such a strategy may include the management of vegetation to make it unsuitable for reptiles prior to breaking ground; or in the case of larger reptile populations being present, a trapping and exclusion exercise may be required in order to ensure legal compliance and ensure no harm or injury would result from clearance operations.
- 6.37 The restoration scheme for both the northern tip area (Tip 890) and southern tip area (Tip 871) involves provision of various habitats will provide an increase in foraging and refuge resources available to local populations of reptiles. The retention/re-engineering of waterbodies in particular will provide suitable foraging habitat for grass snake if present within the local environment and the aspect created by reprofiling works to both the northern and southern tip areas will increase basking habitat available for common lizard in particular in the short term as grassland establishes leaving some areas of substrate exposed.

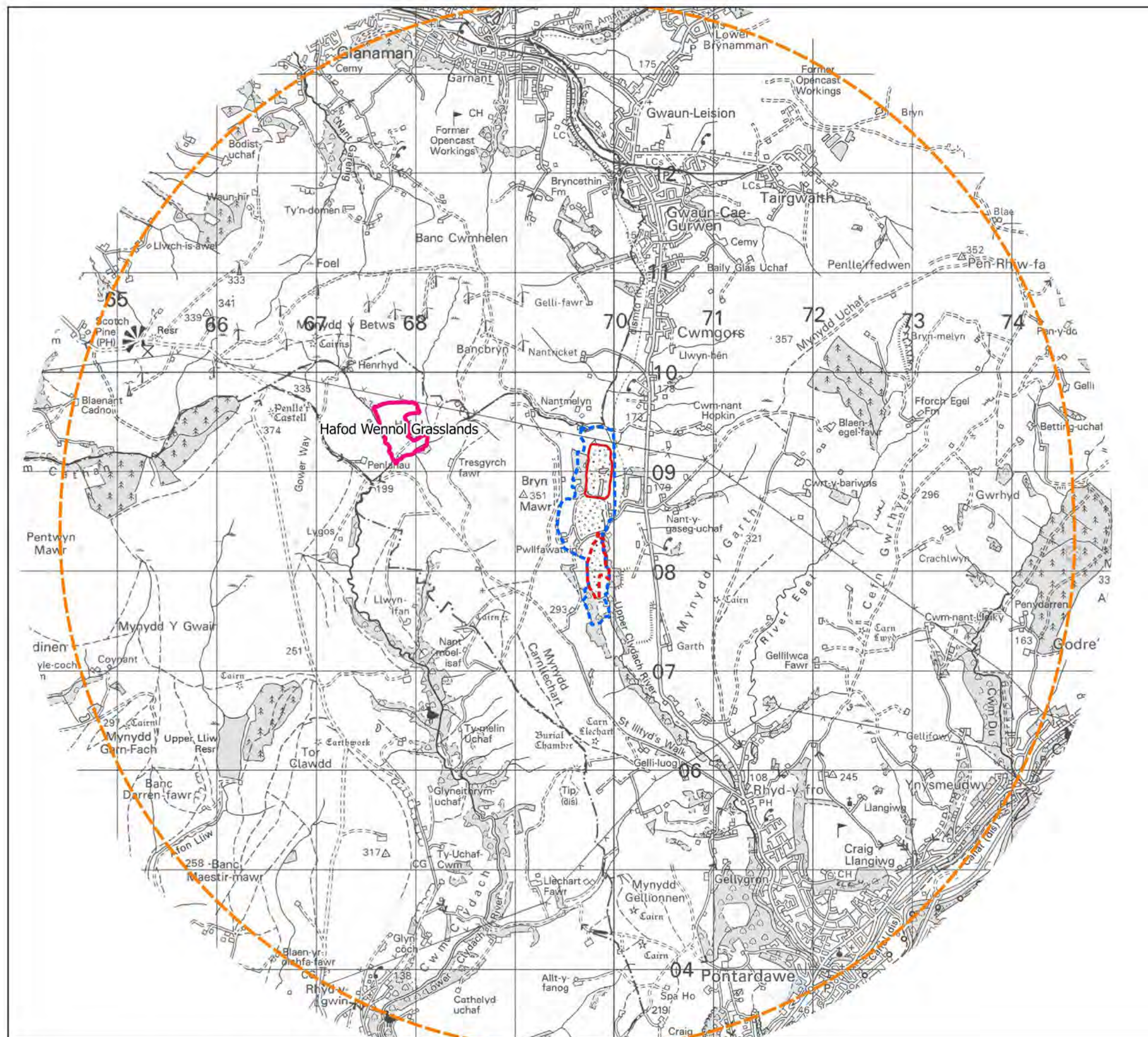
Riparian mammals

- 6.38 It is certain that otters are present on the Upper Clydach river even if only seasonally and evidence of the use of some waterbodies adjacent to the northern tip area (Tip 890) and wider FCC land ownership has been recorded, as has that of potential water vole burrows.
- 6.39 Anecdotal evidence and observations by FPCR ecologists confirm the use of waterbodies one, two and three by a single male otter and areas adjacent for laying up although no holt has been identified in this area.
- 6.40 Where works (including vegetation removal) are required in close proximity to existing waterbodies, these areas should be surveyed for signs indicating the presence of otters, in particular holts the entrances to which may be occluded by vegetation. Similarly, any affected areas should also be subject to searches for water vole burrows or signs indicating the use of the affected areas by water vole.
- 6.41 Any works deemed to have the potential to affect the resting place (holts or active burrows) of either species then a method statement or, dependent upon the nature of the proposed works an active feature present, a protected species licence from the Countryside Council of Wales will need to be obtained prior to the commencement of works.

- 6.42 The restoration schemes are required as a result of cessation of landfill operations at the FCC Pwllfawatkin site and as such will see a significant reduction in the level of daytime disturbance from vehicular site traffic associated with these operations which will undoubtedly be of benefit to local otter populations given they are known to be reclusive.
- 6.43 In addition, the provision of indigenous hedgerows and native woody species planting in the restored northern and southern tip areas in accordance with the restoration scheme will increase cover and therefore potential connectivity, in particular for otter across the whole of the wider FCC land ownership and provide potential opportunities for new holts together with areas for laying-up and loafing. As the amended drainage strategies for both restoration schemes are implemented this will more closely link the waterbodies across the wider FCC land ownership with drainage ditches, sediment control and attenuation features; habitats associated with which can be readily exploited by local water vole populations in future.

Monitoring and management.

- 6.44 A comprehensive management and monitoring proposal will be designed and implemented for the areas covered by the proposed restoration scheme, the primary aims and objectives of which will be to ensure the successful restoration of the former landfill site in accordance with the restoration scheme. This will take the form of a five-year aftercare plan.



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Key

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- 5km Buffer
- Site of Special Scientific Interest (SSSI)

No international statutory designated sites are located within 5km of the site boundary.

client
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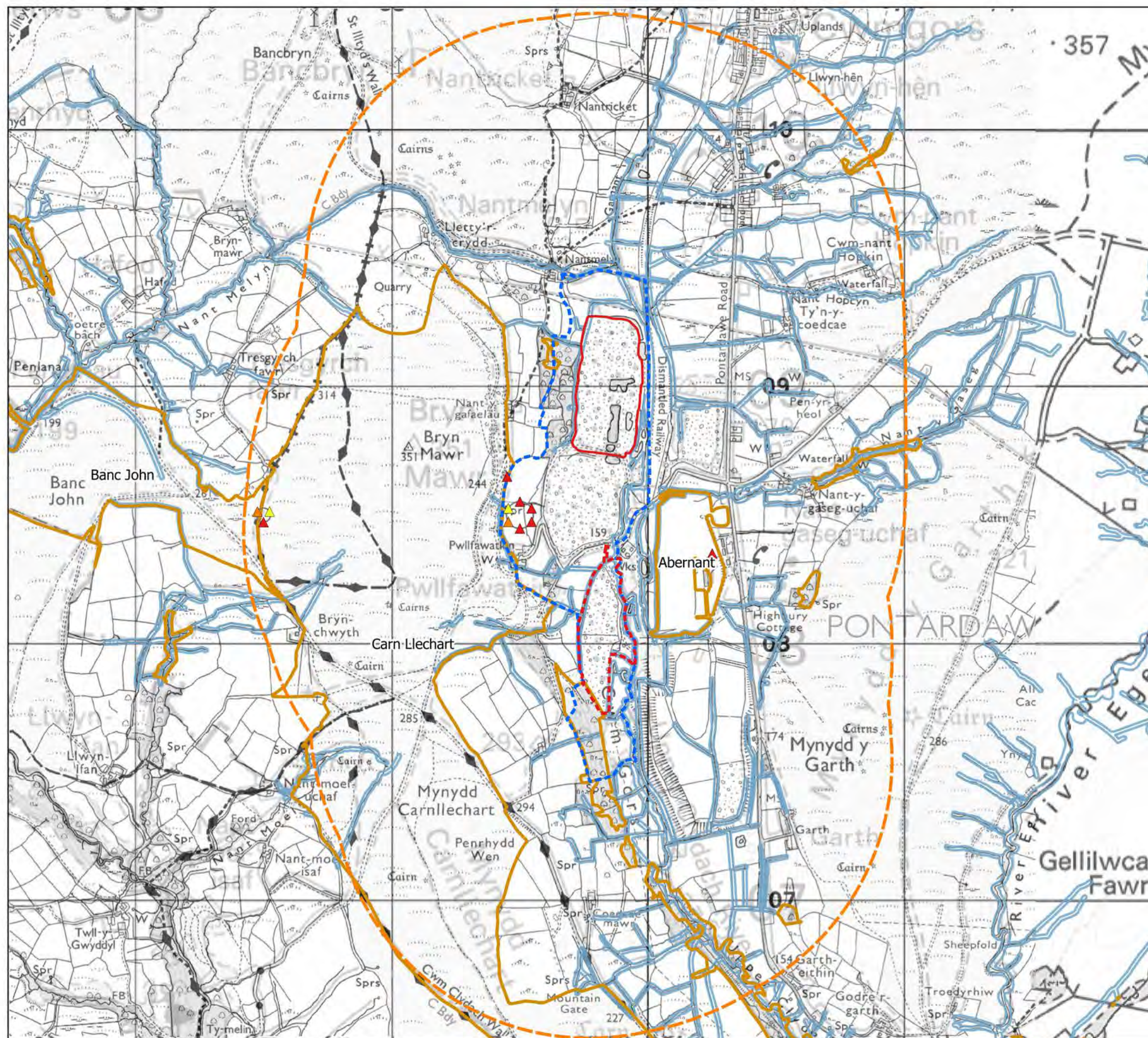
project
Pwllfawtkin,
Pontardawe

drawing title
SITE LOCATION & STATUTORY DESIGNATED
SITE PLAN

scale
1:40,000

drawn / figure number
SLD / MEL
27/9/2018
Figure 1

7833-E-01A



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Key

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- 1km Buffer
- Site of Importance for Nature Conservation (SINC)
- Site of Importance for Nature Conservation (SINC) - Watercourses
- ▲ Fieldfare
- ▲ Red Kite
- ▲ Redwing

client
FCC Environment Ltd

project
Pwllfawtkin,
Pontardawe

drawing title
PROTECTED SPECIES & NON-STATUTORY
DESIGNATED SITE PLAN

scale
1:15,500

drawn
SLD / MEL

date
27/9/2018

Figure 2

7833-E-02A

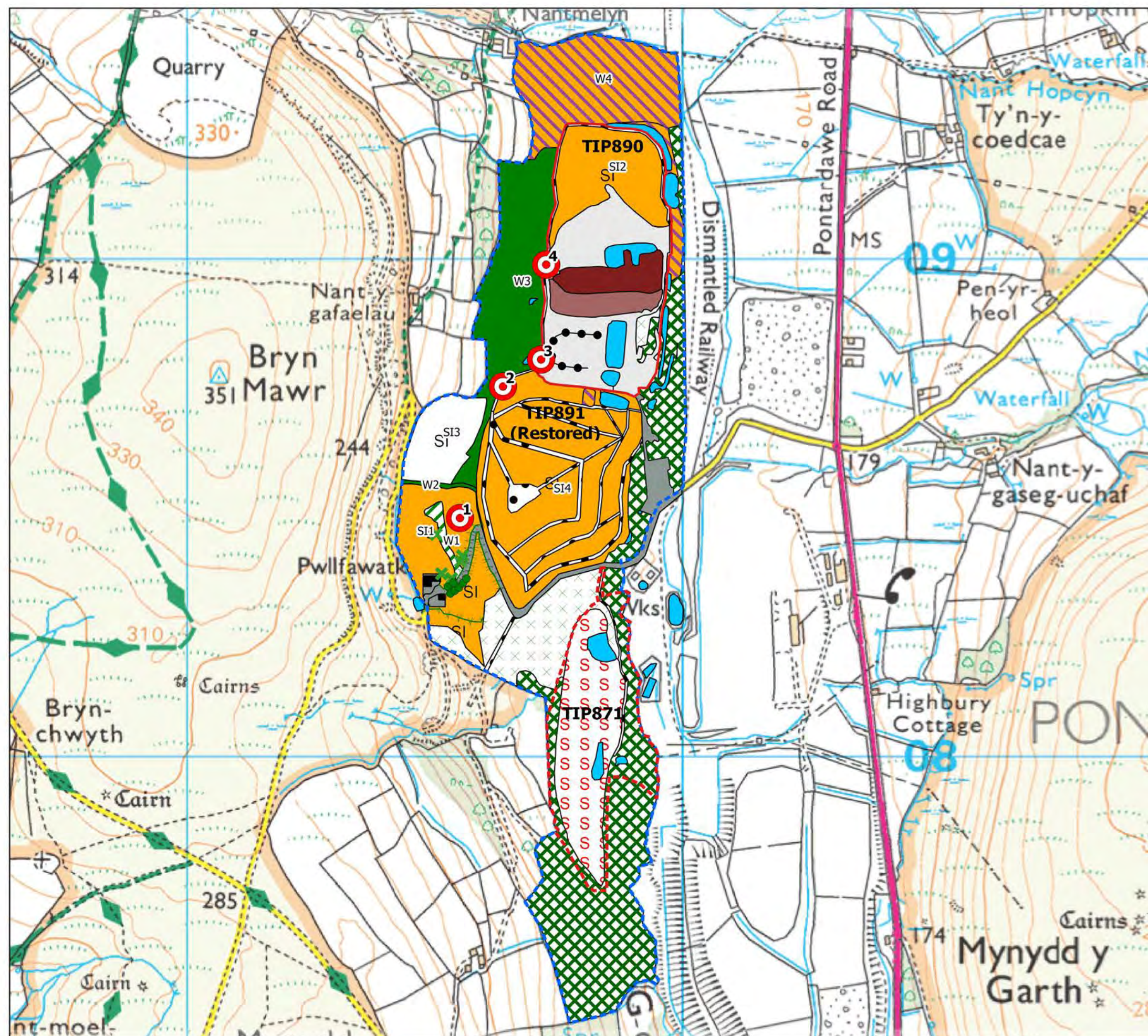
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masterplanning environmental assessment landscape design urban design ecology architecture arboriculture

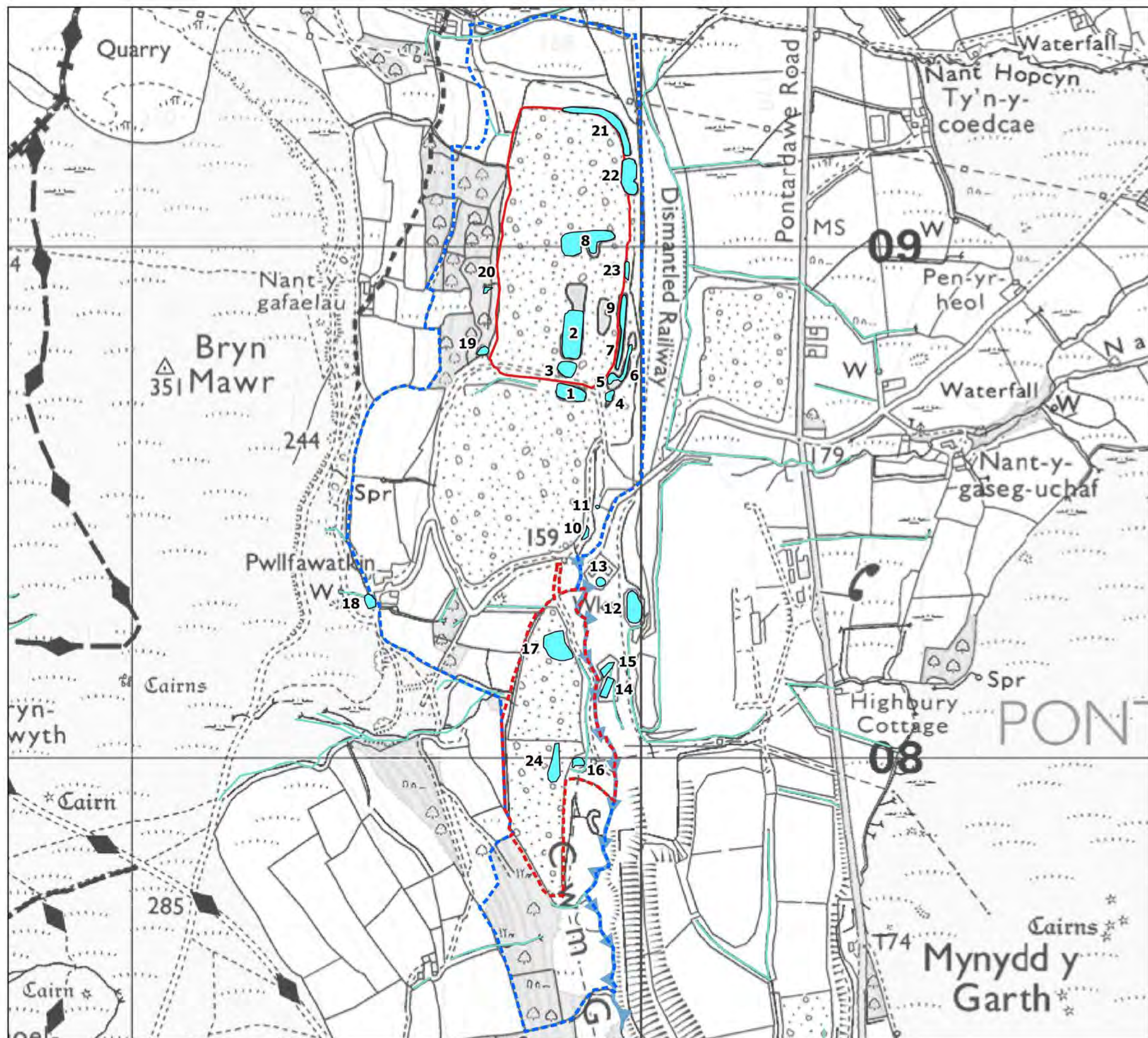
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	S73 Planning Boundary (P/2002/1016)
	S73 Planning Boundary (P/2014/0693)
	FCC Ownership Boundary
	Broadleaved tree
	Target note
	Intact hedge - native species-rich
	Hedge with trees - native species-rich
	Earth bank
	Built Environment: Buildings/hardstanding
	Buildings
	Broadleaved woodland - semi-natural
	Broadleaved woodland - plantation
	Marsh/marshy grassland
	Standing water
	Spoil
	Scrub - scattered
	Scrub - dense/continuous
	Neutral grassland - semi-improved
	Poor semi-improved grassland
	Landfill
	Landfill - Sealed Cell
	Landfill - Active

scale 1:8,000 drawn KL / MEL issue 27/9/2018

drawing / figure number
Figure 3
rev
7833-E-03C

J:\7800\7833\OGIS 2.14\Plans\Phase 1 plans



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Key

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- Waterbody
- Ditch
- River



Figure 4

client
FCC Environment

project
Pwllfawatkin,
Pontardawe

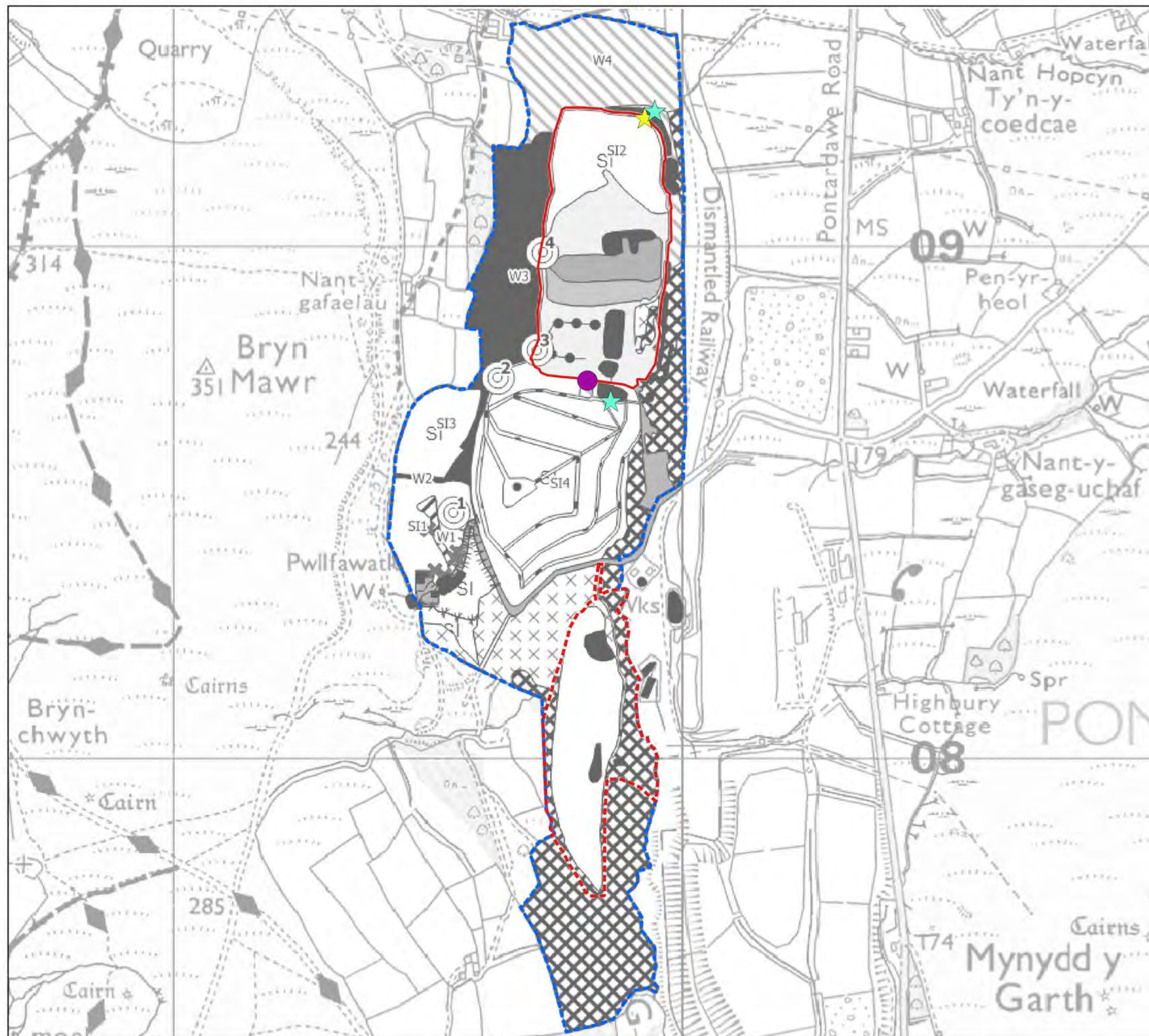
drawing title
WATERBODY LOCATION PLAN

scale
1:7,800

drawn
SLD / MEL

issue
27/9/2018

7833-E-04A



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Key

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- ★ Otter print
- ★ Otter spraint
- Watervole burrow



client
FCC Environment

project
Pwllfawatkin,
Pontardawe

drawing title
RIPARIAN MAMMAL SURVEY RESULTS PLAN

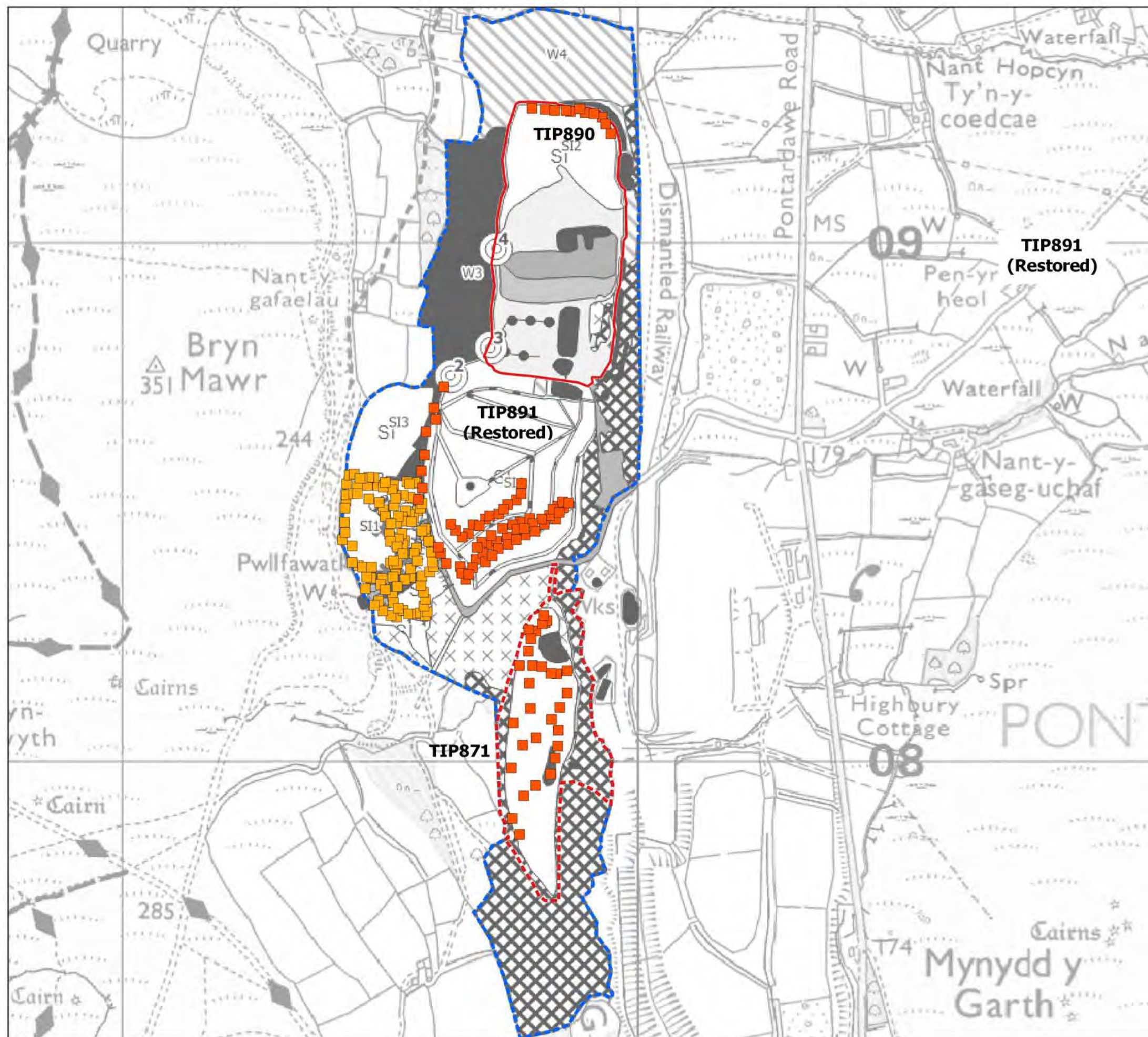
scale
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drawn
SLD / MEL

date
27/9/2018

Figure 5

7833-E-05A

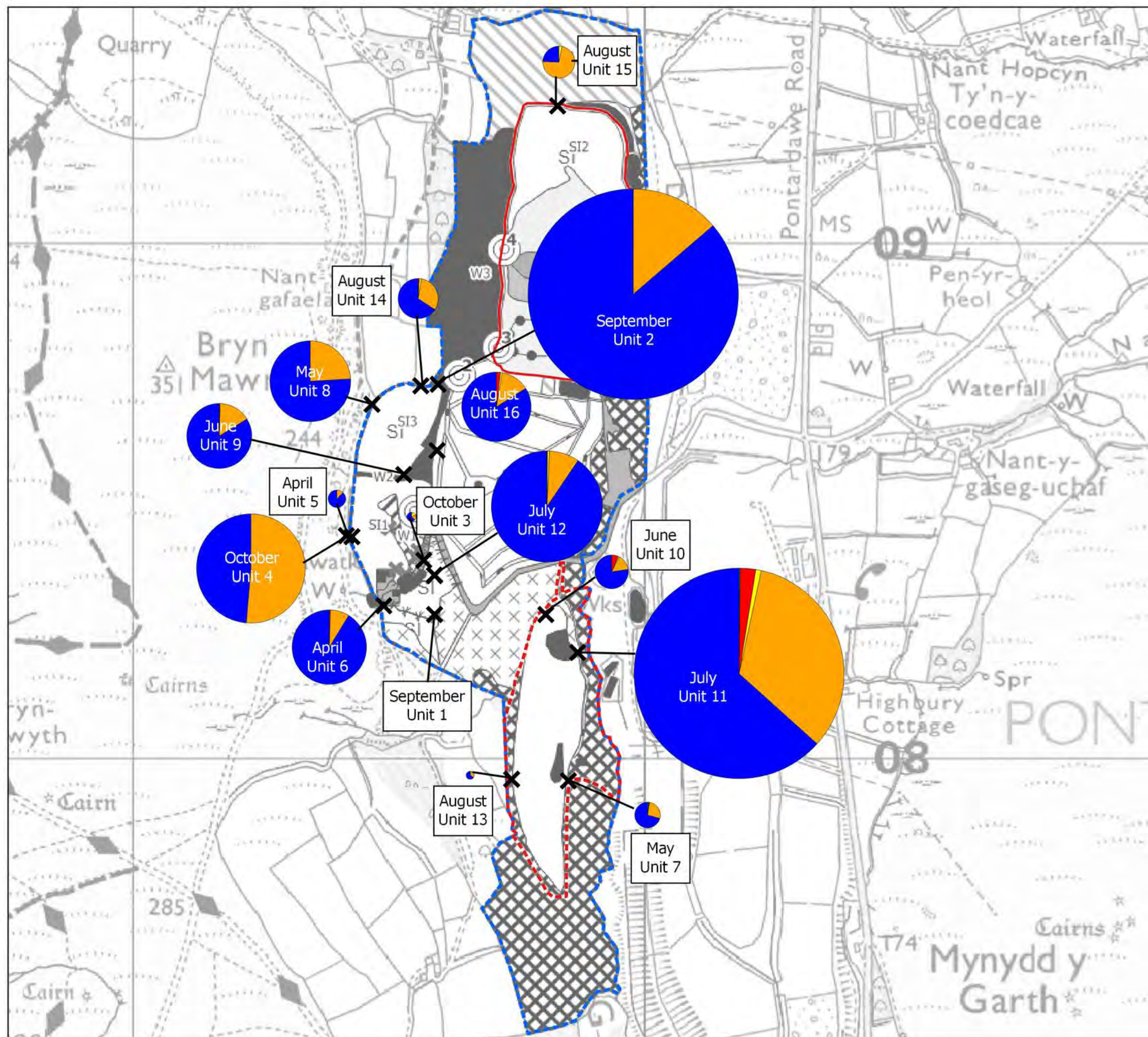


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Key

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Environment Ownership Boundary
- Tin Location 2017
- Tin Location 2018



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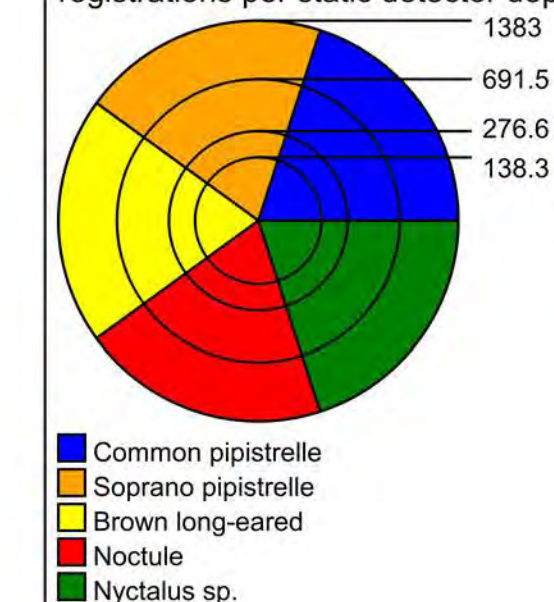
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Key

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- X Static detector location

Pie Chart Key

Size of chart is relative to S7 and Annex II sp. registrations per static detector deployment.



No Annex II species were recorded on site during static detector deployment.

The very low number of total registrations recorded on September Unit 1 (11 soprano pipistrelle) could not be visually represented in a scale relative to the other static detector results.

client
FCC Environment Ltd.

project
Pwllfawatkin,
Pontardawe

drawing title
STATIC DETECTOR RESULTS PLAN - S7 &
ANNEX II SPECIES REGISTRATIONS

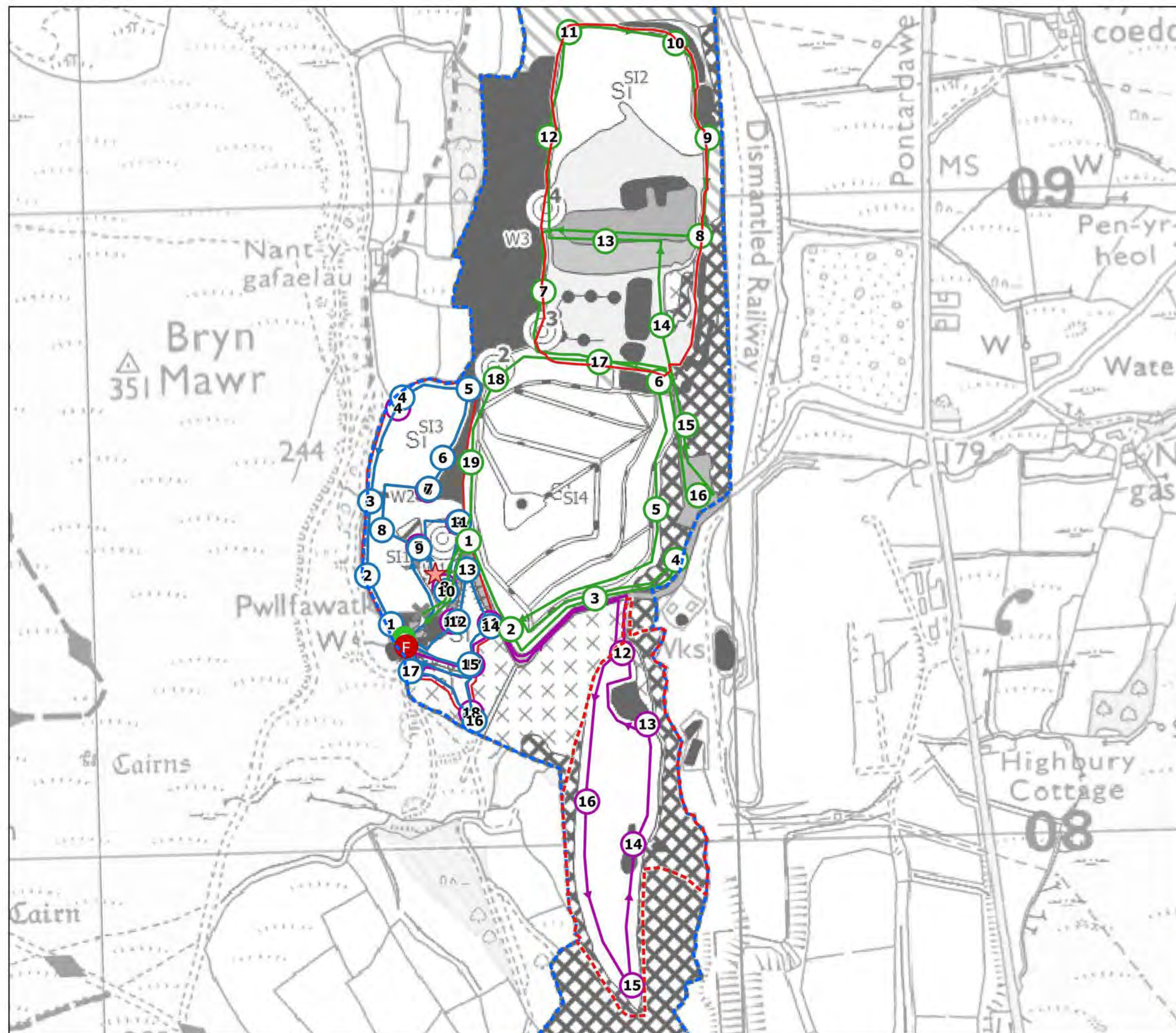
scale
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drawn
SLD / MEL

issue
27/9/2018

Figure 7

7833-E-07A



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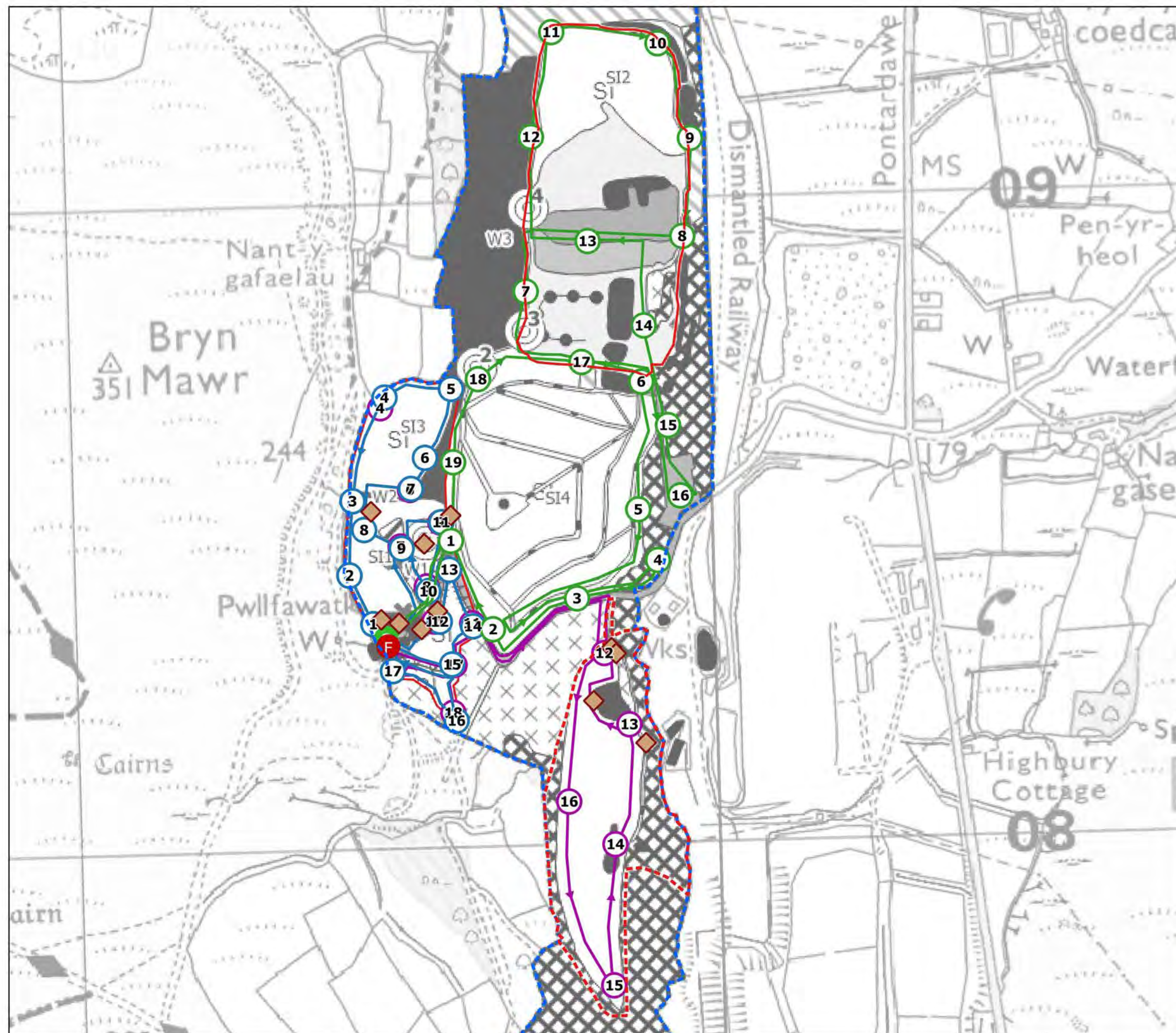
Key:

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- S Start point
- F Finish point
- ← Transect Route 1a
- 1 Point Count Locations (with ref.) Route 1a
- ← Transect Route 1b
- 1 Point Count Locations (with ref.) Route 1b
- ← Transect Route 2
- 1 Point Count Location (with ref.) Route 2
- ★ Barbastelle

All barbastelle activity recorded during 3 hour transects undertaken monthly during the active season from September 2017 to August 2018.

The first transect route (Route 1a) was altered to include the southern spoil tip (Route 1b) from May 2018 onwards.

A second transect route (Route 2) to cover the northern spoil heap and the active landfill area was introduced from August 2018.



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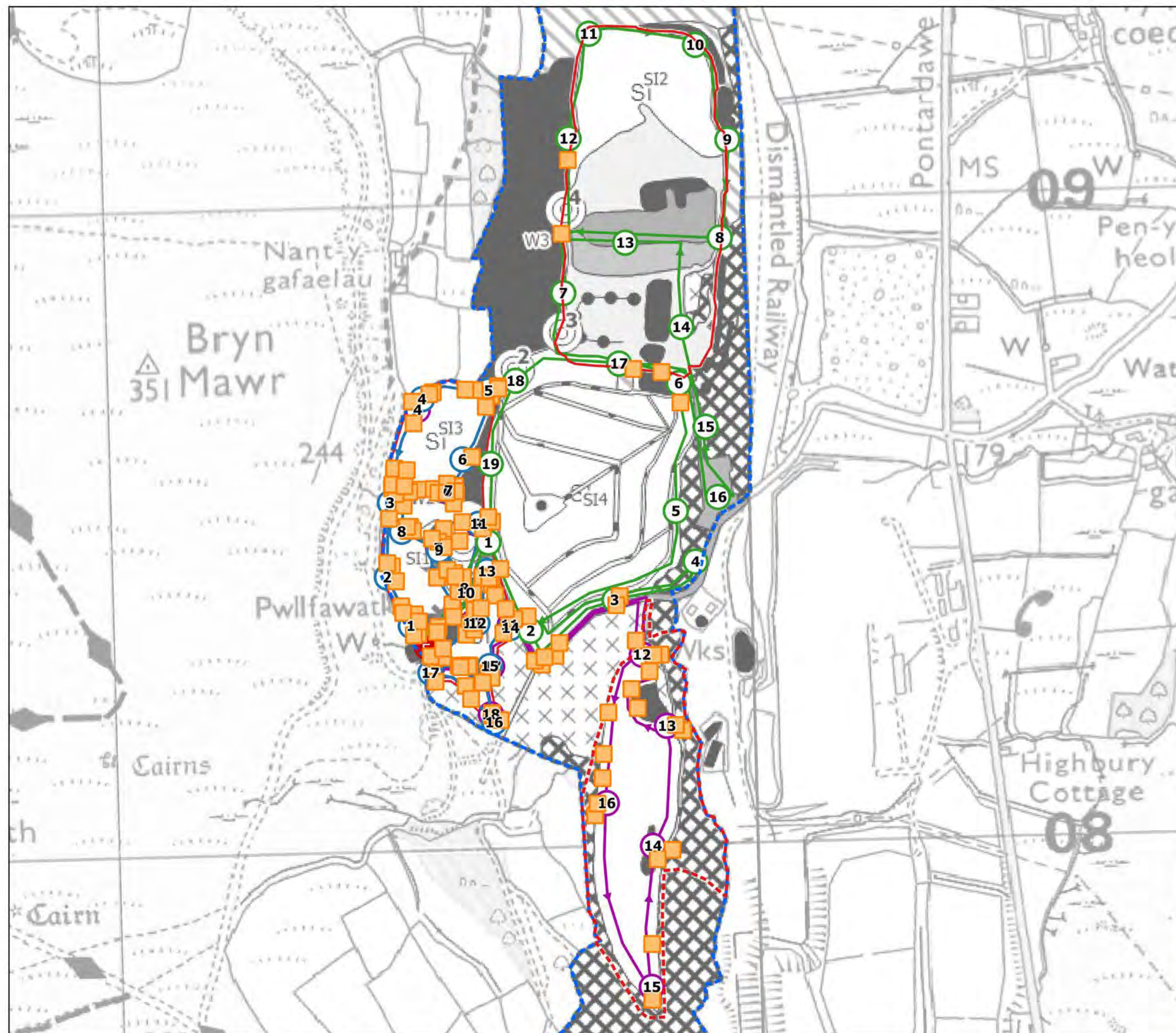
Key:

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- S Start point
- F Finish point
- ← Transect Route 1a
- Point Count Locations (with ref.) Route 1a
- ← Transect Route 1b
- Point Count Locations (with ref.) Route 1b
- ← Transect Route 2
- Point Count Location (with ref.) Route 2
- Brown Long-eared

All brown long-eared activity recorded during 3 hour transects undertaken monthly during the active season from September 2017 to August 2018.

The first transect route (Route 1a) was altered to include the southern spoil tip (Route 1b) from May 2018 onwards.

A second transect route (Route 2) to cover the northern spoil heap and the active landfill area was introduced from August 2018.



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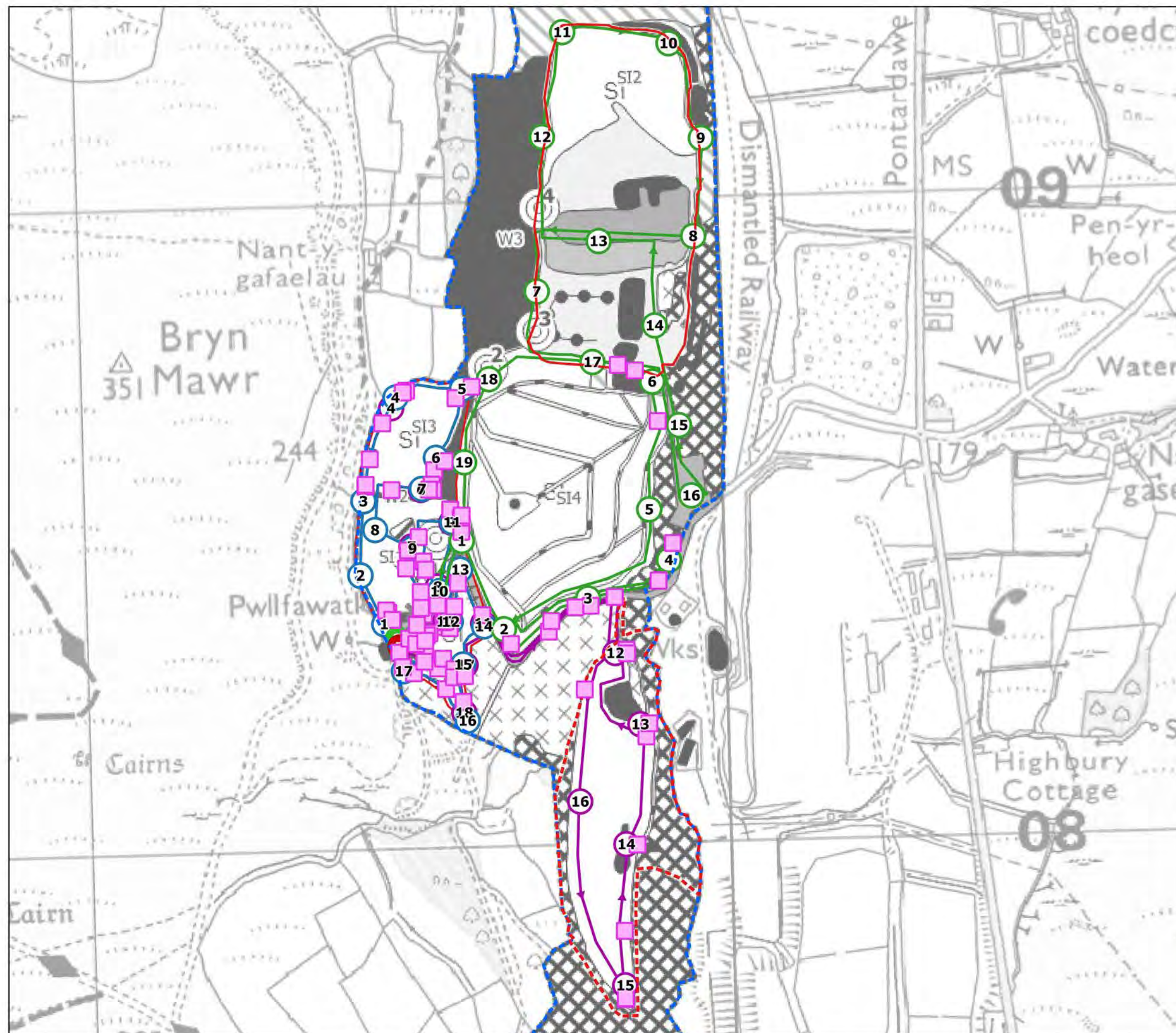
Key:

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- S Start point
- F Finish point
- ← Transect Route 1a
- Point Count Locations (with ref.) Route 1
- ← Transect Route 1b
- Point Count Locations (with ref.) Route 2
- ← Transect Route 2
- Point Count Location (with ref.) Route 2
- Common pipistrelle

All common pipistrelle activity recorded during 3 hour transects undertaken monthly during the active season from September 2017 to August 2018.

The first transect route (Route 1a) was altered to include the southern spoil tip (Route 1b) from May 2018 onwards.

A second transect route (Route 2) to cover the northern spoil heap and the active landfill area was introduced from August 2018.



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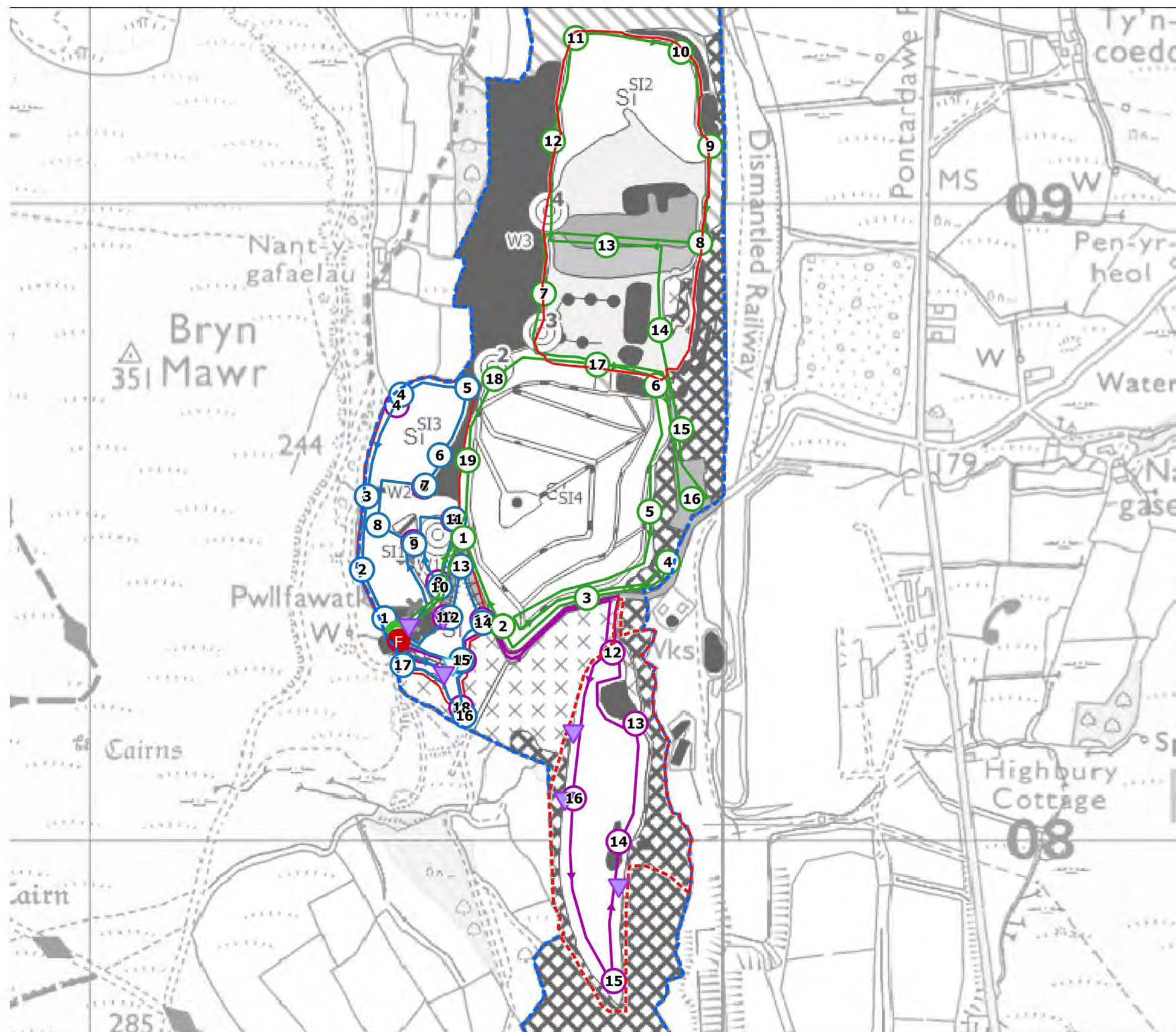
Key:

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- S Start point
- F Finish point
- ← Transect Route 1a
- 1 Point Count Locations (with ref.) Route 1a
- ← Transect Route 1b
- 1 Point Count Locations (with ref.) Route 1b
- ← Transect Route 2
- 1 Point Count Location (with ref.) Route 2
- Soprano Pipistrelle

All soprano pipistrelle activity recorded during 3 hour transects undertaken monthly during the active season from September 2017 to August 2018.

The first transect route (Route 1a) was altered to include the southern spoil tip (Route 1b) from May 2018 onwards.

A second transect route (Route 2) to cover the northern spoil heap and the active landfill area was introduced from August 2018.



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Key:

- S73 Planning Boundary (P/2002/1016)
- S73 Planning Boundary (P/2014/0693)
- FCC Ownership Boundary
- S Start point
- F Finish point
- ← Transect Route 1a
- Point Count Locations (with ref.) Route 1a
- ← Transect Route 1b
- Point Count Locations (with ref.) Route 1b
- ← Transect Route 2
- Point Count Location (with ref.) Route 2
- ▽ Nyctalus Species
- ▽ Noctule

All nyctalus species activity recorded during 3 hour transects undertaken monthly during the active season from September 2017 to August 2018.

The first transect route (Route 1a) was altered to include the southern spoil tip (Route 1b) from May 2018 onwards.

A second transect route (Route 2) to cover the northern spoil heap and the active landfill area was introduced from August 2018.

APPENDIX A LEGISLATION

The Conservation of Habitats and Species Regulations (“The Habitats Regulations”) (Amendment) 2012

European Protected Sites

The Habitats Regulations ratifies into UK law the “Habitats Directive” (92/43/EEC) and the “Birds Directive” (79/409/EEC). It places a duty on the Secretary of State to propose a list of sites which are important for species listed in Annex I and II of the Habitats Directive respectively to the European Commission. Once the Commission and EU Member States have agreed that the sites submitted are worthy of designation, they are identified as Sites of Community Importance (SCIs). The EU Member States must then designate these sites as Special Areas of Conservation (SACs) within six years.

The Regulations require the compilation and maintenance of a register of European sites to include SACs as well as Special Protection Areas (SPAs) designated for birds and sites designated as internationally important wetlands under the Ramsar Convention known as “Ramsar Sites”. These three designations form a collective Europe wide network of internationally protected sites known as Natura 2000. All European sites are also designated under UK law as Sites of Special Scientific Interest (SSSIs; please see below).

Habitats Regulation Assessment

There is a requirement under EU law that Member States’ take measures to reach and maintain European Protected Sites’ at Favourable Conservation Status (FCS). An Appropriate Assessment is required for plans or projects that may potentially damage a European Protected Site. This is based on an assessment against a given European Protected Site’s Conservation Objectives. The process is commonly known as a Habitats Regulations Assessment (HRA).

The HRA must be conducted by, or on behalf of, the Competent Authority. The HRA process assesses plans or projects alone or in combination. It involves a four stage approach as follows:

- Stage One: Screening - also known as the Test of Likely Significant Effect (TOLSE). If the Competent Authority cannot screen out a *likely significant effect*, an Appropriate Assessment is required.
- Stage Two: Appropriate Assessment - the Competent Authority will only agree to plans or projects that will not affect the *integrity* of a European site also known as the “Integrity Test”.
- Stage Three: Alternative Solutions - assesses any alternative solutions of a potentially damaging plan or project that failed the Integrity Test, and if it is determined there are no alternative solutions, the project cannot be agreed to and it will either need to be changed or refused.
- Stage Four: The final stage may allow a plan or project to proceed if after failing stage three if it is for Imperative Reasons of Overriding Public Interest, and only if suitable compensatory measures are secured.

Any plan or project that may have a potentially damaging effect on a transient species or the habitat on which it relies (for example bats or birds), that is both a Qualifying Features of a European Protected Site and considered *functionally linked* with a European Protected Site, are required under law to be considered as part of any HRA process.

European Protected Species

The Habitats Regulations includes a list of animals and plant species taken from the Annex IV of the Habitats Directive that have a natural range which includes any area in Great Britain. These are collectively known as European Protected Species (EPS). The regulations make it an offence to deliberately capture, kill, disturb, take or destroy eggs of, or damage or destroy a breeding or resting place of animals listed in Schedule 2 of the Regulations, and to pick, collect, cut, uproot or destroy wild plants listed in Schedule 5 of the Regulations. All listed EPS are shown in Table 1 below. The Regulations also protect these species alive or dead and parts thereof from various forms of possession and trade.

Table 1: The Habitats Regulations Schedule 2 and Schedule 5 species

Schedule 2 – European Protected Species of Animals		Schedule 5 – European Protected Species of Plants	
Common name	Scientific name	Common name	Scientific name
Horseshoe bats – all species	<i>Rhinolophidae</i>	Shore dock	<i>Rumex rupestris</i>
Bats – all species	<i>Vespertilionidae</i>	Killarney fern	<i>Trichomanes speciosum</i>
Large blue butterfly	<i>Maculinea arion</i>	Early gentian	<i>Gentianella anglica</i>
Wild cat	<i>Felis silvestris</i>	Lady's-slipper	<i>Cypripedium calceolus</i>
Dolphins, porpoises and whales – all species	<i>Cetacea</i>	Creeping marshwort	<i>Apium repens</i>
Hazel dormouse	<i>Muscardinus avellanarius</i>	Slender naiad	<i>Najas flexilis</i>
Pool frog	<i>Rana lessonae</i>	Fen orchid	<i>Liparis loeselii</i>
Sand lizard	<i>Lacerta agilis</i>	Floating-leaved water plantain	<i>Luronium natans</i>
Fisher's estuarine moth	<i>Gortyna borelii lunata</i>	Yellow marsh saxifrage	<i>Saxifraga hirculus</i>
Great crested newt	<i>Triturus cristatus</i>		
Otter	<i>Lutra lutra</i>		
Lesser Whirlpool Ram's-horn snail	<i>Anisus vorticulus</i>		
Smooth snake	<i>Coronella austriaca</i>		
Sturgeon	<i>Acipenser sturio</i>		
Natterjack toad	<i>Bufo calamita</i>		
Marine turtles	<i>Caretta caretta</i> <i>Chelonia mydas</i> <i>Lepidochelys kempii</i> <i>Eretmochelys imbricata</i> <i>Dermochelys coriacea</i>		

These actions may be made lawful in certain circumstances through the granting of licences by the appropriate authority (Natural Resources Wales). Licences must only be granted after the appropriate authority is satisfied that no satisfactory alternatives are available. In most circumstances, licences are only applied for and granted following full planning permission.

In determining whether or not to grant a licence Natural Resources Wales must apply the requirements of The Conservation of Habitats and Species Regulations 2012 (amendment) and, in particular, the three derogation tests:

- Test 1: A licence can be granted for the purposes of “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”.
- Test 2: The appropriate authority shall not grant a licence unless they are satisfied “that there is no satisfactory alternative”.
- Test 3: The appropriate authority shall not grant a licence unless they are satisfied “that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (WCA) (as amended) is the principal legislation providing protection for wildlife in the UK. It prescribes legislation for wild birds, other animals, wild plants and non-native species. In addition, it provides for the designation of Sites of Special Scientific Interest (SSSI) in Wales.

Wild birds

The Act makes it an offence (with exception to species listed in Schedule 2) to intentionally:

- kill, injure, or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

For birds listed on Schedule 1 of the Act, protection extends to offences relating to disturbance of these birds while at their nests or their dependent young.

Other animals

The WCA (as amended) makes it an offence to (subject to exceptions) intentionally or recklessly kill, injure or take wild animals listed on Schedule 5 of the Act. For some species, the protection extends to interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. These species are regarded as “fully protected” and as well as the EPS species listed above include the mammal species water vole *Arvicola terrestris*, pine marten *Martes martes* and red squirrel *Sciurus vulgaris* as well as selected others from a range of species groups including, fish, butterflies, hemipteran bugs, beetles, crickets, dragonflies, moths, spiders, crustaceans, sea-mats, molluscs, Annelid worms and sea anemones (and allies).

There are seven species on Schedule 5 of the Act that not fully protected but are still protected against killing and injuring these include the common reptile species slow worm *Anguis fragilis*, viviparous lizard *Lacerta vivipara*, grass snake *Natrix natrix* and adder *Vipera berus*.

The Act prohibits certain methods of killing, injuring, or taking wild animals, and numerous species are protected against sale only as well as other variations for example Atlantic stream (white-clawed) crayfish *Austropotamobius pallipes* are protected against taking and sale.

Vascular plants, bryophytes, lichens and fungi

With regards to native flora the Act makes it an offence to (subject to exceptions) intentionally pick, uproot or destroy any wild plant listed in Schedule 8. Similarly, the Act prevents the sale, offer or expose for sale, or possess (for the purposes of trade), any live or dead wild plant included in Schedule 8, or any part of, or anything derived from, such a plant.

Non-native species

The Act contains measures for preventing the establishment of non-native species which may be detrimental to native wildlife, prohibiting the release of animals and planting of plants listed in Schedule 9 in England and Wales.

Sites of Special Scientific Interest

The Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs). These sites can be identified for their flora, fauna, geological or physiological interest. In Wales, the power to confirm an SSSI lies with Natural Resources Wales.

Laws protecting areas designated as SSSIs are described in Sections 28 to 33 of Part 2 of the Wildlife and Countryside Act 1981 (as amended). SSSIs are the principle statutory designation of sites in the UK and offences are enforced through Natural Resources Wales. Offences include the following:

SSSI owners and occupiers

- carrying out, causing or allowing operations likely to damage an SSSI without Natural Resources Wales consent.
- failing to keep to a management notice.
- failing to let us know about a change in ownership or occupation of land in an SSSI.

Public bodies

- carrying out or authorising operations likely to damage an SSSI without meeting the requirements to notify Natural Resource Wales.
- failing to minimise any damage to an SSSI and if there is any damage, failing to restore it to its former state so far as is reasonably practical and possible.

Any person

- intentionally or recklessly damaging, destroying or disturbing any of the habitats or features of an SSSI.
- intentionally or recklessly damaging, destroying, obscuring or taking down a site notice put up on land within an SSSI.

- preventing a Natural Resources Wales officer lawfully accessing an SSSI.

Protection of Badgers Act 1992

Badgers and their setts are protected under the Protection of Badgers Act 1992. This act is based on the need to protect badgers from persecution by baiting and deliberate harm or injury.

The act makes it an offence to:

- intentionally capture, kill or injure a badger;
- damage, destroy or block access to their setts;
- disturb badgers in setts;
- treat a badger cruelly;
- deliberately send or intentionally allow a dog into a sett; and
- bait or dig for badgers.

A sett is defined as:

“Any structure or place that displays signs indicating current use by a badger”.

Environment (Wales) Act 2016

Section 6 of the Environment (Wales) Act 2016 imposes a duty on every public authority to maintain and enhance biodiversity in exercising its functions, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions (S6 duty). Resilience of ecosystems is accounted by the following aspects; diversity between and within ecosystems; the connections between and within ecosystems; the scale of ecosystems; the condition of ecosystems (including their structure and functioning); and the adaptability of ecosystems.

Section 7 of the Environment (Wales) Act 2016 requires the Welsh Ministers to publish a list of habitats and species that are of principal importance for the conservation and enhancement of biodiversity in Wales. The list (including 55 habitats and 560 species) has been drawn up in consultation with Natural Resource Wales and draws upon the UK BAP List of Priority Species and Habitats. The section 7 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 6 of the Environment (Wales) Act 2016.

Planning Policy Wales (2018) (PPW)

The Planning Policy Wales (2018) sets out the Welsh Government's planning policy for Wales. As such, the PPW must be a material consideration for local authorities when considering planning decisions. The following points highlight those policies/statements which particularly relate to ecology/biodiversity and the planning system:

Policy 5 – Distinctive and Natural Places

Biodiversity and Ecological Networks

5.42 The planning system has a key role to play in helping to reverse the decline in biodiversity and increasing the resilience of ecosystems, at various scales, by ensuring appropriate mechanisms are in place to both protect against loss and to secure enhancement. Development plan strategies, policies and individual development proposals must take into account the need to:

- promote the conservation of biodiversity, in particular the conservation of wildlife and habitats;
- ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;
- ensure statutorily designated sites are properly protected and managed;
- safeguard protected species; and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil; and
- seek enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.

Maintaining and Enhancing Biodiversity

5.58 Planning authorities should protect and enhance biodiversity and build resilient ecological networks by ensuring that any adverse environmental effects are minimised and mitigated, by:

- ensuring that features and elements of biodiversity or green infrastructure value are retained on site wherever possible, and enhanced or created where appropriate, by adopting best practice site design and green infrastructure principles; and
- when all other options have been exhausted, and where modifications, alternative sites, conditions or obligations are not sufficient to secure beneficial environmental outcomes, offsite compensation for unavoidable damage should be sought.

Local Nature Reserves

Local Nature Reserve (LNR) is a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949.

Local authorities have the powers to acquire, declare and manage LNRs. Parish and town councils can declare LNRs providing power is given by the district or county council. LNRs may or may not have other statutory designations such as SSSI status. LNRs must be controlled by the local authority through ownership, lease or agreement with the owner. The main aim must be to care for the natural features which make the site special. LNRs are of local, but not necessarily national, importance.

LNRs are usually owned by local authorities, with management often passed onto other organisations such as County Wildlife Trusts etc. They often have good public access and facilities. There is no legal necessity to manage an LNR to any set standard but management agreements and plans often exist. Protection of LNRs is usually provided through local planning policy and through local bylaws.

Non-Statutory Protected Local Sites

Non-statutory Designated Sites are sites designated by local authorities which fall outside the statutory criteria for designation. They are policy protected and included in the Planning Policy Wales (PPW). Local Planning Authorities should set criteria based policies against which proposals for developments on or affecting protected wildlife sites should be judged. Non-statutory sites are given various names including County Wildlife Sites (CWS), Sites of Importance for Nature Conservation (SINC) and Local Wildlife Sites (LWS). A search of the Ancient Woodland Inventory is also included here.

Hedgerows

Hedgerows are designated as Habitats of Principal Importance under the Environment (Wales) Act 2016. The Planning Policy Wales (PPW) emphasises the preservation, restoration and re-creation of priority habitats and ecological networks. Hedgerows are important components of ecological networks linking other important habitats and designated sites.

Hedgerows also receive statutory protection under the Hedgerow Regulations 1997 made under Section 97 of the Environment Act 1995, which came into force in 1997. The regulations introduced new arrangements for local planning authorities in England and Wales to protect important hedgerows in the countryside, by controlling their removal through a system of notification. Important hedgerows are defined by complex assessment criteria, which draw on biodiversity features, historical context and the landscape value of the hedgerow.

Local Biodiversity Action Plan (LBAP)

Local Biodiversity Action Plans (LBAP) identify habitat and species conservation priorities at a local level (typically at the County level), and are usually drawn up by a consortium of local Government organisations and conservation charities.

Birds of Conservation Concern (BoCC)

The Birds of Conservation Concern (BoCC) is jointly prepared by the British Trust for Ornithology (BTO), Joint Nature Conservation Committee (JNCC) and The Royal Society for the Protection of Birds (RSPB).

The report classifies birds according to the extent that they are known to be declining. The classifications are split into groups, Red, Amber and Green, with species classified as Red being those with the greatest declines. The criteria for classifications are presented in *Table 2*.

Table 2: BoCC species classification criteria

Red List Criteria	Amber List Criteria	Green List Criteria
Global Conservation Status - Species listed by BirdLife International as being Globally Threatened using IUCN criteria.	European Conservation status - Categorised as a Species of European Conservation Concern.	All regularly occurring species that do not qualify under any of the red or amber criteria are green listed.
Historical Decline - A severe decline in the UK between 1800 and 1995, without substantial recent recovery.	Historical Decline – Recovery - Red listed for Historical Decline in a previous review but with substantial recent recovery (more than doubled in the last 25 years).	Includes those species listed as recovering from Historical Decline in the last review that have continued to recover and do not qualify under any of the other criteria.
Breeding Population Decline - Severe decline in the UK breeding population size, of more than 50%, over 25 years or the entire period used for assessments since the first BoCC review, starting in 1969 (“longer-term”).	Breeding Population Decline - As for red list criteria and, but with moderate decline (by more than 25% but less than 50%).	
Non-breeding Population Decline - Severe decline in the UK non-breeding population size, of more than 50%, over 25 years or the longer-term.	Non-breeding Population Decline - As for red list criteria and, but with moderate decline (by more than 25% but less than 50%).	
Breeding Range Decline - Severe decline in the UK range, of more than 50%, as measured by number of 10 km squares occupied by breeding birds, over 25 years or the longer-term.	Breeding Range Decline - As for red list criteria and, but with moderate decline (by more than 25% but less than 50%).	
	Rarity - UK breeding population of less than 300 pairs, or non-breeding population of less than 900 individuals.	
	Localisation - At least 50% of the UK breeding or non-breeding population found in 10 or fewer sites.	
	International Importance - At least 20% of the European breeding or non-breeding population found in the UK.	

APPENDIX B

Non EPS or WCA Species Records within 1km

Scientific	Common	NERC Act 2006	Amber Birds	Red Birds	BAP2007	LBAP2009	WCA 9	WCA 8	Red Data Book
Bird									
<i>Chroicocephalus ridibundus</i>	Black-headed gull	*	*			*			
<i>Pyrrhula pyrrhula</i>	Bullfinch	*		*	*	*			
<i>Periparus ater</i>	Coal tit					*			
<i>Cuculus canorus</i>	Cuckoo	*	*		*	*			
<i>Cinclus cinclus</i>	Dipper		*			*			
<i>Prunella modularis</i>	Dunnock	*	*		*	*			
<i>Sylvia borin</i>	Garden warbler					*			
<i>Locustella naevia</i>	Grasshopper warbler	*		*	*	*			
<i>Larus marinus</i>	Great black-backed gull		*						
<i>Picus viridis</i>	Green woodpecker		*			*			
<i>Larus inflata</i>	Lesser black-backed gull		*			*			
<i>Acanthis cabaret</i>	Lesser redpoll	*	*		*	*			
<i>Anas platyrhynchos</i>	Mallard		*			*			
<i>Anthus pratensis</i>	Meadow pipit		*			*			
<i>Phoenicurus phoenicurus</i>	Redstart		*			*			
<i>Emberiza schoeniclus</i>	Reed bunting	*	*		*	*			
<i>Turdus philomelos</i>	Song thrush	*		*	*	*			
<i>Alauda arvensis</i>	Skylark	*		*		*			
<i>Sturnus vulgaris</i>	Starling	*		*	*	*			
<i>Hirundo rustica</i>	Swallow		*			*			
<i>Anthus trivialis</i>	Tree pipit	*		*	*	*			
<i>Sylvia communis</i>	Whitethroat					*			
<i>Phylloscopus trochilus</i>	Willow warbler		*			*			
Mammal									
<i>Lepus europaeus</i>	Brown hare	*			*	*			
Insect									
<i>Erynnis tages</i>	Dingy skipper	*			*	*			
<i>Cordulegaster boltonii</i>	Golden-ringed dragonfly					*			
Plants									
<i>Ulot callescens</i>	Balding pincushion								*
<i>Hyacinthoides non-scripta</i>	Bluebell					*		*	
<i>Eriophorum angustifolium</i>	Common cottongrass								*
<i>Trichophorum caespitosum</i>	Deergrass								*
<i>Euphrasia arctica</i> subsp. <i>Borealis</i>	Eyebright					*			*

Scientific	Common	NERC Act 2006	Amber Birds	Red Birds	BAP2007	LBAP2009	WCA 9	WCA 8	Red Data Book
<i>Carex pulicaris</i>	Flea sedge								*
<i>Carex riparia</i>	Greater pond sedge					*			
<i>Polygala serpyllifolia</i>	Heath milkwort								*
<i>Gymnocolea inflata</i>	Inflated notchwort								*
<i>Fallopia japonica</i>	Japanese knotweed						*		
<i>Carum verticillatum</i>	Whorled caraway								*

APPENDIX C

Botanical Species List

Scientific Name

English Name

Woodland W1

Acer pseudoplatanus
Corylus avellana
Crataegus monogyna
Rubus fruticosus agg.
Sorbus aucuparia

Sycamore
Hazel
Hawthorn
Bramble
Rowan

Woodland W2

Quercus Pertraea
Salix caprea
Sorbus aucuparia

Sessile Oak
Goat Willow
Rowan

Woodland W3

Anemone nemorosa
Brachypodium sylvaticum
Cardamine flexuosa
Corylus avellana
Crataegus monogyna
Digitalis purpurea
Fraxinus excelsior
Hedera helix
Hyacinthoides non-scripta
Ilex aquifolium
Malus Sp.
Prunus spinosa
Quercus Pertraea
Quercus Robur
Ranunculus ficaria
Rosa Canina
Rubus caesius
Salix caprea
Sorbus aucuparia
Stachys sylvatica
Thuidium tamariscinum
Ulex europaeus
Veronica chamaedrys

Wood Anemone
False-brome
Wavy Bittercress
Hazel
Hawthorn
Foxglove
Ash
Common Ivy
Bluebell
Holly
Apple Species
Blackthorn
Sessile Oak
English Oak
Lesser Celandine
Dog Rose
European Dewberry
Goat Willow
Rowan
Hedge Woundwort
Common Tamarisk-moss
Common Gorse
Germander speedwell

Woodland W4

Alnus glutinosa

Alder

Anemone nemorosa
Betula pendula
Betula pubescens
Corylus avellana
Hyacinthoides non-scripta
Lonicera sp
Oxalis acetosella
Polytrichum sp.
Pteridium aquilinum
Quercus Pertraea
Quercus Robur
Rubus fruticosus agg.
Rumex sanguineus
Salix caprea
Salix Sp.

Wood Anemone
Silver Birch
Downy Birch
Hazel
Bluebell
Honeysuckle
Wood Sorrel
Hair Cap Species
Bracken
Sessile Oak
English Oak
Bramble
Wood Dock
Goat Willow
Willow Species

Semi-Improved Grassland SI1

Alopecurus pratensis
Anthoxanthum odoratum
Cardamine pratensis
Cerastium fontanum
Festuca rubra
Holcus lanatus
Hyacinthoides non-scripta
Juncus effusus
Juncus inflexus
Lotus uliginosus
Ranunculus acris
Ranunculus ficaria
Ranunculus repens
Rumex acetosa
Rumex obtusifolius
Taraxacum officinale
Urtica dioica

Meadow Foxtail
Sweet Vernal Grass
Cuckoo Flower
Common Mouse Ear
Red Fescue
Yorkshire Fog
Common Bluebell
Sot Rush
Hard Rush
Greater Birds Foot Trefoil
Meadow Buttercup
Lesser Celandine
Creeping Buttercup
Common Sorrel
Broad-leaved Dock
Dandelion
Common Nettle

Waterbody and marshy wetland areas

Alisma plantago-aquatica
Apium nodiflorum
Aponogeton distachyos
Betula pendula
Callitriche sp.
Caltha palustris
Carex riparia
Carex sp.
Cirsium palustre
Deschampsia cespitosa

European water-plantain
Watercress
Water hawthorn
Silver birch
Water star-wort
Marsh marigold
Pond sedge
Sedge species
Marsh Thistle
Tufted hair grass

<i>Epilobium hirsutum</i>	Great Willowherb
<i>Equisetum fluviatile</i>	Water horsetail
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Glyceria maxima</i>	Reed Sweet-grass
<i>Juncus effusus</i>	Soft Rush
<i>Mentha aquatica</i>	Water mint
<i>Potamogeton natans</i>	Broad-leaved pondweed
<i>Potamogeton sp.</i>	Pondweed
<i>Rubus fruticosus</i>	Bramble
<i>Salix sp.</i>	Willow species
<i>Tussilago farfara</i>	Colt's foot
<i>Typha latifolia</i>	Bulrush
<i>Ulex europaeus</i>	European gorse

Semi-improved Grassland SI2 – Reseeded Closed Cells

<i>Angelica sylvestris</i>	Wild Angelica
<i>Arrhenatherum elatius</i>	False Oat Grass
<i>Cardamine pratensis</i>	Cuckoo Flower
<i>Equisetum sylvaticum</i>	Wood Horsetail
<i>Festuca rubra</i>	Red Fescue
<i>Fragaria vesca</i>	Alpine Strawberry
<i>Geranium dissectum</i>	Cut Leaved Cranes Bill
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Juncus effusus</i>	Soft Rush
<i>Lathyrus nissolia</i>	Grass Vetchling
<i>Lathyrus pratensis</i>	Meadow Vetchling
<i>Lotus uliginosus</i>	Greater Birds Foot Trefoil
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Ranunculus acris</i>	Meadow Buttercup
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Rhinantus minor agg</i>	Yellow Rattle
<i>Rumex acetosa</i>	Sorrel
<i>Rumex crispus</i>	Curled Dock
<i>Sanguisorba sp.</i>	Burnet Species
<i>Trifolium repens</i>	White Clover
<i>Tussilago farfara</i>	Coltsfoot
<i>Vicia sylvatica</i>	Wood Vetch

Semi-improved Grassland SI3- Sheep Grazed

<i>Filipendula ulmaria</i>	Meadowsweet
<i>Lysimachia nummularia</i>	Moneywort
<i>Veronica chamaedrys</i>	Germander Speedwell

Semi-Improved Grassland SI4 – Species Poor Reseeded Closed Cells

<i>Arrhenatherum elatius</i>	False Oat Grass
<i>Bellis perennis</i>	Daisy

Carex flacca
Carex nigra
Cirsium arvense
Cirsium palustre
Cirsium vulgare
Dactylis glomerata
Deschampsia Sp.
Epilobium hirsutum
Equisetum Sp.
Festuca rubra
Galium aparine
Geranium diss
Geranium molle
Holcus lanatus
Juncus effusus
Lathyrus Sp.
Lotus pedunculatus
Plantago lanceolata
Poa annua
rumex obtusifolius
Senecio vulgaris
Sonchus Sp.
Taraxacum officinale
Trifolium dubium
Trifolium pratense
Trifolium repens
Tussilago farfara
Vicia sativa nigra

Ephemeral areas

Acer pseudoplatanus
Alnus glutinosa
Anisantha sterilis
Bellis perennis
Betula pendula
Buddleja davidii
Cardamine hirsuta
Carex otrubae
Carex pendula
Chamerion angustifolium
Cirsium palustre
Dryopteris filix-mas
Epilobium ciliatum
Epilobium hirsutum
Equisetum sp.
Hypericum perforatum

Glaucous Sedge
Common Sedge
Creeping Thistle
Marsh Thistle
Spear Thistle
Cocks-foot
Hair Grass Species
Great Willowherb
Horsetail Species
Red Fescue
Cleavers
Cut-leaved Cranes-bill
Dove's-foot Cranes-bill
Yorkshire Fog
Soft Rush
Vetchling Species
Greater Trefoil
Ribwort Plantain
Annual Meadow Grass
Broad-leaved Dock
Groundsel
Sow Thistle
Dandelion
Lesser Trefoil
Red Clover
White Clover
Coltsfoot
Common Vetch

Sycamore
Alder
Barren Brome
Daisy
Silver Birch
Buddleia
Bittercress
False Fox Sedge
Pendulous Sedge
Rosebay Willowherb
Marsh Thistle
Male Fern
American Willowherb
Great Willowherb
Horsetail Sp.
Perforate St John's-wort

leucanthemum vulgare
Lotus uliginosus
Pilosella aurantiaca
Plantago lanceolata
Poa annua
Potentilla erecta
Potentilla reptans
Quercus robur
Rhytidadelphus squarrosus
Rubus fruticosus
Salix caprea
Salix cinerea
Saxifrage oppositifolia
Scrophularia auriculata
Solanum dulcamara
Taraxacum officinale
Trifolium pratense
Trifolium repens
Ulex europaeus
Valeriana dioica
Viola riviniana

Wasteland / Ruderal areas

Helminthotheca echioides
Oenothera biennis
Sonchus Sp.
Tussilago farfara

Oxeye daisy
Greater Birds Foot Trefoil
Tawny Hawkweed
Ribwort Plantain
Annual Meadow Grass
Tormentil
Creeping cinquefoil
Common oak
Springy turf-mosrub
Bramble
Goat Willow
Grey Willow
Purple Saxifrage
Water Figwort
Bittersweet
Dandelion
Red Clover
White Clover
European Gorse
Marsh Valerian
Common dog violet

Bristly Oxtongue
Evening Primrose
Sow Thistle Species
Coltsfoot

APPENDIX D

Summary of Great Crested Newt (GCN) Survey Results

eDNA Status of Waterbodies 1-21

Pond Number	eDNA Status
1	Negative
2	Negative
3	Negative
4	Negative
5	Negative
6	Negative
7	Negative
8	Negative
9	Negative
10	Negative
11	Negative
12	Positive
13	Negative
14	Negative
15	Negative
16	Negative
17	Negative
18	Negative
19	Negative
20	Negative
21	Negative

Habitat Suitability Index (HSI) data

Pond	SI -1		SI - 2		SI -3		SI -4		SI -5		SI -6		SI -7		SI -8		SI -9		SI -10		HSI score	Pond suitability	Predicted presence
	geographic al location		pond area		pond drying		water quality		shade (perimeter)		fowl		fish		ponds		terrestrial habitat		macrophytes				
	Field result (A,B,C)	SI score	Field result (m2)	SI score	Field result	SI score	Field result	SI score	Field result (% cover)	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score			
1	B	0.5	1000	1	Never	0.9	Good	1	5	1	Minor	0.7	possible	0.7	22	1	Good	1	70	1	0.85	Excellent	93%
2	B	0.5	5000	0.3	Rarely	1	Poor	0.3	0	1	Major	0	possible	0.7	22	1	Moderate	0.7	0	0.3	0.39	Poor	3%
3	B	0.5	1600	0.9	Rarely	1	Good	1	0	1	Minor	0.7	possible	0.7	22	1	Moderate	0.7	70	1	0.82	Excellent	93%
4	B	0.5	600	1	Never	0.9	Moderate	0.7	90	0.4	Absent	1	possible	0.7	22	1	Moderate	0.7	20	0.5	0.70	Average	55%
7	B	0.5	1800	0.8	Never	0.9	Poor	0.3	80	0.6	Minor	0.7	possible	0.7	22	1	Good	1	5	0.4	0.64	Average	55%
9	B	0.5	2000	0.8	Rarely	1	Good	1	40	1	Absent	1	Absent	1	22	1	Good	1	80	1	0.91	Excellent	93%
10	B	0.5	600	1	Never	0.9	Good	1	50	1	Absent	1	possible	0.7	22	1	Good	1	70	1	0.89	Excellent	93%
11	B	0.5	100	0.2	Never	0.9	Moderate	0.7	80	0.6	Absent	1	Absent	1	22	1	Good	1	50	0.8	0.70	Good	79%
12	B	0.5	1600	0.9	Never	0.9	Good	1	30	1	Minor	0.7	possible	0.7	22	1	Good	1	50	0.8	0.82	Excellent	93%
14	B	0.5	300	0.6	Never	0.9	Moderate	0.7	90	0.4	Absent	1	possible	0.7	22	1	Good	1	60	0.9	0.73	Good	79%
15	B	0.5	24	0.1	Never	0.9	Moderate	0.7	90	0.4	Absent	1	possible	0.7	22	1	Good	1	0	0.3	0.51	Below Average	20%
16	B	0.5	900	1	Rarely	1	Good	1	60	1	Absent	1	possible	0.7	22	1	Good	1	65	1	0.89	Excellent	93%
17	B	0.5	4900	0.4	Never	0.9	Moderate	0.7	0	1	Minor	0.7	possible	0.7	22	1	Good	1	5	0.4	0.66	Average	55%
20	B	0.5	100	0.2	Sometimes	0.5	Poor	0.3	90	0.4	Minor	0.7	possible	0.7	22	1	Moderate	0.7	65	1	0.53	Below Average	20%
21	B	0.5	4000	0.5	Never	0.9	Good	1	5	1	Minor	0.7	possible	0.7	22	1	Good	1	50	0.8	0.78	Good	79%
22	B	0.5	1600	0.9	Never	0.9	Good	1	5	1	Absent	1	Absent	1	22	1	Good	1	70	1	0.91	Excellent	93%
23	B	0.5	240	0.4	Rarely	1	Good	1	80	0.6	Minor	0.7	possible	0.7	22	1	Good	1	60	0.9	0.74	Good	79%
24	B	0.5	975	1	Rarely	1	Good	1	20	1	Absent	1	possible	0.7	22	1	Good	1	10	0.4	0.81	Excellent	93%

GCN Survey Results

[illegible]

Pond Number	Survey Date	Evening air temp	Methodology Employed	Peak count									
				GCN		Smooth		Palmate		Toad		Frog	
				Num	Eggs	Num	Eggs	Num	Eggs	Num	eggs	Num	eggs
14	14/05/2018	16°	B,N,E	-	-	-	-	-	-	-	-	-	-
14	29/05/2018	18°	B,N,E	-	-	-	-	-	-	-	-	-	-
15	14/05/2018	16°	B,N,E	-	-	-	-	-	-	-	-	-	-
15	15/05/2018	16°	B,N,E	-	-	-	-	-	-	-	-	-	-
15	24/05/2018	15°	B,N,E	-	-	-	-	-	-	-	-	-	-
15	29/05/2018	18°	B,N,E	-	-	-	-	-	-	-	-	-	-
16	14/05/2018	16°	B,N,T,E	-	-	-	-	-	-	-	-	-	-
16	15/05/2018	16°	B,N,T,E	-	-	-	-	-	-	-	-	-	-
16	24/05/2018	15°	B,N,T,E	-	-	-	-	-	-	-	-	-	-
16	29/05/2018	18°	B,T,E	-	-	-	-	-	-	-	-	-	-
17	14/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
17	15/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
17	24/05/2018	15°	B,T,E	-	-	-	-	-	-	-	-	-	-
17	29/05/2018	18°	B,T,E	-	-	-	-	-	-	-	-	-	-
20	10/05/2018	10°	B,T,E	-	-	-	-	-	-	-	-	-	-
20	14/05/2018	16°	B,N,T,E	-	-	-	-	-	-	-	-	-	-
20	23/05/2018	21°	B,N,T,E	-	-	-	-	-	-	-	-	-	-
20	30/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
21	09/05/2018	10°	B,T,E	-	-	-	-	-	-	-	-	-	-
21	15/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
21	23/05/2018	21°	B,T,E	-	-	-	-	-	-	-	-	-	-
21	30/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
22	09/05/2018	10°	B,T,E	-	-	-	-	-	-	-	-	-	-
22	15/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
22	23/05/2018	21°	B,T,E	-	-	-	-	-	-	-	-	-	-
22	30/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
23	09/05/2018	10°	B,T,E	-	-	-	-	-	-	-	-	-	-
23	15/05/2018	17°	B,T,E	-	-	-	-	-	-	-	-	-	-
23	23/05/2018	21°	B,T,E	-	-	-	-	-	-	-	-	-	-
23	30/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
24	15/05/2018	17°	B,T,E	-	-	-	-	-	-	-	-	-	-
24	14/05/2018	16°	B,T,E	-	-	-	-	-	-	-	-	-	-
24	24/05/2018	15°	B,T,E	-	-	-	-	-	-	-	-	-	-
24	29/05/2018	18°	B,T,E	-	-	-	-	-	-	-	-	-	-

Methodology Employed Key: B = Bottle trapping. N = Netting. T = Torching. E = Egg search.