ARBTECH

Ecological Mitigation and Enhancement Plan

Report Prepared on behalf of: Mr. Charles Lawson

For the site of: Plas Fron Barns, Porthwgan Road, Marchwiel, Wrexham, LL13 OTP.

30 March 2016

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Ecological Mitigation and Enhancement Plan

1.0 The Scope

The scope of this report is to provide an ecological mitigation and enhancement plan for bats for site of Plas Fron Barns, Porthwgan Road, Marchwiel, Wrexham, LL13 OTP. Located at grid reference SJ 378 461.

The proposed development involves the conversion of redundant farm buildings to four residential units and construction of a new vehicular access. The scheme was granted planning permission in April 2007 (planning reference: P/2006/0826). There is now a section 73 application to remove/vary the conditions of the granted planning permission (reference: P/2015/0180). The Design and Access Statement in support of the section 73 application states:

"The application seeks to establish the removal/variation of the following conditions:

- ***Condition 3 – submission of amended plans***
- ***Condition 4 – approval for additional rebuilding works, these have been discussed and agreed on site with Matthew Phillips and elevations showing the extent of this submitted as part of the application.***
- ***Condition 10 – mitigation measures for nesting birds (see 4.2 below)***
- ***Condition 11 – mitigation measures for nesting bats (see 4.3 below)***
- ***Conditions 12, 14 & 15 – a separate planning application ref PP-0381810 (VAL/2014/0300) has been submitted to deal with these conditions***

4.2 Condition 10 – it is proposed that the following mitigation measures will be provided for birds:

6 No. Esschert Design NKLB2 24 x 15 x 9cm Swallow nest

2 No. conservation sparrow box.

4.3 Condition 11 – it is proposed that the following mitigation measures will be provided for bats:

2 No. 1FS Colony type bat boxes (50 bats each)

Bat loft incorporated into unit 4."

This mitigation and enhancement plan will deal with Condition 11 and the mitigation measures referred to in point 4.3.

The existing site plan (aerial image from Bing Maps and site layout diagram taken from the Star Ecology Report 2015) and proposed site plan are provided as Figures 1, 1a and 2 below.

Figure 1 Existing plan: Aerial Image

Figure 1a Site Layout Diagram (Star Ecology 2015)

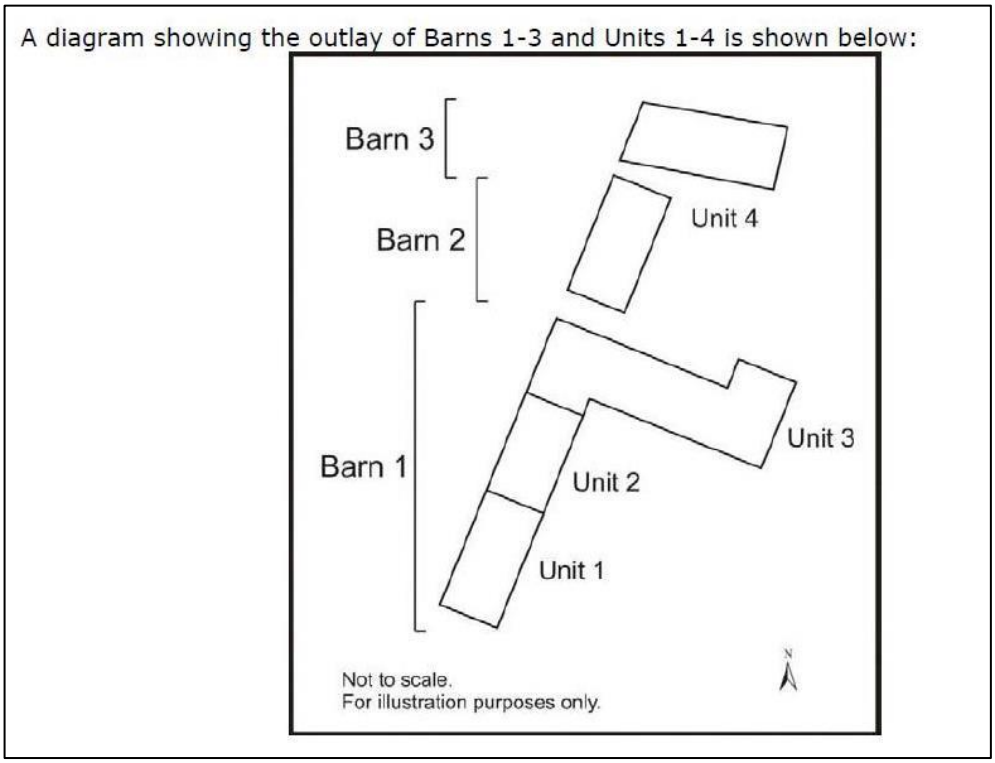
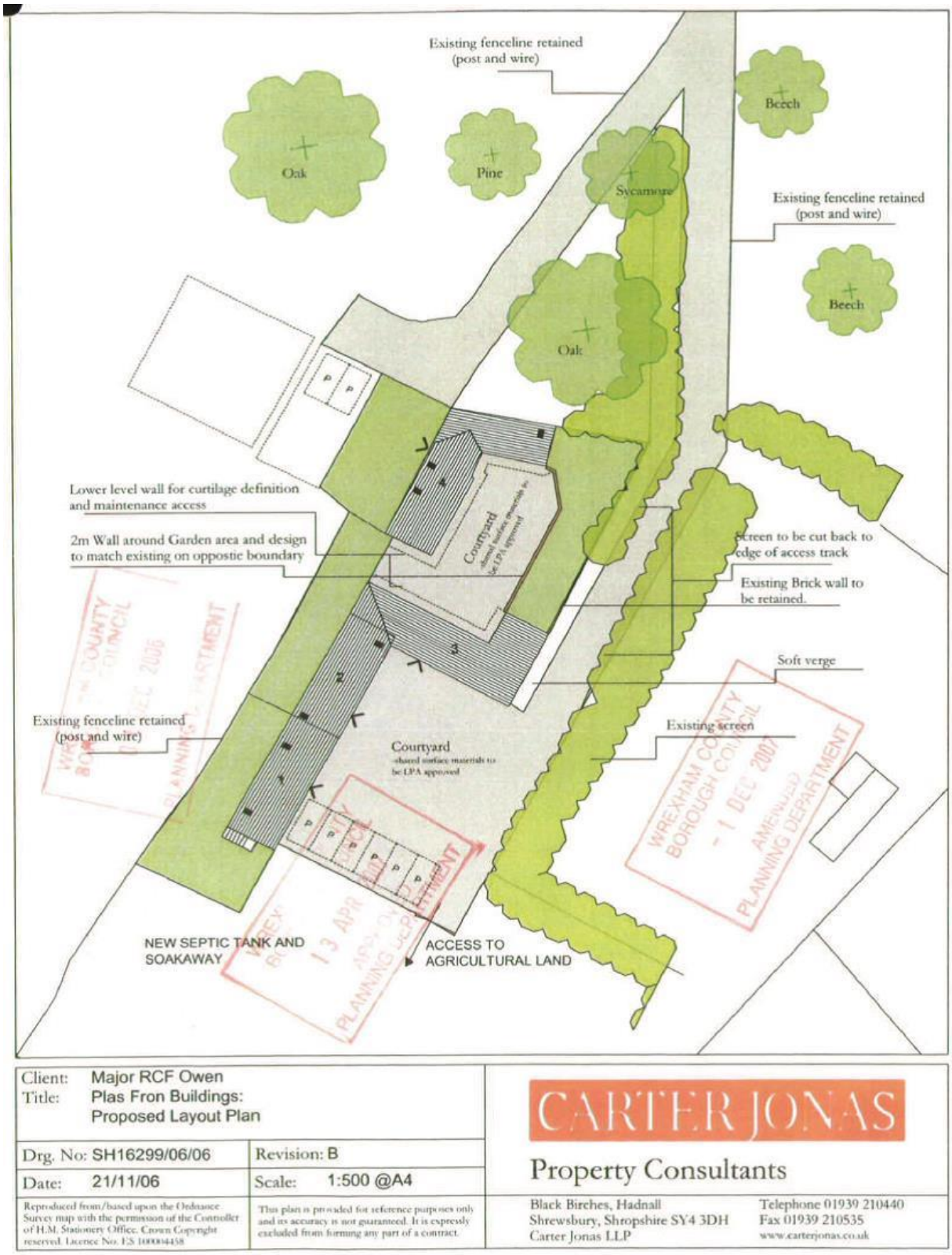


Figure 2 Proposed plans



The approved plans permit the conversion of Barn 1 into three dwellings referred to as Unit 1, Unit 2 and Unit 3 in the proposed plans; and the conversion of Barn 2 and Barn 3 into one dwelling referred to as Unit 4 in the proposed plans.

2.0 Background

Ecological surveys of the site were completed by Wildlife Promotion Company Ltd in June 2006 comprising a daytime inspection and a dusk survey of Barns 1, 2 and 3. The results found no evidence of bats roosting within the barns.

Further ecological surveys were completed by Ecotrack Ltd in 2014 comprising a daytime inspection of Barns 1, 2 and 3 and a dusk survey on Barn 1 only. These surveys found scattered bat droppings on the first floor of Barn 1. A small number of bat droppings were found on the inside face of the southwest elevation wall. A cluster of moth winds and bat droppings indicating a possible feeding perch was found on the first floor towards the southwest end of the Unit 2. Bat droppings were considered to be from pipistrelle species (*Pipistrellus spp.*) and brown long-eared bats (*Plecotus auritus)*. A soprano pipistrelle (*Pipistrellus pygmaeus*) bat roost was found between a rafter and an internal dividing wall within a first floor room of Unit 1. No physical evidence of bats was records within Building 2 or Building 3 (assumed Barn 2 and Barn 3).

The most recent ecological surveys of site were completed by Star Ecology in 2015. On 7th May 2015 the exterior and interior of Barn 1 was surveyed for the presence of bats and their roosts. During the survey the building work on Unit 1 was nearing completion and as a result the previously recorded soprano pipistrelle roost in the crevice was no longer apparent. Bat droppings from the 2015 bat season (N=4) and the 2014 bat season (N=1) were located on the floor of the first floor of Unit 3 in the landing and middle bedroom. DNA analysis confirmed the species to be soprano pipistrelle. Bat droppings from the 2015 bat season (N=6) were located stuck to a recently constructed first floor concrete block wall between the landing and the southeast end room on the first floor. The bat droppings were within a crevice between the wall and a rafter and immediately below the crevice indicating the roost was used by a lone bat. DNA analysis confirmed the species to be soprano pipistrelle.

On 29th May 2015 the exterior and interior of Barn 1 was surveys for the presence of bats and their roosts. No fresh bat droppings were noted in Barn 1. A cluster of approx. 50 mixed age bat droppings were found on the floor at the western end of Barn 3. Some of the bat droppings were within a large cobweb towards the base of the inside west elevation wall. The droppings were located immediately beneath the roof apex and were considered to be from the 2012 – 2015 bat seasons. Their size and appearance were similar to those of brown long-eared bats.

A dusk survey was completed on the 27th May 2015, as well as surveyors positioned around the buildings Anabat SD1 bat detectors were also positioned inside the buildings: one located at the immediate west of Barn 2; one positioned immediately east of Unit 1 and the immediate south of Unit 3; one located within the first floor landing of Unit 3; and one located within the western room of Barn 3.

The surveys found a single soprano pipistrelle day roost located under a ridge tile towards the middle of Unit 2. A single brown long-eared bat emerged from the west elevation gable wall plate of Barn 3 and flew into the western roof of Barn 3 prior to emerging.

The overall conclusion of the status of the bat roosts present at the site, provided in the Star Ecology 2015 report, is that the singe soprano pipistrelle day roost that was present in Unit 1 no longer exists; a single brown long-eared bat feeding perch that was present in Unit 2 is no longer accessible to the bat; a single soprano pipistrelle day roost currently exists within the first floor landing of Unit 3 and a single soprano pipistrelle day roost currently exists in the ridge tile above Unit 2 (this could possibly be the same individual bat using two different roost locations); a single brown long-eared bat day roost currently exists above the west elevation gable wall-plate and below/within the remaining roof structure of Barn 3.

3.0 The Site and Building Description

The total size of the development area is approx. 0.2ha. The site consists of three traditional-type buildings referred to as Barn 1, Barn 2 and Barn 3 in the ecological reports. Conversion works had commenced on site when the 2015 bat surveys were completed by Star Ecology. The conversion of Barn 1 was almost complete, and the majority of the roof structures of Barns 2 and 3 had been stripped with materials being used for the roofing works to Barn 1.

The buildings are surrounded by scattered trees and areas of maintained grass with dense tree cover on the southeast boundary. The trees on site provide foraging and commuting routes to key foraging areas in the wider landscape.

4.0 Designated Sites and Landscape

The site is located in a Sites of Special Scientific Interest (SSSI) Impact Risk Zones due to the River Dee SSSI located near to the site. The River Dee is approx. 780m to the east at the nearest point, and continues southwards and then west.

“The River Dee is notified for its nationally important transition through a range of river types from mesotrophic to eutrophic. It is also notified for Atlantic salmon (*Salmo salar*), otter (*Lutra lutra*), club-tailed dragonfly (*Gomphus vulgatissimus*) and fluvial geomorphology. The River Dee lies within both England and Wales, and is notified as separate SSSIs – the River Dee (England) and the Afon Dyfrdwy-River Dee SSSI in Wales. The features for which the two SSSIs are notified, in particular the range of river types and migratory fish, depend upon the whole river ecosystem. The fluvial geomorphological interest occurs in both England and Wales. The English sections of the river are therefore notified as components of the whole ecosystem for which the river is a nationally important example, and because the otter, club-tailed dragonfly and the geomorphological interest occurs on the English reaches.” (Natural England SSSI Citation).

The SSSI also incorporates Special Areas of Conservation (SAC) (Wales) - River Dee and Bala Lake / Afon Dyfrdwy A Llyn Tegid (Wales) SAC. This is a SAC under the EC Habitats Directive and registered as a Natura 2000 site of European importance due to the following habitats being present: Tidal rivers; Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Salt marshes, Salt pastures, Salt steppes; Inland water bodies (Standing water, Running water); Improved grassland; Broad-leaved deciduous woodland. Annex II species present include: Sea lamprey (Petromyzon marinus), Brook lamprey (Lampetra planeri), River lamprey (Lampetra fluviatilis), Bullhead (Cottus gobio) and Otter (Lutra lutra). (http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0030252 accessed 23 March 2016)

The site is located in a rural area with pasture being the dominant land use in the surrounding landscape. There are no priority habitats located within 2km of the site however the following habitat features are present within 1km of the site:

Woodlands: Approx. 825m to the north, and approx. 805m to the southwest of the site.

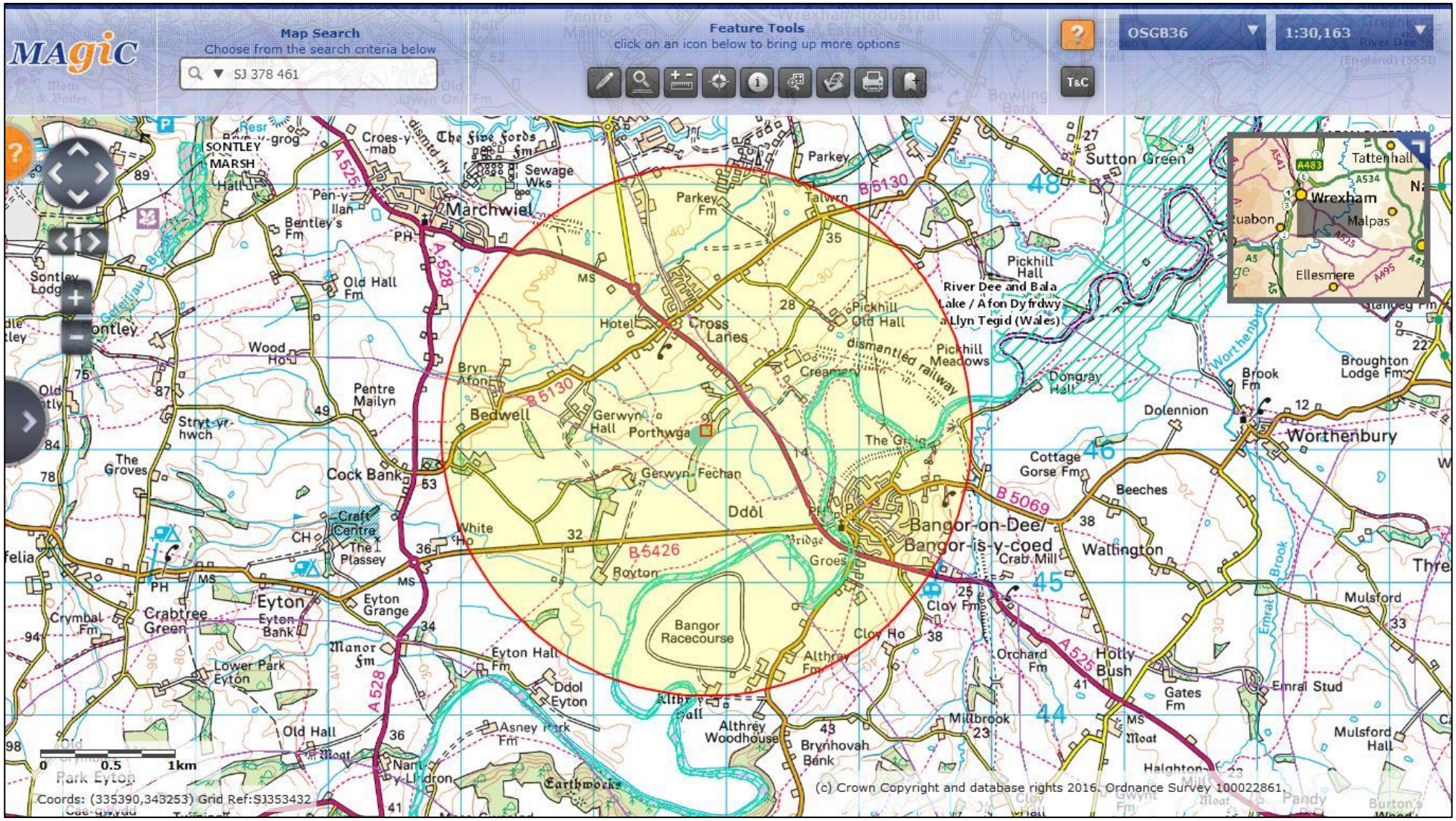
Linear: Tree and hedge lined fields, and dense scattered trees provide linear features linking the site to the wider habitat.

Pasture/grassland: Pasture is adjacent to the site and the dominant land use in all directions.

Water courses and waterbodies: The River Dee is located approx. 780m to the east, approx. 985m to the southeast, and approx. 990m to the south of the site. Pond with scattered trees are located approx. 780m to west of the site.

A map showing the location of the designated sites and habitat features is provided is Figure 3 below.

Figure 3 Locations of designated sites and habitat features



5.0 The Mitigation and Enhancement Plan

Table 1 below details the mitigation and enhancements included in the plan in relation to the planning conditions:

Planning Condition Requirements	**Mitigation and Enhancement**
Mitigation measures for roosting bats Condition 11 (planning reference P/2006/0826)	2 No. 1FS Colony type bat boxes erected on retained trees on site. Bat loft incorporated into Unit 4. 3 No. Natural timber bat boxes manufactured by Ark Wildlife fixed at a high level to the gable of Unit 4. (planning reference: P/2015/0180)
A scheme to mitigate the impact of the development on bats. The scheme shall include details of: • details of methods to avoid killing, injury or disturbance to bats during development • details of the provision of temporary roosts during construction • details of the provision of replacement roosts • details of habitat management and enhancement, e.g. suitable lighting and planting • details of appropriate post construction monitoring Condition 11 (planning reference P/2006/0826)	Full mitigation and enhancement strategy for bats in accordance with best practice.

The following Tables 2 and 3 detail the mitigation and enhancements of the site for bats. These are detailed below and will be undertaken in year 1 of the ecology enhancement plan.

Post-development monitoring and maintenance are detailed below and will be undertaken in years 2-5 of the ecology enhancement plan.

Table 2: Mitigation, Capital Works and Enhancements in Year 1

Work	Specification
Bat Mitigation and Compensation	• Prior to the works to the continuation of works to Barns 3 and 4 two Schwegler 1FS Colony bat boxes will be erected on retained trees on site. These boxes are specifically designed for and known to be used by pipistrelle species and brown long-eared bats. - They will be positioned in a shady location, approximately 3 – 5m above ground level, facing a south/south-westerly direction, with clear flight paths to and from the entrances. - No lighting will illuminate any of the bat boxes or tree lines. • A bat licenced ecologist will be present for the works affecting the existing bat roosts on the site i.e. the soprano pipistrelle day roost within the first floor landing of Unit 3; the soprano pipistrelle day roost in the ridge tile above Unit 2; and the brown long-eared bat day roost the west elevation gable wall-plate and below/within the remaining roof structure of Barn 3. This is to ensure that any bats present will not be injured/killed or entombed during the remainder of the works. • All contractors working on site will be informed of the procedure to follow should a bat be unexpectedly found during the works i.e. all work must stop and further advice sought from a bat licenced ecologist. • Any bats accidentally harmed during the works will be carefully placed in a vivarium (see example of a bat vivarium below) and passed to the local bat group carer until which time they can be re-released at the site.

In addition to the bat boxes erected on retained trees, permanent replacement roosting provision will be provided in the form of a small bat loft in the converted Barn 3 (Unit 4).

- The bat loft will be created within the roof void at the apex of Unit 4.
  - This will measure approx. 800mm to 1200mm in length and 600mm in height to the ridge.
  - A brick will be removed to provide access to the bat loft with a height restricted to 30mm with a mortar bed.
  - A small (45cm x 45cm) loft hatch will be inserted into the ceiling to provide access to the bat loft for bat licenced ecologists only.
  - The roof of the bat loft will be lined with 6mm.wbp plywood
  - The floor of the bat loft will be lined with 6mm.wbp plywood covered with a layer of bitumastic felt.

See Appendix 1 for locations of the bat boxes, and bat loft.

Bats – Lighting Strategy	Lighting will be controlled across the developed site. No lighting will illuminate any of the bat boxes or the bat loft entrance. Research into the effects of artificial lighting on bats has shown that it can impact upon bat emergence times and lead to a reduced foraging time (particularly for the light sensitive brown long-eared bat). As bats are faithful to their roost sites, often returning to the same site for many years, the impact of lighting on emergence times and in turn reduced foraging times can ultimately result in the roosts being abandoned. Key areas of the site which are sensitive to artificial lighting are the site boundaries and entrance as they consist of scattered trees and dense trees lines which provide foraging and commuting routes for bats. The grassland areas on the site also provide dark areas for foraging and commuting. The lighting on the developed site will be limited to the new dwellings only. Lighting around driveways and parking areas will be low level bollards. The proposed lighting scheme incorporates low impact lighting adopted from the guidance outlined in the Bat Conservation Trust's 'Bats and Lighting' publications: http://www.bats.org.uk/pages/bats_and_lighting.html The lighting on the site will: • Use narrow spectrum light sources to lower the range of species affected by lighting • Use light sources that emit minimal ultra-violet light • Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin.

	• Not use bare bulbs and any light pointing upwards. The spread of light will be kept in line with or below the horizontal. Light spill will be reduced via the use of low level lighting used in conjunction with hoods, cowls, louvers and shields. Lights will also be directional to ensure that light is directed to the intended areas only. Lighting on the new dwellings will be positioned below the eaves, be on PIR sensors that are sensitive to large objects only (so that they are not triggered by passing bats), and will be set to the shortest time duration to reduce the amount of time the lights are on. Wall lights and security lights on the replacement dwellings will be 'dimmable' and set to the lowest light intensity settings. There are several products on the market that allow the control of the light intensity and duration that the lights are on. All lighting on the developed site will make use of the most up to date technology available. All of the above will ensure that the replacement bat roosts created on the developed site will not be affected by the proposed lighting ensuring the long term use of the roosts. There will be no lighting directed at tree lines as this will impact upon the foraging and commuting activities of bats.
Post-Development inspection	After all the habitat enhancement works are finished, and prior to the first occupation of the new dwellings, an inspection of the site will be undertaken by an Ecological Consultant. The number and suitability of habitat boxes and external lighting will be checked. Recommendations for changes or improvements will be made where applicable. A letter shall then be written to confirm the site has complied fully with the measures included in this mitigation and enhancement plan.

Table 3 – Management and Maintenance Plan Years 1-5

Activity	Year 1	Years 2 to 5
Bat Boxes and Bat loft entrance	Monitor the bat boxes and entrance to the bat loft to ensure entrances do not become blocked or the bat boxes become damaged or fall down e.g. during storms. Replace any that become inviable or broken. Only licence bat workers are permitted to enter the bat loft for inspection.	Monitor the bat boxes and entrance to the bat loft to ensure entrances do not become blocked or the bat boxes become damaged or fall down e.g. during storms. Replace any that become inviable or broken. Only licence bat workers are permitted to enter the bat loft for inspection.
Lighting	The location and suitability of the external lighting will be checked by a bat licenced ecologist. Recommendations for improvements will be made where applicable.	Maintain approved lighting levels across the developed site. No changes will be made until advice has been sought from a bat licenced ecologist.

6.0 Document Production and Approval

Status	Issue	Author/Reviewer	Edits	Date
Draft	1	Jo Gregory	Draft	23/03/2016
Reviewed	2	Chris Formaggia	Reviewed	25/03/2016
Final	3	Jo Gregory	Amended	30/03/2016

7.0 Limitations

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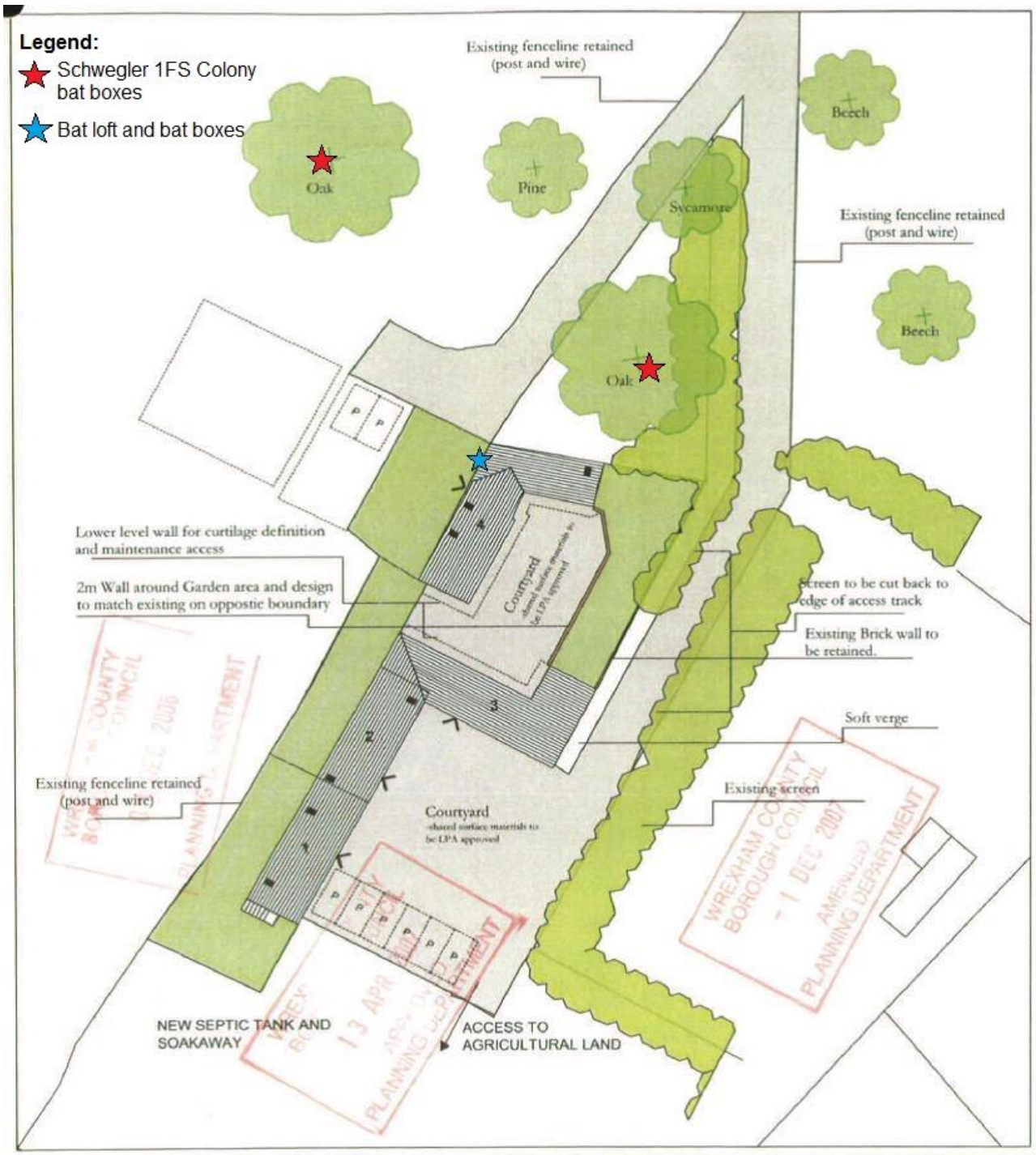
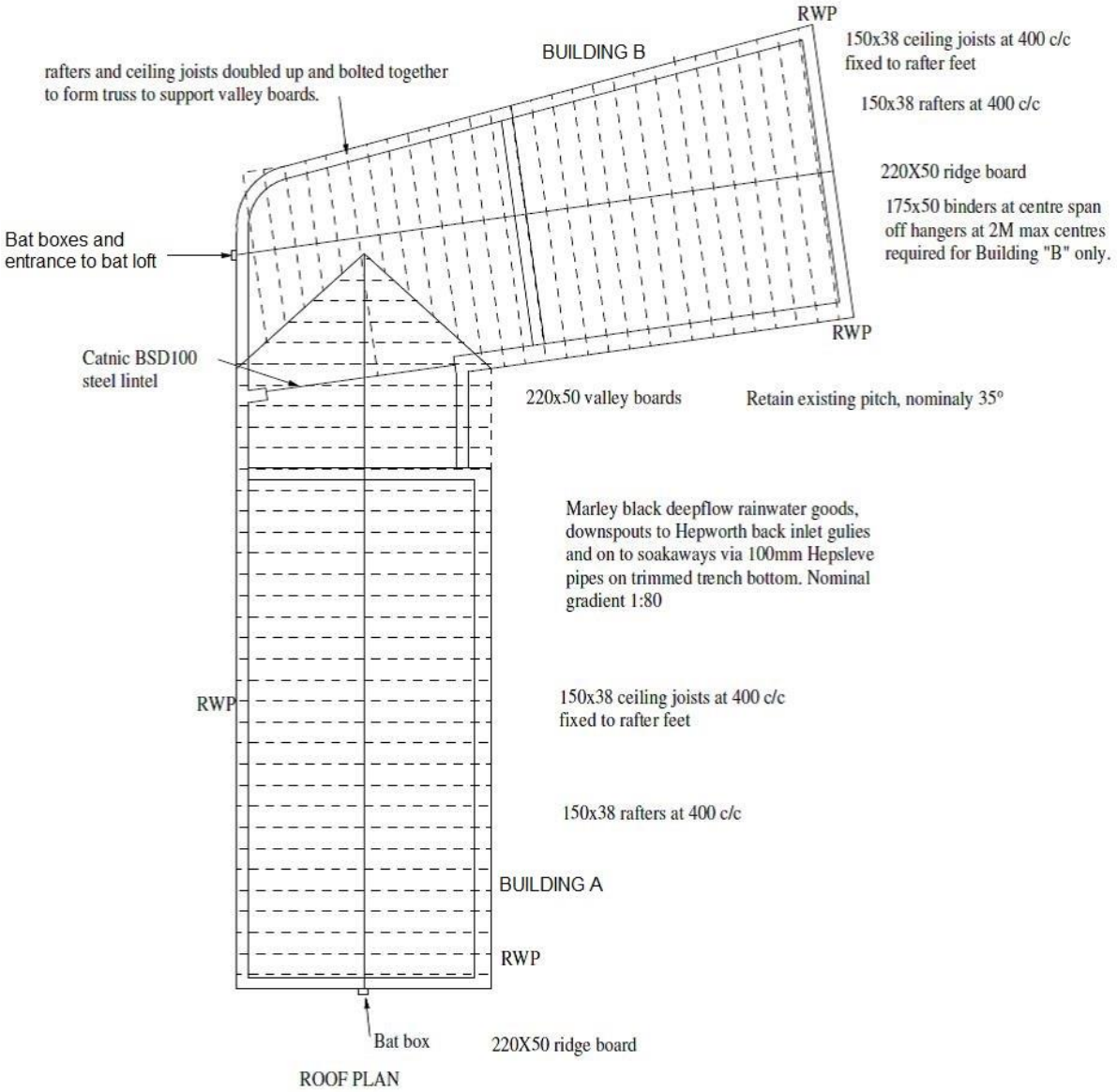
Appendix 1 Full Mitigation and Enhancement Plan

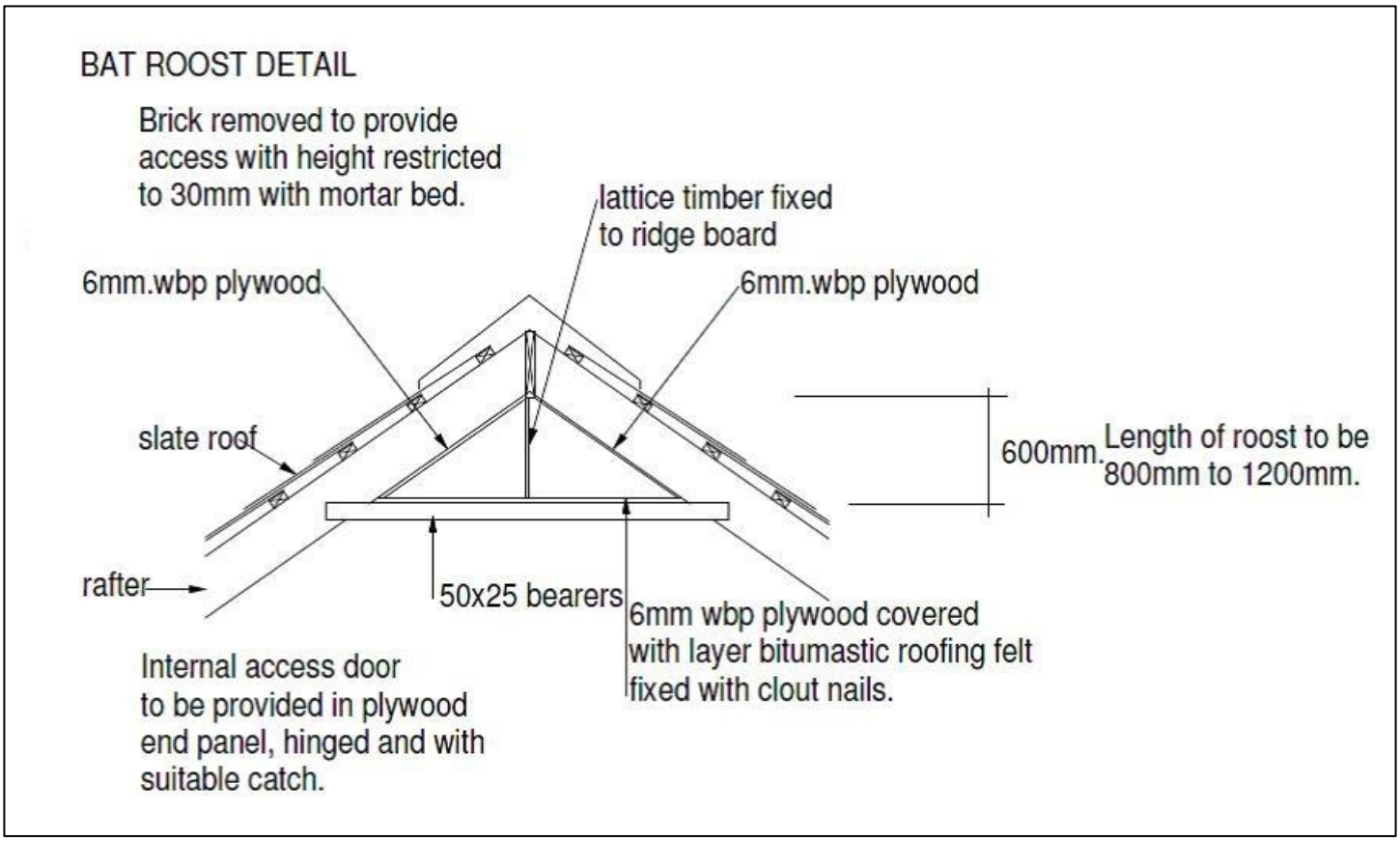
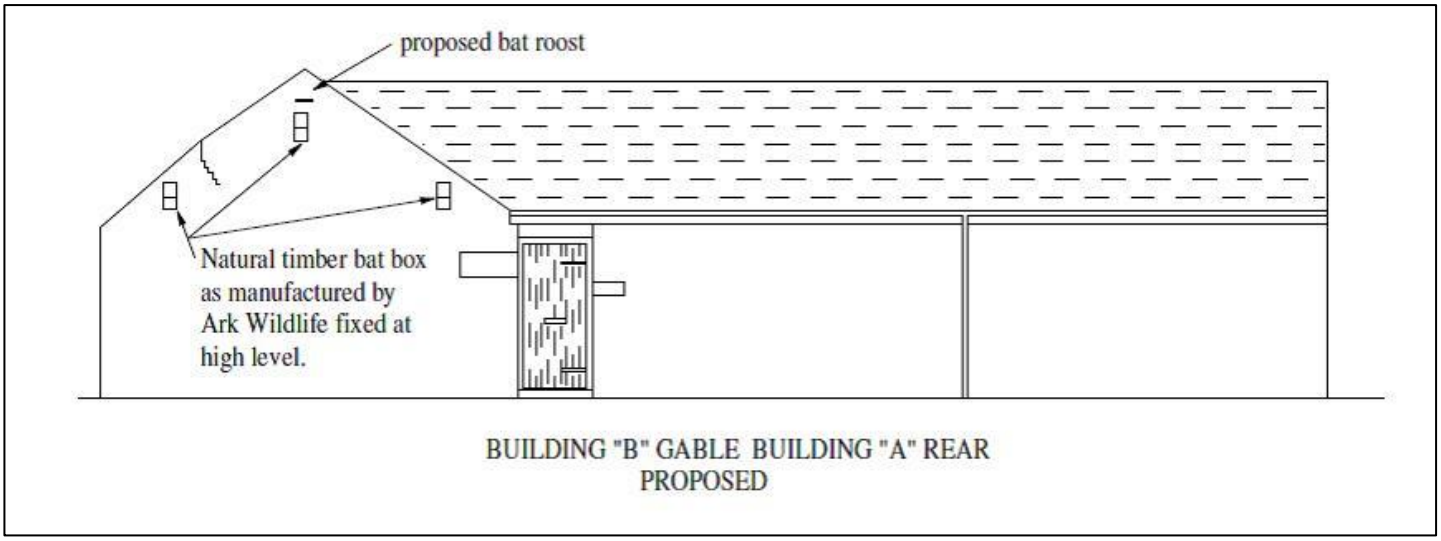


Client: Major RCF Owen Title: Plas Fron Buildings: Proposed Layout Plan	CARTER JONAS Property Consultants
Drg. No: SH16299/06/06 — Revision: B	
Date: 21/11/06 — Scale: 1:500 @A4	
Reproduced from/based upon the Ordnance Survey map with the permission of the Controller of H.M. Stationery Office. Crown Copyright reserved. Licence No. FS 100004458 — This plan is provided for reference purposes only and its accuracy is not guaranteed. It is expressly excluded from forming any part of a contract.	Black Birches, Hadnall Shrewsbury, Shropshire SY4 3DH Carter Jonas LLP Telephone 01939 210440 Fax 01939 210535 www.carterjonas.co.uk

Bat Loft Location



Bat Loft Details



Bat Boxes and Bat Loft Entrance