Land adjacent to Llantwit Major Bypass, Boverton: Phase 2

Dormouse Mitigation Strategy

Prepared by:
The Environmental Dimension Partnership Ltd

On Behalf of:
Barratt Homes, South Wales

February 2018
Report Reference
edp3775_r009

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Appendices

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For EDP use	
Report no.	edp3775_r009
Author	Kate Henson
Peer Review	Emily Williams
Formatted	Georgia Lewis
Proofed	Fay Jenkins
Date	21 February 2018

Section 1
Introduction, Site Context and Purpose

Introduction

1.1 This Dormouse Mitigation Strategy has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf Barratt Homes, South Wales (hereafter referred to as 'the Client'), in relation to a second phase of development at land at Llantwit Major Bypass, Boverton (hereafter referred to as 'the Application Site'), referred to as Phase 2.

1.2 Detailed planning consent 2014/00995/FUL was granted for Phase 1 of development by Vale of Glamorgan Council (VoGC) on 30 August 2017, for the development of 65 residential dwellings, public open space, landscaping, highways improvements and associated engineering works encompassing two agricultural fields comprising land adjacent to Llantwit Major Bypass, Boverton.

1.3 A second phase of development across a third field to the immediate south east of Phase 1 is now proposed for the provision of 24 residential dwellings and associated works, as illustrated at **Appendix EDP 1**. This Dormouse Mitigation Strategy has therefore been prepared to form part of the detailed planning application submission for Phase 2 development.

Site Context

1.4 The Application Site measures approximately 0.56 hectares (ha) and is located to the immediate east of Boverton and west of the Ministry of Defence (MoD) site at St. Athan, approximately 2km inland from the south Wales coastline. Beyond the built up areas of Boverton and MoD Saint Athan the wider landscape is otherwise dominated by agricultural land.

1.5 The Application Site is bound on three sides by transport links, including Llantwit Major Bypass (B4265) along its south western edge, the Vale of Glamorgan railway line along its north eastern edge, and Llantwit Road defining the south eastern boundary. The consented Phase 1 development site bounds the Application Site to the immediate north west.

1.6 The Application Site predominantly comprises poor semi-improved grassland bound by to the north east by an established belt of broadleaved woodland aligning the railway line, to the south west by highways planting aligning Llantwit Major Bypass, to the north west by a native, species-poor hedgerow and to the south east by a line of mature trees. Field access is provided via a field gate from Llantwit Road at the far south eastern end of the Application Site.

1.7 It should be noted that a wider Ecology Masterplan encompassing land comprising both phases of development, was devised as part of the consented Phase 1 scheme, to

ensure that those mitigation measures detailed within this Mitigation Strategy with respect to dormice remain coherent whilst ensuring the maintenance of the favourable conservation status of the species over the long-term. The Ecology Masterplan is provided at **Appendix EDP 2**.

Purpose

1.8 Detailed surveys for dormouse (*Muscardinus avellanarius*) undertaken by Thomson Ecology during 2015 confirmed the presence of this species onsite (**Appendix EDP 3**). Following a prior Preliminary Ecological Assessment of the Application Site by Thomson Ecology in July 2014, an update appraisal was undertaken by EDP during September 2017, confirming no material change to habitats across the Application Site (**Appendix EDP 4**).

1.9 The hazel dormouse is listed as a European Protected Species (EPS) on Schedule 2 of the Conservation Regulations (Annex IV(a) to the Habitats Directive), affording it protection under the Conservation of Habitats and Species Regulations 2017.

1.10 In absence of appropriate compensation and mitigation measures, the development proposals could to result in the destruction of, and disturbance to, dormouse habitat both on and immediately adjacent to the Application Site. Additionally, the potential for disturbance, injury and killing of individuals could also arise during the pre-construction and construction phases. Given the risk of causing an offence under the Conservation Regulations, a development licence from Natural Resources Wales (NRW) will likely be required prior to any commencement of works.

1.11 This Dormouse Mitigation Strategy therefore sets out the necessary sensitive working methodologies in relation to the construction of the new residential development proposed. The methodologies devised are based upon the findings of the dormouse survey as detailed within the Thomson Ecology Dormouse Survey Report. This strategy also details the necessary compensation, mitigation and enhancement measures required for implementation, to ensure no significant negative effects will arise upon the favourable conservation status of a local dormouse population following development of the Application Site. This strategy will therefore form the basis of the Method Statement template comprising the future development licence application submission going forward.

Section 2
Survey Findings

Desk Study

2.1 No records of dormouse were returned within 1km of the Application Site by the South East Wales Biodiversity Records Centre (SEWBReC) during the previous desk study undertaken by Thomson Ecology in 2014. A known population of dormouse associated with the West Gate entrance of St. Athan Royal Airforce east of Application Site, was however identified by the Council Ecologist during consultation with respect to the Phase 1 scheme.

Habitats

Habitat Assessment

2.2 An assessment of the suitability of all habitats on and immediately adjacent to the Application Site for dormouse was undertaken by Thomson Ecology during 2015. The full methodology is detailed within the dormouse survey report included at **Appendix EDP 3**. In brief, a number of habitat features were recorded to determine their suitability to support dormouse, including: habitat type; size; species richness; structure and management; habitat connectivity; and availability of natural nesting and hibernation sites.

2.3 Additionally, update site visits by suitably qualified ecologists were undertaken on 9 November 2016 and 9 February 2017, with an update Extended Phase 1 survey completed on 6 September 2017 to determine any material change to those habitats to be impacted with regards to their potential to support dormouse.

2.4 The vast majority of the Application Site comprises poor, semi-improved grassland subject to regular management through cutting and/or grazing and of negligible value to dormouse. However, the vegetated boundaries of the Application Site offer suitable dispersal and foraging habitat for this species, comprising habitat corridors both across the Application Site and to the wider landscape, as summarised below:

- *North eastern boundary* (*circa 138 linear metres*): Linear belt of broadleaved woodland reaching circa 6m height located along the full length of this boundary and extending beyond the Application Site along the railway line. This woodland belt is characterised by abundant mature ash (*Fraxinus excelsior*) and frequent sycamore (*Acer pseudoplatanus*) with an understorey characterised by hawthorn (*Crataegus monogyna*), English elm (*Ulmus procera*), blackthorn (*Prunus spinosa*), elder (*Sambucus nigra*) and sycamore. Ivy (*Hedera helix*) dominates the ground flora;

- *South western boundary* (*c.83 linear metres*): Comprises recently established highways planting aligning Llantwit Bypass and located on a bank measuring

approximately 10m in width. Species present young to semi-mature specimens of ash, hawthorn, English elm and Scots pine (*Pinus sylvestris*), achieving heights of circa 13m;

- *North western boundary* (*c.74 linear metres*): Intact, species-poor and outgrown hedgerow measuring approximately 6m in height and 3m in width, dominated by hawthorn, blackthorn, elder and bramble; and

- *South eastern boundary* (*c. 40 linear metres*): Treeline reaching between circa 5m to 14m in height and characterised by multi-stemmed standards including ash and sycamore.

Dormouse Survey

Methodology

2.5 A dormouse survey was undertaken by Thompson Ecology over the course of 2015, as detailed within their dormouse survey report included at **Appendix EDP 4**.

2.6 To summarise, a total of 60 dormouse nest tubes were deployed onsite on 19 March 2015. Tubes were left *in situ* and checked by licensed surveyors for evidence of use by dormouse on six separate occasions over the course of 2015 during suitable weather conditions, on 20 April, 19 May, 18 June, 20 July, 13 August and 4 September.

Results

2.7 Nest tube surveys of suitable dormouse habitat undertaken in 2015, confirmed the presence of dormouse activity onsite, as follows:

- Dormouse nest present within tube 10 recorded during the May check, situated along the internal species-poor hedgerow; and

- Evidence of the start of a dormouse nest within tube 26 also recorded during the May check, situated within highways planting aligning Llantwit Bypass forming the south western boundary of the Application Site.

2.8 An update walkover of the area was completed by EDP on 29 November 2016, 9 February 2017 and 6 September 2017, confirming ongoing regular management of the grassland field onsite. No material changes were noted with respect to boundary habitats to be impacted with regards to their potential to support dormouse.

2.9 In line with Natural England guidance[1] which states that "*the survey should be from the current or previous active season. Surveys up to 3 years old are acceptable if the habitats haven't significantly changed*", the above findings as documented within

[1] https://www.gov.uk/guidance/hazel-or-common-dormice-surveys-and-mitigation-for-development-projects

Thompson Ecology's dormouse survey report (**Appendix EDP 4**), are thus considered to remain a valid baseline upon which appropriate mitigation measures can be based.

Assessment of Survey Findings

2.10 Of the 60 survey tubes deployed onsite, two (tubes 10 and 26) recorded evidence of dormouse during the 2015 surveys, with two nests found in May 2015. No further evidence of dormouse was recorded for the Application Site over the remainder of the survey period. Given the findings of the survey, it is considered that only a low population of dormouse is present within the locality; likely existing at only very low densities.

2.11 Habitats onsite confirmed to support dormouse are contiguous with the remainder of the boundary vegetation present on and immediately adjacent to the Application Site. Given the connectivity of such habitats onsite and with similar habitat extending across the wider landscape to the north, east and west, facilitated further by those vegetated corridors aligning Llantwit Major Bypass and the railway line, all hedgerows and linear belts of vegetation on and immediately adjacent to the Application Site are assumed to be used by the local dormouse population.

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Section 3
Legislative Context

3.1 Dormouse receive strict protection which is mainly derived from the legal protection provided primarily through the EU Habitats Directive, transposed in the UK through the Conservation of Habitats and Species Regulations 2017. The legal context of the Directive and Regulations as it applies to dormice is set out below.

EU Habitats Directive

3.2 Article 12(1) of the Habitats Directive requires Member States to:

"*Establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:*

- *All forms of deliberate capture or killing of specimens of these species in the wild;*
- *Deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;*
- *Deliberate destruction or taking of eggs from the wild; and*
- *Deterioration or destruction of breeding sites or resting places*".

3.3 Dormouse is included at Annex IV(a) of the Directive.

3.4 Article 16(1) of the Habitats Directive states that:

"*provided that there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range, Member States may derogate from the provisions of Articles 12:*

- *In the interest of protecting wild fauna and flora and conserving natural habitats;*
- *To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property;*
- *In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;*

- *For the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants; and*

- *To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species listed in Annex IV in limited numbers specified by the competent national authorities*".

3.5 'Favourable Conservation Status' (FCS) is defined by the EU Habitats Directive by Article 1(e) of the Directive. The conservation status of a species is defined as "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory*". This is considered 'favourable' when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and

- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The Conservation of Habitats and Species Regulations 2017

3.6 Articles 12 and 16 of the EU Habitats Directive are transposed into UK law through the provisions of The Conservation of Habitats and Species Regulations 2017 (as amended).

3.7 Regulation 40 states that Schedule 2 of the Regulations lists those species of animals listed in Annex IV(a) to the Habitats Directive which have a natural range which includes any area in Great Britain. The species listed are considered European Protected Species (EPS) and include dormouse.

3.8 Regulation 41(1) states that it is against the law to:

- *"Deliberately capture, injure or kill any wild animal of a European protected species;*

- *Deliberately disturb wild animals of any such species;*

- *Deliberately take or destroy the eggs of such an animal, or*

- *Damage or destroy a breeding site or resting place of such an animal"*.

3.9 Regulation 41 (2) further states that with respect to "disturbance" this includes in particular any disturbance which is likely to:

- *"Impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or*

- *Impair their ability to, in the case of animals of a hibernating or migratory species, to hibernate or migrate; or*

- *To affect significantly the local distribution or abundance of the species to which they belong"*.

3.10 The protection afforded under Regulation 41 can be derogated through a licensing process under the requirements of Regulation 53 under certain circumstance, including the preservation of public health and public safety or other imperative reasons of overriding public need including those of a social nature, subject to there being no satisfactory alternative or that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range.

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Section 4
Impact Assessment in Absence of Mitigation or Compensation

Impacts

4.1 Losses specific to the Phase 2 development will result in the permanent loss of approximately 298m^2 of potential dormouse habitat, arising as a result of required crown reduction of the vegetation canopy and associated scrub removal aligning the north eastern boundary of the Application Site, and loss of a multi-stemmed sycamore tree (tree T109, **Appendix EDP 6**), located along the south eastern boundary.

4.2 Losses required to the north western boundary hedgerow of the Application Site, to facilitate construction of the access road linking the consented Phase 1 development to the proposed Phase 2 scheme, were detailed as part of the consented Phase 1 scheme and are thus not discussed further within this document.

4.3 The extent of habitat losses proposed across the Application Site is calculated based upon a topographical and tree survey undertaken for the Application Site (**Appendices EDP 5** and **EDP 6**). Habitat losses are illustrated at **Appendix EDP 7**.

4.4 Losses are considered minimal relative to the extent of existing dormouse habitat present immediately adjacent to the Application Site along the railway line and Llantwit Major Bypass, forming the north eastern and north western boundaries respectively. Nevertheless, such habitat losses have the potential to kill, injure and/or disturb dormouse that may be present therein.

4.5 The Application Site will also be subject to increased levels of lighting, vehicular movement and noise disturbance as a result of converting a greenfield site to residential use, with 24 residential dwellings proposed.

4.6 Additionally, potential increases in predation levels could also arise as a result of the introduction of domestic cats following occupation.

4.7 In absence of mitigation or compensation, and considering the small size of the dormouse population located within the local landscape and confirmed utilising the Application Site for foraging and dispersal purposes, such impacts upon the dormouse population present onsite are considered to be low negative at the site and local level, but negligible at the regional and national levels.

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Section 5
Mitigation and Compensation

Works to be Undertaken

5.1 Vegetation clearance will commence following receipt of the consented application and approval of a development licence from NRW. Dormouse habitat requiring clearance to facilitate development is illustrated at **Appendix EDP 7**.

Site Briefing

5.2 A site-specific briefing will be given by a licensed dormouse ecologist, to the Principal Contractor appointed by the Developer, with regards to the strict working methodologies and legal obligations to be met, particularly with respect to those methodologies and timing constraints set out within any development Licence granted given the presence of a dormouse population onsite.

Pre-commencement Site Check

5.3 Immediately prior to the commencement of any pre-construction/enabling works onsite, including vegetation clearance, a site walkover will be conducted by the suitably qualified ecologist, to determine any significant changes to those habitats supported by the Application Site with respect to dormouse. The purpose of the site walkover is to determine whether any further, species-specific working methodologies beyond those contained within this document will be required.

Protective Fencing

5.4 With respect to all mature trees, shrubs and hedgerows to be retained, protective fencing accommodating root protection areas will be securely installed at least two weeks prior to the commencement of the pre-construction/enabling works phase occurring adjacent, and adequately maintained along all identified boundaries. Such fencing is the responsibility of the Developer.

5.5 Additionally, all areas of vegetation to be cleared will be identified and agreed in advance by the suitably qualified ecologist and Principal Contractor appointed by the Developer, and appropriately marked out onsite prior to the commencement of site works.

Installation of Dormouse Boxes

5.6 A minimum of ten dormouse nest boxes[2] will be installed approximately 20m apart upon suitable trees and shrubs, located primarily along the south western and north eastern boundaries prior to commencement of habitat clearance works to further enhance the Application Site for dormouse.

5.7 Dormouse boxes will be installed by a licensed dormouse ecologist, in accordance with those requirements set out within any forthcoming dormouse licence approved by NRW. Their installation, maintenance and repair throughout the pre-construction/enabling works phase remain the responsibility of the Developer.

Temporary Lighting

5.8 Temporary lighting across the Application Site, if required, will be kept to the lowest permissible level through the use of sensitive lighting design. This will include:

- The reduction in height of lighting columns employed across the site to allow for low-level lighting or, where more appropriate, the use of tall columns designed to allow light to be directed downwards more acutely so as to reduce horizontal spill;
- The use of light spill accessories such as hoods, shields and filters to allow for lighting to be directed to the intended area only, such that light spillage is avoided elsewhere;
- The use of timed and/or sensor lighting across the site; and
- The programming of timed lighting to ensure adequate dark periods between dusk and dawn across the Application Site, particularly along the eastern and northern boundaries.

5.9 Such sensitive lighting principles aim to maintain existing habitat corridors across the Application Site utilised by notable and protected species for commuting, foraging and dispersal during the pre-construction/enabling works phase onsite.

Sensitive Vegetation Clearance

5.10 Crown reduction of the vegetation canopy aligning the north eastern boundary of the Application Site and loss of a single sycamore tree T109 located along the south eastern boundary will result in the permanent loss of approximately 298m^2 of potential dormouse habitat.

[2] Nest box construction to meet specifications detailed within Bright, P., Morris, P. & Mitchell-Jones, T (2006). *The Dormouse Conservation Handbook, 2nd Edition*. English Nature, Peterborough or similar (e.g. as per Peoples Trust for Endangered Species ( ) specifications: https://ptes.org/campaigns/dormice/).

5.11 Given the presence of dormouse, such clearance works comprise licensable actions and as such will be delivered under a development licence to be issued by NRW following planning approval, including the discharge of relevant conditions and execution of the agreed S106. As such, the timings of such clearance works will necessarily be dependent upon planning and licensing timeframes. Single stage clearance methodologies, along with their associated clearance windows, are therefore proposed below.

Option 1: Single Stage Summer Clearance: To be completed between 1 – 31 May or 1 September – 31 October

5.12 Single stage, summer clearance methodologies, aimed at displacing active individuals away from the area to be cleared and towards retained vegetation adjacent, are considered appropriate for the Application Site in accordance with guidance[3] given the limited extent (amounting to circa 298m^2) of vegetation clearance proposed, primarily comprising crown reduction works and removal of any natural regeneration/saplings encountered within the construction footprint.

5.13 Single stage summer clearance works will involve the completion of both above-ground and below-ground vegetation clearance during the dormouse active season, with above-ground vegetation clearance confined to the period 1 - 31 May or 1 September and 31 October, thereby avoiding the main dormouse breeding season (considered to be between mid June and August inclusive) and hibernation period (considered to be between November and March inclusive), following receipt of the approved development licence from NRW.

5.14 Clearance works will be overseen by the suitability qualified ecologist (or their accredited agents and assistants) named on the development licence.

5.15 A tool-box talk will be given to the vegetation clearance contractors by the ecologist prior to commencement with respect to the legal protection afforded to dormouse and breeding birds, the working methodologies to be employed, identification of individuals and their nests, and procedures to be followed should any evidence of dormouse, breeding birds or active nests be encountered during the works. Any other ecological considerations/potential constraints will also be identified.

5.16 A thorough pre-commencement check for dormouse, their nests and active bird nests will be undertaken by the ecologist immediately prior to the clearance of vegetation, with the ecologist working closely alongside the contractor and declaring specified habitat sections as being clear following completion of a thorough search prior to clearance of those specified areas commencing.

5.17 Should any active bird nest or bird nest under construction be found then a buffer zone of a minimum radius of 5m (or greater, dependant on species and following the advice of the suitably qualified ecologist) will be created around the nest and maintained until all eggs have hatched and chicks fledged, before works can recommence within this area.

[3] Bright, P., Morris, P. & Mitchell-Jones, T (2006). *The Dormouse Conservation Handbook, 2nd Edition*. English Nature, Peterborough

5.18 Should an active dormouse be encountered during the clearance works, then the individual will be given adequate time to disperse of its own accord and away from the area subject to the clearance works and towards retained habitat adjacent, before re-commencing with the clearance works.

5.19 In the unlikely event that a dormouse breeding nest containing young is encountered, clearance will cease within a 10m radius of the nest until all young have dispersed of their own accord, before works can recommence in this area. Habitat connectivity between the breeding site and area of suitable retained habitat adjacent will also be maintained throughout this period with no clearance works continuing here; where necessary, brash piles will be created between the nest and retained habitat adjacent to facilitate future foraging and dispersal.

5.20 Thereafter, above-ground vegetation will be removed using hand-held tools/machinery, with crown reduction to existing canopies undertaken at a rate of approximately 25 linear metres per day, at a slow pace and in a direction towards retained vegetation adjacent to aid dispersal of wildlife potentially remaining. Tree T109 and any natural regeneration/saplings and associated scrub encountered within the construction footprint will be reduced down to heights of between 30cm and 50cm above ground level.

5.21 Following clearance, brash will remain in situ for 24 hours to aid dispersal of wildlife during this time, before being taken offsite or with waste chipped and stored away from vegetated areas. Vehicles will avoid tracking across areas subject to clearance, and will instead be confined to the hedgerow edges and field interiors utilising long-reach machinery where required.

5.22 Below-ground clearance required to T109 and any natural regeneration/saplings and/or ground level scrub present along the north eastern boundary encountered within the construction footprint will commence immediately following completion of above-ground clearance, as follows:

- Prior to below-ground clearance, a thorough pre-commencement check for dormouse, their nests and active bird nests will be undertaken by the ecologist across all areas of above-ground vegetation remaining;

- Dormouse will be active during this time and will have dispersed on their own accord; however, should any individuals be encountered during the works then such individuals will be persuaded to move away from the working area and towards retained vegetation and dormouse boxes;

- In the unlikely event that a torpid dormouse without dependant young be found during the works, they will be relocated by hand to a suitable, secure and protected area of retained habitat adjacent and/or to the nearest available dormouse box (maximum distance 150m);

- In the unlikely event that a dormouse breeding nest with dependent young is encountered, clearance will cease within a 10m radius of the nest until all young

have dispersed of their own accord before works can recommence in this area. Habitat connectivity to retained habitat will be maintained throughout this period; where necessary, brash piles will be created between the nest and retained habitat adjacent to facilitate future foraging and dispersal;

- Thereafter, all below-ground material including tree stumps, root balls, buried rubble, spoil etc. will be lifted out using a tracked excavator and undertaken in a sensitive manner to ensure no significant disturbance to soil and adjacent, retained planting; and

- Any such excavations that occur within the root protection zone of retained vegetation will be undertaken by hand and backfilled as soon as possible. Dormouse will be active during this time and will have dispersed on their own accord; however, should any individuals be encountered during the works then such individuals will be persuaded to move away from the working area and towards retained vegetation and dormouse boxes.

5.23 Following completion of the above and below ground vegetation clearance works the site area will be released to the Developer to enable the commencement of the construction works.

Option 2: Single Stage, Winter Clearance: 1 November – 31 March

5.24 Should delays to timescales render the above timings impracticable, then single stage winter clearance methodologies employing fingertip searches over the winter months can be followed, given that below ground clearance works will be limited to the removal of tree T109 and limited areas of scrub and occasional saplings arising from natural re-generation along the north eastern boundary.

5.25 Above-ground and below-ground clearance will be undertaken between 1 November and 31 March inclusive, i.e. outside of the dormouse active season and main bird breeding season, as follows:

- All clearance works will be overseen by the suitability qualified ecologist (or their accredited agents) named on the development licence;

- A tool-box talk will be given to the vegetation clearance contractors by the ecologist prior to commencement with respect to the legal protection afforded to dormouse, the working methodologies to be employed, identification of individuals and their nests, and procedures to be followed should any evidence of dormouse be encountered during the works. Any other ecological considerations/potential constraints will also be identified;

- A thorough pre-commencement check for dormouse, their nests and active bird nests will be undertaken by the ecologist immediately prior to the clearance of vegetation;

- Should any active bird nest or bird nest under construction be found, then a buffer zone of at least 5m radius (or greater dependent upon species found, to be advised by the ecologist), will be created around the nest and maintained until all eggs have hatched and chicks fledged, before works can recommence within this area;

- Should an occupied, dormouse winter nest be discovered, clearance will cease within a 10m radius of the nest and will recommence no earlier than 1 May the following year. Habitat connectivity between the hibernation site and area of suitable retained habitat adjacent will also be maintained with no clearance works continuing here; where necessary, brash piles will be created between the nest and retained habitat adjacent to facilitate future foraging and dispersal;

- In the unlikely event that an active dormouse be encountered during the clearance works, then the individual will be given adequate time to disperse of its own accord and away from the area subject to the clearance works, and towards retained habitat adjacent, before re-commencing with the clearance works;

- Thereafter, above-ground vegetation will be removed using hand-held tools/machinery, with crown reduction to existing canopies undertaken at a rate of approximately 25 linear metres per day, at a slow pace and in a direction towards retained vegetation adjacent to aid dispersal of wildlife potentially remaining. Tree T109 and any natural regeneration/saplings and associated scrub encountered within the construction footprint will be reduced down to heights of between 30cm and 50cm above ground level;

- During the clearance, brash will remain in situ for 24 hours to aid dispersal for wildlife during this time, before being re-used where appropriate/required to provide temporary dead-hedges to maintain habitat connectivity within the clearance area, and/or taken off site or chipped onsite and stored away from vegetated areas;

- Vehicles will avoid tracking across areas subject to clearance, and will instead be confined to the hedgerow edges and field interiors utilising long-reach machinery where required;

- Thereafter, below-ground clearance, involving the lifting out of tree stumps, root balls, buried rubble, spoil etc associated with T109 and any natural regeneration/saplings and associated scrub encountered within the construction footprint, will be undertaken using a tracked excavator and in a sensitive manner to ensure no significant disturbance to soil and adjacent, retained planting; and

- All below-ground clearance works will be preceded by a fingertip search by the suitably qualified ecologist (or their accredited agents/assistants) named on the development licence immediately prior to and during any below-ground clearance works commencing/continuing.

Dormouse Habitat to be Retained, Enhanced and Created

5.26 Given the confirmed presence of dormouse onsite, the proposed scheme has been designed to retain, protect and enhance key dormouse habitat, in addition to creating new dormouse habitat within the scheme as far as possible. This has been achieved through the following design measures:

- Retention and protection of existing dormouse habitat on and immediately adjacent to the Application Site, as follows:
    - The full retention of existing tree and shrub planting forming the south western boundary of the Application Site;
    - The retention of the vast majority of tree standards forming the south eastern boundary of the Application Site;
    - The partial retention of vegetation forming the north eastern boundary of the Application Site; and
    - The sensitive orientation of the vast majority of properties away from retained vegetation adjacent, with gardens located adjacent to retained vegetation, and with curtilage boundaries delineated and separated from such habitats by 1.8m-2m high, close-board fencing to rear gardens.
- The creation of additional dormouse habitat onsite so as to strengthen and protect existing habitat corridors, as follows:
    - The provision of new native structure scrub planting along the north eastern, south eastern and north western boundaries of the Application Site, amounting to circa 509m^2;
    - The inclusion of 1m wide, native hedgerows totalling circa 28 linear metres connecting to boundary vegetation; and
    - The provision of 10 dormouse nest boxes to be installed along the north eastern and south western boundaries of the Application Site to facilitate future population monitoring.

5.27 Additionally, all retained, enhanced and newly created dormouse habitat excluded from adjacent curtilages will be subject to a sensitive management and maintenance regime by a Private Management Company over the lifetime of the development (further detailed at **Section 6**).

5.28 A summary of the extent of habitat loss, retention and creation proposed by the Proposed development is illustrated at **Appendix EDP 7** and further quantified within **Table EDP 5.1**.

Table EDP 5.1: Summary of habitats proposed for retention, loss and creation (all m^2 approximate).

Dormouse Habitat	Existing (m^2)	Retained (m^2)	Of Which Lost (m^2)	Of Which New (m^2)	Net Gain/ Loss (m^2)
Broadleaved woodland, treeline & hedgerow habitat	732	434	298	537	+239
	Ratio of replacement planting (Loss: Gain) = 1: 1.8				

5.29 New planting proposed will include native tree and shrub species favoured by dormouse, as summarised within **Table EDP 5.2**, with their locations and distribution illustrated at **Appendix EDP 8**.

Table EDP 5.2: Native Species Planting Proposed.

Native Structure Planting	
Common Name	**Latin Binomial**
Old man's beard	*Clematis vitalba*
Dogwood	*Cornus sanguinea*
Hazel	*Corylus avellana*
Hawthorn	*Crataegus monogyna*
Spindle	*Euonymus europaea*
Holly	*Ilex aquifolium*
Honeysuckle	*Lonicera periclymenum*
Crab Apple	*Malus sylvestrus*
Dog rose	*Rosa* canina
Bramble	*Rubus frcucticosus* agg.
European gorse	*Ulex europaeus*
Guelder rose	*Viburnum opulus*
Native Hedgerow Planting Mix	
Field maple	*Acer campestre*
Hazel	*Corylus avellana*
Hawthorn	*Crataegus monogyna*
Holly	*Ilex aquifolium*
Privet	*Ligustrum vulgare*
Blackthorn	*Prunus spinosa*
Tree Standards Proposed Across Development Footprint	
Field maple	*Acer campestre*
Downy birch	*Betula pubescens*
Hawthorn	*Crataegus monogyna*
Beech	*Fagus sylvatica*
Crab Apple	*Malus sylvestrus*
Bird cherry	*Prunus padus*
English oak	*Quercus rober*

Section 6
Post-Development Site Safeguard

Habitat Management and Maintenance

6.1 Native tree, shrub and hedgerow planting to be implemented across the proposed development will require ongoing sensitive and appropriate management over the lifetime of the development given the presence of dormouse on site.

6.2 Sensitive management will seek to maximise the value of food, nesting and hibernation resources for dormouse through:

- The inclusion of native tree and shrub species considered to offer valuable food resources throughout the dormouse active season;
- The maintenance of canopy and understorey connectivity through appropriate management measures, including sensitive levels of coppicing and thinning to ensure good light levels reach the woodland floor; and
- Minimising disturbance within newly planted areas through the exclusion of such habitats from adjacent curtilages.

6.3 Key management and maintenance prescriptions are detailed below.

New Planting Areas

Planting and Establishment

6.4 Native structure planting is proposed along the western, northern and eastern boundaries of the Application Site and will commence as soon as possible following the granting of planning consent by VoGC.

6.5 The locations, planting densities and species incorporated into the new planting areas are detailed within the soft landscape scheme included at **Appendix EDP 8**. Planting will be undertaken in accordance with those specifications stated therein. Additional measures are further provided below.

6.6 The provision of additional native hedgerows and native structure planting along the north eastern, south eastern and north western boundaries, aimed at strengthening and protecting existing habitat corridors, will be undertaken during the first available planting season where considered appropriate by a Chartered Landscape Architect.

6.7 All planting material will incorporate native species and will be of local or at least UK origin. Such stock will be handled in accordance with the Horticulture Trade Association guidelines and will follow landscape specifications as provided by a Chartered Landscape Architect.

6.8 Cultivation adjacent to established vegetation will take care to ensure no damage to existing root systems, with disturbance kept to the minimum necessary to expose fresh soil.

6.9 Soil debris and arisings will be swept from adjacent hard surfaces after each planting operation. All extraneous rubbish not arising from the contract works will be collected and removed from site at each visit.

6.10 All products will be supplied and fitted in accordance with the manufacture's guidelines and whips protected using stakes and durable rubber ties.

6.11 The condition of all tree stakes, ties and guards will be checked by the Developer and all broken items will be replaced and items regularly adjusted to accommodate plant growth and prevent rubbing. Any bark damage will be cut back neatly with a sharp knife. All plants will be straightened and the ground at the base to be firmed up. All shelters will be hand weeded.

6.12 Watering will be undertaken as necessary by the Developer to ensure the establishment and thriving of all planted areas. Watering will be to the full depth of the topsoil. If supply is restricted by emergency legislation, watering will not be carried out unless instructed to do so.

6.13 A weed free area around each tree and shrub should be maintained through the application of a non-residual herbicide during the growth season, following the advice of the Landscape Architect.

6.14 All areas where plants or trees have failed to thrive (through death, damage or disease), will be identified by the Developer, with specimens removed and replaced with equivalent or more appropriate native species to match the size of adjacent nearby plants in the next appropriate planting season, as frequent as necessary. The advice of the Landscape Architect should be sought wherever possible.

6.15 All plants will be pruned to promote healthy growth and natural shape, and any dead, dying or diseased wood and suckers will be removed. Pruning will be undertaken annually or as appropriate to each species between October and February inclusive, to avoid the main bird breeding and dormouse active season, and undertaken according to best practice. All arisings will be removed for composting.

Long-term Maintenance and Management

6.16 To ensure the long-term viability of all retained and newly planted trees on site, a biannual inspection during the first three years should be undertaken by an Arboricultural Association (AA) approved arboricultural contractor or professional arboriculturalist, to

ensure that the tree stock is managed for its health and safety and its lifespan and coverage optimised.

6.17 With respect to retained and newly planted trees, shrubs and hedgerow species, their management will aim to maximise the value of food, nesting and hibernation resources for dormice through the following measures:

- New growth of tree whips planted in new native hedgerows should be topped by approximately 30% on all sides on an annual cycle up to the first three years after planting to encourage low lateral growth of branches, thereby establishing a thick hedgerow at the base;

- In subsequent years, long cutting cycles will be implemented, with hedgerow cutting to occur every three years to maintain heights of between 2m - 3m height. Cutting will be undertaken on a 3-year rotation cycle, with a maximum of 30% of the hedgerow resource cut at any one time (thereby enabling a minimum of 30% left to grow for 7-10 years), to ensure that a proportion of cut versus un-cut hedgerows exists onsite at any one time. Lateral branches and shoots should be trimmed to an A-shaped cross-section, with greater width at the base of the hedgerow;

- The implementation of appropriate hedgerow management, including coppicing and/or laying of the hedgerow where appropriate according to species, will be undertaken to encourage the formation of a more dense and continuous hedgerow. Where stands of hazel, willow and other coppice-tolerant species are present, then such species should be subject to coppicing regimes on a 6-10 year rotation or where appropriate to species;

- The selective thinning of newly planted native trees and shrubs and/or small-scale removal of invasive species will be undertaken to ensure that overcrowding is reduced with increasing species maturity; that slower growing climax species are not outcompeted; and that diseased and dying plants are removed. Thinning is to be undertaken between December and February inclusive to avoid the main bird breeding and dormouse season; and

- Herbicide use will be avoided unless considered necessary to inhibit re-growth of non-native and invasive species.

6.18 In addition to the above, any maintenance pruning required should be undertaken in accordance with good horticultural and arboricultural practice with thinning, trimming and shaping of specimens undertaken as appropriate to species, location, and stage of growth. Pruning should be confined to the months of October and February inclusive so as to avoid the main bird breeding and dormouse active seasons. All arisings from any vegetation clearance will be taken away from the vicinity of the development footprint no later than the day after vegetation clearance.

6.19 The management and maintenance of all retained, enhanced and newly created habitats will be undertaken by a Private Management Company appointed by the Developer over the lifetime of the development.

Dormouse Boxes

6.20 Dormouse boxes installed across the Application Site will be annually inspected and regularly maintained over the required monitoring period, with damaged boxes replaced where necessary.

6.21 The maintenance and repair of dormouse boxes installed along the eastern boundaries of the Application Site remain the responsibility of the Developer or any appointed Management Company.

Section 7
Monitoring and Works Schedule

Monitoring

7.1 All ten dormouse nest boxes installed along the boundaries of the Application Site will be monitored by the suitability qualified ecologist (or their accredited agents) named on the development licence.

7.2 A minimum of two checks will be completed each year between May and November, ideally during May and October. Each check will be carried out between the 19th and 25th of the nominated month in line with national monitoring methodologies.

7.3 Monitoring will be undertaken during construction and following completion of development, with two checks completed each monitoring year between May and November and ideally during May and Sept/October. Each check will be carried out between the 19th and 25th of the nominated month in line with national monitoring methodologies.

7.4 Evidence of dormouse, including nests and individuals will be recorded. Individuals will be sexed and weighed where appropriate to do so, before returning to the box from which it was captured. All findings will be recorded and submitted annually to Peoples Trust for Endangered Species (PTES) and NRW in accordance with the requirements of the development licence. A monitoring report detailing the findings of the monitoring surveys and any remedial action undertaken to dormouse boxes and their habitat will also be submitted to VoGC.

Timetable of Works

7.5 Tree, woodland and hedgerow clearance will to commence following the granting of consent of the detailed application, discharge of all relevant conditions attached, and receipt of approved development licence from NRW.

7.6 Construction is anticipated to commence thereafter and following completion of the adjacent Phase 1 developpment, for a period of circa 6 months.

7.7 **Table EDP 7.1** illustrates the key optimal and sub-optimal times of year to undertake the main tasks as detailed within this Dormouse Mitigation Strategy.

Table EDP 7.1: Optimal and sub-optimal timings to undertake tasks anticipated in relation to the Phase 2 development of land adjacent to Llantwit Major Bypass, Boverton.

Task		Timing	Comments
Site Check & Briefing of Personnel		Immediately prior to commencement of works onsite	To be undertaken by the suitably qualified ecologist.
Installation of Dormouse Nest Boxes		As soon as possible prior to vegetation clearance	Subject to regular inspections and maintenance over the required monitoring period. All damaged boxes replaced as required.
Site Check & Briefing of Personnel		Immediately prior to commencement of works onsite	To be undertaken by the suitably qualified ecologist.
Installation of Protective Fencing		Prior to commencement of vegetation clearance	Install as soon as possible prior to vegetation clearance works. Maintain throughout pre-construction and construction phases.
New Habitat Creation & Planting		As soon as possible following granting of planning consent	New planting to be undertaken during the first available planting season following the advice of a suitably qualified Landscape Architect and supervised by the suitably qualified ecologist as and when necessary.
Single Stage Habitat Removal – summer clearance methodologies		1 May – 31 May or 1 September – 31 October	Vegetation to be reduced to heights of between 30-50cm utilising hand-held machinery before commencing with below-ground clearance thereafter.
Single Stage Habitat Removal – winter clearance methodologies (with fingertip search)		30 November 2017 - 31 March	Vegetation to be reduced to heights of between 30-50cm utilising hand-held machinery before commencing with below-ground clearance thereafter, employing fingertip search.
Construction Period		Circa 6 Months	To commence following completion of the vegetation clearance works.
Post-construction Management & Maintenance	Dormouse Nest Boxes	Between May - November of each year	Monitoring to be undertaken during construction and post development.
	Retained, Enhanced & Created Habitats	Over lifetime of the development	Long-term management and maintenance to be undertaken by Private Management Company.

Appendix EDP 1
Site Layout
(Hammond Architectural Ltd., Drawing Number 1753-TP-01)

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House Type Schedule

House Code	Net Floor Area (ft²)	Number of Bedrooms	House Type Name	Number of Units	Total Net Area of Each Unit (ft²)
ALR	514	1	Alder	4	2056
WAS	615	2	Washington	4	2460
RIC	731	2	Richmond	5	3655
FOL	830	3	Folkestone	2	1660
MAI	830	3	Maidstone	7	5810
BUC	874	3	Buchanan	1	874
ENN	916	3	Ennerdale	1	916
Total No. of Units on Site & Total Net Area (ft²)				**24**	**17431**

Site Key

- 1.8m high timber close board fence
- 2m high timber close board fence *(with 130mm gaps at base for hedgehog movement)*
- 1.1m high hoop top railings
- Existing vegetation retained *(Refer to landscaping layout)*
- Existing trees retained and root protection zone
- Existing tree removed
- Proposed new trees *(Indicative only refer to landscaping layout)*
- × 1.8m high close board gate
- 12 Plot numbers
- P14 Parking space

N

W E

S

SCALE BAR

0 5 10 20 30 40 50

REV.	DESCRIPTION	DATE

CLIENT
Barratt Homes South Wales

JOB TITLE
Land North of B4265, Boverton, Phase 2

DRAWING TITLE
Phase 2, Site Layout

SCALE @ A3	DATE	DRAWN BY
1:500	Jan '18	RW
JOB NO.	**DRAWING NO.**	**REVISION**
1753	TP-01	-

hammond Architectural Ltd
10 Gold Tops
Newport
NP20 4PH
t. 01633 844970
e. info@hammond-ltd.co.uk
www.hammond-ltd.co.uk

Appendix EDP 2
Ecology Masterplan
(Hammond Architectural Ltd., Drawing Number 1363-EM-03 Rev E)

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House Type Schedule

	House Code	Net Floor [illegible]	Number of Bedrooms	House Type Name	Number of Units	Total Net Area of [illegible]
Private Housing	MAI	830	3	Maidstone	10	8300
	□ER	907	3	□er□ent	8	7256
	□IS	1078	4	□ings□ille	8	8624
	AL□	1225	4	Alderne□	6	7350
	□LN	1268	4	□alton	4	5072
	□M□	1299	4	□amerton	4	5196
	RA□	1316	4	Radleigh	6	7896
LCHO	WAS	615	2	Washington	4	2460
	□AL	776	3	□almerston	2	1552
Social Rented	□AW	459	1	□a□thorne	6	2754
	ALR	514	1	Alder	4	2056
	OLI	840	2	Oli□e	4	3360
[illegible]					66	61876

□□□□□□y Site Key

- 1.8m High Timber Close Board Fence
- 1.8m High Brick Screen Wall
- 1.1m High Hooptop Railings
- 2m High Close Board Fence *with 130mm gaps at □ase for hedgehog mo□ement*
- 1.2m High Post and 3 Rail Fence
- Proposed Hedgerow *(Refer to landscaping layout)*
- Existing Hedgerow□Trees Retained *(within site layout □oundary)*
- Existing Hedgerow□Trees *(outside off site layout □oundary)*
- 2m wide buffer from existing landscaping outside site boundary. Suitable planting to be proposed within buffer
- Existing Building *(location pic□ed up from OS)*
- Proposed New Trees *(Indicati□e only refer to landscaping layout)*
- Existing Trees *(approximate location)*
- Proposed bird boxes *to □e installed on plots 1□1□□17□22□23□25□ 2□□33□35□3□□□0-□3□52□53□5□□5□ □ □□*

REV.	DESCRIPTION	DATE
C:	Layout updated	10.02.17
B:	Note removed from site key	20.12.16
A:	Indicative phase 2 layout revised. Text within site key corrected.	20.12.16

CLIENT
Barratt Homes South Wales

JOB TITLE
Land North of B4265, Boverton

DRAWING TITLE
Ecology Masterplan

SCALE @ A1	DATE	DRAWN BY
1:500	Dec '16	RW
JOB NO.	**DRAWING NO.**	**REVISION**
1363	EM-03	C

hammond Architectural Ltd
10 Gold Tops
Newport
NP20 4PH
t. 01633 844970
e. info@hammond-ltd.co.uk
www.hammond-ltd.co.uk

Appendix EDP 3
Dormouse Survey Report, June 2016
(Thomson Ecology, Report Reference ABAW105/006/001/002)

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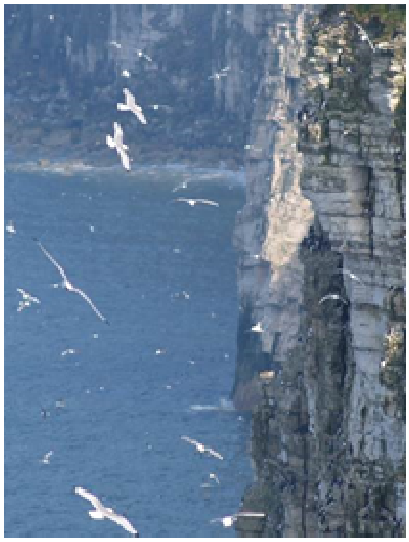



Dormouse Survey

Boverton, Vale of Glamorgan

For

Barratt Homes South Wales

Project No.: ABAW105/006

June 2016

London & South East
Compass House
Surrey Research Park
Guildford
GU2 7AG . UK
t: +44 (0)1483 466 000

North & Borders
Calls Wharf
2 The Calls
Leeds
LS2 7JU . UK
t: +44 (0)113 247 3780

Wales & South West
Williams House
11-15 Columbus Walk
Cardiff
CF10 4BY . UK
t: +44 (0)2920 020 674

Scotland
20-23 Woodside Place
Glasgow
G3 7QF . UK
t: +44 (0)141 582 1333

Enquiries

e: enquiries@thomsonecology.com

w: www.thomsonecology.com

Project Number	Report No.
ABAW105/006	001

Revision No.	Report Status	Date of Issue	Author	Reviewer	Approver
002	Final	13/06/16	Janine Burnham	Kristina Lewis	Natalie Drury

Disclaimer:

Contents

1. Summary and Main Recommendations

1.1 Summary

1.1.1 Barratt Homes South Wales is seeking planning permission for a residential development located adjacent to the B4265 Llantwit Major Bypass, Boverton, Vale of Glamorgan. The development will be located on 1.8 hectares (ha) of farmland and will comprise the construction of 64 residential units with associated tree and hedgerow planting, and public open spaces, whilst the survey area totals 2.41 ha. The location of the site is shown in Figure 1.

1.1.2 In March 2015 Thomson Ecology was commissioned to undertake dormouse surveys at the site. The brief was to undertake an assessment of the suitability of habitat within the site for dormouse and undertake a dormouse nest tube survey on the site, comprising one visit to deploy the tubes and six survey visits to check for the presence of dormouse.

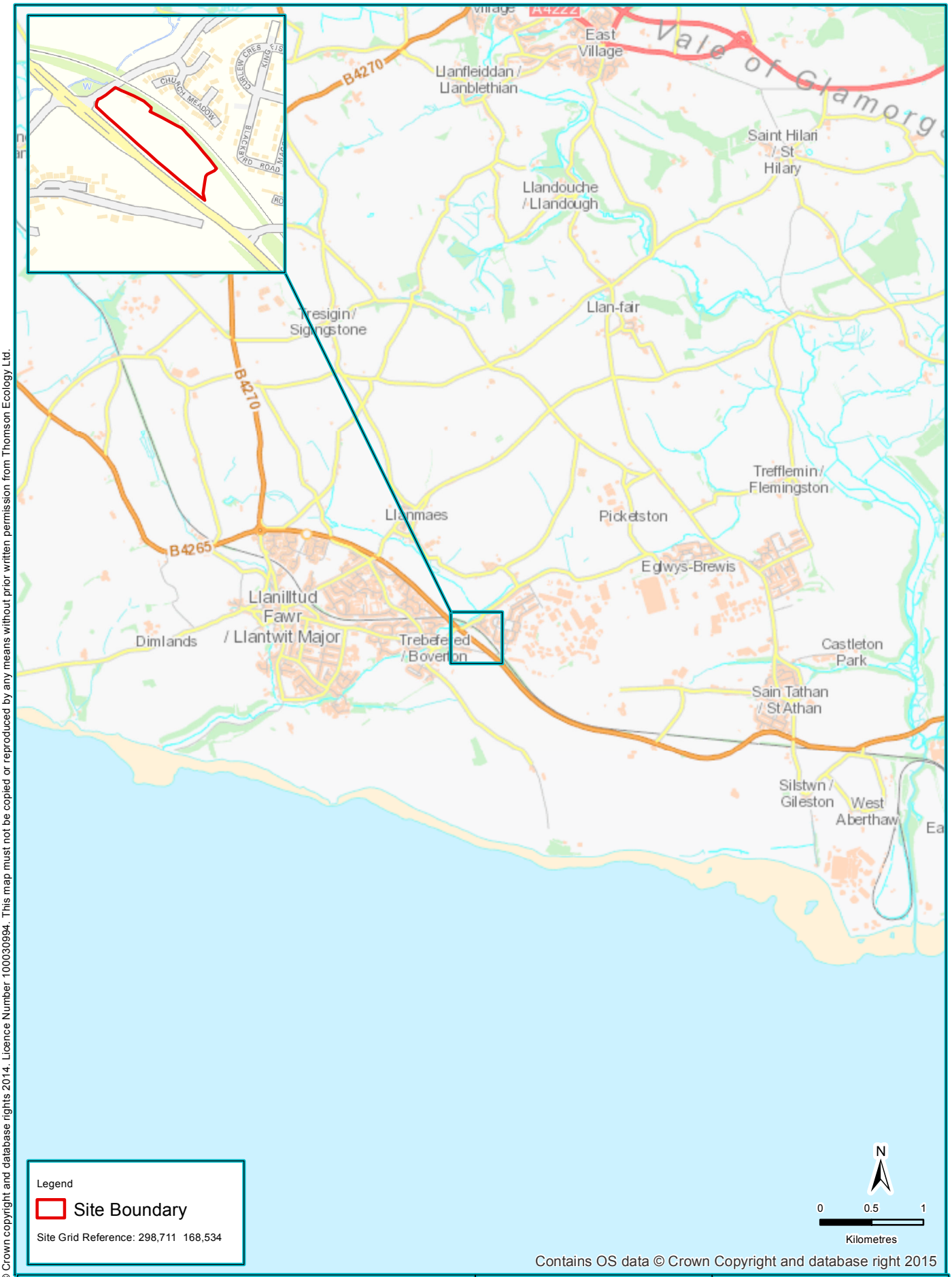
1.1.3 Evidence of dormouse presence on site was found during the nest tube survey, with nests being recorded in one internal hedge and a hedgerow on the south western perimeter of the site. These results suggest that the species is also likely to be present in suitable connected habitat around the edge of the site, and adjacent to the site.

1.2 Main Recommendations

1.2.1 Without mitigation, it is possible that dormice will be disturbed, harmed or their habitat destroyed as a result of the proposed development.

1.2.2 In order for the works to proceed lawfully, a European Protected Species Licence application for dormouse including a mitigation method statement should be prepared and submitted to Natural Resources Wales, once planning permission has been received.

1.2.3 The results of these surveys will be used to inform the planning application with respect to dormouse and to inform appropriate mitigation methods to be formulated based upon finalised development plans.



Client: Barratt Homes South Wales		Drawing Ref: ABAW105/19307/1	
Figure Number: 1		Scale at A3: 1:50,000	
Figure Title: Site Location		Drawn: KM	Checked: AC
		Date: 09/06/2016	Date: 09/06/2016

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www.thomsonecology.com
enquiries@thomsonecology.com

Filepath: S:\Cardiff\Projects\ABAW105 Phs 1 & Arb, Boverton\Reports\MappingWorking\Dormouse Survey\ABAW105_Fig2_HabitatSuitabilityAssessment_DJ_070915.mxd

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Legend

- Photograph Location and Direction
- Suitable Dormouse Habitat
- Survey Boundary
- Site Boundary

Site Grid Reference: 298,712 168,532

Drawing Ref	ABAW105/19308/1
Scale at A3	1:1,100
Drawn: KM	Checked: AC
Date: 09/06/2016	Date: 09/06/2016
Client	Barratt Homes South Wales
Figure Number	2
Figure Title	Habitat Suitability Assessment

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Legend

- Dormouse Nest Found
- Dormouse Tube Location
- Suitable Dormouse Habitat
- Survey Boundary
- Site Boundary

Site Grid Reference: 298,712 168,532

Drawing Ref	ABAW105/19309/1
Scale at A3	1:1,100
Drawn: KM	Checked: AC
Date: 09/06/2016	Date: 09/06/2016
Client	Barratt Homes South Wales
Figure Number	3
Figure Title	Results of Dormouse Nest Tube Survey

Filepath: S:\Cardiff\Projects\ABAW105 Phs 1 & Arb, Boverton\Reports\Mapping\Working\Dormouse Survey\ABAW105_Fig3_DormouseNestTubes_DJ_070915.mxd

Photograph 1:
Species poor hedge (PH1) looking south.

Photograph 2:
Species poor hedge with trees (PHT1) along south western site boundary.

Photograph 3:
Edge of broadleaved woodland (BW1) along north eastern site boundary.

Photograph 4:
Scattered broadleaved trees (SBW1).

Photograph 5:
Dormouse nest in Tube 10 in PH1.

Photograph 6:
Temporary dormouse resting nest in Tube 26 in PHT1.

Client: Barratt Homes South Wales		Drawing Ref: ABAW105/19310/1	
Figure Number: 4		Scale at A4: Not applicable	
Figure Title: Photographs of the Site		Drawn: DJ	Checked: AC
		Date: 08/09/2015	Date: 08/09/2015

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enquiries@thomsonecology.com

2. Introduction

2.1 Development Background

2.1.1 Barratt Homes South Wales is proposing the development of 64 residential units on a site in Boverton, Vale of Glamorgan. The site comprises fields and hedgerows and one disused building. The proposed development will include an access road joining the B4265 at the southern edge of the site. The proposals are hereafter referred to as 'the development'.

2.1.2 The development will be located on a parcel of farmland with an area of approximately 1.8 ha (Grid Reference SS 986 685), bounded by the B4265 Llantwit Major bypass to the west and the Vale of Glamorgan railway line to the east (Figure 1). The area affected by the development is hereafter referred to as 'the site'.

2.1.3 The site lies within an area that has been identified for potential housing development under Policy MG2 in the Vale of Glamorgan Deposit Local Development Plan 2011 – 2026. Policy MG2 - Housing Allocations states that '*in order to meet the housing requirement identified in policy SP3 land is allocated for residential development at the following locations'* where the site is identified as site number '*22 - Land adjacent to Llantwit Major bypass'.* Barratt Homes South Wales is currently seeking planning permission for the development.

2.2 Ecology Background

2.2.1 In July 2014, Thomson Ecology was commissioned by Barratt Homes South Wales to undertake an extended Phase 1 habitat survey and desk study to inform a planning application for the original Phase 1 site boundary (Thomson Ecology Report Ref: ABAW105/002/002 issued August 2014). No records of dormouse were recorded within 1 kilometre (km) of the site during the desk study; however information provided by the Vale of Glamorgan County Ecologist in November 2014 indicated the presence of a recent dormouse record in habitat connected to the site. Consequently, a dormouse survey at the site was recommended for 2015.

2.2.2 In April 2015, Thomson Ecology was commissioned by Barratt Homes South Wales to undertake an extended Phase 1 habitat survey of an additional field to be included within the development (Thomson Ecology Report Ref: ABAW105/009/003/002, issued May 2015). Habitat suitable to support dormouse was identified in the form of broadleaved woodland and hedgerows.

2.2.3 In June 2016, Barratt Homes South Wales informed Thomson Ecology that this additional field was no longer to be included in the proposed development, however, the survey area includes the site and the additional field (see Figure 2).

2.2.4 A summary of the biology, conservation status and legal protection of dormouse is given in Appendix 1.

2.3 The Brief and Objectives

2.3.1 Barton Willmore LLP commissioned Thomson Ecology, on behalf of Barratt Homes South Wales, on 11th March 2015 to undertake a dormouse survey on the development site. The brief included:

- One visit to deploy a minimum of 50 nest tubes, spaced approximately every 20m, in areas of suitable habitat within the site;
- A habitat suitability assessment;
- Six monthly visits to check nest tubes for signs of dormouse activity, removing them on the final (sixth) visit; and
- Production of a survey report (supported by appropriate digitised mapping), which will provide the methods and results of the survey any legal and planning policy issues relating to dormouse and the development, our recommendations as to how these may be overcome.

2.4 Limitations

2.4.1 The surveys were carried out at optimum times of year and at suitable intervals for this type of survey.

2.5 Surveyors

2.5.1 The surveys were undertaken by Janine Burnham BSc (Hons) MRes, Natural Resources Wales European Protected Species (Dormouse) Licence Number: 61538: OTH: SA: 2015.

3. Methodology

3.1 General Approach

3.1.1 Following an initial desk study, a survey area was defined which encompassed the whole development site.

3.1.2 Within the survey area, habitat that is potentially suitable for dormouse was identified. Such habitat included woodland, scrub and hedgerows.

3.1.3 Each of the areas of potential dormouse habitat were then subject to a habitat suitability assessment. Where habitat was found to be suitable, a dormouse survey was undertaken using dormouse nest tube survey methods to determine the presence or likely absence of dormouse. Survey effort was focussed on hedgerows and woodland which were assessed as providing suitable habitat for dormouse.

3.1.4 The survey methods used are based on those described in Bright *et al.,* 2006.

3.2 Desk Study

3.2.1 Records of dormouse within a 1 km radius of the development site were obtained from South Wales Biological Records Centre (SEWBReC).

3.2.2 For continuity between Thomson Ecology reports the habitat identification codes have remained the same as those in the Phase 1 Habitat Assessment reports for the site (Thomson Ecology Report Ref: ABAW105/002/001 and ABAW/009/003/001).

3.3 Habitat Assessment

3.3.1 An assessment of habitat suitability for dormice was made of all potential dormouse habitats in the survey area. This included all areas of woodland, scrub and hedgerows.

3.3.2 Within each area of potentially suitable habitat (or habitat parcel), the following features were recorded:

- Type of habitat and size in hectares;
- Tree, shrub and climbing species and their abundance on the DAFOR scale;
- Density of the canopy layer expressed as an average percent cover;
- Degree of continuity in the shrub layer expressed as an average percent cover;
- Degree of connectivity with other areas of potential habitat expressed as high, medium or low;
- Presence of potential summer and winter nest sites, such as tree holes, deep litter layers, wood piles and tangled woody vegetation;

- Evidence and stocking density, where known, of grazing animals, including deer and livestock;
- Evidence of likely presence of competitors and predators, such as squirrel and cats, respectively; and
- Evidence of woodland management techniques *e.g.* coppicing.

3.3.3 For each hedgerow, additional habitat information was recorded, including:

- Hedgerow structure (leggy, dense, with trees, without trees, layered);
- Average height and width;
- Degree (annually, less frequent or none) and type of hedgerow management (flailed, traditional or none); and
- Number of gaps and length of gap as a percentage of the total length of the field boundary.

3.3.4 Each area of potentially suitable habitat was then assessed and assigned a category of negligible, low, good or excellent suitability (Figure 2), using the criteria in Table 1 below:

Table 1: Assessment of Habitat Suitability for Dormouse

Category	Examples
Negligible	Annually cut hedgerows in arable landscapes. Small (<5ha) area of woodland which is isolated from others by 500m or more and lacks two or more key features. Woodland or scrub which floods throughout in winter.
Low	Annually cut hedgerows in wooded landscapes. Small (<5ha) area of woodland which is isolated and lacks up to one of the key features*. Moderate (5 - 20ha) or large areas (>20ha) of woodland or scrub which lack two or more of the key features.
Good	Moderate areas of woodland or scrub (5 - 20ha) with all the key features but which are isolated from other areas of high suitability woodland. Large areas of woodland (>20ha) which lack one of the key features. Infrequently cut hedgerows that are relatively isolated but have some connectivity to other areas of suitable dormouse habitat.
Excellent	Small and moderate areas of woodland with all the key features and well connected to other areas of suitable dormouse habitat. Large areas (>20ha) of woodland or scrub with all the key features. Infrequently cut hedgerows either in dense networks or linking areas of high suitability woodland.

Category	Examples
	Large areas (>20ha) of young plantation with good connectivity to other areas of suitable dormouse habitat.

*Key Features for dormouse: (i) mixed vegetation comprising a high proportion of at least three of these species: hazel (*Corylus avellana*), oak (*Quercus* sp.), honeysuckle (*Lonicera periclymenum*) and bramble (*Rubus fruticosus*); (ii) a dense shrub layer; (iii) no or relatively open tree canopy (above the shrub layer); (iv) scattered old trees with hollows, dense tangled vegetation, nest boxes or other suitable nest sites, such as dense leaf litter; and (v) tree stumps with cavities at around ground level or other suitable hibernation sites.

3.3.5 Areas of suitable habitat were selected for a dormouse presence, or likely absence, survey.

3.4 Dormouse Nest Tube Survey

3.4.1 Nest tubes placed in appropriate places in suitable habitat may be used by dormouse to nest in. Dormouse summer and breeding nests within nest tubes can often be distinguished from other animal nests by a number of key characteristics: (i) they often incorporate strips of honeysuckle bark, or other shredded bark and green leaves and (ii) lack an obvious entrance hole.

3.4.2 Nest tubes constructed from folded corrugated plastic sheeting (approximately 60mm x 60mm wide and 250mm long) were used. Each nest tube has a sliding plywood base, which also forms the end of the tube and provides a platform extending approximately 50mm from the front of the tube.

3.4.3 The nest tubes were installed on 19th March 2015, a month before the first survey visit, in order to allow dormouse time to find and nest in the tubes before the first survey visit. Sixty nest tubes were installed across the site. Nest tubes were installed along the hedgerows bounding the bordering the site and the two internal hedges at 20 metre intervals.

3.4.4 Dormouse nest tubes were fastened to scrub or beneath a horizontal tree branch of sufficient thickness at a height of approximately 1.5m using garden wire. Tubes were positioned with the entrance of the tube orientated towards the centre of the shrub and angled slightly downwards to prevent water collecting within the tube. Each nest tube was given a number and its location recorded on a GPS enabled mobile mapper. The location of the nest tubes is shown on Figure 3.

3.4.5 The nest tubes were left *in situ* for the duration of the survey and subsequently removed on completion of the survey, excluding any nest tubes which contained dormice or dormouse nests during the survey as these might still be in use by dormouse.

3.4.6 All tubes were checked for the presence of dormice or their nests once a month for a total of six times between April and September. The dates of each survey visit are provided in Table 2.

Table 2: Dates of dormouse survey visits

Survey Date	Visit Number
19/03/2015	Deployment of survey tubes
20/04/2015	Visit 1
19/05/215	Visit 2
18/06/2015	Visit 3
20/07/2015	Visit 4
13/08/2015	Visit 5
04/09/2015	Visit 6 and collection of dormouse nest tubes*

*Excluding any nest tubes which contained dormouse or dormouse nests that have been retained on site after the survey was completed.

3.4.7 The number of the nest tubes deployed and the timing of the survey met the requirements for a thorough survey (Bright *et al*, 2006). This is defined as a survey in which the combined dormouse detection probability scores from Table 3 below exceed 20 points and the survey is conducted over a minimum period of five months. The score for this survey was 25.2 points.

Table 3: Dormouse detection probability scores (examples).

Month	Score with 50 tubes	Score with 100 tubes	Score with 150 tubes
April	1	2	3
May	4	8	12
June	2	4	6
July	2	4	6
August	5	10	15
September	7	14	21
October	2	4	6
November	2	4	6

4. Results

4.1 Desk Study

4.1.1 No records of dormouse within 1km of the site were identified, however information provided by the Vale of Glamorgan County Ecologist in November 2014 indicated the presence of a recent dormouse record in habitat connected to the site.

4.2 Habitat Assessment

4.2.1 All habitats with potential to support dormouse (species poor hedgerows (PH1 and PH2), species poor hedgerow with trees (PHT1), semi-natural broadleaved woodland (SBW1) and broadleaved woodland (BW1)) were assessed as having good suitability for dormouse (see Figure 2). Habitat continuity and the degree of connectivity across the site and to surrounding suitable habitat is high and the dense shrub layer and understorey offer medium potential for nesting opportunities.

4.2.2 The complete data set on which the assessment of habitat suitability for dormouse was assessed are presented in Appendix 2.

4.2.3 Following the assessment of habitat suitability for dormouse confirming the presence of habitat with good suitability for dormouse and the record highlighted by the Vale of Glamorgan Council, it was considered necessary to conduct a dormouse nest tube survey for presence/absence of dormouse across the site.

4.3 Dormouse Nest Tube Survey

4.3.1 A complete dormouse nest was found in Nest Tube 10 located in species poor hedgerow PH1 and evidence of a temporary dormouse resting nest in Nest Tube 26 located in PHT1 on the second survey visit (see Figure 3).

4.3.2 Other small mammal species incidentally recorded using nest tubes included wood mouse (*Apodemus sylvatica*). Bird droppings were also recorded within the nest tubes.

5. Legal and Planning Policy Issues

5.1.1 The content of the legislation and planning policy section is the legislation and planning policy issues that we know are relevant based on this dormouse nest tube survey.

5.1.2 As set out in Appendix 1, dormouse and their habitats are strictly protected by a range of legislation and policy, including the following:

- Conservation (Habitats &c) Regulations 2010, as amended;
- Wildlife and Countryside Act 1981, as amended;
- Countryside and Rights of Way Act 2000;
- Natural Environment and Rural Communities Act 2006; and
- Planning Policy Wales (PPW).

5.1.3 Furthermore, development affecting dormice is governed by a licensing procedure administered by Natural Resources Wales (NRW).

5.1.4 The Hedgerow Regulations (1997) provide for the conservation of 'important' hedgerows and their constituent trees. The presence of a protected species such as dormice is included in the assessment of whether a hedgerow is considered 'important' and applications to remove such hedgerows must be made to the planning authority.

5.1.5 Dormice are a Species of Principal Importance (SPI) for the conservation of biodiversity in Wales under Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006 and are also a Vale of Glamorgan Local BAP Priority Species. This places a duty on all government departments to have regard for the conservation of these species and on the Welsh Ministers to further, or promote others to further, the conservation of these species. Additionally, some of the habitats of SPI's receive protection through planning policy.

5.1.6 As evidence of dormouse presence was found on the site a European Protected Species Licence (EPSL) from NRW, detailing appropriate mitigation, will be required. Without mitigation and licensing, the development would contravene the legislation and policy set out above with respect to dormouse. This is because the clearance of vegetation prior to the development could result in harm to individual dormouse, the loss of suitable dormouse habitat and affect the ability of dormouse to disperse. However, using established mitigation techniques it should be possible to:

- Avoid harm to individual dormouse during the development process; and
- Maintain the population of dormouse at a favourable conservation status through the creation of replacement habitats and enhancement of existing habitat.

5.1.7 As dormouse is a European Protected Species the local planning authority will be required to consider three licencing tests in the determination of the planning application for this development that is:

- The purpose of the work is for preserving public health or public safety or other imperative reasons of over-riding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment;
- There is no satisfactory alternative; and
- 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.

5.1.8 Mitigation measures for dormouse are outlined in Section 6.

6. Recommendations

6.1 Mitigation

6.1.1 Without mitigation measures dormouse populations may be negatively affected both during and after development works so a European Protected Species Licence (EPSL) from Natural Resources Wales (NRW) will be required. The EPSL application will require the production of a detailed mitigation method statement describing the mitigation approach. No mitigation can be undertaken without approval of the appropriate licence and mitigation method statement, which once issued, makes the licence and associated mitigation method statement a legally binding document.

6.1.2 It will be necessary to implement mitigation methods to minimise any negative impacts of the development on the dormouse population.

6.1.3 Important elements of the mitigation measures likely to be included in the mitigation method statement are outlined in the following paragraphs:

- Where hedgerow removal is proposed (PH1 and PH2 and a section of PHT1 for the construction of the access road), techniques to persuade any dormice present to move away to suitable habitat should be employed;
- Searches for nests and animals, in vegetation both above ground and at ground level, should be undertaken by a suitably licenced ecologist immediately prior to any clearance;
- Ideally clearance should be carried out in the winter, to encourage dormouse to move to retained areas of suitable habitat when they emerge from hibernation. Vegetation should be cut to a height of 30 - 50 cm above ground level between November and March, this should be undertaken in a sensitive manner to minimise the likelihood of disturbing or killing hibernating dormouse. Stump extraction should then take place after dormouse emerge from hibernation in the following spring;
- If removal is not possible during the winter months, as the lengths of hedge to be removed are short, summer clearance should be an acceptable alternative. May or late September are the best times for these works to avoid the likelihood of young being present in nests. Small sections (approximately 10 m) of vegetation could be removed on successive days in the direction of any suitable habitat that is being retained on site. Clearance should be undertaken using hand tools at a slow pace; dormice are active at this time of year and therefore will be able to respond immediately. However, it is important to note that there are restrictions on hedge removal/vegetation clearance at this time of year due to the bird nesting season;
- Native hedgerow species should be planted within the development to compensate for the loss of habitat from hedge removal. The compensatory planting should be like for like in terms of area of habitat that is removed from the site;
- Dormouse nest boxes should be installed in adjacent suitable habitat, prior to any development work commencing on site, to make it attractive to displaced dormouse;

- All lighting during the development should be directed away from hedgerows, woodland and scrub areas to reduce light pollution and disturbance to dormice; and
- Management of new and remaining habitat should be sympathetic to dormice *i.e.* no intensive flailing of hedges or aggressive scrub management.

6.1.4 The proposed mitigation strategy outlined above is subject to approval by NRW.

6.2 Opportunities for Enhancement

6.2.1 Habitat enhancement and expansion could be achieved by supplementary planting of native tree and shrub species on site following the development to increase the diversity and availability of food resources for dormice.

6.2.2 Any sparsely vegetated areas and hedgerows could be supplemented by planting of species known to benefit dormice. Species such as hazel (*Corylus avellana*), hawthorn (*Crataegus monogyna*) and honeysuckle (*Lonicera periclymenum*) provide important food resources for dormice, help to improve habitat connectivity and provide nesting opportunities.

6.3 Further Survey

6.3.1 No further surveys for dormouse are recommended.

7. Conclusion

7.1.1 The survey found evidence of the presence of dormouse on the site in hedgerows PH1 and PHT1. As dormouse are present in one area of the site they are also likely to be present in connected suitable habitat along the hedgerows across the site and around the perimeters of the site.

7.1.2 As dormouse is a European protected species, mitigation is required, under licence from NRW, to allow development of the site to proceed. The data collected during this survey can be used to inform a dormouse licence mitigation method statement for the site to be submitted to NRW for approval.

8. References

8.1.1 Bright, P., Morris, P. & Mitchell-Jones, A. (2006) The dormouse conservation handbook 2nd Edition. English Nature, Peterbrough.

8.1.2 Thomson Ecology Ltd. (2015) Boverton, Vale of Glamorgan, Phase Desk Study and Extended Phase 1 Habitat Survey (report reference ABAW105/002/002). Thomson Ecology Ltd.

8.1.3 Thomson Ecology Ltd. (2015) Boverton, Vale of Glamorgan, Phase Desk Study and Extended Phase 1 Habitat Survey (report reference ABAW105/009/003/003). Thomson Ecology Ltd.

9. Appendix 1 – Dormouse Ecology

9.1 Introduction

9.1.1 A summary of the biology of the common dormouse (*Muscardinus avellanarius*) and the legislation and policy that protects this species is given below.

9.2 Biology

9.2.1 Two species of dormouse occur in Britain, the common dormouse (also known as the hazel dormouse) and the edible dormouse, (*Glis glis*) (also known as the fat dormouse). The edible dormouse was introduced to the UK in 1902 and its distribution is mainly restricted to the Chilterns, within a 25 mile radius of Tring, where it was first released in 1902. This summary will focus on the common dormouse, our native species which has undergone a rapid decline in numbers and distribution over the last century.

9.2.2 The common dormouse is physically quite distinctive from other native small mammals, having an orange-brown coat (when adult), large dark eyes and a thickly furred tail.

9.2.3 It is a nocturnal animal and is active between April and late October, spending the remainder of the year in hibernation. During its active season, however, adverse weather (cold and wet conditions) can reduce activity and summer torpor is common. It is a highly arboreal species and individuals rarely travel far from their nests in one night (70 metres). Generally dormice only descend to the ground to hibernate during the winter months, though on occasion individuals may descend to gather nest making material and to cross narrow lanes and tracks when moving between adjacent parcels of habitat.

9.2.4 Dormice typically live 2-3 years and first breed in the year following birth. Young are born between June and September and are weaned between 6-8 weeks later. A second litter in the same year is reasonably common, the success of which is influenced by food availability.

9.2.5 The dormouse builds three types of nest: summer, breeding, and hibernation. The summer and breeding nests are normally to be found above ground in tangles of vegetation, holes in trees and hedgerows whilst winter hibernation nests are usually constructed at ground level or below ground level under moss, leaf-litter, old stools, wood piles and rocks.

9.2.6 Dormouse habitat is traditionally thought of as ancient semi-natural woodlands with mixed species rich under storey, whilst open coppiced woodland and hedgerows are also important habitats. However, dormice have also been found in a variety of other habitats, including pure sessile oak woodlands; pure beech woodlands; replanted ancient conifer plantations; gorse and bracken scrub; coastal scrub; alder/reed beds; bramble thickets and even overgrown gardens.

9.2.7 The principal factor governing habitat suitability appears to be food availability. Important food species include hazel, being the principal source of nuts in the autumn prior to hibernation; blackthorn, being a particularly important nectar and flower source in early spring; brambles, being important as a source of berries; and, honeysuckle, being a source of not only nectar and flowers but easily shredded bark, for nesting material. Sycamore and other species which are

characterised by a high insect biomass, become especially important during the mid summer as other food sources are low at this time.

9.2.8 This species has undergone a rapid decline in numbers, which can be attributed to a variety of factors including direct habitat loss, isolation and other habitat fragmentation effects.

9.2.9 The current distribution and status of the dormouse, however, is not well understood. The species has a rather localised distribution in Wales, as it is on the western edge of its range here. There are four key areas for dormice in Wales: central and eastern Monmouthshire, east Montgomeryshire, south east Radnor/east Brecon and Carmarthen/west Glamorgan. Most records come from suitable habitat in southern and eastern parts of Wales, although scattered populations are known in the south west of Wales.

9.3 Site Designation

9.3.1 Some sites with dormouse populations may be designated as Special Areas of Conservation (SAC) under the Conservation of Habitats and Species (Amendment) Regulations 2012 (which replaces the Conservation (Habitats &c) Regulations 1994) and/or Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act (WCA), 1981 (as amended).

9.3.2 However, the Habitats Directive does not require that SACs are designated specifically to protect dormouse populations and, according to NCC guidelines, the presence of dormouse on its own is not normally considered to be sufficient for the designation of a SSSI. Instead, the guidelines imply that the presence of dormouse within an SSSI should be regarded as an attribute which enhances the value of an already important site.

9.3.3 Sites designated for nature conservation at the county level may include dormouse populations as part of the site qualifying criteria, although the criteria used may vary from county to county. Such sites are protected through the planning system and there is generally a presumption against development that affects such sites in local authority development plans.

9.4 Planning Policy

9.4.1 Planning Guidance, Technical Advice Note 5; Nature conservation and planning (TAN5) gives further direction with respect to land use and development. It states that protected species, including dormice, should be a material planning consideration when local authorities are considering a development proposal that is deemed likely to result in disturbance or harm to the species or its habitat.

9.4.2 Furthermore, the Natural Environment and Rural Communities (NERC) Act (2006) places a duty on all public authorities to conserve biodiversity; conserve including preservation and enhancement.

9.5 Species Protection

9.5.1 Dormice are protected under the Conservation of Habitats and Species (Amendment) Regulations 2012 (which replaces the 1994 Regulations). The Regulations make it an offence, with very few exceptions, to:

- Deliberately capture, injure or kill a dormouse;
- Deliberately disturb a dormouse in such a way as to be likely:
    i. to impair its ability to survive, to breed or reproduce, or to rear or nurture its young; or
    ii. to impair its ability to hibernate or migrate; or
    iii. to affect significantly the local distribution or abundance of the species to which they belong.
- Damage or destroy a breeding site or resting place of a dormouse; and
- Keep, transport, sell or exchange, or offer for sale or exchange, any live or dead dormouse, or any part of, or anything derived from such an animal or plant.

9.5.2 In addition to the protection given to Dormice under the Conservation of Habitats and Species (Amendment) Regulations 2012 already described, the dormouse is also partially protected in Wales under the Wildlife and Countryside Act, which adds the following offences (with certain exceptions):

- Disturbance while it is occupying a structure or place which it uses for shelter or protection; or
- Obstructing access to any structure or place used for shelter or protection.

9.5.3 The dormouse is also incidentally protected by The Hedgerow Regulations (1997), the aim of which is to prevent the removal of 'important' hedgerows which includes those which support Schedule 5 species of the WCA 1981. If dormice are known to be using the hedgerows or to have done so within the last 5 years, then they are afforded some protection.

9.5.4 If proposed work could cause killing, injury or disturbance to either of dormice or damage to their habitats, appropriate mitigation which seeks to avoid these impacts should be devised and implemented under licence. Licences for 'scientific or educational', 'ringing or marking' and 'conservation' may be issued by Natural Resources Wales, licences for the reason of 'preserving public health or public safety' by the Welsh Assembly Government (WAG).

9.6 UK Post-2010 Biodiversity Framework and Species of Principal Importance

9.6.1 Published by the Joint Nature Conservation Committee (JNCC) and the Department for Environment, Farming and Rural Affairs (Defra) in July 2012, the UK Post-2010 Biodiversity Framework identifies UK-scale activities and priority works that are required to deliver the EU Biodiversity Strategy. Following a process of devolution, the framework is underpinned by country level strategies which are now largely responsible for continuing the work carried out under the former UK Biodiversity Action Plans (UK BAP). JNCC guidance dictates that UK BAP background information on priority species and habitats still remains relevant and it now forms the basis of country specific priority lists which, for Wales, are specified under Section 42 of the NERC Act 2006. The Section 42 list is used as a guide and a reference for ensuring that appropriate consideration is given to the conservation of biodiversity in all development activity, and affords legal protection to those species and habitats it includes. The dormouse has been

adopted as a Species of Principal Importance for the Conservation of Biodiversity in Wales. This places a duty on all government departments to have regard for the conservation of these species and on the Secretary of State to further, or promote others to further, the conservation of these species. Furthermore, TAN5 states that species of Principal Importance for the conservation of biodiversity should be protected from the adverse effects of development, which presumably includes those listed the former UK BAP and on Local or Regional priorities species lists.

9.7 References

9.7.1 Bright, P., Morris, P. & Mitchell-Jones, A. (2006) The dormouse conservation handbook 2nd Edition. English Nature, Peterbrough.

9.7.2 JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). (2012). UK Post-2010 Biodiversity Framework. Available from: http://jncc.defra.gov.uk/page-6189.

9.7.3 Morris, P. (2004) Dormice. Whittet Books, Stowmarket.

9.7.4 Highways Agency (1996 et seq) Design Manual for Roads and Bridges, Volume 10 Environmental Design and Management, Section 4 The Good Roads Guide - Nature Conservation, Part 5 Nature Conservation Management Advice in Relation to Dormice.

10. Appendix 2 - Dormouse Habitat Suitability Assessment Index Data

		PH1	PH2	PHT1	BW1	SBW1
ALL HABITATS	**Type**	Hedge	Hedge	Hedge with Trees	Broadleaved Woodland	Broadleaved Trees
	Area/ Length	57m	73m	415m	0.46	N/A
	Species abundance DAFOR	Frequent elder (***Sambucus nigra***), hawthorn (***Crataegus monogyna***) and blackthorn (***Prunus spinosa***) in shrub layer with frequent bramble (***Rubus fruticosus* agg.**) in the understorey	Dominant hawthorn (***Crataegus monogyna***) with occasional elder (***Sambucus nigra***). Ivy (***Hedera helix***) is frequent throughout the hedge, and the understorey is dominated by bramble (***Rubus fruticosus agg.***).	Abundant mature ash (***Fraxinus excelsior***) and occasional sycamore (***Acer pseudoplatanus***) and hornbeam (***Carpinus betulus***) trees, with Scots pine (***Pinus sylvestris***) also present. The shrub layer features abundant hawthorn (***Crataegus monogyna***) with bramble (***Rubus fruticosus* agg.**), ivy (***Hedera helix***) and elder (***Sambucus nigra***) also present.	Abundant ash (***Fraxinus excelsior***), and frequent sycamore (***Acer pseudoplatanus***). The shrub layer includes abundant hawthorn (***Crataegus monogyna***) with occasional elm (***Ulmus procera***) and blackthorn (***Prunus spinosa***) and sycamore (***Acer pseudoplatanus***) saplings, and the ground flora includes abundant ivy (***Hedera helix***). Rare honeysuckle also present (***Lonicera periclymenum***).	Dominant sycamore (***Acer pseudoplatanus***), with each tree having abundant cover of ivy (***Hedera helix***). The ground layer consists of occasional bramble (***Rubus fruticosus* agg.**).
	Canopy density %	90	75	95	80	40
	Shrub continuity %	90	100	80	80	30
	Degree of connectivity	High	High	High	High	High
	Nest site potential	Dense shrub layer and understorey offer medium potential for nesting opportunities.	Dense shrub layer and understorey offer medium potential for nesting opportunities.	Dense shrub layer and understorey offer medium potential for nesting opportunities.	Trees with holes in and dense scrub layer offer high potential for nesting opportunities.	Mature trees and connectivity with scrub layer offer high potential for nesting opportunities.
	Evidence of competitors and predators	Surrounded by residential area where cats may be present. No evidence of wild competitors or predators recorded during assessment.	Surrounded by residential area where cats may be present. No evidence of wild competitors or predators recorded during assessment.	Surrounded by residential area where cats may be present. No evidence of wild competitors or predators recorded during assessment.	Surrounded by residential area where cats may be present. No evidence of wild competitors or predators recorded during assessment.	Surrounded by residential area where cats may be present. No evidence of wild competitors or predators recorded during assessment.
	Grazing evidence	None	None	None	None	None
	Woodland management	None	None	None	None	None
HEDGES	**Structure**	Dense	Dense	Dense with trees	N/A	N/A
	Height	5	5	10	N/A	N/A
	Width	3	3	8	N/A	N/A
	Management	No	No	No	N/A	N/A
	Gaps %	1 gap, 10%	0	0	N/A	N/A

Appendix EDP 4
Ecology Update Note
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Land adjacent to Llantwit Major Bypass, Boverton
Ecology Update Note
edp3775_r005a_221117

1. Introduction

1.1 This Ecology Update Note has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf of Barratt Homes, South Wales (hereafter referred to as 'the Client') in relation Phase 2 of proposed residential development of land adjacent to Llantwit Major Bypass, Boverton (hereafter referred to as 'the Application Site').

1.2 EDP is an independent environmental planning consultancy with offices in Cirencester, Cardiff and Shrewsbury. The practice provides advice to private and public sector clients throughout the UK in the fields of landscape, ecology, archaeology, cultural heritage, arboriculture, rights of way and masterplanning. Details of the practice can be obtained at our website www.edp-uk.co.uk.

2. Background and Scope

2.1 A Preliminary Ecological Appraisal of the Application Site and subsequent detailed surveys with respect to reptiles and dormouse (*Muscardinus avellanarius*) were previously undertaken by Thomson Ecology during 2015 to inform a planning submission for its proposed residential development. This was further to ecological surveys of adjacent land to the north west (Phase 1) for which an application for full planning permission was submitted to Vale of Glamorgan Council (VoGC) on 22 August 2014 (application reference 2014/00995/FUL) for the development of 66 residential dwellings, public open space, landscaping, highways improvements and associated engineering works on agricultural land.

2.2 Following submission of a planning application for Phase 1 of proposed residential development, planning consent is now sought to deliver Phase 2 of the proposed development scheme (**Annex EDP 1**). Given the time that has elapsed since the Application Site was last surveyed, an update assessment is considered necessary to determine whether any material changes have arisen during the interim period, with respect to the distribution and management of habitats on site and their potential to support protected species.

2.3 This Ecology Update Note details the findings of the update baseline investigations completed during September 2017 and assesses the current ecological status of the Application Site necessary to determine any additional potential ecological constraints to its proposed development.

Site Context

2.4 The Application Site is centred approximately at Ordnance Survey Grid Reference (OSGR) SS 988 684 in the local planning authority of VoGC. The Application Site measures approximately 0.56 hectares (ha) and is located to the immediate east of Boverton and west of the Ministry of Defence (MoD) site at St. Athan, approximately 2km inland from the south Wales coastline. Beyond the built-up areas of Boverton and MoD Saint Athan, the wider landscape is otherwise dominated by agricultural land.

2.5 The Application Site is bound on three sides by transport links, including Llantwit Major Bypass (B4265) along its south-western edge, the Vale of Glamorgan railway line along its north-eastern edge, and Llantwit Road defining the south-eastern boundaries of the Application Site. Agricultural fields associated with Phase 1 development site delineates the north-western boundary. The Application Site predominantly comprises poor semi-improved grassland, delineated native species-poor hedgerows. Additionally, an established belt of broadleaved woodland aligns the railway line forming the north-eastern boundary, whilst the south-western boundary is defined by highways planting aligning Llantwit Bypass and supporting relatively young and semi-mature tree standards.

2.6 The principal ecological features within the Application Site (identified through the update site survey) are illustrated on **Plan EDP 1**.

3. Methodology

Update Desk Study

3.1 The desk study is an important element of undertaking an initial ecological review of a site proposed for development, enabling the initial collation and review of contextual information, such as designated sites, together with known records of protected and priority species.

3.2 The original desk study was conducted by Thomson Ecology on 15 April 2015. Given how recently this desk study was undertaken the results are still considered to provide an accurate representation of the Application Site and surrounding habitats and thus remains relevant to the development proposals discussed herein. Thus, the desk study collated by Thomson Ecology (pertaining to species records and non-statutory local sites) has been summarised within **Section 4** of this report. An update desk study with respect to statutory designated sites was, however, undertaken by EDP on 1 November 2017 and included obtaining information on the following:

- International statutory designations (within a 10km radius around site);
- National statutory designations and non-statutory local sites (2km radius);

3.3 The above search areas are considered sufficient to cover the potential zones of influence[1] of the proposed development in relation to designated sites, habitats and species.

Update Extended Phase 1 Survey

3.4 The survey technique adopted for the initial habitat assessment was at a level intermediate between a standard Phase 1 survey technique[2], based on habitat mapping and description, and a Phase 2 survey, based on detailed habitat and species surveys. The survey technique is commonly known as an Extended Phase 1 survey. This level of survey does not aim to compile a complete floral and faunal inventory for the Application Site.

3.5 The level of survey involves identifying and mapping the principal habitat types and identifying the dominant plant species present therein. Additionally, any actual or potential protected species or species of Principal Importance[3] are identified and scoped.

3.6 The Extended Phase 1 survey was undertaken by a suitably experienced surveyor on 6 September 2017, during which the weather was 16°C, dry with 100% cloud cover and no wind.

Limitations

3.7 September is within the optimal period for undertaking an Extended Phase 1 Survey. As such, the survey is not considered to have been limited by climatic or seasonal factors.

Detailed (Phase 2) Surveys

3.8 In addition to an Extended Phase 1 survey, further detailed assessments were undertaken in relation to bats and badger to update the existing baseline and further inform potential ecological constraints in relation to future development of the Application Site, as detailed further below.

Bats

<u>Investigations of Bat Roosting – Trees</u>

3.9 To determine the potential impacts of the proposed development upon bats potentially roosting within trees across the Application Site, all suitable standards were subject to an update ground level visual assessment with reference to current best practice guidance[4].

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[1] Zone of Influence - the areas and resources that may be affected by the proposed development.

[2] Joint Nature Conservation Council (2004) *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit* (reprinted with minor corrections for original Nature Conservancy Council publication).

[3] Species of Principal Importance for the purpose of conserving biodiversity, as listed under Sections 41 (England) and 42 (Wales) of the NERC Act (2006).

[4] Bat Conservation Trust (2016) Bat *Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition.* Bat Conservation Trust, London.

3.10 The tree survey involved a ground-based visual assessment of trees for the presence of, or potential to support, roosting bats. The survey was undertaken during the Extended Phase 1 survey on 6 September 2017 by a suitably qualified and licensed ecologist. The trees were searched as thoroughly as possible from ground level, with all elevations covered where accessibility allowed.

3.11 Suitable features for roosting bats sought for during the assessment included:

- Loss/peeling/fissured bark;
- Natural holes e.g. rot holes and holes from fallen limbs;
- Woodpecker holes;
- Cracks/splits or hollow tree trunks/limbs; and
- Thick-stemmed ivy.

3.12 Signs of roosting bats sought for included:

- Bat/s roosting *in-situ*;
- Bat droppings within or beneath a feature;
- Oily marks (staining) around or beneath a feature;
- Oily marks (staining) around roost access points;
- Audible squeaking from the roost;
- Large/regularly used roosts or regularly used sites may produce an odour; and
- Flies around the roost, attracted by the smell of guano.

3.13 Based upon the results of the visual assessment and features/evidence identified, the following ratings for trees were used during the assessment:

- **Known or confirmed roost** - European Protected Species (EPS) licence required for works to tree to be completed lawfully;
- **High potential** - Tree supports one or more features that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time;

- **Moderate potential** - Tree supports one or more features that could be used by bats but are unlikely to support a roost type of high conservation status;
- **Low potential** - Tree supports one or more features that could be used by individual bats opportunistically, or is of sufficient size and age to contain such features; and
- **Negligible potential** - Negligible features likely to support roosting bats.

Limitations

3.14 Visual assessments of buildings for roosting bats can be undertaken at any time of year and this assessment was therefore not limited by seasonal or climatic factors.

Badger Survey

3.15 Badger activity within the Application Site was assessed during the Extended Phase 1 survey on 6 September 2017. During the survey, any signs of badger activity such as holes, latrines, trails, snuffle holes and hairs on fencing or vegetation were recorded. Where holes of a size and shape consistent with badger were identified, the following signs of badger activity were searched for in order to determine whether they were currently in active use:

- Fresh spoil outside entrances;
- Old bedding material (typically dried grass) outside entrances;
- Holes being cleared of leaf litter;
- Badger guard hairs; and
- Fresh tracks leading to/from the holes.

4. Findings

4.1 The section below summarises the baseline ecological conditions determined through the course of update desk-based and field-based investigations and should be read in conjunction with **Plan EDP 1**.

Designated Sites

4.2 Information regarding designated sites was obtained during the desk study from the website: MAGIC by EDP and local records centre (SEWBReC) by Thomson Ecology. Statutory designations (those receiving legal protection) and non-statutory designations (those receiving planning policy protection only) are discussed in turn below.

Statutory Designations

4.3 Statutory designations represent the most significant ecological receptors, being of recognised importance at an international and/or national level. International designations include Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites. National designations include Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs).

4.4 No part of the Application Site is covered by any statutory designations. There are no national designated sites within 2km of the Application Site whilst a single international designation was identified within 10km of the Application Site. Dunraven Bay SAC is located 9. 2km north west of the Application Site and is designated for the occurrence of Shore Dock (Rumex rupestris), an Annex II species.

Non-Statutory Designations

4.5 Non-statutory designations are also commonly referred to in planning policies as 'local sites', although in fact these designations are typically considered to be important at county level. The search area encompasses the administrative area of VoGC. Non-statutory designations are named Sites of Importance for Nature Conservation (SINC) in this area. Additional designated sites which should be considered at this level include Local Nature Reserves (LNRs) and Ancient Semi-Natural Woodland (ASNW), where these are not covered by other designations.

4.6 No part of the Application Site is covered by any non-statutory designation. However, there are a number of such designations within the Application Site's potential zone of influence, as identified during a desk study assessment undertaken by Thomson Ecology and summarised within **Table EDP 4.1**. These constitute four SINCs, one Wildlife Trust Reserve (WTR) and two ancient woodland units.

Table EDP 4.1: Non-statutory designations within the site's potential zone of influence.

Designation	Distance from site	Interest Feature(s)
SINC		
Frampton Court Farm (D39 P1)	*1.6km (NW)*	Flood alleviation pond with a diversity of plant species present.
Summerhouse Bay West (C53-W1)	1.96km (SE)	Hillfort remains surrounded by semi natural broadleaved woodland and scrub.
East of Meadowvale Nursey (D39 G1)	1.98km (NW)	Designated for purple moor grass and rush pasture.
Cwm Colhuw	1.98km (SW)	Semi improved neutral and calcareous grassland, dense scrub and mixed deciduous woodland and Iron Age earthworks present along with many section 42 bird species.

Designation	Distance from site	Interest Feature(s)
WTR		
Cwm Colhuw	1.98km (SW)	Semi improved neutral and calcareous grassland, dense scrub and mixed deciduous woodland and Iron Age earthworks present along with priority bird species listed under the Environment Act 2016.
Ancient Woodland (Grid Reference)		
SS 97561 67880	1.07km (SW)	Ancient woodland
SS 97173 67943	1.4km (SW)	Ancient woodland

Habitats

4.7 Information on habitats within and around the Application Site, was obtained during the initial desk study and Extended Phase 1 survey conducted by Thomson Ecology and updated following an Extended Phase Habitat Survey undertaken by EDP in September 2017. The distribution of different habitat types within and adjacent to the Application Site is illustrated on **Plan EDP 1** with illustrative photographs provided at **Annex EDP 2**. In addition, detailed descriptions of these habitat types are provided below.

Broadleaved Woodland

4.8 There are two areas of broadleaved woodland situated off-site, located between the north eastern boundary of the Application Site and adjacent railway line, and between the north western boundary of the Application Site and Llantwit Major Bypass (B4265). Woodland habitat comprises semi-mature ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) with a shrub layer comprising hawthorn (*Crataegus monogynea*), elm (*Ulmus sp.*), dog-rose (*Rosa canina*) and blackthorn (*Prunus spinosa*). A ground flora community is dominated by common ivy (*Hedera helix*).

Species-poor Hedgerow

4.9 The north western boundary of the Application Site is delineated by a relatively unmanaged species-poor hedgerow measuring approximately 73m in length. The hedgerow is dominated by hawthorn with occasional elder (*Sambruca nigra*), blackthorn and bramble (*Rubus fructinosus* agg.). Ground flora associated with this hedge comprises frequent common ivy and common nettle (*Urticia dioica*).

Species-poor Hedgerow with Trees

The south western boundary of the Application Site comprises a dense, continuous species-poor hedgerow supporting mature tree standards. This hedgerow measures approximately 8m high and is characterised by immature ash, field maple (*Acer campestre*), sycamore and bramble.

Scattered Broadleaved Trees

4.10 The eastern boundary of the Application Site is delineated by scattered trees dominated by semi-mature sycamore. The ground layer is mostly absent, dominated by common ivy with occasional bramble.

Dense Scrub

4.11 Sections of dense scrub, dominated by bramble, is associated with both the western and north eastern field boundaries. Areas of scrub are subject to regular management, being cut down to ground level at the time of the survey.

Poor Semi-improved Grassland

4.12 The Application Site encompasses a single agricultural field comprising poor-semi improved grassland characterised by a recently mown grassland sward. Grassland habitat supports Yorkshire-fog (*Holcus lanatus*) and cock's-foot (*Dactylis glomerata*), with occurrences of creeping buttercup (*Ranunculus repens*), broadleaved dock (*Rumex obtusifolius*) and common nettle (*Urticia dioeca*).

Overview

4.13 The update survey did not identify any significant material changes to the nature and distribution of habitats inherent within the Application Site, with the majority comprising managed, poor semi-improved grassland. Such habitat is considered of negligible ecological value *per se*, albeit with the limited potential to support low numbers of common reptiles.

4.14 Boundary woodland and hedgerow habitat, in contrast, is considered to be of greater intrinsic value with potential to support protected and notable species, particularly dormouse and common reptile species.

Protected Species

4.15 The likelihood of presence, or confirmed presence, of protected/and or notable wildlife species within the Application Site is summarised below with reference to desk study records and habitat suitability where relevant.

Bats

4.16 A desk study undertaken by Thomson Ecology returned two records of bat species within 1km of the Application Site: brown long-eared bat (*Plecotus auritus*) and soprano pipistrelle (*Pipistrellus pygaemus*).

4.17 A ground level inspection of suitable tree standards within and adjacent to the Application Site did not identify any suitable features for roosting bats. With respect to foraging/commuting bats, short poor semi-improved grassland provides a limited foraging resource whilst woodland boundaries and hedgerows provide a linear feature for commuting bats across the Application Site and to the wider landscape. Given that there are no material changes to the distribution of habitats across the Application Site, no further survey with respect to commuting/foraging bats is considered necessary in this instance such that the baseline established during previous survey effort remains valid.

Breeding Birds

4.18 A number of records for bird species were returned during the desk study assessment and included barn owl (*Tyto alba*), and osprey (*Pandion haliaetus*), both listed as Schedule 1 species under the Wildlife and Countryside Act (1981). There is, however, no suitable breeding habitat for either of these species onsite, although offsite woodland habitat may provide some opportunities for breeding barn owl.

4.19 With respect to a common and widespread bird assemblage, hedgerow boundaries provide suitable cover and a foraging resource for nesting birds.

4.20 The update Extended Phase 1 survey identified no significant changes in the ecological baseline with respect to breeding birds. Woodland and hedgerows identified during the update survey have potential to support a breeding bird assemblage comprising common and widespread species only.

Badger

4.21 The initial desk study assessment undertaken by Thomson Ecology in 2015 returned no records of badger within 1km of the Application Site, nor records of potential setts within the local area. Ecological survey of the Application Site, completed by Thomson Ecology in 2015 and updated by EDP in 2017, also did not record any evidence of badger use or presence on-site. This species is, therefore, presumed to be absent from the Application Site.

Dormouse

4.22 The initial desk study conducted by Thomson Ecology in 2015 returned no records for dormouse within 1km of the Application Site by SEWBReC. The vegetated boundaries of the Application Site do, however, provide suitable dispersal and foraging habitat for dormouse. As such, a habitat suitability assessment and subsequent nest tube survey was undertaken by Thomson

Ecology during 2015 and confirmed dormouse presence onsite, with nests recorded within boundary features (Thomson Ecology, Report Reference ABAW105/006/002).

4.23 An update Extended Phase 1 Habitat Survey did not identify any significant material changes to hedgerow and woodland boundaries with regards to their potential to support dormouse, such that their continued presence onsite is assumed.

Otter and Water Vole

4.24 SEWBReC returned no records of otter (*Lutra lutra*) or water vole (*Arvicola amphibius*) within 1km of the Application Site. Given the lack of waterways within or adjacent to the Application Site there is no suitable habitat present for either species onsite, such that these species are presumed absent from the Application Site.

Great Crested Newt

4.25 SEWBReC returned no records of great crested newt (*Triturus cristatus*) within 1km of the Application Site. There are, furthermore, no ponds onsite, or within a 500m radius of the Application Site. Although the Phase 1 survey undertaken by Thomson Ecology in 2015 identified suitable terrestrial habitat for great crested newt, this is limited to hedgerow and woodland boundaries which will largely be retained within the development. In contrast, managed, poor semi-improved grassland is considered sub-optimal for this species.

4.26 In the absence of desk study records and suitable aquatic habitat combined with the limited extent of suitable habitat, great crested newt is thus presumed absent from the Application Site.

Reptiles

4.27 SEWBReC returned no records for common reptile species during the desk study undertaken by Thomson Ecology.

4.28 The initial Extended Phase 1 survey undertaken by Thomson Ecology identified poor semi-improved grassland habitat on site that was deemed unsuitable for reptiles owing to poor structural diversity within the grassland sward as a result of management activities. Hedgerow and woodland boundaries and associated dense scrub cover is, however, considered more suitable and as such reptile surveys of the Application Site and adjacent agricultural fields comprising Phase 1 of proposed residential development were completed by Thomson Ecology in April 2015.

4.29 The reptile surveys identified small numbers of slow-worm (*Anguis fragilis*) indicative of a low population within the Application Site and wider survey area. Slow-worm was identified within the south-east corner of the Application Site and centrally within the adjacent western field.

4.30 Although recent management of the grassland sward has rendered the Application Site largely unsuitable for a slow-worm population, hedgerow and woodland boundaries continue to provide suitable habitat.

Other Invertebrates

4.31 Habitats present on site are considered likely to support a limited assemblage of common and widespread invertebrate species only, although woodland habitat has the potential to support a more diverse assemblage. No records for invertebrate species within 1km of the Application Site were returned by the desk study completed by Thomson Ecology in 2015.

Other Species Mammals

4.32 A desk study returned records for European Hedgehog (*Erinaceus europaeus*) within 57m of the Application Site. Woodland and hedgrow boundaries continue to provide suitable habitat for this species.

5. Summary and Conclusions

5.1 This Ecology Update Note has been prepared by The Environmental Dimension Partnership Ltd (EDP) on behalf of Barratt Homes South Wales in relation Phase 2 of proposed residential development of land at Llantwit Major Bypass, Boverton.

5.2 Detailed ecological assessments of the Application Site were previously undertaken by Thomson Ecology in 2015 to inform an outline planning application submission. The ecological assessments comprised an Extended Phase 1 Habitat survey, desk study and further detailed protected species surveys for dormouse and reptiles.

5.3 Given the time that has elapsed since the Application Site was last surveyed, an update assessment was considered necessary to determine whether any material changes have arisen during the interim period, with respect to the distribution and management of habitats on site and their potential to support protected species.

5.4 An Extended Phase 1 Habitat survey, desk study and further detailed surveys with respect to bats and badger was completed on 6 September 2017 by an experienced and suitably licensed ecologist.

5.5 No significant material changes to the nature and distribution of habitats onsite were identified during the updated Extended Phase 1 Habitat survey. Poor semi-improved grassland and scrub habitat have, however, been subject to regular management in the interim.

5.6 The Application Site remains dominated by poor semi-improved grassland habitat of negligible ecological value, albeit with some limited potential to support protected and notable species, namely common reptiles including slow-worm, their continued presence assumed within

peripheral habitats, as previously confirmed during detailed surveys completed by Thomson Ecology in 2015.

5.7 The adjacent woodland and hedgerow network are considered to be of greater ecological importance and offers suitable foraging, refuge and dispersal opportunities to protected and notable species, including foraging/commuting bats, breeding birds and dormouse, the continued presence of dormouse assumed across woody habitats, as previously confirmed during detailed surveys completed by Thomson Ecology during 2015.

5.8 A ground level visual assessment of all mature and semi-mature tree standards on and immediately adjacent to the Application Site, identified none with potential to support roosting bats. With respect to badger, no setts or general activity was identified within or immediately adjacent to the Application Site.

5.9 Overall, the update survey did not identify any significant material changes to the Application Site, such that the results of the previous ecological assessments completed by Thomson Ecology during 2014 and 2015 and recommendations detailed therein are considered to remain valid.

Annex EDP 1
Site Layout

House Type Schedule

House Code	Net Floor Area (ft²)	Number of Bedrooms	House Type Name	Number of Units	Total Net Area of Each Unit (ft²)
ALR	514	1	Alder	4	2056
WAS	615	2	Washington	4	2460
RIC	731	2	Richmond	5	3655
FOL	830	3	Folkestone	2	1660
MAI	830	3	Maidstone	7	5810
BUC	874	3	Buchanan	1	874
ENN	916	3	Ennerdale	1	916
Total No. of Units on Site & Total Net Area (ft²)				**24**	**17431**

Site Key

- 1.8m high timber close board fence
- 2m high timber close board fence *(with 130mm gaps at base for hedgehog movement)*
- 1.1m high hoop top railings
- Existing vegetation retained *(Refer to landscaping layout)*
- Existing trees retained and root protection zone
- Existing tree removed
- Proposed new trees *(Indicative only refer to landscaping layout)*
- × 1.8m high close board gate
- 12 Plot numbers
- P14 Parking space

N

W E

S

SCALE BAR

0 5 10 20 30 40 50

REV.	DESCRIPTION	DATE

CLIENT
Barratt Homes South Wales

JOB TITLE
Land North of B4265, Boverton, Phase 2

DRAWING TITLE
Phase 2, Site Layout

SCALE @ A3	DATE	DRAWN BY
1:500	Jan '18	RW
JOB NO.	**DRAWING NO.**	**REVISION**
1753	TP-01	-

hammond Architectural Ltd
10 Gold Tops
Newport
NP20 4PH
t. 01633 844970
e. info@hammond-ltd.co.uk
www.hammond-ltd.co.uk

Annex EDP 2
Illustrative Photographs

Photo EDP 1: The Application Site looking north-east.

Photo EDP 2: North-west corner of the Application Site.

Photo EDP 3: North-eastern boundary of the Application Site delineated by broadleaved woodland.

Photo EDP 4: South-western boundary of the Application Site.

Plan EDP 1
Phase 1 Habitat Plan
edp3775/d007a 17 November 2017 (CR/EW)

Site Boundary

SI Poor Semi Improved Grassland

Tall Ruderal

Broadleaved Scattered Tree

Hedge and Trees Species Poor

Intact Hedge Species Poor

Fence

client

Barratt Homes, South Wales

project title

Llantwit Major Bypass, Boverton (Phase 2)

drawing title

Plan EDP 1: Phase 1 Habitat Survey

date	17 NOVEMBER 2017	**drawn by**	CR
drawing number	edp3775_d007a	**checked**	EW
scale	1:1,000 @ A3	**QA**	JTF

the environmental dimension partnership

info@edp-uk.co.uk www.edp-uk.co.uk
Cirencester 01285 740427 Cardiff 02921 671900 Shrewsbury 01939 211190

Appendix EDP 5
Tree Survey Report & Tree Constraints Plan
(Treescene, December 2017

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Tree Survey

At

Land at Boverton
Llantwit Major, Vale of Glamorgan

Inspected by:-
Julian Wilkes BSc.For, MSc.Land Man, MIC.For, TechArborA
Treescene Ltd
The Walled Garden
Old Coedarhydyglyn
St Nicholas
Cardiff
CF5 6SG
Tel No. 029 20599300

5th December, 2017

Registered Office: Treescene Limited
The Walled Garden, Old Coedarhydyglyn, St. Nicholas, Cardiff CF5 6SG
Tel. 029 205 99300 Email. trees@treescene.co.uk

I have been instructed by David Jones of Barratt Homes to carry out a survey on trees at land at Boverton, Llantwit Major, Vale of Glamorgan.

Scope of Report

This Tree Survey has been undertaken within the recommendations of British Standards 5837:2012 and current good arboricultural practice.

The survey entailed a visual inspection from ground level of all trees.

Each tree has been numbered and, where instructed, for future identification on site, have been tagged using small durable metal or plastic tags.

Due to variations of existing ground levels through the site, height dimensions are estimated and are given in metres. Accurate heights, measured with the aid of optical instruments can be provided where instructed.

Trunk/stem diameters are measured at 1.5 metres above ground level, or immediately above the root flare for multi-stemmed trees.

Estimate branch spread is taken in metres from the centre of the trunk, at the four cardinal points of a compass, to achieve an accurate representation of crown shape.

An assessment of a tree's age classification is made in terms of its maturity within the site's landscape.

An assessment of a tree's physiological condition is to be made as good, fair, poor, dead.

Data on the structural condition of the tree should be entered, e.g., collapsing, leaning and the presence of any decay or physical defect should be noted.

Preliminary management recommendations include further investigation of suspected defects that require more detailed assessment and potential for wildlife habitat.

An assessment of a tree's future life expectancy is made as <10, 10-20, 20-40 or >40 etc.

Table 1 – Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)		
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other U category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7		
	1 Mainly Arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation
Category A Those of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as Arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation; historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B Those of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural benefits
Category C Those of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value, and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value

Tree No.	Species	Height(m)	Single/Multi Stemmed	Stem Diameter(m)	Branch Spread(m)				Height of Crown(m)	Age	Physiological Condition	Structural Condition	Prel. Man. Recommendations	Est. Remaining Contribution	Category
					N	E	S	W							
G101	Group of Blackthorn (Prunus spinosa), Hawthorn (Crataegus monogyna) and Elder (Sambucus nigra)	Up to 8	Single and multi	0.2	2	2	2	2	0	Middle aged	Fair to poor	Scrubby specimens forming gappy hedgerow	No action required at this time	20-40	C
G102	Group of 2 Ash (Fraxinus excelsior)	13	Multi	0.55	7	6	6	6	3	Middle aged	Fair to poor	Off-site trees of variable form	Monitor for safety	10-20	C
G103	Group of Hawthorn (Crataegus monogyna), Blackthorn (Prunus spinosa), Sycamore (Acer pseudo-platanus) and Ash (Fraxinus excelsior)	Up to 13	Single and multi	Up to 0.45	7	5	6	5	1	Middle aged	Fair to poor	Off-site trees forming gappy hedgerow. Trees generally of variable form with low spreading crowns.	Crown raise to 3.5m over the adjacent site. Monitor for safety.	20-40	C

Tree No.	Species	Height(m)	Single/Multi Stemmed	Stem Diameter(m)	Branch Spread(m)				Height of Crown(m)	Age	Physiological Condition	Structural Condition	Prel. Man. Recommendations	Est. Remaining Contribution	Category
					N	E	S	W							
T104	Ash (Fraxinus excelsior)	12	Multi	0.35	3	7	4	1	2	Middle aged	Fair to poor	Multi stemmed specimen of variable form sited on low earth bank. Evidence of wire damage at base of main stem. This specimen may become at risk of failure at a later date.	Monitor for safety	10-20	C
T105	Sycamore (Acer pseudo-platanus)	14	Multi	0.55	7	3	5	6	1	Middle aged	Fair to poor	Multi stemmed specimen of variable form with some stems rubbing against each other leading to potential internal decay	Monitor for safety	10-20	C
T106	Sycamore (Acer pseudo-platanus)	13	Multi	0.4	5	3	5	2	1	Middle aged	Fair to poor	Multi stemmed specimen of variable form with some mild wire damage at base of main stem. Main stem and mid crown heavily colonised by ivy thus preventing full inspection.	Sever ivy at base. Monitor for safety.	10-20	C

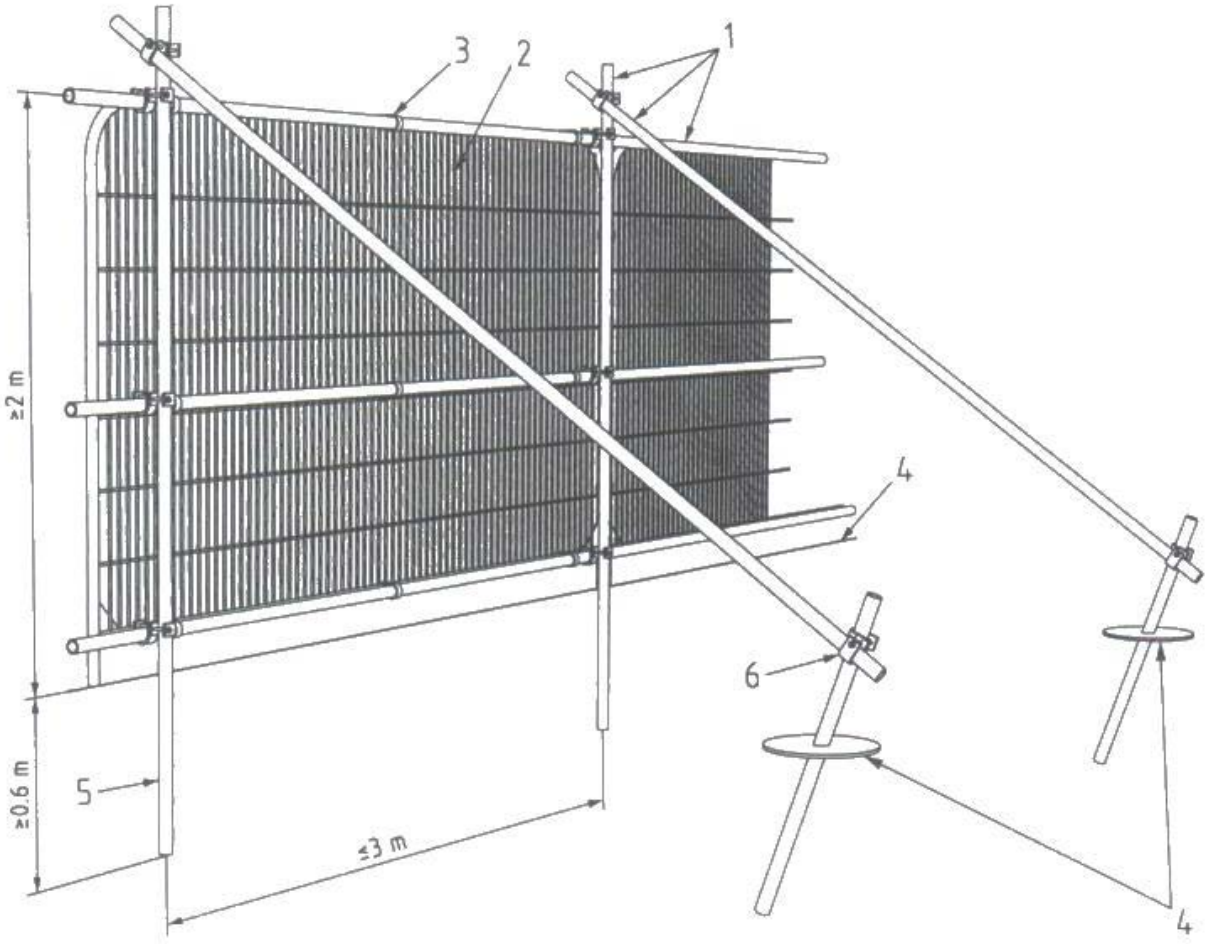
Tree No.	Species	Height(m)	Single/Multi Stemmed	Stem Diameter(m)	Branch Spread(m)				Height of Crown(m)	Age	Physiological Condition	Structural Condition	Prel. Man. Recommendations	Est. Remaining Contribution	Category
					N	E	S	W							
T107	Sycamore (Acer pseudo-platanus)	14	Multi	0.65	6	3	5	6	1	Middle aged	Fair to poor	Multi stemmed specimen of variable form with evidence of slight basal inclusions which may become points of weakness at a later date. Main stem and mid crown heavily colonised by ivy thus preventing full inspection.	Sever ivy at base. Monitor for safety.	10-20	C
T108	Sycamore (Acer pseudo-platanus)	11	Multi	0.4	6	5	5	6	1	Middle aged	Fair to poor	Twin stemmed specimen sited on low earth bank. Tree of variable form. Main stem heavily colonised by ivy thus preventing full inspection.	Sever ivy at base. Monitor for safety.	10-20	C
T109	Sycamore (Acer pseudo-platanus)	11	Multi	0.5	7	5	6	5	1	Middle aged	Fair to poor	Multi stemmed specimen of variable form. Main stem and mid crown heavily colonised by ivy thus preventing full inspection.	Sever ivy at base. Monitor for safety.	10-20	C
T110	Sycamore (Acer pseudo-platanus)	11	Multi	0.45	5	3	6	6	1	Middle aged	Fair to poor	Multi stemmed specimen with evidence of potentially weak included forks which may become at risk of failure at a later date	Monitor for stability	10-20	C

Tree No.	Species	Height(m)	Single/Multi Stemmed	Stem Diameter(m)	Branch Spread(m)				Height of Crown(m)	Age	Physiological Condition	Structural Condition	Prel. Man. Recommendations	Est. Remaining Contribution	Category
					N	E	S	W							
T111	Sycamore (Acer pseudo-platanus)	5	Multi	0.2	1	0	1	3	1	Young	Fair to poor	Twin stemmed specimen of variable form heavily suppressed by adjacent specimen. Crown developed on western side only.	Monitor for stability	10-20	C
G112	Group of Hawthorn (Crataegus monogyna)	6	Single and multi	0.2	3	1	1	2	1	Middle aged	Fair to poor	Scrubby specimens forming gappy hedgerow	Crown raise to 3m over site. Monitor for health.	20-40	C
G113	Group of Hawthorn (Crataegus monogyna), Elm (Ulmus spp) and Elder (Sambucus nigra)	6	Single and multi	0.2	3	1	2	2	0	Middle aged	Fair to poor	Scrubby specimens forming gappy hedgerow. Elms are at risk of developing Dutch Elm disease.	Monitor for health	20-40	C

Recommendations for Tree Protection during Development

Due to the high risk to established trees we would recommend the installation of protective fencing prior to commencement of **any** works on site in accordance with BS 5837:2012 "Trees in relation to Construction". Trees should be protected using scaffold frame supporting weld mesh panel fencing sited on the edge of the Root Protection Area as defined in BS5837:2012. These fenced areas should not be used for the storage of any plant machinery or materials and personnel should be excluded at all times; these fences should remain in situ until after final landscaping has been carried out, removed by hand with great care to prevent compaction or root damage to established trees. The services of a suitably qualified arborist should be sought **prior** to the commencement of each stage.

Figure 2 **Default specification for protective barrier**

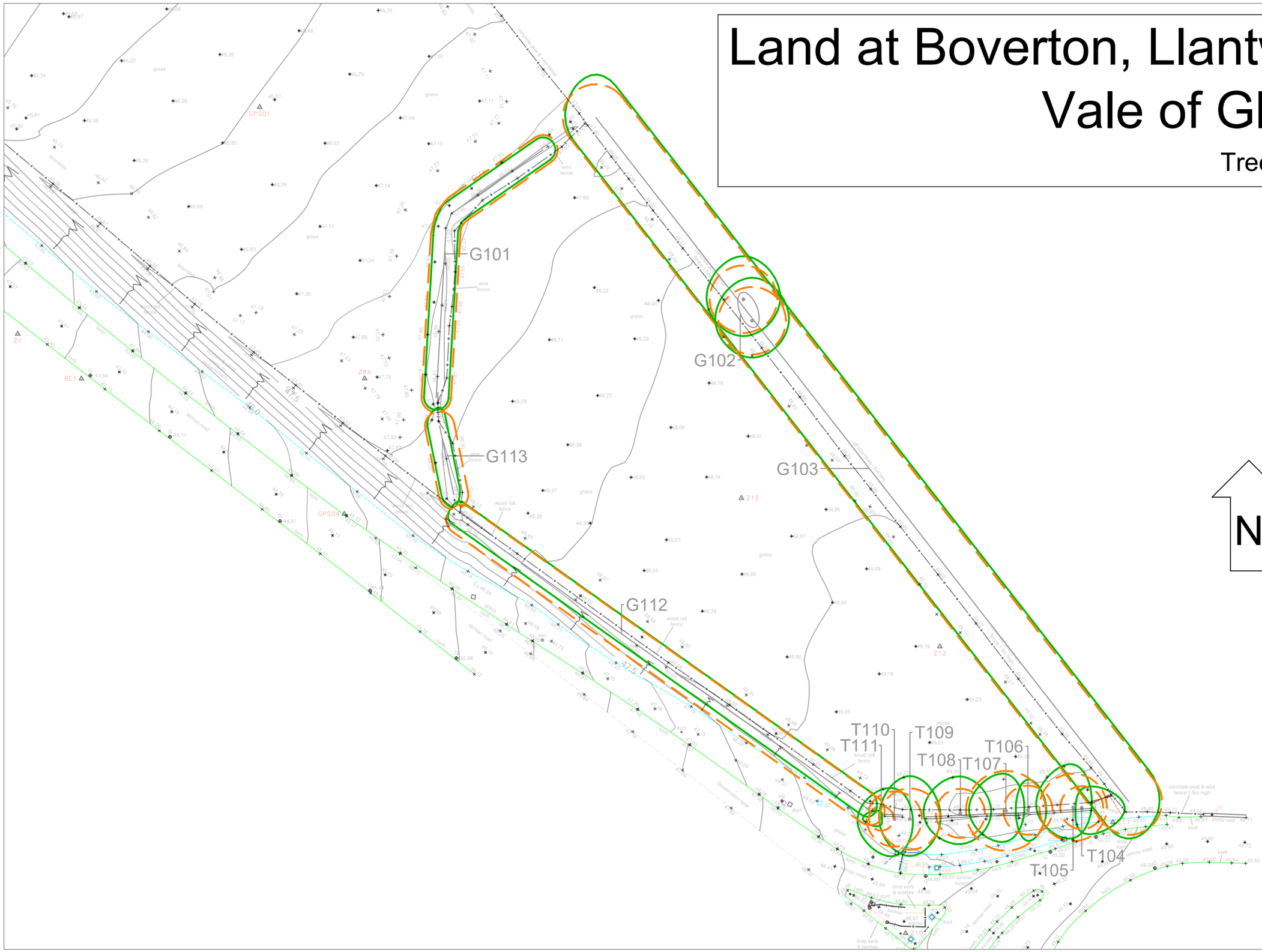


Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Land at Boverton, Llantwit Ma□or
Vale of Glamorgan

Tree Constraints Plan



Tree Constraints Plan

Root Protection Area
Tree Category
Tree Number
T44
Canopy Spread

Category A Trees
Category B Trees
Category C Trees
Category U Trees

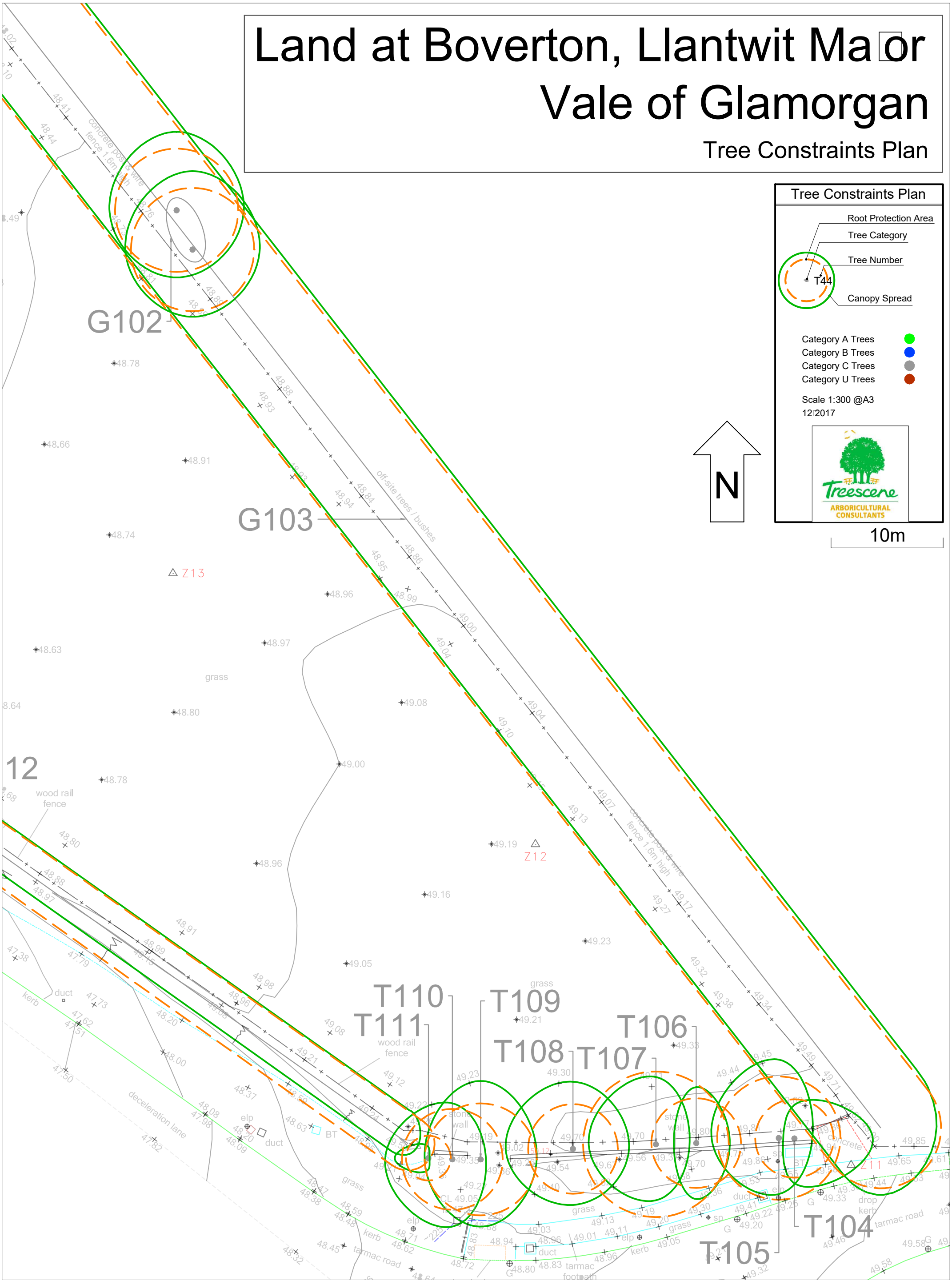
Scale 1:600 @A3
12□2017

Treescene
ARBORICULTURAL CONSULTANTS

10m

Land at Boverton, Llantwit Major
Vale of Glamorgan

Tree Constraints Plan



Tree Constraints Plan

Root Protection Area
Tree Category
Tree Number
T44
Canopy Spread

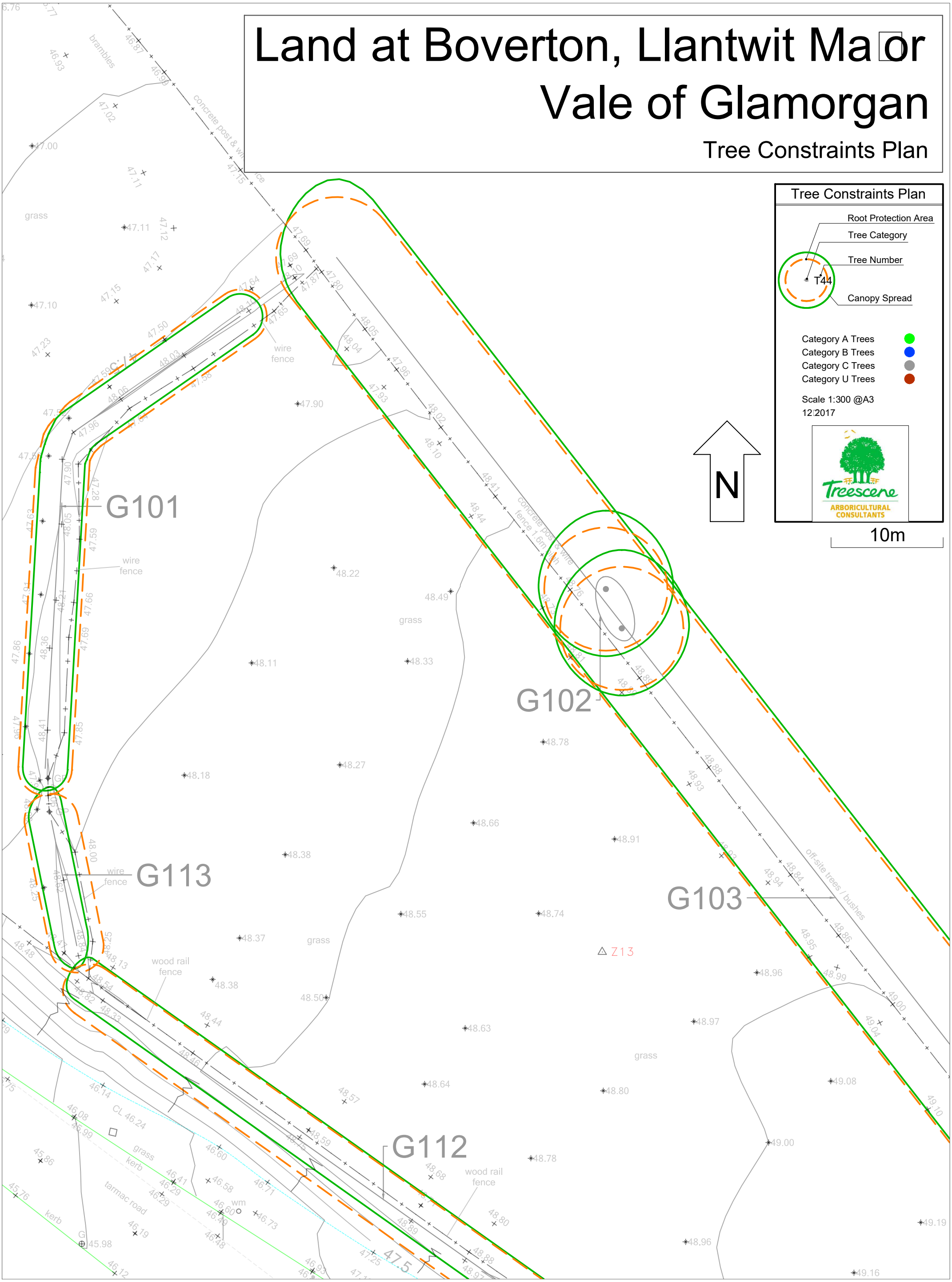
Category A Trees	🟢
Category B Trees	🔵
Category C Trees	●
Category U Trees	🔴

Scale 1:300 @A3
12 2017

Treescene
ARBORICULTURAL CONSULTANTS

Land at Boverton, Llantwit Major
Vale of Glamorgan

Tree Constraints Plan



Tree Constraints Plan

Root Protection Area
Tree Category
Tree Number
T44
Canopy Spread

Category A Trees
Category B Trees
Category C Trees
Category U Trees

Scale 1:300 @A3
12.2017

Treescene
ARBORICULTURAL CONSULTANTS

Appendix EDP 6
Tree Protection Plan
(Treescene, February 2018)

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Land at Boverton, Llantwit Major
Vale of Glamorgan

Tree Protection Plan

Area of hedgerow to be pruned back to fence line

Area of hedgerow to be pruned back to fence line

Area of No Dig Construction

G101

G103

G102

G101

G113

G112

G103

T109

T111

T110

T108

T107

T106

T105

T104

B4265

Attenuation Pond

N

10m

Tree Protection Plan

Root Protection Area

Tree Category

Tree Number

T44

Canopy Spread

Area of Hedgerow to be Pruned Back to Fence Line

Area of No Dig Construction

Position of Protective Fencing

Trees to be Removed for Development Reasons

Category C Trees to be Retained

Scale 1:600 @A3

02.2018

Treescene ARBORICULTURAL CONSULTANTS

Land at Boverton, Llantwit Ma□or
Vale of Glamorgan

Tree Protection Plan

Tree Protection Plan

Root Protection Area
Tree Category
Tree Number
T44
Canopy Spread

Area of Hedgerow to be Pruned Back to Fence Line
Area of No Dig Construction
Position of Protective Fencing
Trees to be Removed for Development Reasons
Category C Trees to be Retained

Scale 1:300 @A3
02□2018

Treescene ARBORICULTURAL CONSULTANTS

N

10m

Area of hedgerow to be pruned back to fence line

Area of hedge to be pruned to fence line

Area of N Construct

G103
G102
G103
T109
T111
T110
T108
T107
T106
T105
T104
B4265

Land at Boverton, Llantwit Ma□or
Vale of Glamorgan

Tree Protection Plan

Tree Protection Plan

Root Protection Area

Tree Category

Tree Number

T44

Canopy Spread

Area of Hedgerow to be Pruned Back to Fence Line

Area of No Dig Construction

Position of Protective Fencing

Trees to be Removed for Development Reasons

Category C Trees to be Retained

Scale 1:300 @A3

02□2018

Treescene ARBORICULTURAL CONSULTANTS

10m

N

Area of h
to be pru
to fence l

G101

G103

G102

G101

Attenuation Pond

G113

G112

24

23

22

21

20

19

18

17

16

15

1

2

3

4

5

6

50

-43

-49

wm

Appendix EDP 7
Habitat Calculations
(edp3775_d012 16 February 2018 EB/KH)

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Phase 1

(Planning Reference: 2014/00995/FUL)

1.0m Buffer
2.0m Buffer
2.0m Buffer
1.3m Buffer
1.0m Buffer
2.1m Buffer
2.2m Buffer
5.4m Buffer
2.0m Buffer
2.0m Buffer
2.0m Buffer

Attenuation Pond

B4265

N

0 20m

Site Boundary

Habitat Loss

- Trees to be Removed
- Tree/Shrub Belt to be Removed (Total Area: 298m²)

Habitat Retention

- Trees to be Retained
- Tree/Shrub Belt to be Retained (Total Area: 434m²)

Habitat Creation

- Native Structure Planting (Total Area: 504m²)
- Native Hedgerow Planting (Total Length: 28m)
- New Trees

client
Barratt Homes, South Wales

project title
Land Adjacent to Llantwit Major Bypass, Boverton (Phase 2)

drawing title
Habitat Calculations Plan

date	16 FEBRUARY 2018	**drawn by**	EB
drawing number	edp3775_d012	**checked**	KH
scale	1:500 at A3	**QA**	JTF

the environmental dimension partnership
info@edp-uk.co.uk www.edp-uk.co.uk
Cirencester 01285 740427 Cardiff 02921 671900 Shrewsbury 01939 211190

Appendix EDP 8
Detailed Soft Landscape (Phase 2) Plans Sheet 1 & 2 (edp3775_d011 16 February 2018 EB/KH)

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Planting Schedule

Trees

Number	Girth	Height	Species	Specification	Density
2 No.	10-12cm	300-350cm	Quercus robur	2x :Feather :7 brks	Counted
63 No.		100-125cm	Malus sylvestris	1+2: Transplant - seed raised: B	1/m²
21 No.		80-100cm	Crataegus monogyna	1+2: Transplant - seed raised: B	1/m²
30 No.		80-100cm	Acer campestre	1+1: Transplant - seed raised: B	0.3Ctr Double Staggered at 0.5m offset
30 No.		60-80cm	Crataegus monogyna	1+1: Transplant - seed raised: Branched: 3 brks: C	0.3Ctr Double Staggered at 0.5m offset
5 No.	6-8cm	250-300cm	Prunus padus	2x :Feather :Multi-Stemmed :5 brks :BR	Counted
3 No.	10-12cm	300-350cm	Betula pubescens	2x :Feather :7 brks	Counted

Shrubs

Number	Species	Specification	Density
34 No.	Corylus avellana	1+2: Transplant - seed raised: Branched: 4 brks: B	1/m²
50 No.	Euonymus europaeus	1+2: Transplant - seed raised: Branched: 5 brks: B	1/m²
90 No.	Ilex aquifolium	Leader with Laterals: C	1/m²
50 No.	Rosa canina	1+1: Transplant - seed raised: Branched: 3 brks: B	1/m²
90 No.	Ulex europaeus	Bushy: 3 brks: C	1/m²
8 No.	Amelanchier canadensis	BR: Feathered :3 brks	Counted
31 No.	Cornus sanguinea	1+1: Transplant - seed raised: Branched: 3 brks: B	1/m²
21 No.	Rubus fruticosus	0/1: Cutting: Branched: 2 brks: B	1/m²
31 No.	Viburnum opulus	1+2: Transplant - seed raised: Branched: 3 brks: B	1/m²
24 No.	Buxus sempervirens	Bushy: 10 brks: C	2/m²
43 No.	Choisya ternata	Bushy: 7 brks: C	2/m²
5 No.	Ligustrum ovalifolium	Bushy: 9 brks: C	2/m²
3 No.	Viburnum davidii	Bushy: 5 brks: C	2/m²
38 No.	Euonymus fortunei 'Emerald Gaiety'	Bushy: 11 brks: C	4/m²
10 No.	Buxus sempervirens	Bushy: 10 brks: RB	2/m²
19 No.	Ceanothus thyrsiflorus repens	Bushy: 6 brks: C	2/m²
7 No.	Choisya ternata	Bushy: 5 brks: C	2/m²
27 No.	Vinca major	Several Shoots: 3 brks: C	6/m²
39 No.	Corylus avellana	1+2: Transplant - seed raised: Branched: 4 brks: B	0.3Ctr Double Staggered at 0.5m offset
39 No.	Ilex aquifolium	Leader with Laterals: C	0.3Ctr Double Staggered at 0.5m offset
20 No.	Ligustrum vulgare	0/2: Cutting: Branched: 3 brks: B	0.3Ctr Double Staggered at 0.5m offset
39 No.	Prunus spinosa	1+1: Transplant - seed raised: Branched: 2 brks: B	0.3Ctr Double Staggered at 0.5m offset
16 No.	Hebe 'Amy'	Bushy: 3 brks: C	4/m²
28 No.	Lavandula angustifolia 'Hidcote'	Bushy: 9 brks: C	4/m²
12 No.	Lavandula x intermedia 'Alba'	Bushy: 5 brks: C	4/m²

Herbaceous

Number	Species	Specification	Density
28 No.	Nepeta 'Six Hills Giant'	Full Pot: C	4/m²
28 No.	Tiarella cordifolia	Full Pot: C	4/m²
27 No.	Mentha spicata	Full Pot: C	6/m²
12 No.	Bergenia 'Bressingham White'	Full Pot: C	6/m²
12 No.	Salvia officinalis 'Purpurascens'	Full Pot: C	6/m²

Climbers

Number	Species	Specification	Density
34 No.	Lonicera periclymenum	Caned: Several Shoots: 2 brks: C	1/m²
21 No.	Clematis vitalba	Caned: Several Shoots: 2 brks: C	1/m²

Bulbs

Number	Species	Specification	Density
18 No.	Allium 'Globemaster'	Full Pot: C	4/m²
10 No.	Allium 'Globemaster'	Grade 20/+	6/m²

Ferns

Number	Species	Specification	Density
5 No.	Dryopteris filix-mas	Full Pot: C	4/m²

🟥	Site Boundary
○	Retained Trees
▨	Existing Tree/Shrub Belt
○	Trees to be Removed
●	Proposed Trees
Ⓑ	Tree Pit Specification Type *Refer to edp3775_d011 (Sheet 2) for specification detail*
🟩	Native Hedgerow
▽	Native Whip Structure Planting
▨	Amenity Plot Planting
▨	Amenity Turf
+	Wildflower Meadow *EM7 - Meadow Mixture for Sandy Soils*
◇	Wear Tolerant Turf Mixture *EG22 - Wear Tolerant Turf grass Mixture*
⬡	Decorative Aggregate Gravel *Plum Slate Chippings*
- - -	Root Barrier System
- - -	Tree Protection Fencing

client

Barratt Homes, South Wales

project title

Land Adjacent to Llantwit Major Bypass, Boverton (Phase 2)

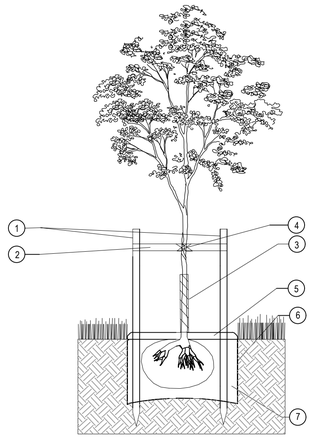
drawing title

Detailed Soft Landscape (Plan 1 of 2)

date 16 FEBRUARY 2018
drawing number edp3775_d011
scale 1:200 at A1
drawn by EB
checked KH
QA JW/JTF

the environmental dimension partnership

info@edp-uk.co.uk **www.edp-uk.co.uk**
Cirencester 01285 740427 Cardiff 02921 671900 Shrewsbury 01939 211190



Tree Pit Detail A - Trees to be planted in Open Space

1&2. 2x tanalised timber tree stake 2m, 75mm Ø and crossbar driven into backfilled pit to provide support to the tree.

3. Clear spiral guard to be fitted to trunk to protect against animal browsing.

4. Use 2x Tree Tie *GLB25A* with *GLPFA* spacer sleeve or similar to secure tree to support post.

5. 50mm deep bark mulch layer to be spread evenly over a circular area 1000mm Ø around the tree to prevent weed growth and retain moisture.

6. Excavate tree pit to sufficient size to accommodate tree root ball. Loosen any compaction in base of excavated pit to aid drainage. The tree should be planted at a depth where the root flare is still visible just breaching the soil surface following backfilling.

7. Backfill tree pit with subsoil and topsoil excavated from pit if this is regarded as of sufficient quality to promote the healthy establishment of the tree. If either the top soil or sub soil excavated from the pit is of poor quality then soil ameliorants may be used sparingly or imported topsoil compliant with **BS3882** should be used.

Immediately after planting, water the tree, saturating the tree pit to field capacity.

The notes above are intended as a basic guide only. For further guidance on tree planting refer to **BS 8545:2014** Section 10.

Products suggested in italics above are available from Green Blue Urban (http://greenblueurban.com/)

Tree Planting Program

Trees to be planted between October 2015 and March 2016.

A full young tree management programme with budgetary provision should be in place for all planting schemes. This management programme should be in place for at least 5 years. Between the months of March and October monthly visits should be made to inspect tree specimens, and correct irrigation carried out in line with management information provided. Trees should be watered to recommended field capacity percentage, and not allowed to drop below the permanent wilting point percentage where risk if failure is likely (see table fig 1). Tree monitoring frequency should be increased accordingly in periods of hot weather.

Tree Maintenance and Management During 5 Year Establishment Period

Immediately following planting, the tree should be watered thoroughly. Following this, and with regard to prevailing weather conditions, newly planted trees should be watered regularly during periods of dry weather. If the tree pit has been specified with and irrigation pipe, this should be used as the primary method of watering. If no irrigation pipe is specified, the square metre of ground around the tree should be soaked to field capacity (refer to BS **8545:2014** for further detail) by surface watering. Watering frequency is more important than quantity to prevent the root ball of the newly planted tree from drying out.

All trees are fitted with protective guards to prevent animal damage. These should be checked regularly to ensure they remain in place and are providing adequate protection against the animals in the area. If damage to trees from browsing by animals still occurs additional measures may be required.

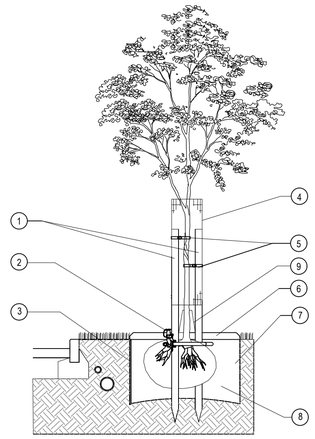
A formal assessment of young tree health and development should be carried out annually by a qualified arborist who will be able to advise on solutions should any problems be picked up. During this assessment any stakes and ties should be checked to ensure they are providing support but not damaging the tree and that the tree is still firmly seated in the ground. If the tree has become loose in the ground the soil around the base should be re-firmed and stakes and ties adjusted accordingly.

The mulched area around the base of the tree should be kept clear of competing vegetation and weeds at all times.

Tree stakes and ties should be removed once the tree has established a strong enough root system to support itself, likely to be 1-2 years after planting. Strimmer guards should remain in place until the end of the 5 year establishment, with adjustments or segments added as necessary to facilitate tree growth. Tree guards should only be removed if they are beginning to restrict tree growth or if it is felt the risk of damage has significantly reduced due to strong tree growth and development or changes in the surrounding environment.

Formative pruning should be carried out in accordance with **BS 3998** as required throughout the five year establishment period.

For further guidance on tree maintenance during establishment refer to **BS 8545:2014** Section 11.



Tree Pit Detail B - Trees to be planted within 3m of Hard Sufaces and/or Services

1. 2x tanalised timber tree stake 2m, 75mm Ø driven into backfilled pit to provide support to the tree.

2. *RootRain Metro* irrigation system or similar. Place around top of root ball and nail to supporting stake ensuring filler cap finishes slightly above mulch level.

3. *ReRoot* root barrier with root deflecting ribs installed between tree root ball and hard surfaces/services where there is a risk of root damage as the tree grows outward. **As a general rule root barriers should be installed in locations where hard surfaces and/or services are located within four metres of the tree stem.** Install closer to the paving/service than the tree, to allow space for the tree roots to grow into the space available, with the ribs facing the tree. Note this may mean not placing the barrier within the tree pit, but further away within its own trench. Root barriers must extend a minimum of 2m lengthways beyond the expected canopy of the mature tree. The top of the root barrier should be set as close to the soil surface as possible without being visible.

4. 50mm square galvanized wire mesh bent in circle 320mm Ø and nailed to tree stake to protect tree from damage by people and animals. Bottom of mesh should be 300mm above ground level to allow strimmer guard to be fitted and prevent litter and grass/weeds building up around the base of the tree. Top of mesh should be below the first lateral branch.

5. Use 2x Tree Tie *GLB25A* with *GLPFA* spacer sleeve or similar to secure tree to support post.

6. 50mm deep bark mulch layer to be spread evenly over a circular area 1000mm Ø around the tree to prevent weed growth and retain moisture.

7. Excavate tree pit to sufficient size to accommodate tree root ball. Loosen any compaction in base of excavated pit to aid drainage. The tree should be planted at a depth where the root flare is still visible just breaching the soil surface following backfilling.

8. Backfill tree pit with subsoil and topsoil excavated from pit if this is regarded as of sufficient quality to promote the healthy establishment of the tree. If either the top soil or sub soil excavated from the pit is off poor quality then soil ameliorants may be used sparingly or imported topsoil compliant with **BS3882** should be used.

9. *Strimmer guard* by Arbortech or similar to be fitted around base of tree to protect from damage by grass maintenance machinery primarily but also to provide an additional layer of defense against animal browsing.

Immediately after planting, water the tree, saturating the tree pit to field capacity.

The notes above are intended as a basic guide only. For further guidance on tree planting refer to **BS 8545:2014** Section 10.

Products suggested in italics above are available from Green Blue Urban (http://greenblueurban.com/) and Arbortech (www.arbortech.co.uk)

Irrigation of new tree planting

The timing and frequency of irrigation should take into account the prevailing weather conditions, soil moisture release characteristics, and the response of the tree species to water deficits or periods of prolonged soil saturation.

The water holding capacity varies between soils and should be assessed before determining irrigation needs.

The frequency of irrigation is more important than volume of water at any one time. Increased water volumes should not compensate for a lack of frequency.

Additional monitoring is recommended if there are 10 consecutive days during the growing season at >25^{o}C. Water should only be added if soil moisture probe/ tensiometer values indicate that it would be appropriate to do so.

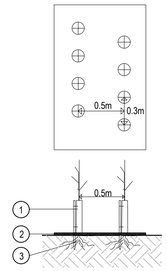
Ongoing Maintenance and Management

- All trees are to be regularly inspected by a member of the arboricultural association to ensure that they remain in a safe condition, do not obstruct access routes or visibility and do not cause nuisance. In undertaking the inspection, consideration should be given to safety aspects in balance with visual and ecological benefits provided by the tree
- Replace dead or dying trees in the next planting season (November to March)
- All tree works are to be carried out in accordance with good arboricultural practice, and under the direction of a member of the arboricultural association BS8545. In undertaking tree works, consideration must be given to safety aspects in balance with visual and ecological benefits provided by the tree.
- Tree works must take place outside of the bird nesting season (March to August inclusive, for most British birds) or under the supervision of a suitably qualified ecologist. If tree works need to be carried out between March and August seek ecological advice.
- Remove annually any excess growth encroaching onto grassed areas, paths, roads, signs, sightlines and light fittings

Texture	FC (v%)	PWP (v%)
Sand	10	5
Loamy sand	12	5
Sandy loam	18	8
Sandy clay loam	27	17
Loam	28	14
Sandy clay	36	25
Silt loam	31	11
Silt	30	6
Clay loam	36	22
Silty clay loam	38	22
Silty clay	41	27
Clay	42	30

Table fig 1: This table shows field capacity and past wilting point percentages, and how they vary according to soil texture and composition.

Double Staggered Row



Hedgerow Planting Detail

1. Tubex shrub shelter with supporting cane or stake.

2. Tubex 1m wide biodegradable Jute/Hessain Fbric roll pegged down with supplied biodegradable plastic pegs along line of hedgerow to prevent weed growth and retain moisture.

3.Whip to be notch planted following clearance of any existing vegetation.

Immediately after planting, water the whip, saturating the ground around its base to field capacity.

The notes above are intended as a basic guide only. For further guidance on whip planting refer to **BS 8545:2014** Section 10.

Whip planting only to take place between November and March

Products suggested in italics above are available from Green Blue Urban (http://www.tubex.com/)

Whip Maintenance and Management During 5 Year Establishment Period

Immediately following planting, the whip should be watered thoroughly. Following this, and with regard to prevailing weather conditions, newly planted whips should be watered regularly during periods of dry weather. When watering the square meter of ground around the whip should be soaked to field capacity (refer to BS **8545:2014** for further detail) by surface watering. Watering frequency is more important than quantity to prevent the roots of the newly planted whip from drying out.

All whips are fitted with protective guards to prevent animal damage. These should be checked regularly to ensure they remain in place and are providing adequate protection against the animals in the area. If damage to trees from browsing by animals still occurs additional measures may be required.

A formal assessment of areas of whip planting should be carried out annually by a qualified arborist who will be able to advise on solutions should any problems be picked up. During this assessment any guards and canes/stakes should be checked to ensure they are providing protection but not damaging the developing whip and that its roots are still firmly seated in the ground. If the whip has become loose in the ground the soil around the base should be re-firmed and guards adjusted accordingly.

The space above the mulch mat around the whip should be kept clear of competing vegetation and weeds at all times.

The shrub shelter/guard should be removed once the whip has established a strong enough root system to support itself and has begun to grow strongly clear of the top of the shelter/gaurd, likely to be 1-2 years after planting. Biodegradable fabric can remain in place indefinitely.

Formative pruning should be carried out in accordance with **BS 3998** as required during the first five years to ensure the desired form is achieved.

For further guidance on whip and tree maintenance during establishment refer to **BS 8545:2014** Section 11.

Ongoing Maintenance and Management

- Allow whips to reach desired height before trimming
- Maintain weed-free area around trees and whips, minimum diameter from stem, using mulch mats
- Any dead or dying plants to be replaced during the winter season (November to March)
- Re-firm any plants loosened by frost heave, wind rock or vandalism by treading around the base
- Watering to be undertaken regularly during the summer months and as required in the first five years following planting, to achieve successful plant establishment
- Ameliorants to be added as necessary to amenity hedgerows and in accordance with the on-going maintenance above
- Shrub shelters/guards to be removed after two years to facilitate further growth and management
- Ideally hedges should be cut to form an 'A' shape, allowing light to reach the lower branches, which leads to a healthier and stronger hedge, whilst also offering a better habitat for wildlife and shelter for livestock;
- Native hedges are generally cut to a height of between 2 and 3m in sections on a three year rotation to allow fruit and berries to develop and remain as a food source for birds through the winter.

N

client
Barratt Homes, South Wales

project title
Land Adjacent to Llantwit Major Bypass, Boverton (Phase 2)

drawing title
Detailed Soft Landscape (Plan 2 of 2) - Tree Pit Specification Details

date	16 FEBRUARY 2018	drawn by	EB
drawing number	edp3775_d011	checked	KH
scale	1:200 at A1	QA	JW/ITF

the environmental dimension partnership
info@edp-uk.co.uk www.edp-uk.co.uk
Cirencester 01285 740427 Cardiff 02921 671900 Shrewsbury 01939 211190

edp | the environmental dimension partnership

CIRENCESTER
Tithe Barn,
Barnsley Park Estate,
Barnsley, Cirencester,
Gloucestershire GL7 5EG
01285 740427

CARDIFF
First Floor,
The Bonded Warehouse,
Atlantic Wharf,
Cardiff CF10 4HF
02921 671900

SHREWSBURY
The Stables,
Sansaw Business Park,
Hadnall, Shrewsbury,
Shropshire SY4 4AS
01939 211190

info@edp-uk.co.uk
www.edp-uk.co.uk

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