University of Kent Canterbury Campus Framework Masterplan

Preliminary Ecology Appraisal and Guidance

February 2018

University of Kent

CMA PLANNING

BIODIVERSITY BY DESIGN

SAVIA NUEVA

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Grey Squirrel
taken near Kent Business School

Contents

“Nature holds the key to our aesthetic, intellectual, cognitive, and even spiritual satisfaction.”

E.O.Wilson

1.0 Introduction

Introduction

1.1 Background

In 2015 the University of Kent (UoK) commissioned Farrells to produce a Concept Master Plan for its campus in Canterbury (also referred to here as *'the Campus'*), setting out a vision for the University's ongoing development over the next 50 years. This study concluded that the priorities for the growth should be to:

- Sympathetic growth through intensification of the heart of the campus, and
- A focus on Placemaking' through the process of consolidation and reorganisation

With respect to the second point, the University recognises that enhancing sense of place will play a major part in attracting new students and staff to the campus, as well as differentiating the UoK from competing universities, and that the soft estate of any campus can and should be major part of its sense of place. The strategy seeks to promote a wider diversity of landscape spaces within the core area of the Campus which *'will be the public* "living rooms" *where all members of the University community can gather to exchange ideas, where formal events take place and informal encounters are made possible.'*

The UoK now intends to develop the masterplan concept into a more detailed *'Framework Masterplan'*. The Framework Masterplan process is being undertaken in collaboration with Canterbury City Council with the intention that it is in due course adopted by the Council as planning guidance. In order to achieve these goals, the UoK has appointed a masterplan team to explore *'new opportunities to enhance the landscape, ecology, movement, environmental and economic infrastructure'.* The UoK therefore commissioned Studio Engleback and Biodiversity by Design to work together (under the banner joint company label *'Savia Nueva'*) to produce a Landscape and Biodiversity Appraisal which will in turn inform the wider Framework Masterplan; the present document has been produced in support of this.

Task reference / name	Description
1	Agree Memorandum of Understanding with Canterbury City Council (CCC); status, purpose, scope, process & resourcing.
2	Appoint Core Consultant Team.
3	Compile Baseline Data.
4	Review and agree the Client Brief & Objectives for the Framework Masterplan (including the University's development strategy).
5	Review Concept Masterplan in context of Public Consultation Statement (Round 1).
6	Prepare a detailed Project Plan, Programme & Fee Projection for the next stages of Framework Masterplan.
7	Set the Strategic Direction for the Core Disciplines: Urban Design; Town Planning; Transport & Movement; Landscape & Biodiversity; Consultation / Communications / PR (see below for further explanation).
8	Undertake gap analysis to identify need for further studies and identify study briefs.
9	Review and agree implementation of some *'Early Wins'.*
10	Review & agree all of the above before proceeding to Step 2.
Outputs	Client Brief & Objectives • Digital Database. • Digital & Physical Model. • Strategic Planning Report (contents to summarise all of the above).

Table 1.1:
Stage 1 requirements as set out in the University of Kent: Introduction to a Framework Masterplan document

1.1 Terms of Reference

In keeping with the project brief set out in the document University of Kent: Introduction to a Framework Masterplan, the UoK envisages the Framework Masterplan being produced over five stages which are:

1. Strategic Spatial Vision
2. Option Studies
3. Option Review
4. Framework Masterplan
5. Publication

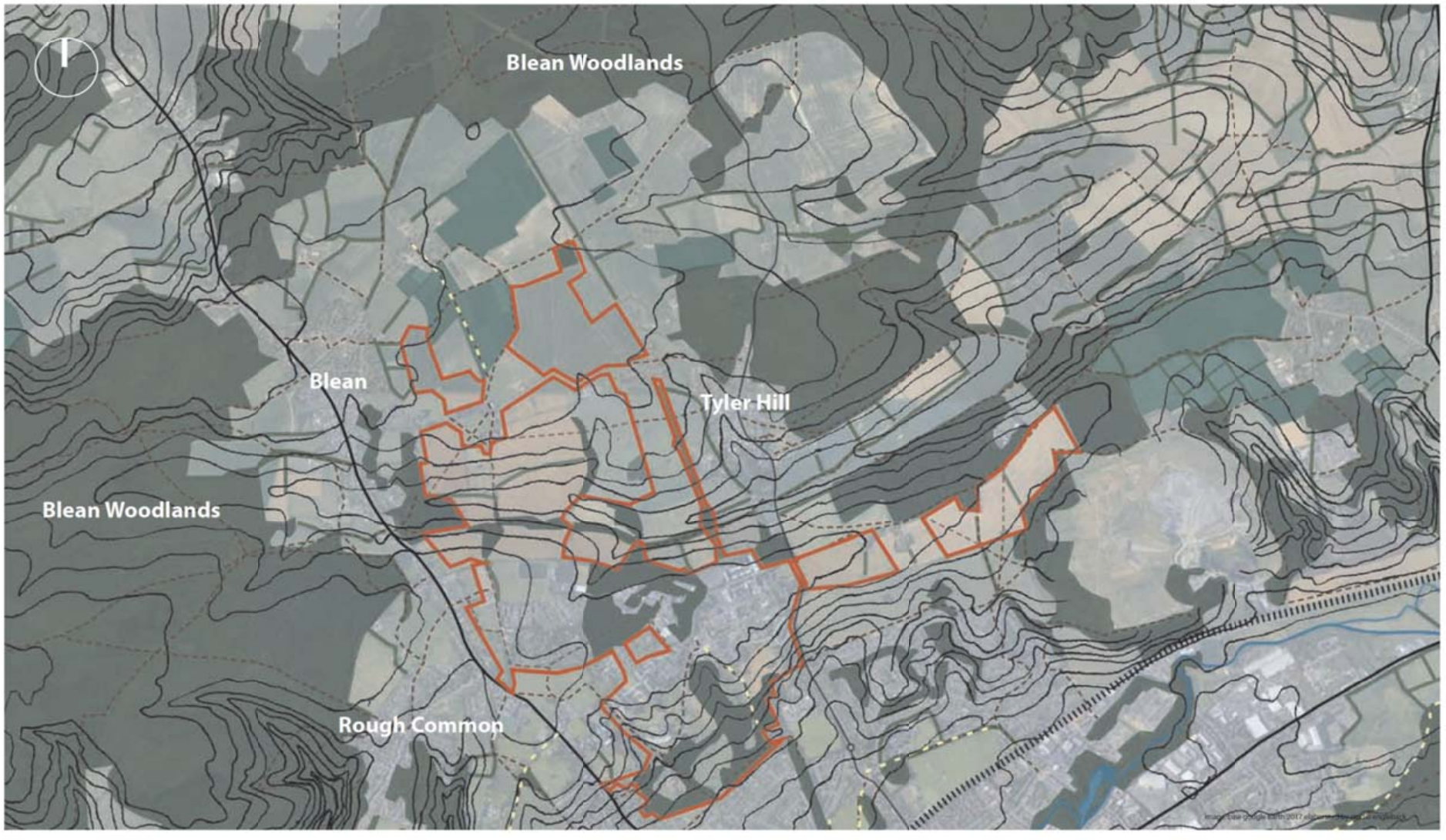
This Landscape and Biodiversity Appraisal document relates to Stage 1 (Project Planning), the requirements for which are set out verbatim in Table 1.1.

With respect to Task 7 – 'Set the Strategic Direction'– the project brief provides further clarity; specifically, regarding the Landscape and Biodiversity the strategy should include the following elements:

- *Define the strategy for the public realm in the Campus Core: hard/ soft/ character /levels /uses /commercial/ seasonal/ productive/enhancement of eco habitats/continuity with past.*
- *Define the strategy for the public realm in the Parklands: character/ continuity with past/planting/landscape elements & structures/enhancement of eco habitats.*
- *Define the strategy for the public realm in north of the campus: ditto, plus landscape setting for business clusters.*

The project brief clearly requires that all tasks listed above apply to the entire UoK estate and not just the Campus Heart (see Figure 1.1).

The present document has been produced to provide more detail on the ecological baseline as a basis for the Framework Masterplan and to set out a preliminary strategic approach to green infrastructure provision from an ecological point of view.


Blean Woodlands
Blean
Tyler Hill
Blean Woodlands
Rough Common

2.0 Survey Protocols

Meadow Brown Butterfly
taken in the lower parklands

2.0 Survey Protocols

2.1 Desk Study
The collation and review of desk information was carried out through June and July 2017. The aim was to collate local records of protected or notable species and habitats.

Desk records and comments were requested from Kent and Medway Biological Records Centre (KMBRC). The search area was a 10km radius for sites designated for nature conservation at the European level (Natura 2000 sites) and Annex II bat roost records and 2km for all other ecological data. KMBRC subsequently provided data including records from Kent Bat Group and Kent Ornithological Group.

Kent Wildlife Trust was contacted specifically with respect to the Blean Living Landscape Area, although no response has been received to date.

As discussed below, various biodiversity planning policy documents and biodiversity strategies and initiatives have also been reviewed.

2.2 Field Survey
Fieldwork followed standard Phase 1 Habitat Survey protocol (JNCC 2010), extended in accordance with the Institute of Environmental Assessment (1995) to include an assessment of the potential presence of legally protected flora and fauna.

All accessible land within the Site was walked and habitat types were classified and mapped as fully as possible using standard codes. Survey was undertaken by experienced ecologist Dr Lincoln Garland MCIEEM between the 13th and 16th July 2017 inclusive.

A map of habitats was drawn up and target notes were used to describe features of particular ecological interest. Land adjacent to the university estate was mapped at a more basic level of detail from the ownership boundary where visible to provide context. No detailed Phase 2 surveys (e.g. for protected species) were undertaken as part of these initial investigations.

2.3 Assessment of Ecological Importance
The approach to the assessment of ecological importance and impact assessment has followed guidance prescribed by the Chartered Institute for Ecology and Environmental Management (2016). The ecological importance of areas of land, and assemblages/populations of species and taxa has been categorised as follows:

- International (Special Areas of Conservation, Special Protection Areas, Ramsar sites)
- National (e.g. Sites of Special Scientific Interest and National Nature Reserves)
- Regional
- County
- Local (District) – Canterbury City Council
- Local (Parish) - Blean Forest Ward and Blean Parish
- Within the Immediate Zone of Influence of the Site only

3.0 Legislation Policy and Strategies

3.0 Biodiversity Legislation, Policy and Strategies

3.1 Biodiversity legislation

Key wildlife legislation covering protected sites and species relevant to the present project is summarised as follows:

- **Conservation of Habitats and Species Regulations 2010 (HR 2010)**. Provides protection for European Protected Species (EPS)/Schedule 2 (Sch. 2) listed species and their places of shelter and protection.

- **Wildlife and Countryside Act 1981 (as amended) (WCA 1981)**. Provides protection for – Schedule V (Sch. V) listed species and their places of shelter and protection; Schedule I (Sch. I) birds, their young, their eggs and their nests.

- **Natural Environment and Rural Communities Act 2006 (NERC 2006).** Provides protection via the 'Biodiversity Duty' of habitats, flora and fauna listed on Section 41 (S. 41) of the Act as being of 'Principal Importance' in England for the purpose of conserving biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making throughout the public sector, which should be seeking to make a significant contribution to the achievement of the commitments made by Government in *Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services.* The framework demonstrates how the UK and its component countries are to work to achieve the 'Aichi targets' set out in the Convention on Biological Diversity report - *'Strategic Plan for Biodiversity 2011–2020'.*

- **Hedgerow Regulations 1997.** These are the main regulations aimed at protecting 'Important' countryside hedges from removal and apply in England and Wales; hedgerows are exempt from protection where planning permission has been obtained for removal.

- **Protection of Badgers Act 1992 (PBA 1992**). Provides protection for Badgers and their setts.

The relevant protective status of each protected species (e.g. S. 41) is only given on the first occasion the species in question is mentioned.

3.1 National and Local Biodiversity Planning Policy

3.1.1 National Biodiversity Planning Policy

The National Planning Policy Framework (NPPF) 2012 establishes a presumption in favour of *'sustainable'* development except in case of Natura 2000 sites. For development to be sustainable there should be at least no-net loss of ecological resources. It prescribes that developments should seek to minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

In summary the NPPF stipulates that:

- All developments should consider climate change and biodiversity.

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

- Development proposals, where the primary objective is to conserve or enhance biodiversity, should be permitted. (N.B. as will be discussed, achieving a significant net gain for biodiversity is a key aim of the present proposals.)

- Opportunities to incorporate biodiversity in and around developments should be encouraged.

- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including Ancient Woodland and the loss of aged or veteran trees found outside Ancient Woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.

3.1.2 Biodiversity 2020: A Strategy for England's Wildlife & Ecosystem Services

In October 2010, over 190 countries signed an historic global agreement in Nagoya, Japan to take urgent and effective action to halt the alarming global declines in biodiversity. In June 2011, the Government published a Natural Environment White Paper entitled *The Natural Choice - Securing the Value of Nature*, responding to the global commitments made at Nagoya. It outlines the Government's vision for the natural environment, shifting the emphasis from piecemeal conservation action towards a more integrated landscape-scale approach and focus on provision of ecosystem services. Also, in June 2011, EU Member States endorsed the European Commission's *European Union Biodiversity Strategy,* which along with the global Nagoya agreement is being used to inform national plans.

The biodiversity strategy for England builds on the Natural Environment White Paper and these international strategies and agreements, setting out the strategic direction for biodiversity policy. The mission for this strategy, for the next decade, is to halt overall biodiversity loss, support healthy well-functioning ecosystems and the very valuable services that they provide, and to establish coherent ecological networks with more and better places for nature for the benefit of wildlife and people.

Biodiversity 2020 is being implemented in Kent via *Kent Biodiversity 2020 and Beyond – a Strategy for the Natural Environment 2015-2025* (Kent Nature Partnership, undated), which is discussed below.

3.02.3 Canterbury District Local Plan Publication Draft 2014 - Landscape and Biodiversity
The Canterbury District Local Plan 2017 (CDLP) has been adopted. Consultation on Main Modifications (following an Examination in Public) took place in February and March 2017 and the Plan is expected to be adopted by the end of 2017. Given this advanced stage of preparation, the emerging Plan (as proposed to be modified) is taken as being the 'development plan'. Relevant policies are set out below

In summary the plan:

1. Broadly commits to the Royal Town Planning Institute's (1999) five- point approach to decision-making which is: (i) basing decisions on up-to-date ecological information; (ii) avoidance of ecological impacts where possible; (iii) mitigation of significant impacts; (iv) compensation for losses of important biodiversity; and (iv) new benefits or enhancement.

2. Identifies notable ecological features as designated sites, protected habitats and species, and the requirement for these to be protected and enhanced.

3. Recognises the importance of biodiversity networks (linear and continuous landscape features that provide links or stepping stones from one habitat to another) and the importance of landscape scale conservation measures.

4. Recognises the importance Areas of High Landscape Value and Landscape Character Areas, and in this regard emphasises that new development should address the findings of the Landscape Character and Biodiversity Appraisal (see next section).

5. Provides particular support for projects that restore, enhance and connect the valued woodland habitat complex of the Blean (see below for further discussion).

Policy LB2 Areas of High Landscape Value
Within these areas, development will be considered in relation to the extent to which its location, scale, design and materials would protect the local landscape character and enhance the future appearance of the designated landscape and its nature conservation interest. Development proposals which run contrary to landscape character (including settlement character), or impact directly upon historic setting, archaeological or nature conservation interests, where relevant, will not be permitted.

[N.B. The Canterbury (the valley of the River Stour around Canterbury) Areas of High Landscape Value overlaps with the southern edge of the Site and thus is of most relevance to the present proposals.]

Policy LB4 Landscape Character Areas
Proposals for development, and associated land use change or land management, must demonstrate that they are informed by, and sympathetic to, the landscape character of the locality. In considering development proposals, the Council will take every opportunity to reinforce, restore, conserve or improve, as appropriate, the landscape character of the area in which development is proposed.

Development will only be permitted if the following criteria can be satisfied:

1. Development would be appropriate to the economic and social wellbeing of the area;
2. The site selection can be adequately justified, with the siting of development minimising the impact;
3. Development would safeguard or strengthen tranquillity, features and patterns that contribute to the landscape character and local distinctiveness of the area;
4. The scale, design, materials and landscaping measures are appropriate and would lead to an enhancement of the character of the landscape; and Development will promote maintenance, enhancement, and restoration of biodiversity as appropriate in accordance with policy LB9.

All development must take into account the sensitivity of the particular landscape to accommodate change. Development, or associated land use change or land management, which would adversely affect the landscape character of an area, will not normally be allowed. The development should appropriately address the findings of the Landscape Character and Biodiversity Appraisal condition and sensitivity guidelines of the particular landscape policy character areas affected.

Policy LB5 Sites of International Conservation Importance
Sites of international nature conservation importance must receive the highest levels of protection. No development will be permitted which may have an adverse impact on the integrity of a Special Area of Conservation, Special Protection Area for birds or Ramsar site, alone or in combination with other plans or projects, as it would not be in accordance with the aims and objectives of this local plan. Where a likely significant effect of a plan or project on European sites cannot be excluded, during Habitat Regulations Assessment Screening, an Appropriate Assessment in line with the Habitats Directive and associated regulations will be required. In the event that the Council is unable to conclude that there will be no adverse effect on the integrity of any European sites, the plan or project will be refused.

Policy LB6 Sites of Special Scientific Interest
Planning permission will not be granted for development which would materially harm the scientific or nature conservation interest, either directly, indirectly or cumulatively, of sites designated as a site of Special Scientific Interest (SSSI) or National Nature Reserve (NNR) for their nature conservation, geological, or geomorphological value.

Policy LB7 Locally Designated Sites
Development or land-use changes likely to have an adverse effect, either directly or indirectly, on:
1. Local Wildlife Sites;
2. Local Nature Reserves; or
3. Regionally Important Geological / Geomorphological Sites

will only be permitted if the justification for the proposals clearly outweighs any harm to the intrinsic nature conservation and/or scientific value of the site. Where development is permitted on such sites, careful site design should be used to avoid any negative impact. Where negative impact is unavoidable, measures must be taken to ensure that the impacts of the development on valued natural features and wildlife have been mitigated to their fullest practical extent. Where mitigation alone is not sufficient, adequate compensatory habitat enhancement or creation schemes will be required. Any application affecting locally important sites will be expected to demonstrate enhancement measures to benefit biodiversity.

Policy LB8 Landscape Scale Biodiversity Networks
New development will need to:

1. Avoid the fragmentation of existing habitats and support the creation of coherent ecological networks through both urban and rural areas, and

2. Retain, protect and enhance notable ecological features of conservation value such as ancient woodland, neutral grassland, hedgerows, trees, wetlands, river corridors and other water bodies, and habitats that offer breeding or feeding sites of local importance to populations of protected or targeted species. Only lighting that has been sensitively designed to minimise disturbance to protected species and their food sources (e.g. low level, directed, warm, tinted lighting) will be permitted.

Strategic opportunities for biodiversity improvement will be actively pursued within the Biodiversity Opportunity Areas. Development which significantly damages opportunities for improving connectivity of habitats in these strategically important areas will be refused.

Policy LB9 Protection, Mitigation, Enhancement and Increased Connectivity for Species and Habitats of Principal Importance
All development should avoid a net loss of biodiversity/nature conservation value and actively pursue opportunities to achieve a net gain, particularly where:

1. There are wildlife habitats/species identified as Species or Habitats of Principal Importance;
2. There are habitats/species that are protected under wildlife legislation;
3. The site forms a link between or buffer to designated wildlife sit

This will be secured by:

1. Ensuring that site evaluation is undertaken to establish the nature conservation value of proposed development sites. Developers will be expected to carry out appropriate ecological survey/s and present proposals for mitigation and enhancement prior to determination of a planning application. Planning permission will only be granted where the City Council is satisfied that mitigation measures proposed represent an appropriate response to the habitat or species interest of the site. Where on-site mitigation is not possible, adequate compensatory habitat enhancement, creation schemes or other measures will be required to ensure that the impacts of the development on valued natural features and wildlife have been offset to their fullest practical extent.

2. In some cases, where wildlife impacts are significant, it may be necessary to find an alternative location for the development. For European protected species, planning permission will only be granted where the three tests set out in the Habitats Regulations are satisfied.

3. Delivering positive opportunities for habitat restoration and creation through the development process: identifying, safeguarding and managing existing and potential land (or landscape features of major importance for wild flora and fauna) for nature conservation as part of development proposals, particularly where a connected series of sites can be achieved.

Development which may harm (either directly or indirectly) Habitats or Species of Principal Importance will only be permitted if *"there are no reasonable alternatives and there are clear demonstrable social or economic benefits of the development which clearly outweigh the need to safeguard the site or species; and adequate mitigation and compensation measures are provided when damage to bio diversity interests are unavoidable."*

Any mitigation measures must be within the control of the developer. The developer must take responsibility for ensuring mitigation measures are fully implemented.

Policy LB10 Trees, Hedgerows and Woodland
Development should be designed to retain trees, hedgerows and woodland that make an important contribution to the amenity of the site and the surrounding area and which are important to wild flora and fauna. New development should incorporate trees, in areas of appropriate landscape character, help restore and enhance degraded landscapes, screen noise and pollution, provide recreational opportunities, help mitigate climate change and contribute to floodplain management. The value and character of woodland and hedgerow networks should be maintained and enhanced, particularly where this would improve the landscape, biodiversity or link existing woodland habitats.

This will be achieved by:

- Incorporating tree planting as an integral element of landscaping schemes where this is in keeping with the landscape character of the area;

- Protecting ancient woodland, ancient trees and 'important' hedgerows from damaging development and land uses;

- Promoting the retention and effective management, and where appropriate, extension and creation of new woodland areas and hedgerows;

- Promoting and encouraging the economic use of woodlands and wood resources, including wood fuel as a renewable energy source;

- Promoting the growth and procurement of sustainable timber products; and

- Promoting the retention, enhancement and extension of existing hedges.

The Council will refuse planning permission for proposals that would threaten the future retention of trees, hedgerows, woodland or other landscape features of importance to the site's character, an area's amenity or the movement of wildlife.

Policy LB11 The Blean Complex
The Council will support projects that restore, enhance and connect the valued woodland habitat complex of The Blean Complex. The Council will give particular support to projects that benefit the landscape through sensitive and traditional woodland practices and which support the timber market and wider local economy.

The Council will refuse proposals for development that damages the character and integrity of The Blean Complex or which will prevent important opportunities for biodiversity improvement within the Biodiversity Improvement Areas.

Policy LB13 River Corridors
The environment within river corridors and river catchments, including the landscape, water environment and wildlife habitats, will be conserved and enhanced.

Supply of water, treatment and disposal of waste water and flood risk management should be sustainable and deliver environmental benefits.

3.02.4 Canterbury Landscape Character and Biodiversity Appraisal
CCC has produced a Draft Supplementary Planning Document (SPD), titled the *Draft Canterbury Landscape Character and Biodiversity Appraisa*l (Jacobs & Canterbury City Council 2012). This report is intended to be a useful tool for development management, land managers, developers and conservation bodies. It is also being used to inform the preparation of the Local Plan. Summary recommendations from this document are set out below in section 3.02.5.

3.02.5. More specific recommendations are provided in the document for the various Landscape Character Areas found within the local authority. The two Landscape Character Areas covering the UoK site are the *Stour Valley Slopes* and *Blean Farmlands*.

Recommendations for these two areas from the Appraisal document are summarised below in 3.02.06. Habitat Network Potential figures extracted from the document are shown in Section 3.02.3. Note that within the UoK boundary two areas are highlighted as having potential for woodland establishment in the Blean Farmlands Landscape Character Area; one just to the north of Sarre Penn Valley and the other to the north of Tyler Hill Road.

Summary Recommendations from the Draft Canterbury Landscape Character and Biodiversity Appraisal Document

Task: Overview

- For biodiversity, the conservation of the existing resource must be done in concert with the creation of new areas of habitat, where such creation can provide district and county-wide linkage.

- As an adaptation to climate change and to rectify past losses, the development of well-connected habitat networks at the landscape scale should be given a clear priority.

- The active involvement of local landowners, farmers, national and local government, special interest groups and all those who live in, work in and visit the countryside will be vital to secure these measures to protect and enhance the countryside around Canterbury.

Task: Farmland Landscapes

- Where these landscapes [farmland] are in poor condition opportunities should be sought to enhance natural features such as the enclosure pattern.

- Where grazing of grasslands is prevalent, consideration should be given to managing grazing for enhanced biodiversity.

- Mechanisms for the enhancement of the [farmland] landscape include the application of appropriate design through the normal planning process and land management initiatives such as woodland and environmental stewardship grant schemes.

Task: Valley and Wetland Landscapes

- The improvement of the condition of these areas should be encouraged through the appropriate retention and management of areas of woodland, heath and pasture.
- The long term aim for The Blean is to bring the different parts of The Blean together. This will be achieved through The Blean Initiative, which is a partnership of landowners, local authorities, conservation bodies and community groups working together to look after this unique landscape for both wildlife and people.
- Particular objectives include improving access and enabling people to explore the landscape on both foot and by bike.

3.02.5 Habitat Network Opportunities

The Summary recommendations in the Draft Canterbury Landscape Character and Biodiversity Appraisal covering the two landscape character areas falling within the University's landholding (Stour Valley Slopes and Blean Farmlands Landscape Character Areas) are as follows:

Stour Valley Slopes

- There is significant opportunity in this area to extend and buffer the woodlands of The Blean southwards into the Stour valley, towards Canterbury. This would also link the small blocks of woodland scattered throughout this area between the University of Kent and Broad Oak.
- Encourage the restoration of the historic parkland planting.
- Strengthen and recreate the traditional field pattern.
- Conserve and restore open grass slopes overlooking the City.
- Promote active coppice management of designated woodland habitat where appropriate.
- Resist further fragmentation and seek to create new woodland or woodland corridors where significant opportunity exists between the University and Broad Oak village.
- Strengthen the structure of the field pattern on the slopes beneath the University resisting the further introduction of scattered ornamental planting.
- Resist the introduction of dominant features on the visually sensitive ridgeline.

Blean Farmlands

- There is great woodland habitat network opportunity in this area, mainly around the periphery, as shown on the graphic showing detailed habitat network potential (see Figure 3.1).
- In addition, to the north east, there is a significant zone highlighted as having acid grassland and heath network potential
- Conserve grazed pasture.
- Maintain and improve the traditional character of hedgerow planting along lanes and roads.
- Reinforce and conserve the hedgerow and shelterbelt networks.
- Encourage suitable planting around visually prominent farm buildings (particularly large, modern sheds) to soften the visual impact.
- New development should be of local scale and character and relate to existing settlements.

3.02.6 Blean Living Landscape Area

Nature conservation in the UK has traditionally focused on the preservation of specific sites. But outside these limited areas, natural habitats have been lost on an unprecedented scale and many species, both common and rare, are in long-term decline. It is therefore generally agreed that:

- Small, isolated areas of habitat are likely to hold proportionately fewer species than larger areas, and the populations of these species are likely to be more vulnerable to local extinction.
- Functional connectivity between areas of wildlife habitat is likely to make it easier for populations of species to shift in response to climate change.
- The small and isolated nature of most areas of wildlife habitat in the UK poses a significant risk to biodiversity, particularly in the face of likely climate change.

In response to these challenges The Wildlife Trusts has since 2006 championed the *Living Landscape Recovery Plan*; a new way of thinking about how land is managed for wildlife, people and the economy. To achieve a vision for Living Landscapes, where wildlife is flourishing and recovering from past decline, the goal is to 'think bigger and longer-term'. Each Living Landscape scheme therefore covers a large area of land; a naturally functioning landscape (such as a river catchment). Each Living Landscape aims to protect and enhance: core areas of high quality; connections between core areas; and to make land between the core areas and connecting habitats more permeable for wildlife.

The northern part of the University estate is within Blean Living Landscape Area. The Blean Living Landscape includes one of the biggest complexes of Ancient semi-natural woodland in England, covering ca. 1,000ha. Most of the woodlands are designated under various tiers of protection including Special Area of Conservation (SAC), National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI) and Local Wildlife Site (LWS). The Blean Woodland Complex is of particular importance for birds and several threatened butterfly species, and harbours Kent's last few colonies of the rare Heath Fritillary Butterfly *Melitaea athalia* (Sch. V; S. 41). The Blean Living Landscape aims to expand and reconnect nature reserves within the area, preserving and enhancing the area's rich biodiversity.

Key actions include:

- Natural ecological processes such as grazing are being restored, in order to re-create a diverse mixture of habitats including broadleaved woodland, wooded heath, grassland and wetland.
- Wildlife corridors are being established to encourage the dispersal of some of the UK's rarest species.
- Habitat will be enhanced for species such as the Nightjar *Caprimulgus europaeus* (S. 41; Amber list), Nightingale *Luscinia megarhynchos* (Red list) and the rare Honey Buzzard *Pernis apivorus*, and one of the largest colonies of the Heath Fritillary Butterfly in Britain will be established.
- More than 1,000 hectares of woodland have been brought into conservation management and a programme has been started to restore native deciduous woodland from pine plantation.

Further information on specific proposals for the Blean Living Landscape Area has been requested from Kent Wildlife Trust although a response has not been received to date.

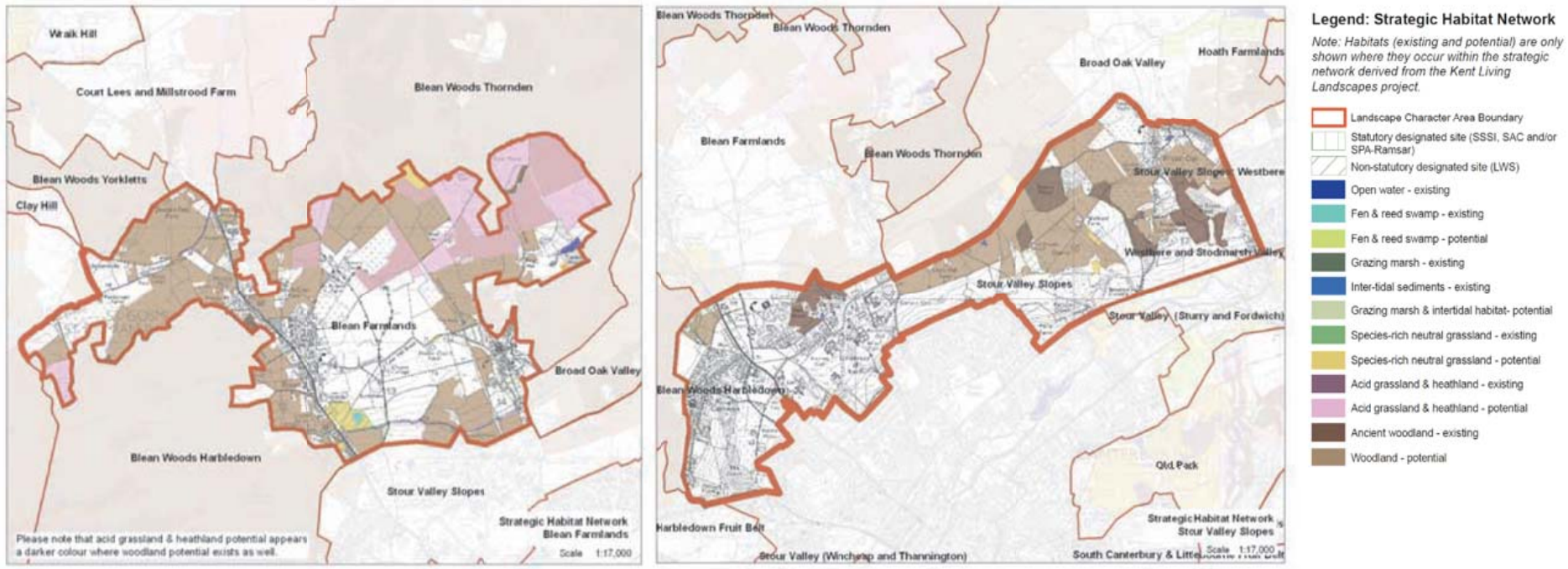


Figure 3.1: Stour Valley Slopes and Blean Farmlands Landscape Character Areas Habitat Network Potential (reproduced from Draft Canterbury Landscape Character and Biodiversity Appraisal). N.B. Within the UoK boundary two areas are highlighted as having potential for woodland establishment in the Blean Farmlands Landscape Character Area (see dashed black line)

3.02.8 Blean Biodiversity Opportunity Area

The northern part of the University estate is also within the Blean Biodiversity Opportunity Area (BOA). Biodiversity Opportunity Areas are areas where conservation action, such as habitat creation, restoration or expansion, is likely to have the greatest benefit for biodiversity. They are centred on existing areas of biodiversity interest but have a key role as areas which offer strategic opportunities for biodiversity enhancement and are expected to contribute towards the UKBAP priority habitat targets identified in regional and local Biodiversity Strategies and Action Plans. As discussed, The Blean is one of the biggest complexes of Ancient semi-natural woodland in England. Much of this interest has been created and maintained by a long history of coppice management. Biodiversity targets for the Blean BOA are set out below.

It should be noted that the Biodiversity Opportunity Area concept is integral element of the Canterbury Landscape Character and Biodiversity Appraisal document and hence is considered a material consideration in planning policy.

Biodiversity Targets for The Blean BOA

1. No loss of ancient semi-natural woodland and its mosaic of associated habitats.

2. Enhance and reconnect woodland to create a very extensive block of habitat, particularly through the maintenance and restoration of coppice management.

3. Restore conifer plantations on ancient woodland sites to suitable, wooded habitat including up to 25% early successional stages.

4. By 2020, at least 50ha of heath and acid grassland (including grazed wooded heath) should be restored or enhanced as part of the wood land matrix, in blocks of at least 2ha in extent. Additional opportunities should be pursued for creation of acid grassland and heathland where this would contribute to the county-wide target of creating up to 37ha.

5. Pursue opportunities for creation of species-rich neutral grassland where this would contribute to the county-wide target of creating 37ha of new lowland meadow in blocks of at least 2ha by 2020. Enhance at least 13ha of species-rich neutral grassland to bring it to UK BAP priority habitat Lowland Meadow quality.

6. Action for naturally widely dispersed habitats and species will need to focus across the whole of the area and not just within the Biodiversity Opportunity Area boundary.

3.03 UoK Policy and Strategy Documents

3.03.1 UoK Environment Policy

The UoK adopted its first Environment Policy in 1996 and the latest version was approved by the Vice-Chancellor and Chair of Council in October 2016. This Environment Policy commits the University to being a responsible corporate citizen that leads by example with regard to environmental sustainability. The University is committed to following good environmental practice, meeting or exceeding all compliance obligations, and continual improvement.

The main objectives and commitments are to:

- 'Reduce carbon emissions in accordance with the University's Carbon Management Plan.
- Improve energy and water efficiency and reduce reliance on fossil fuels.
- Protect the environment and prevent pollution.
- Optimise reduction, reuse, recycling and disposal of waste.
- Reduce the impacts of transport and travel and encourage sustainable alternatives.
- Manage the use, storage and disposal of materials to reduce environ mental impact.
- Manage our campuses to protect and enhance biodiversity.
- Promote sustainable procurement, both internally and through the University's supply chains.
- Communicate with staff, students and relevant interested parties and promote sustainable behaviours.'

Of particular relevance to this document is the commitment to protect and enhance biodiversity.

3.03.2 University of Kent, Canterbury: Concept Master Plan

In 2015 the UoK has published a Concept Masterplan which set out a new vision for future growth and development (Farrells, 2015). Key messages with respect to sustainability and environmental protection are set out in Table 3.5. In summary the UoK has great ambitions to create a safe and sustainable landscape environment that is visually appealing, and which encourages leisure activities and social interaction. The strategy sees the creation of a high quality public realm linked to local landscape character as critical in establishing a unique selling point for the University. This is founded upon establishing a network of high quality green landscapes set within the framework of a consolidated pedestrian friendly campus *'heart'.* This landscape-based approach also ties in neatly in with the wider reputation of the county as the *'Garden of England'.*

The strategy commits to creating *'eco-spaces where a diversity of flora and fauna could thrive'.* The broad commitment to enhance and create new recreational greenspaces will also provide opportunities for the creation of rich biodiverse landscapes i.e. greenspaces should be multifunctional.

The strategy goals respond to the fact that many of the *'green spaces within the campus are rather homogenous and repetitious, and this lack of variety means that the university under-achieves in terms of its campus character and personality'. Furthermore, the report notes that 'access to green space is available but their use is not encouraged …. paths that connect the core with the outer campus are long, lack animation or passive surveillance.'*

Much of the University landscape is valuable woodland and protected from development or adaptation. The University of Kent should embrace the value of woodlands within the Campus and should not see them as a constraint. Woodlands on campus should be viewed as major natural assets that should be enhanced to provide much greater ecological, visual and amenity interest, as is discussed in more detail below.

Other Environmental Guidance for the Framework Masterplan
The masterplan team are in the process of preparing Baseline Mapping data, which will identify the relevant planning designations, that will need to be taken into account during the Framework Masterplan process, including relevant open space, TPO's, ancient woodland and biodiversity designations.

The masterplan team are also in the process of preparing a Planning Baseline section of an emerging Planning and Environment Strategy, which will refer to key relevant planning designations and additional relevant guidance/evidence documents. The emerging strategy document will include links to the relevant documents as making reference to the following documents:

Trees and development SPG (September 2003)
The aim of this guidance is to provide advice and examples of best practice, and to assist applicants in the identification and successful retention of appropriate trees within development sites.

The Landscape Assessment of Kent (October 2004)
The Landscape Assessment of Kent is a landscape character-based study that draws together existing assessments and updates them. Additional work on the condition and sensitivity of the Kent landscape was used to formulate character-based strategies to ensure the continued distinctiveness of the Kent landscape.

The Character Area Report for the Stour Valley (p216) describes the Valley's condition as "Poor" (within a range of "Poor", "Moderate" and "Good") and its sensitivity as "Moderate" (within a range of "Low", "Moderate" and "High"). The identified 'Landscape Actions' comprise:

- Conserve ditches and the pattern of sinuous pastures.
- Conserve the strong ecological corridor of the river, wetlands and ditch network, and enhance it with sensitive management.
- Conserve areas of non-intensive use within farmland.
- Restore managed tree cover in and around areas of settlement.
- Conserve and restore tree lines along water courses.

Woodland Inventory for Canterbury District, Kent:
Report & Inventory Maps (August 2012)
This document sets out a revised Ancient Woodland Inventory for the Canterbury District. It identifies part of the Campus as comprising Ancient semi-natural woodland (ASNW). ASNW stands are those that are composed predominantly of trees and shrubs native to the site that do not obviously originate from planting. They include stands that may have been managed by coppicing or pollarding in the past, as well as those where the tree and shrub layer has grown up by natural regeneration.

The draft Planning & Environment Strategy also has a section on hedgerows which seeks to summarise their protection. It would be good to get comments on this to make sure it is correct.

Draft Open Space Strategy for the Canterbury District (2014 to 2019)
This is a comprehensive strategy for open space provision in the District. The most relevant part is Appendix 13 -Public open space in new housing developments best practice paper – which can be accessed vi the second link.

3.04. Kent Biodiversity Strategy and Action Plan Documents

3.04.1 Kent Biodiversity 2020 and Beyond Strategy

The Kent Nature Partnership has produced the *Kent Biodiversity 2020 and Beyond – A Strategy for the Natural Environment 2015-2025* to:

- Halt overall biodiversity loss in Kent and Medway.
- Contribute to the conservation of national and global biodiversity.
- Support healthy well-functioning ecosystems.
- Establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.
- Support work that contributes to the objectives of the Strategic Frame work for the Natural Environment and ensures that this work is reported to capture the contribution that is being made in Kent and Medway to the England Biodiversity Strategy.

The Strategy provides a spatial plan for the delivery of these objectives, indicating where targets should be focused in order to secure the maximum biodiversity benefits. In this regard Kent's terrestrial landscape has been divided into Biodiversity Opportunity Areas. Objectives for the Blean Biodiversity Opportunity Area have been, as discussed, integrated into CCC planning policy through the Canterbury Landscape Character and Biodiversity Appraisal.

Targets aspired to in the Strategy for habitats that are potentially relevant to UoK are set out in Table 3.1.

3.04.2 Kent Biodiversity Action Plan

The Kent Biodiversity Action Plan (BAP) has been considered pivotal in ensuring delivery of the local nature conservation goals described for the National Character Areas set in a national context (Kent Biodiversity Action Plan Steering Group, 1997). While the Kent BAP has now been largely superseded by Kent Biodiversity 2020 and Beyond strategy in terms policy and approach, the BAP is still referenced here as much of the background information still has relevance with respect to nature conservation practice; note though it is recognised that the current approach has a much greater focus on landscape-scale habitat restoration and management.

As discussed, the UoK is within the North Kent Plain National Character Area. Relevant objectives for Priority Habitats and Priority Species as set out in the Kent (BAP) are set out in Tables 3.2 and 3.3 respectively.

Priority Habitats	Objectives
Lowland Mixed Deciduous Woodland	• Restore 23ha by 2020 & 11ha by 2025. • Create 12ha by 2020 & 6ha by 2025.
Wet Woodland	• Restore 99ha by 2020 & 49ha by 2025. • Create 53ha by 2020 & 26ha by 2025.
Wood Pasture and Parkland	• Restore 476ha by 2020 & 238ha by 2025. • Create 254ha by 2020 & 127ha by 2025.
Traditional Orchard	• Restore 1500ha by 2020 & 750ha by 2025. • Create 1500ha by 2020 & 750ha by 2025.
Hedgerows	• Restore 16km by 2020 & 8km by 2025. • Create 134km by 2020 & 67km by 2025.
Arable Field Margins	• Restore x ha by 2020 & x ha by 2025. • Create x ha by 2020 & x ha by 2025.
Lowland meadow	• Restore 69ha by 2020 & 34ha by 2025. • Create 37ha by 2020 & 18ha by 2025.
Rivers, including chalk rivers	• Improve condition 21ha by 2020 & 10ha by 2025. • Restore No net loss by 2020 & No net loss by 2025.
Ponds	• Restore 350 by 2020 & 170 by 2025. • Create 300 by 2020 & 150 by 2025.

Priority Habitats	Objectives
Woodland	To retain all ancient semi-natural woodland, to restore positive conservation management and enhance to a more semi-natural character woodlands on ancient replanted sites (e.g. diversify Sweet Chestnut plantations, retain some standard trees, allow some neglected coppice to develop into high forest), with a priority given to SSSI/SNCI woodlands. Creation of new native woodland on greenfield sites of no current wildlife or archaeological value. Implement best practice in woodlands, with increasing biodiversity as a key aim. Establish a small number of large, minimal intervention woodlands. To manage some areas of scrub, in the long term, alone or in association with other habitats.
Lowland Wood-Pasture And Historic Parkland	Retain the best examples of wood-pasture in the county. Reinstate positive management of key areas of wood-pasture and parkland to ensure the survival of the old trees and their associated micro-habitats.
Hedgerows	Prevent further hedgerow losses. Reinstate positive management and restoration of existing hedges, with a priority given to ancient and species-rich hedges. Extend the hedgerow cover to create links between isolated woodland and hedge fragments. All planting to use plants of native stock where possible of local provenance. Maintain current stock of hedgerow trees and establish new ones where absent.
Lowland Farmland	Maintain the existing areas of semi-natural habitat within the farmland matrix and create new areas increase where possible (e.g. field margins, number of ponds, woodland shaws [A shaw is a strip of woodland usually between 5 and 15 metres (15 and 50 feet) wide) commonly forming a boundary between fields or between a field and a road], hedges, wet grassland) and connect fragmented habitats and populations where appropriate. Increase the number of farms operating under nature conservation schemes. Reduce agricultural pollution, especially entering waterways.
Neutral Grassland	To prevent the further loss of species-rich neutral grassland. To secure positive, traditional management of species-rich semi-improved sites. To create and restore habitats by promoting appropriate management of those improved grasslands in proximity to valuable neutral grassland areas, enlarging areas and creating links between existing fragments.
Rivers and Streams	To manage all catchments and maintain in a condition which supports the full potential range of flora and fauna, through improved water quantity and quality, and physically respecting and conserving the dynamic nature of rivers, their micro-habitats and their associated floodplains.
Standing Water	Retain the current area of standing open water in Kent. Enhance the conservation interest of existing water bodies by appropriate management, particularly those which support important species or communities. Increase the number of ponds and ditches with open water. To maintain ground water supplies and increase to historic levels.

Table 3.2 Relevant Kent BAP Priority Habitats and Species

Priority Species	Objectives
Otter *Lutra lutra* (Sch. 2; Sch. V; S. 41)	Survey to assess and monitor populations. Protect existing populations and encourage natural expansion through good habitat management. Assess and alleviate physical threats. Maintain and raise the profile of the Otter. Determine historical distribution.
Dormouse *Muscardinus avellanarius* (Sch. 2; Sch. V; S. 41)	To maintain and enhance the current Dormouse populations and increase the number of self-sustaining populations. To ensure known sites are managed with appropriate scale and frequency of coppicing cycles. To ensure commercial viability of coppicing by stimulating the wood products market. As a stronghold Kent could possibly act as a donor for translocation to other counties.
Serotine Bat *Eptesicus serotinus* (Sch. 2; Sch. V)	To maintain this building-dependent bat as a widespread species in Kent. To maintain and enhance, and where possible extend, the available feeding habitat. To maintain and increase opportunity for roosting in buildings.
Nightingale *Luscinia megarhynchos* (RSPB Red List)	To maintain the current population numbers (at least 1,000 pairs) in the short-term and increase in the longer-term within Kent. To ensure appropriate coppicing and scrub management is carried out on and adjacent to known sites, and in other areas identified as being potential expansion sites (N.B. to conflict with management for dormice, heath or pearl-bordered fritillary if known to be present).
Great Crested Newt *Triturus cristatus* (Sch. 2; Sch. V; S. 41)	Maintain the range, distribution and viability of existing Great Crested Newt populations, in the county. Increase the area of suitable terrestrial habitat and number of ponds available to GCN (aim to create, or restore from a derelict state, 20 ponds/year in areas with suitable terrestrial habitat).
Heath Fritillary *Melitaea athalia* (Sch. V; S. 41)	Ensure positive management of all known Heath Fritillary sites in Kent. To increase the population and range within Kent.

Table 3.3 Relevant Kent BAP Priority Habitats and Species

Table 3.4 Summary of Management Plan Objectives

Habitat	Management objectives
Biodiversity Management Plan & Woodland Management Strategy	
Woodland	Brotherhood Wood and Park Wood: Rotational coppicing of Brotherhood Wood, Park Wood and Bluebell Wood. Maintain ongoing presence of oak standards through recruitment of natural regeneration and planting. Control invasive species such as sycamore. Bluebell Wood Selective thinning with Norway maple and Hornbeam to encourage establishment of woodland ground flora.
Mature trees	A number of Tree Preservation Orders exist across campus and all proposed works take into account the requirements set by these Orders. Fell dangerous or diseased trees where necessary. When planting new trees the majority will be selected from British native species and where possible of local provenance. This is with the exception of trees selected for the Arboretum.
Grassland	Amenity – monthly cuts April to October. Meadows in the Parklands zone (also known as the Southern Slopes – annual cut in August. Wildflower meadows between Beverly Farm House and Keynes College - annual cut in September.
Ponds	Remove dead vegetation Remove excess detritus from pond surface Check tree canopy and cut back where required
Invasive species	The types and locations of invasive species will be recorded and a detailed management plan produced. Where necessary a specialised contractor will be employed to deal with invasive species around the campus.
Estates Environmental Plan	
Soft estate management - general	The Canterbury campus is host to number of protected species including, but not limited to: Bats, Great Crested Newts, Badgers *Meles meles*, Dormice, Reptiles and Birds. Where construction, maintenance or grounds work has the potential to disturb these species ecologist surveys, mitigation plans and in some cases licences are required. Prevent pollution. Manage the use, storage and disposal of materials to reduce environmental impact. Manage green spaces to promote biodiversity (N.B. prescriptions for management of woodlands, grasslands and ponds as set out in Biodiversity Management Plan are reiterated). Work with staff, students and other contacts to understand their own environmental impacts and assist them to make improvements where possible.
Short term goals	Improve communication between Projects team and Grounds Maintenance to ensure protection of existing landscapes.
Medium term goals	Develop campus-wide tree survey programme. Develop campus-wide biodiversity forum to discuss issues, share best practice and ensure a joined-up approach to biodiversity management.
Long term goals	Investigate campus GIS mapping to include trees, wetlands, greenspace, protected and biodiversity important species. Formalise practical conservation through academic curriculum.

3.05 University of Kent Landuse Management Plan

The University of Kent has produced the following land management plans:

- *University of Kent Biodiversity Management Plan (UoK, 2016).*
- *Woodland Management Strategy (LUC, 2016).*
- *University of Kent Estates Environmental Plan (UoK, 2015).*
- *Woodland Mitigation and Enhancement (LUC, 2014).*
- *Canterbury Campus: Ponds and Recommended Management Actions (2012)*

These documents outline the University's commitment to environmental sustainability with respect soft estate management. As stated in the Biodiversity Management Plan, a key aim is to ensure that *'biodiversity becomes an integral part of the day to day running of the University's outdoor spaces through identification of the status of its habitats and the species present, and key objectives are identified for maintaining and enhancing biodiversity.'*

Management objectives and prescriptions are not reproduced in detail here, although a summary is provided in Table 3.4 (all habitats referenced are described in detail in the following section).

Management is primarily being implemented by the University's Estates Department although voluntary management of select areas is being carried out by a number of groups including:

- Durrell Institute of Conservation and Ecology (DICE) – GCN Experimental Ponds and adjoining plot of land (western edge of Site near Estates Management yard).
- Allotment Group / Oasis Garden Society – allotment area (western edge of Site near Estates Management yard).
- School of Anthropology and Conservation - Dr Ian Bride and students undertaking traditional woodland management activities in Billhook Nook, along the south-western margins of Brotherhood Wood.
- The University of Kent Conservation Society – worked on a Birdbox project, erecting 40 bird boxes around the Campus for National Birdbox Week.

4.0 Existing Conditions

4.0 Existing Conditions

4.01 Context

The UoK is located in Kent, England's south-easternmost county. Kent is bordered to the north by the River Thames and the North Sea, and to the south by the Straits of Dover and the English Channel. The major geographical features of the county are a series of ridges and intervening valleys and lowlands that extend broadly from west to east. These include (from north to south) the marshlands along the Thames/Medway estuaries and North Kent coast, the Kent Downs, Vale of Holmesdale, the Greensand Ridge, the Low Weald and the High Weald.

A third of Kent is covered by Areas of Outstanding Natural Beauty, including the Kent Downs in the north of the county and the High Weald to the south. The Kent Downs are based on a huge east-west aligned arc of chalk extending from the White Cliffs of Dover to the edge of London, which includes extensive Ancient woodlands and chalk grasslands. The High Weald landscape still displays many medieval characteristics including wooded rolling hills studded with sandstone outcrops and flower-rich meadows.

The University of Kent is located in the north-east of the county just to the north of the city of Canterbury. The National Character Area (NCA) is The North Kent Plain, which covers the strip of land between the Thames Estuary to the north and the chalk of the Kent Downs to the south; the latter forming a particularly distinctive backdrop. The North Kent Plain is mostly open, low and gently undulating including much productive arable land, although tradition- al orchards, soft fruits and other horticultural crops are prevalent in central and eastern areas, giving rise to the County's *'Garden of England'* appellation. There are also extensive areas of Ancient woodland in the North Kent Plain, most notable of which is the Blean Woodland Complex which broadly encompasses the University to the west, east and north. The Blean Woodlands, at 11 square miles in area, are probably the largest area of contiguous/semi-contiguous Ancient woodland in England. These woodlands have developed on heavy, acidic soil that is generally unsuitable for arable production.

4.02 University of Kent - an overview

The UoK Canterbury Campus and adjoining University-owned land' is located on the northern edge of Canterbury, approximately two miles from the centre of the city. In broad terms the Campus is enclosed by St Stephen's Hill Road to the east; Tyler Hill Road to the north (although the UoK also owns a few fields north of this road); Whitstable Road (A290) to the west; and the north-western edge of the City of Canterbury to the south.

The UoK's total landholding (excluding campuses in Medway and Tonbridge) is 230 hectares. This area can be divided into three zones – the Campus Heart, Parklands and the Northern Land Holding. The University's various departments and student accommodation are relatively densely concentrated in the Campus Heart, which is separated from northern edge of Canterbury by a green buffer known as the Parklands. The Campus Heart and Parklands zones together cover 121 hectares. The University has also acquired agricultural land to the north – the Northern Land Holding - which covers a further 109 hectares.

The University sits in an elevated position near the top and at the western end of the Stour Valley Slopes, which rise above the Stour Valley forming a distinct ridge; the Stour Valley is a level floodplain associated with the River Stour which flows south-west to north-east through Canterbury. The Campus generally rises from the Stour Valley south to north. The southern edge of the Campus is approximately at 28m AOD, while the Campus Heart is approximately at 75m AOD. North of the Campus Heart the land descends into the west-east aligned Sarre Penne Valley, which at its base along the Sarre Penn Stream, is approximately 55m AOD. From the valley bottom the land rises again to the north to approximately 75m AOD at the northern edge of the landholding near Tyler Hill Road.

Within the UoK's three zones there are five broad landuse/habitat types:

- Amenity grassland with scattered tree and ornamental planting; dominant between the buildings of the Campus Heart.
- Woodland; mostly encompassing the Campus Heart but also present in the parklands and the land to the north.
- Meadow and parkland; prevailing in the parklands
- Arable farmland; the dominant landuse in the land to the north.
- Waterbodies; most significant of which is the Sarre Penne Stream, although there are also a number of ponds, ditches/rivulets.

These landuse/habitat types are shown on Figure 4.1 and described in more detail below.

In terms of geology, an extensive area of London Clay covers the area to the north of Canterbury known as The Blean. Soils underlying the Campus Heart and Parklands are predominantly loam but include a number bands of loam/clay. Clay soils predominate across the land to the north, at least north of the Sarre Penn Stream. London Clay normally gives rise to acidic conditions although many of the semi-natural plant communities present appeared generally neutral in their soil pH affinities.

Designated site, area and distance from Site boundary	Total area	Distance from Site	Summary description based on citation
Blean Woodland Complex SAC	522.89 ha	ca. 0.2km to the west at closest point	Annex I habitat: Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli. Hornbeam *Carpinus betulus* coppice occurs interspersed with Pedunculate Oak *Quercus robur* stands and introduced Sweet Chestnut *Castanea sativa*. Great Wood-rush *Luzula sylvatica* is locally dominant in the woodland, and the characteristic Greater Stitchwort *Stellaria holostea* is found in more open patches. The stands have traditionally been managed as coppice, and are one of the British strongholds for the Heath Fritillary Butterfly.
Stodmarsh SAC	563.27 ha	ca. 3km to the east	A large area of open water and marsh. Annex II species that is a primary reason for selection of this site - Desmoulin`s Whorl Snail *Vertigo moulinsiana*.
The Swale SPA and Ramsar Site	6514.71 ha	ca. 4.5km to the north-west	The Swale is located on the south side of the outer part of the Thames Estuary in south-eastern England. The Swale is an estuarine area that separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal salt:marshes and mud-flats. This site qualifies for supporting notable waterfowl populations.
Stodmarsh SPA and Ramsar Site	481.33 ha	ca. 4.5km to the north-west	Stodmarsh is a wetland site in the Great Stour valley and supports a number of uncommon wetland invertebrates and plants, and provides wintering habitats for wetland bird species and Hen Harrier *Circus cyaneus*.
Thanet Coast & Sandwich Bay SPA and Ramsar Site	1,870.16 ha	ca. 5.8km to the north	Thanet Coast and Sandwich Bay SPA is located at the north-eastern tip of Kent. It is a coastal site consisting of a long stretch of rocky shore, adjoining areas of estuary, sand dune, maritime grassland, saltmarsh and grazing marsh. The site holds important numbers of Turnstone *Arenaria interpres* and is also used by large numbers of migratory birds.
Tankerton Slopes And Swalecliffe SAC	13.01 ha	ca. 5.8km to the north	Primary reason for selection of this site is Fisher's Estuarine Moth *Gortyna borelii lunata*. The site's north facing slopes are composed of London Clay and support a tall herb community dominated by its food plant Hog's Fennel *Peucedanum officinale*, together with areas of neutral grassland also required by the species for egg laying.

Table 4.1:
Natura 2000 and Nationally Designated sites for Nature Conservation within 10 km of the UoK Campus

Designated Sites

The UoK includes no European or nationally designated sites. The Blean Woodland Complex SAC is, however, only 0.2km to the west of the UoK campus at its closest point (Table 4.1). This SAC is designated for its special oak-hornbeam forest. The SAC consists of a number of Sites of Special Scientific Interest (SSSIs) including Church Woods, Blean SSSI and Ellenden Wood SSSI, designated in part for their noteworthy faunal interest including rare mammals, birds and invertebrates (Table 4.2). European and SSSI designated sites are shown on Figure 4.2

As regards non-statutory designated sites, Blean Pastures Local Wildlife Site directly abuts and overlaps the UoK's western edge. This Local Wildlife Site includes a mosaic of woodland (both wet and dry components) interspersed with glades consisting of tall herb and riparian vegetation. It also includes a section of the Sarre Penn Stream and the Crab and Winkle Link cycleway (see below). The components of this site that are within the UoK landholding include:

- The West Triangle Wood.
- A ca. 140m section of Sarre Penn Stream.
- A ca. 150m section of Crab and Winkle Link.

Figure 4.1: Extended Phase 1 Habitat Survey Map

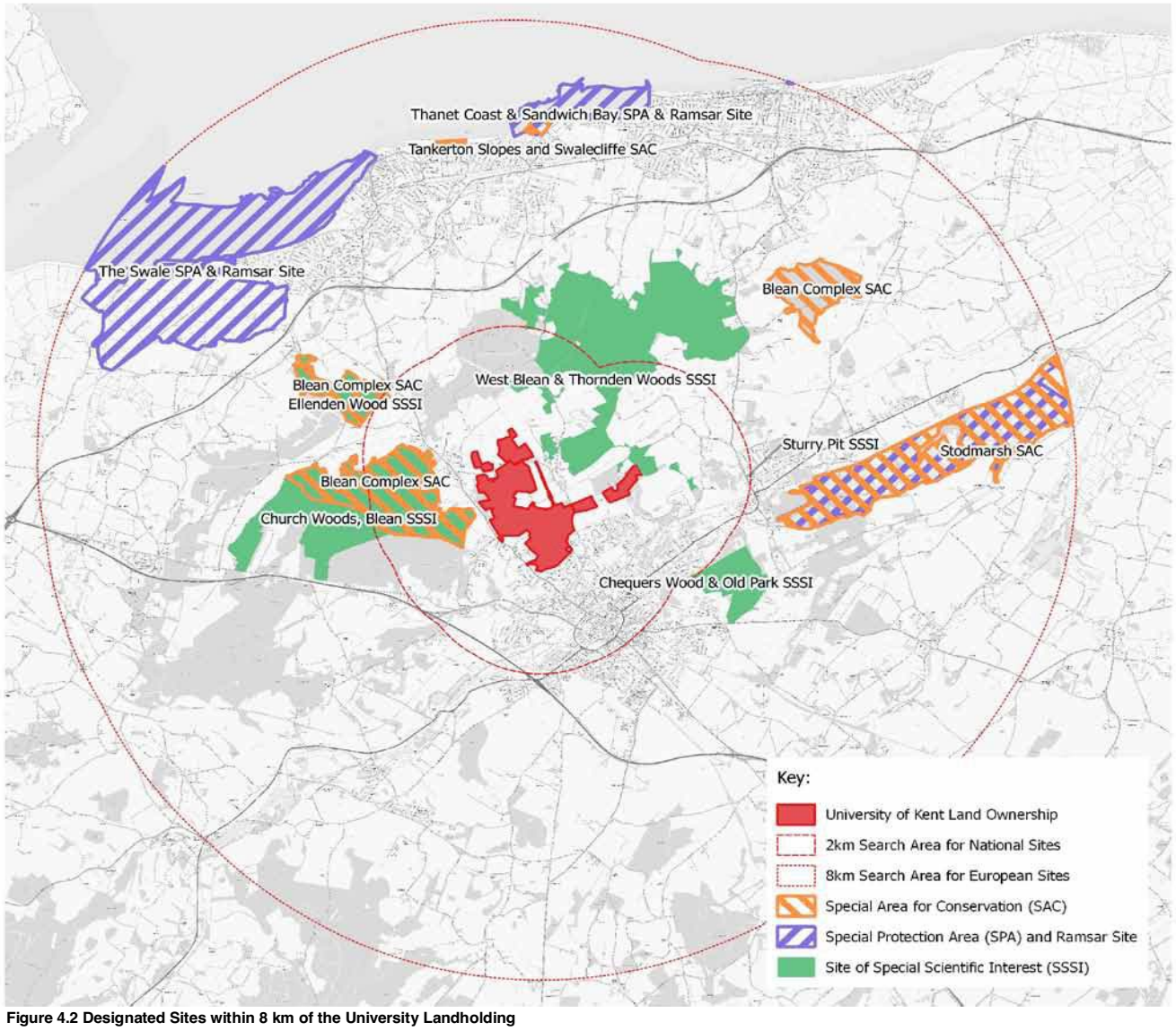


Figure 4.2 Designated Sites within 8 km of the University Landholding

4.03.1 Canterbury World Heritage Site

Canterbury Area of High Landscape Value (AHLV) (the Valley of the River Stour around Canterbury) has been identified to protect the historic and landscape setting of the City and the Canterbury World Heritage Site (the latter consisting of Canterbury Cathedral, St Augustine's Abbey and St Martin's Church). Although the designation is based on cultural / architectural criteria (Canterbury Cathedral, St Augustine's Abbey and St Martin's Church), the picturesque rural setting, is considered inextricably linked to the protective conservation status of this special city. Note that the UoK's Parklands and Campus Heart zones are covered under the AHLV.

4.04 Habitats and Flora

The tree main types of habitats outlined below are Woodlands, hedgerows and grasslands

Designated site, area and distance from Site boundary	Total area	Distance from Site	Summary description based on citation
Church Woods - Blean SSSI (boundary corresponds with Blean Wood National Nature Reserve)	297.07 ha	ca. 0.2km to the west	One of the most extensive areas of broadleaved woodland remaining in the Forest of Blean. A good range of woodland birds is present, including three woodpecker species, eight warblers, and six tits. Several species which regularly breed here are elsewhere rather scarce in East Kent; these include Woodcock *Scolopax rusticola* (RSPB Red List - see RSPB, 2015), Nightjar, Redstart *Phoenicurus phoenicurus* (RSPB Amber List) and Wood Warbler *Phylloscopus sibilatrix* (RSPB Red List). The area has especially good numbers of Nightingales. [N.B. Recent research indicates that Redstart and Wood Warbler no longer breed in the Blean (Walter, undated)]
West Blean and Thornden Woods SSSI	762.5 ha	Adjacent to the UoK Eastern Extension	West Blean and Thornden Woods, lying to the north of Canterbury, comprise a mosaic of Ancient semi-natural woodland and conifer plantation within the Ancient Blean Forest complex and include several rare woodland types. The site is a particularly important locality for the nationally rare and specially protected Heath Fritillary Butterfly. The wide range of woodland habitat types present within the site supports an exceptional diversity of birds. This site also supports an important local population of Dormouse.
Ellenden Wood SSSI	90.8 ha	1.9km to the north-west	Ancient woodland containing several uncommon woodland types. Large numbers of insects including three nationally rare species have been recorded. Birds breeding regularly include Nightingale. Mammals include Dormouse.

Table 4.2 SSSIs and National Nature Reserves designated site within 2km of the Site

Local sites	Total area	Description & distance from Site
Tyler Hill Meadows Local Nature Reserve	4.3 ha	Adjacent to the north-eastern edge of Site. One of the few remaining unimproved neutral grasslands in Kent. In summer the grassland supports colourful wild flowers such as St John's wort *Hypericum* sp. and Black Knapweed *Centaurea nigra*. Although the grassland is important the surrounding scrub and woodland also provides undisturbed habitat for birds. Eleven species of butterfly have been recorded on the site as have reptiles such as Slow-worms *Anguis fragilis* and Viviparous Lizards *Zootoca vivipara* which shows that even small sites support a wealth of wildlife.
Blean Pastures Local Wildlife Site	13.51 ha	Partly within UoK (western boundary) Mosaic of woodland (both wet and dry components) interspersed with glades consisting of tall herb and riparian vegetation. UoK components within the Local Wildlife Site include West Triangle Wood and a section of the Sarre Penn Stream and the Crab and Winkle Link cycleway (see below).
Little Hall and Kemberland Woods and Pasture Local Wildlife Site	Not known	Adjacent to the un-surveyed UoK Eastern Extension. Comprises three predominantly broad-leaved woodlands with a good diversity of ground flora indicative of Ancient woodland (e.g. Moschatel *Adoxa moschatellina* and Bluebell *Hyacinthoides non-scripta*) and a series of unimproved and species-rich semi-improved neutral pastures to the north-west of Kemberland Woods, which lie in the Sarre Penn valley. Plants recorded in the grassland include Pepper Saxifrage *Silaum silaus*, Spiny Restharrow *Ononis spinosa* and Meadow Vetchling *Lathyrus pratensis*, while the stream sides support Branched Bur-reed *Sparganium erectum* and Water Mint *Mentha citrata*. Kingfisher *Alcedo atthis* (Sch. I) present.
Blean Woods RSPB Reserve	Not known	320m west of Site. Ancient woodland including Lesser Spotted Woodpecker *Dryobates minor* (S. 41; RSPB Red List), Nightingale (RSPB Red List)., Nightjar (RSPB Amber List)., Sparrowhawk *Accipiter nisus* and Woodcock (RSPB Red List).

Table 4.3 Local Nature Reserves and Local Wildlife Sites and nature reserves within 2km of the Site

4.04.1 Woodlands

4.04.1 Woodlands

Our Ancient woodlands represent one of our longest-standing land uses and are one of our most diverse habitats. Many have taken hundreds, if not thousands of years to develop, and are essentially irreplaceable. Ancient woodlands are classified as those woodlands which have existed in some form for at least 400 years in the UK (i.e. from the time of the earliest reliable maps). The South East region of England covers 14.5% of the country yet has approximately 40% of the Nation's Ancient woodland. While Ancient woodland covers only ca. 2.5% of England, Ancient woodland coverage in the Canterbury District is nearly 14%, the third highest percentage cover for a local authority in the region (Sansum et al., 2012). The Blean Woodland Complex represents most of the CCC's Ancient woodland. As already stated, it is believed to be the largest contiguous / semi-contiguous area of Ancient woodland in England. Given this context, and the large size of the University's landholding and its semi-rural location, it is perhaps not surprising that the Campus also incorporates areas of Ancient woodland. From the present study it is provisionally estimated that Ancient woodland coverage of the UoK land holding amounts to around 16ha, representing 7% of the Campus area; which again is a disproportionately high coverage compared with England as a whole.

Woodland within the UoK's landholding can be found throughout the University estate. These woodlands are also described below and in Appendix A (Table A.1) and key features are summarised here. The larger woodlands include:

- Brotherhood Wood (northern edge of Central Heart)
- Park Wood (centre/west of Campus Heart)
- Hospital (Bluebell) Wood (southern edge of Campus Heart)
- Giles Lane Wood (centre of Campus Heart)
- West Triangle Wood (western edge of the land to the north)
- The Long Thin Wood (extending the length of Sarre Penn Stream)

All of these woodlands are classified as Ancient. Note that West Triangle Wood, as well as a section of the adjoining Long Thin Wood, are components of Blean Pastures Local Wildlife Site, the only Local Wildlife Site within/overlapping the University's landholding.

The canopies of the two largest woodlands, Brotherhood Wood and Park Wood, are dominated by oaks standards and old Sweet Chestnut *Castanea sativa* coppice. Most oaks appeared to be Pedunculate Oak rather than Sessile Oak *Quercus petraea*, although according to Shire & Martin (undated) many of the oaks of the nearby Blean woodlands have a hybrid quality. Coppiced Hornbeam is also present and is particularly frequent in parts of Brotherhood Wood. All three species are characteristic of woodland in the wider Blean Woodland Complex. The south-western corner of Brotherhood Wood and the northern edge of Park Wood are only separated by Park Wood Road and reference to historic mapping from the 19th Century reveals far greater connectivity prior to the development of the University. Giles Lane Wood also appears to have been part of Brotherhood Wood.

Coppicing of Hornbeam in local woodlands dates back at least 700 years, while coppicing of Sweet Chestnut was introduced in the 18th century (Shire & Mar- tin, undated b). It is interesting to note from OS mapping from 1898 that oaks were also historically pollarded in Brotherhood Wood. While small scale coppicing has been carried out in the past by both the Estate Management and by UoK Conservation Society volunteers, coppicing effort has been inconsistent; and most coppiced areas within the University's woodlands now appear over- grown. Neglect of coppice management will ultimately will be detrimental to the retention of low flowering woodland herbs, including notable species such as Bluebell *Hyacinthoides non-scripta*, Wood Anemone *Anemone nemorosa* and Common Cow-wheat *Melampyrum pratense* (the latter was only recorded in Brotherhood Wood), and also to certain local wildlife adapted to more open woodland conditions. Neglected Hornbeam coppice in particular casts very dense shade. Coppicing has, however, recently been introduced within the eastern-most component of Brotherhood Wood, possibly in response to woodland management recommendations from LUC (2016). In addition to neglect of traditional coppice management, the woodlands are also threatened by the spread of Rhododendron, although at present the limited coverage would seem at a manageable level. One small patch of Japanese Knotweed *Fallopia japonica* is present in Eliot Footpath Woodland (Area 111); this appears to have been recently treated with herbicide and no fresh growth was evident.

While Sweet Chestnut is a non-native species and has been widely planted in many woodlands in Kent, it has also naturalised and therefore woodlands including this species should not necessarily be considered as being plantation in origin (Sansun et al., 2012). Furthermore, many Sweet Chestnut coppices in the Canterbury District provide important habitat for various woodland species of conservation concern, including Nightingale, Nightjars and Tree pipits *Anthus trivialis* (NERC Act S. 41; RSPB Red List), as well as certain rare lepidoptera including the Heath Fritillary Butterfly in Blean Woods.

Woodland 'shaws' are not large-scale hedgerows, but are effectively narrow woodland strips of mature trees, which commonly form boundaries between fields or line a road and are often remnants of larger woods in the Weald that had been cleared for agriculture. They are a particularly characteristic feature of the Kent countryside. The UoK includes a several of these, including Long Thin Wood described above, the Northern Lands Linear Wood (Area 63), and also Areas 100 and 115 that form the south-western boundary of the campus.

It is important to view the Campus woodlands and other semi-natural habitats as forming part of the wider Blean Woodland Complex, and as key *'stepping stones'* for woodland wildlife moving between Church Woods - Blean (to the west) and West Blean / Thornden Woods and Ellenden Wood (to the east / north-east).

Woodlands

Area 5 - Brotherhood Wood
This 4ha Ancient woodland is located on the northern edge of Campus Heart. The upper canopy is dominated by Pedunculate Oak standards, while overgrown Hornbeam and Sweet Chestnut coppice is also prevalent.

Survey in mid-June prohibited a thorough assessment of woodland ground flora, although Bluebells and Wood Anemones were still evident. Common Cow-wheat *Melampyrum pratense* was also present along the northern mar- gins. Note that Common Cow-wheat is the larval food plant of the rare Heath Fritillary Butterfly, one of the flagship species of the wider Blean Woodland Complex. This woodland herb also has a special relationship with the South- ern Wood Ant *Formica rufa*, the large nest mounds of which were found in a number of locations.

Habitat complexity is enhanced by the Sarre Penn Stream, which bounds the woodland's north-western edge, and by several shaded seasonal streams/rivulets which join the Sarre Penn from both sides. The eastern-most compartment of this woodland (Area 6) has been subjected to recent coppice management, while the University's Dr Ian Bride has also been leading traditional wood- land management activities along the south-western margins of Brotherhood Wood. Other evidence of management within the University's woodlands include log piles, tree mounted bird boxes, and supplementary tree planting. According to LUC (2016) this woodland accords to National Vegetation Com- munity (NVC) W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus.*

A 15-20m wide band of plantation woodland (Area 7), ca. 10-15 years of age, links Brotherhood Wood with the southern end of the Dismantled Crab and Winkle Railway woodland (Area 20; see below).

KMBRC also references presence of Common Cow-wheat as well as Bitter-vetch, both of which are vascular plant Red List species (Stroh et al. 2014).

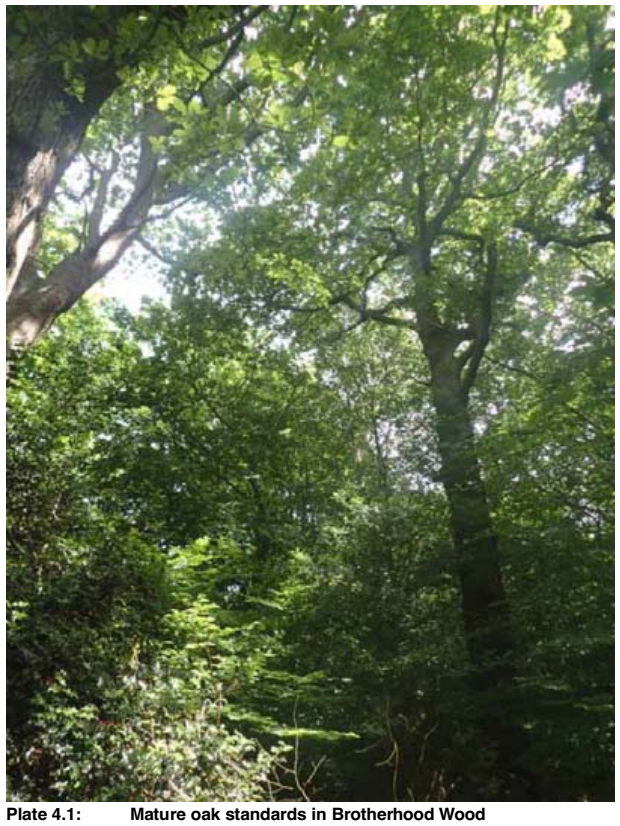


Plate 4.1: Mature oak standards in Brotherhood Wood

Plate 4.2: Coppiced Sweet Chestnut and Hornbeam in Brotherhood Wood; note oak standards have been retained uncoppiced

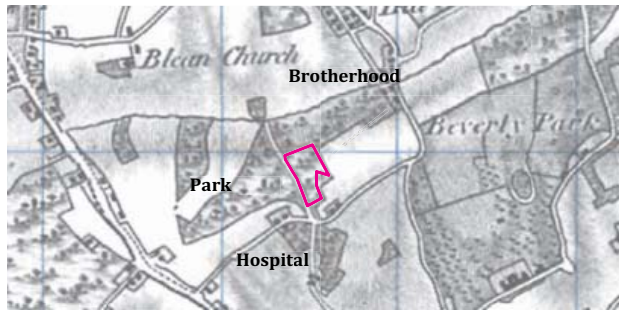


Plate 4.2.1 : Extract from 1816 OS map showing fuller extent of Brotherhood Wood extending north to the Sarre Penn and to Tyler Hill Road. Note that Giles Lane (east) was moved north in 1963. Approx. 1960 ex- tent of Brotherhood Wood shown in red. (Ed.)

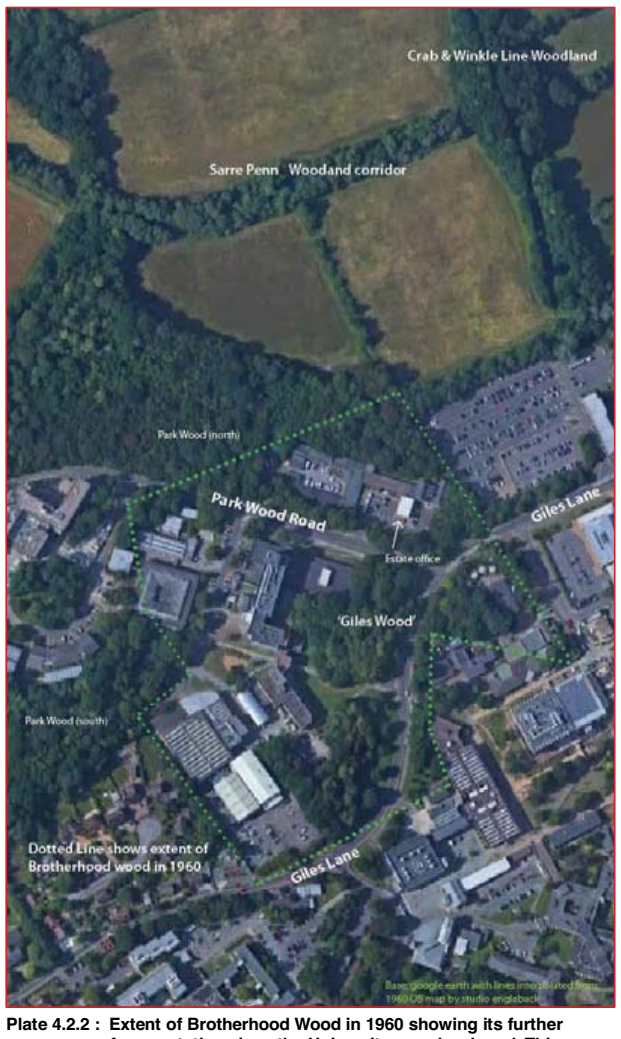


Plate 4.2.2 : Extent of Brotherhood Wood in 1960 showing its further fragmentation since the University was developed. This was already a fraction of its original size (Ed.)

Areas 12 & 13 - Giles Lane Wood

Giles Lane Wood covers ca. 1ha and consists of two small Ancient woodland copses between the Sports Centre / Ingram buildings and Giles Lane. These woodland blocks had been part of Brotherhood Wood (see extend in plates 4.4.1 & 4.4.2), which has become fragmented by the expansion of the University. Giles Wood includes a number of mature Pedunculate Oak standards and Bluebells are locally dominant in the ground flora. Bramble is also frequent and may be becoming increasingly prevalent to due lack of management. Sweet Chestnut is abundant in both woodland blocks. Small patches of Rhododendron are present.

Plate 4.3: Giles Wood, separated from Giles Lane by amenity grassland

Plate 4.4: Giles Wood

Woodlands

Area 17 - Woolf College Wood
Along the northern side of Woolf College is a ca. 0.6ha woodland block that links the Canterbury and Whitstable Dismantled Railway woodland (Area 20) to the west with a block of Ancient woodland to east, the latter being just be- yond the University's boundary. Although Ancient Woodland Inventory map- ping does not show Woolf College Wood as being Ancient woodland, there are a few standard oaks and Bluebells are locally frequent in the ground flora. However, a dense shrub layer and stands of Common Nettle *Urtica dioica* are indicative of ground disturbance and limiting the development of a more no- table ground flora.

Plate 4.5: Deadwood in Woof College Wood providing good opportunities for bats, hole nesting birds and saproxylic invertebrates

Plate 4.6: Occasional oak standards and patches of Bluebell are remnants of former Ancient woodland in Woolf College Wood. (In 1816 it was part of Brotherhood Wood, but by 1870 only trees around the pond remained)

Area 14 - Park Wood
This shaded 5.2ha woodland abuts the western side of the Campus Heart and is similar in composition and structure to Brotherhood Wood, although shrub layer species such as Hazel *Corylus avellana* and Holly *Ilex aquifolium* appear more prevalent. Bluebells are frequent and locally dominant in spite of neglected coppice management. The southern half of the woodland has been fragmented by a relatively newly constructed cycle/footpath, although this has also created a woodland ride effect which may be benefitting certain woodland edge species. Small patches of Rhododendron are present, which in time this could proliferate and reduce the site's conservation importance. According to the Woodland Management Strategy (LUC, 2016) the National Vegetation Community (NVC) accords to W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus*.

Area 20 - The Crab and Winkle Dismantled Railway
This narrow, wooded embankment, 15-30m wide, extends along the dismantled Crab and Winkle Railway Line. The section within the University's land- holding extends ca. 1km from Woolf College/Tyler Hill Tunnel to the village of Tyler's Hill. Canopy species include oak, Ash *Fraxinus excelsior* and Sweet Chestnut, while understorey species include Hazel, Elder *Sambucus nigra*, Hawthorn *Crataegus monogyna*, Field Maple *Acer campestre*, Garden Privet *Ligustrum ovalifolium* and Bramble *Rubus fruticosus*. A relatively well-used footpath extends 175m from Tyler Hill Tunnel to the Sarre Penn Stream crossing but after this point access becomes increasingly restricted by encroaching scrub.

Plate 4.9: Tyler Hill Tunnel at southern end of the woodland along the Crab and Winkle Dismantled Railway

Plate 4.10: Footpath along the Crab and Winkle Dismantled Railway becoming increasingly overgrown north of Sarre Penn crossing

Woodlands

Area 51 - West Triangle Wood
West Triangle Wood is ca. 0.5ha in area and is located on the western edge of Northern Land Holdings. The upper canopy is dominated by mature Pedunculate Oaks while Hazel coppice dominates the shrub layer. The abundance of Hazel coppice is unusual compared with other woodlands within the campus. Sweet Chestnut and Hornbeam were not recorded although may be present in small numbers. Bluebells dominated much of the ground layer while Wood Anemone was frequently recorded. West Triangle Wood forms one component of Blean Pastures Local Wildlife Site. Further ecological complexity is provided by Sarre Penn Stream which bounds the woodland's northern edge. The Crab and Winkle Link cycleway bounds the woodland to the east. LUC (2012) NVC categorises this woodland as W10b Quercus robur – *Pteridium aquilinum* – *Rubus fruticose* subcommunity *Anemone nemorosa.*

Plate 4.11: Rot and woodpecker holes in tree trunk in West Triangle Wood providing opportunities for bats and hole nesting birds

Plate 4.12: Sarre Penn Stream extending along the northern edge of West Triangle Wood

Area 58 - Long Thin Wood

The Long Thin Wood, as referred to by LUC (2016), is an east-west aligned woodland shaw extending along the Sarre Penn Stream. The canopy is dominated mature Pedunculate Oaks and Ash, while Hazel, Hawthorn, Blackthorn, Dogwood, Field Maple and Grey Willow *Salix cinerea* are all frequent in the understory. This woodland is noteworthy for providing connectivity between Brotherhood Wood, West Triangle Wood and the woodland of Blean Pastures Local Wildlife Site; note that the western section is within the Local Wildlife Site. Blean Walk Public Right of Way extends the length of the woodland. LUC (2012) NVC categorises this woodland as W8b *Fraxinus excelsior – Acer campes– Mercurialis perennis* subcommunity *Anemone nemorosa.*

Plate 4.13: Blean Walk along the northern edge

Plate 4.14: Sarre Penn Stream extending the length of woodland

Area 63 - North Linear Wood

A north-south aligned woodland shaw, ca. 0.5km long and 10-35m wide, extends from Court Farm near the top of the Northern Land Holdings down to the Sarre Penn valley bottom, connecting with the Long Thin Wood. Pedunculate Oak dominates much of the canopy while Hawthorn, Blackthorn and Elder are frequent in the understorey. Two large Black Poplars are also present. A narrow stream/rivulet (dry in part) extends the length of the woodland feeding into Sarre Penn Stream at the valley bottom.

Plate 4.15a: Shaw (linear woodland) between Court Farm and Sarre Penn valley bottom

Plate 4.15b: Shaw (linear woodland) between Court Farm and Sarre Penn valley bottom

Woodlands

Area 83 - Bluebell Wood
This ca. 4ha hillside woodland (formally known as Hospital Wood according to 1898 OS mapping) descends from north (edge of Campus Heart) to south, bisecting the Parklands' zone. Bluebell Wood is more complex than the other woods, both botanically and in terms of historic management. As with Brotherhood Wood and Park Wood, large oak standards are present and there is frequent Hornbeam and occasional Sweet Chestnut. However, Silver Birch *Betula pendula* appears to be the dominant canopy species, allowing higher light levels to penetrate to the ground flora. Towards the base of the hillside, however, compartments are dominated by pollarded Hornbeam and Norway Maple *Acer platanoides*, which both cast more shade, thereby inhibiting development of a shrub layer and varied ground flora. In addition to these areas and the open Silver Birch-dominated woodland, there are also compartments including dense understorey, frequent species being Holly, Field Maple and Bramble.

As the name suggests, much of the woodland's ground flora is dominated by Bluebells with Wood Anemone being more occasional.

Remnant hedgerow, ditch and bank features are present; a gnarly Hornbeam coppice-lined embankment being a one particularly striking feature. Further ecological interest is provided by ponds at both the top and base of the hill- side, and from seasonal wet rivulets and ditches. Multiple footpaths criss-cross the woodland. LUC (2012) NVC categorises this woodland as W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus.*

Area 103 - Chaucer College Woodland
A ca. 1ha Norway Maple-dominated woodland is present in the south-western corner of the Parklands zone. The dense shade cast by this woodland appears to have inhibited development of a shrub understorey while ground flora species are also limited. A few mature oaks and Sycamore *Acer pseudoplatanus* are present along the northern edge adjoining University Road.

Plate 4.18 Occasional mature oaks and Sycamore on edge of the Norway Maple-dominated woodland of Chaucer College

Area 111 - Eliot Footpath Woodland

In the south-eastern corner of the Parklands zone is an area of secondary woodland abutting the lower section of the Eliot Path. Sycamore dominates the canopy while oak, Norway Maple, Ash, Wild Cherry *Prunus avium*, Horn- beam, Field Maple and Grey Willow are all frequent to occasional. While some patches of Bluebells are present, Ivy and Common Nettle dominate much of the ground flora. A large steep-side hollow (probably a former sand pit according to historical OS mapping from 1898) is present at the woodland's southern extremity. A small stand of Japanese Knotweed *Fallopia japonica*, an invasive alien Schedule 9 listed species, is present.

Plate 4.19a: Secondary woodland established in a hollow feature at southern end of Eliot Footpath woodland

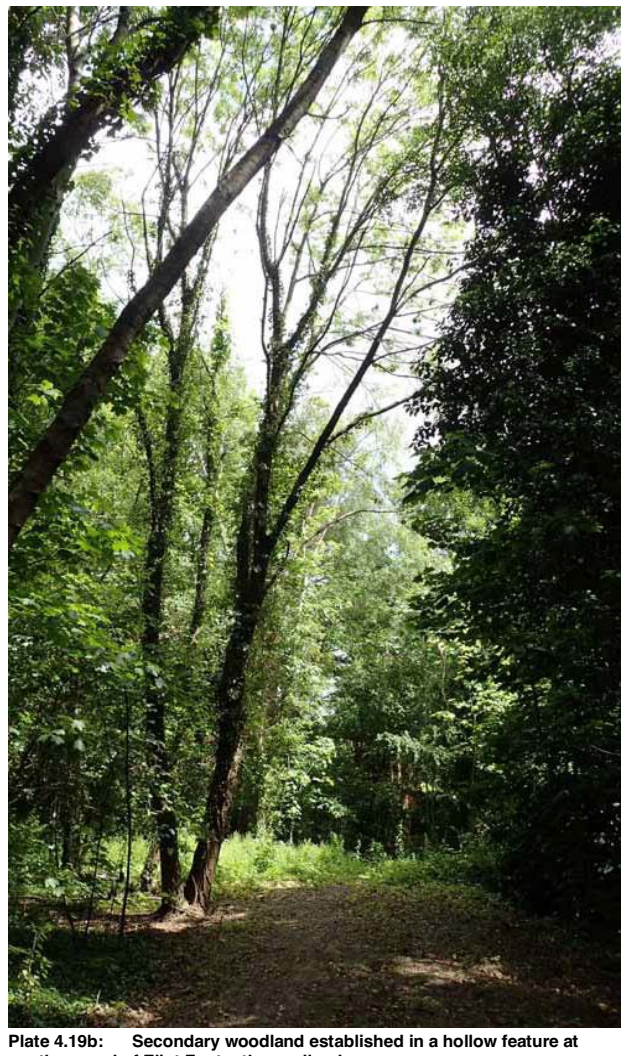


Plate 4.19b: Secondary woodland established in a hollow feature at southern end of Eliot Footpath woodland

Woodlands

Area 113 - St Stephen's Hill Woodland
This area of secondary woodland extends between the eastern side of the Parklands zone and St Stephen's Hill Road. Ash, Sycamore and Silver Birch are most frequent in the upper canopy although a there are also some oak standards present, particularly along the western margins. Ivy and Common Nettle dominate much of the ground flora.

Plate 4.20: Occasional oak standards present along woodland margins in St Stephen's Hill Woodland

Plate 4.21: Secondary woodland of St Stephen's Hill Woodland abutting Tyler Court

4.04.2 Hedgerows

4.04.2 Hedgerows
Hedgerow species lists are provided in Appendix A, Table A.2. A few examples are shown in Plates 4.22-4.25. The most species-rich hedgerows bound farm-land within the Northern Land Holdings. These are dominated by Hawthorn and Blackthorn *Prunus spinosa*. Other relatively commonly occurring species include Field Maple, Elder, Dogwood *Cornus sanguinea*, Goat Willow *Salix caprea*, Hazel, Rose Rosa spp. and Bramble. Most of these hedgerows were intact although a number in the north-eastern corner include quite large gaps. Hedgerows within the campus are mostly species-poor and some include non-native species such as Leyland Cypress *Cupressus x leylandii, and Elaeagnus x ebbingei*. A number of hedgerows are also present within the Parklands Zone, although these consist mostly of Garden Privet and native thorn species. A double Garden Privet *Ligustrum ovalifolium* hedge encloses a track extending through the Chaucer Fields. The track is considered an historic landscape feature that once provided access to Beverley Farm (next to the Innovation Centre).

Plate 4.24: A double privet hedge encloses historic track extending through the Parklands

Plate 4.25: Low cut Hornbeam hedge opposite Woolf College

4.04.3 Grasslands

4.04.3 Grasslands
The UoK campus includes four key grassland habitats:

- Species-poor semi-improved meadow in the Parklands.
- Recently sown wildflower meadow in the vicinity of Turing College/Keynes College/Innovation Centre.
- Amenity grassland (including sports pitches) throughout the Campus Heart.
- Improved pasture and hay meadow in the north.

The key characteristics of these grasslands are summarised here and also described below and Appendix A, Table A.3.

Perhaps of most interest from an ecological perspective are the species-poor semi-improved meadows within the 'Parklands' character area, and the meadows in the south-western corner east of Chaucer College. The Parklands are dominated by relatively coarse neutral grassland with a low proportion of wildflowers, which probably reflects the fact that they were mostly intensively managed as amenity grassland up until 2008 (LUC, 2011). It is also understood from reference to OS mapping dating back to 1938 that much of the meadow area of the Parklands was planted with orchards, which were probably cleared sometime in 1970s. Given this history, more time and ecologically informed management is required before the meadows develop a more notable sward. It has been indicated that cut arisings are not being removed following mowing. If this is the case this will be enriching soils and inhibiting colonisation by low flowering herbs and fine grasses.

Nevertheless, the meadow area between the Eliot Footpath and Bluebell Wood (Area 115) includes a much higher proportion of fine grasses (Common Bent being dominant) and a higher percentage of wildflowers. This particular meadow area along with adjoining Silver Birch-dominated woodland, shares some superficial similarities with the heathland type environment found in parts of the Blean Complex, although no heather species are present. The meadows of the Parklands also include scattered mature trees, creating a Parkland like effect to varying degrees, and hence the name of this particular zone.

Although the Parklands are not botanically rich, as a single coherent feature (and including adjoining woodlands) they are ecologically noteworthy. They also have considerable landscape interest, being important both to the setting of the University, and to the context of the nearby World Heritage Site. Indeed, the Parklands are included within a wider designated AHLV. The Parklands are also valued by the local community in providing a green buffer that is preventing the coalescence of the Campus and the north- ern fringe of Canterbury.

Although the meadows south of Turing College (Areas 93 & 97) and the Innovation Centre (Area 99) are much more herb-rich than those in the Parklands, these appear to have been recently sown with a wildflower mix, which currently limits their nature conservation value compared with longer-standing grassland communities.

The majority of grassland within the Campus Heart is intensively managed as amenity grassland, including large sports pitches on the north-western side. Most grassland within the Northern Land Holdings is improved pasture and hay meadow. None of the farmland is apparently managed under any agri-environment schemes, although ca. 8m wide uncultivated strips (potential conservation headlands) have been left along the margins of two arable fields abutting the Sarre Penn Stream.

Species-poor semi-improved meadow (Areas 86, 87, 104, 106, 114 & 115)
Large species-poor semi-improved meadow, neutral in character, cover much of the Parklands zone of the campus. This area is also referred to as the South- ern Slopes and Chaucer Fields. Yorkshire Fog and False-oat grass are generally dominant, while Meadow Barley, Red Fescue, Cock's-foot, Sweet Vernal Grass and Common Bent are all frequent. Most areas are not rich in flowers, only including occasional buttercup species, Bird's-foot Trefoil, Field Bindweed, Common Sorrel, Red Clover, White Clover and Meadow Vetchling.

The most flower-rich meadow (Area 115) is located towards the top of the Parklands between Eliot Path and Bluebell Wood. Here finer grasses, most notably Common Bent, are dominant and Bird's-foot Trefoil and butter- cups are much more prevalent. The ecological value of these meadows is enhanced by the fact that they form one component of a wider habitat mosaic including woodlands and scattered trees. The latter creates, to varying degrees, a Parkland habitat effect, hence the name of this particular zone. Adjoining woodlands are described in Table 4.1. Free-standing trees within the meadows include Ash, oak species, Norway Maple, Hornbeam, Sycamore, False Acacia Robinia pseudoacacia and a fir species. Area 106 includes more trees than the other meadows within the Parklands zone, and indeed the north-eastern component of this area is described by the University as the Arboretum. It is understood that meadows are mown for hay once or twice annually.

There is also a closely Rabbit-cropped flower-rich sward in a glade within the Eliot Footpath Woodland in the south-eastern corner of the Parklands Zone (Area 112). Frequent species include Bird's-foot Trefoil, Creeping Cinquefoil, Daisy, Selfheal, Creeping Buttercup and White Clover.

Plate 4.26: Mown footpath through species-poor semi-improved grassland (Area 87)

Plate 4.27: Tussocky species-poor semi-improved grassland dominated by False Oat-grass (Area 86)

Plates 4.28a: Greater abundance of fine grasses (primarily Common Bent) and flowers in meadow between Eliot Path & Bluebell

Plate 4.29: Area 112, Rabbit-cropped flower-rich glade within the Eliot Footpath Woodland

Plates 4.28b: Greater abundance of fine grasses (primarily Common Bent) and flowers in meadow between Eliot Path Bluebell Wood

Plate 4.30: Area 114, meadow below Rutherford College

Grasslands

Recently sown wildflower meadow (Areas 93, 97 & 99)
A wildflower meadow has been recently created to the south-west of the Campus Heart on the southern side of Turing College (Areas 93 & 97) and Innovation Centre (Area 99). The former has established less well than the latter, including more weed species characteristic of disturbed ground, although both were attractive including an abundance of Oxeye Daisy. The Innovation Centre meadow included a variety of grass species including abundant York- shire Fog, and frequent Meadow Barley, Crested Dog's-tail, False-oat grass and Quaking Grass. Herbs included abundant Oxeye Daisy and frequent Bird's-foot Trefoil, Black Knapweed and Selfheal, and occasional Meadow Buttercup, Ragged Robin and Red Clover. The Turing College grassland included many similar species, although ruderals such as Creeping Thistle, Spear Thistle, dock, Weld and crucifers were much more prevalent.

Plate 4.31: Existing wildflower meadow south Turing College (Area 97); note the contrast between long-standing relatively flower- poor meadow (left) and newly created flower-rich meadow (right)

Plate 4.32: Existing wildflower meadow south-west of Innovation Centre (Area 99)

Amenity grassland / scattered trees / ornamental planting mosaic Amenity Grassland predominates between the Campus Heart's buildings, car- parks and roads. This is mostly species-poor and regularly tightly mown. Of more interest are the associated trees and ornamental planting discussed below.

Plate 4.33: Amenity grassland and scattered trees alongside University Road

Plate 4.34: Darwin College - amenity grassland and scattered trees

Amenity grassland, species-rich
While the Campus Heart includes a vast area of tightly mown species-poor amenity grassland, there are also a few species-rich lawn areas. These are found mostly on roadside embankments where thinner poorer soils have enabled a greater diversity of herbs to establish including Bird's-foot Trefoil, Daisy, Creeping Buttercup, Field Bindweed, Creeping Cinquefoil, Black Medick, hawkweed, crane's-bill species, Selfheal and White Clover.

Plate 4.35: Flower-rich lawn between Giles Lane and Woolf College

Plate 4.36: Flower-rich lawn bounding carpark near Registry

Improved grassland
The northern part of the campus consists mostly of arable land, although there is also some cattle-grazed improved grassland and hay meadow.

Plate 4.37: Cattle grazed Improved grassland in the Northern Lands

Plate 4.38: Improved hay meadow (possibly species-poor semi-improved grassland)

4.04.4 Watercourses

4.04.4 Sarre Penn Valley

The Sarre Penn Stream, a section of which flows through the UoK landholding, is a 13km long tributary of the River Stour which is joins ca. 12km to the north-east (*'as the crow flies')* at Plucks Gutter. The stream is also known locally as the Fishbourne. While the lower section of the Sarre Penn is defined as a heavily modified watercourse that mainly serves a drainage and water resources (agricultural abstraction) function, in its upper reaches above Calcott (which includes the UoK section) much of the channel has re-naturalised and shows many features of an un-modified (natural) waterbody (Jacobs, 2015).

Flowing west to east across the centre of Northern Land Holding the Sarre Penn has formed a shallow sided 'V' shaped valley. The stream gently meanders in a sequence of glides and riffles, the latter formed over gravels and small cobbles. Silt is mostly confined to the margins and pools. The stream is typically 2-3m wide and only 5-20cm deep, although it is understood that certain sections regularly flood. Banksides are mostly low, typically less than 0.3m in height, and various drainage ditches and rivulets feed into the stream.

Jacobs (2015) also reports Biological Monitoring Working Party data designed to detect the impacts of organic pollution, which show good quality habitat conditions but with some evidence of slight anthropogenic impacts.

For virtually its entire length across the UoK's landholding the Sarre Penn is densely shaded by mature trees and shrubs, and thus there is little in the way of riparian herbaceous vegetation. Woody debris (fine, coarse and large) is a key feature within the channel, generating organic matter that contributes to the overall productivity of the river system; this material is the main source of detritus for benthic invertebrates and other detritivores. Woody debris, as well as submerged roots and limbs, and overhanging canopies, provides refuge areas for fish and invertebrates, and diversifies flow and the range of species that can inhabit the varied current velocities. Tree roots also stabilise the banks that may otherwise be vulnerable to collapse under the spate conditions, which in turn might smother the valuable gravel/riffle habitat. Woody material also *'slows the flow;'* attenuating flood risk downstream. For all these reasons South East Water generally recommends retention and restoration of the stream's wooded character (Jacobs, 2015). They do though qualify this, advising that *'full tunnel vegetation'* should be avoided. In this regard it is interesting to note that on the adjoining Oakwell Estate, scalloped woodland margins have been created intermittently along the Sarre Penn, presumably to allow more light to reach the stream to diversify riverine conditions and perhaps also to maximise woodland edge ecotone.

The westernmost section of the stream within the UoK landholding forms part of the Blean Pastures Local Wildlife Site, while upstream of Blean Pastures the stream passes through Blean Woods. The stream and adjoining habitat is likely therefore to function as an important conduit for wildlife moving between these important habitats and the Campus. A short distance downstream of the Campus the steam is again designated, forming one component of the Little Hall and Kemberland Woods and Pasture Local Wildlife Site.

4.04.5 Ponds

4.04.5 Ponds

The Campus includes eight ponds while there are at least another six ponds outside the boundary but within 300m (see below). Note that for consistency UoK's historic pond numbering regime has been followed here. The most attractive and ecologically rich ponds within the Campus are Ponds 1, 2 and 10 although all of the ponds are generally in a neglected state, being (to varying degrees) relatively inaccessible, silted, polluted, overgrown by trees/shrubs, and in some cases inhabited by non-native invasive species. All these pressures inhibit their ecological potential and detracts from their amenity interest. There is therefore considerable opportunity for enhancing their ecological value, visual interest, accessibility, signage and visual appearance. In spite of the various pressures the Campus's ponds do support Great Crested Newts and various other amphibian species (see below).

The UoK's many drainage features have been sown with amenity grassland and are tightly mown, and hence have very little wildlife or aesthetic interest.

Pond 1, Lower Eliot (Bluebell Wood)

- Attractive shaded pond towards the southern end of wood.
- Circular shaped ca. 10m x 10m, ca. 30cm deep and turbid.
- Woodland setting although overhanging trees and shrubs appear to have been cut back.
- Aquatic/riparian vegetation including Yellow Iris (abundant), water lily, Water Starwort and Soft Rush.
- Fish present.
- Medium population of Great Crested Newts identified from 2014 survey.

Proposed management :

- Selectively remove trees and shrubs from southern edge and continue to manage overhanging branches elsewhere.
- Provide sitting area. Pond 2, Upper Eliot (Bluebell Wood)

Pond 2, Upper Eliot (Bluebell Wood)

- Attractive shaded pond located on north-western edge of Bluebell Wood.
- Circular shaped ca. 10m x 10m, ca. 30cm deep.
- Aquatic/riparian vegetation including Yellow Iris (abundant), and occasional Gypsywort Lycopus europaeus and Soft Rush Juncus effusus.
- Seemingly young Giant Hogweed Heracleum mantegazzianum.
- Favourable location from an amenity perspective being adjacent to Becket Court hall of residence.
- Small population of Great Crested Newts identified from 2014 GCN survey; fish and Alpine Newt Ichthyosaura alpestris present.

Proposed management :

- Provide sitting area.
- Remove small number of trees/shrubs from western bank and prevent further encroachment by trees and shrubs.
- Re-check for Giant Hogweed and treat if necessary.

Plate 4.39: Pond 1, Lower Eliot (Bluebell Wood)

Plate 4.40: Pond 2, Upper Eliot (Bluebell Wood)

Ponds

Pond 3, Beverley Farm

- Shaded pond at southern end of copse to the south of Turing College.
- Rectangular shaped ca. 10m x 5m; only ca. 5cm deep although according to the UoK Biodiversity Management Plan this pond has been recently dredged.
- Stagnant and turbid with many mosquitos.
- No aquatic/riparian vegetation.
- No GCNs from 2014 survey but survey relating to development of Turing College did identify newts (species not known at this time).

Proposed management :

- De-silt, selectively remove a few trees and shrubs from margins, and expand outwards if possible.
- Improve runoff water quality if possible, potentially through establishing marginal, emergent and aquatic planting from local source pond that lacks alien invasive plants.
- Improve access for students.

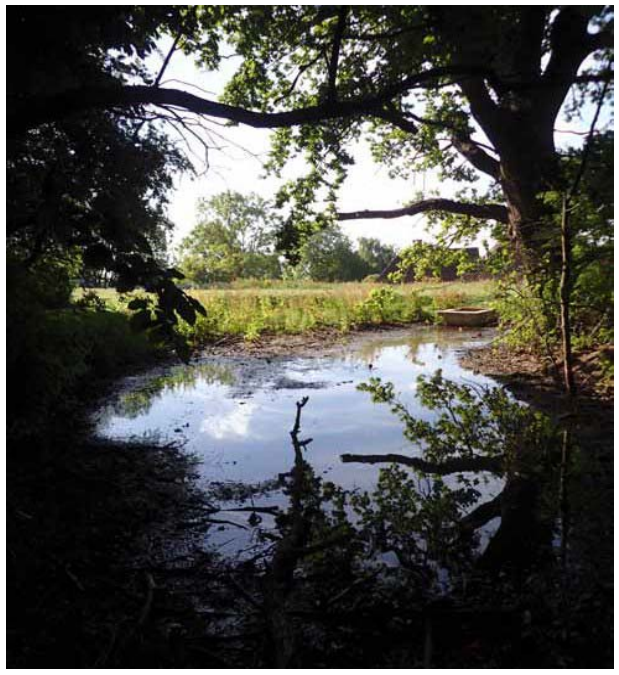


Plate 4.41: Pond 3, Beverley Farm

Pond 4, Keynes

- Located on southern edge of Keynes College.
- 'S' shaped ca. 25m x 8m, ca. 20-30cm deep.
- Eutrophic/polluted, large amount of leaf litter and also plastic litter.
- Trees and Bramble on southern margins; trees including Grey Willow, Crack Willow and Sycamore. Large Oak on north-western bank.
- Aquatic/riparian vegetation limited but includes large stand of Yellow Iris. Schedule 9 listed invasive alien species, New Zealand Pygmyweed Crassula helmsii also present according to UoK Biodiversity Management Plan.
- Favourable location from an amenity perspective being adjacent to a café and hall of residence.
- No Great Crested Newts according to 2014 survey.

Proposed management :

- Control invasive alien species.
- Address pollution.
- Selectively coppice / fell trees around southern, margins to allow more light to penetrate and reduce leaf litter.
- De-silt to deepen and undertake riparian planting.
- Regularly remove litter.
- Provide additional seating and create bankside access at select location on southern bank.

Pond 5 – within St Edmunds School and so not visited
No Image

Pond 6 – within St Edmunds School and so not visited.
No Image

Pond 7 – within St Edmunds School and so not visited.
No Image

Pond 8 – within St Edmunds School and so not visited.
No Image

Plates 4.42a to c: Pond 4, Keynes

Pond 9, Woolf

- Located in north-eastern corner of woodland.
- Circular shaped with 15m diameter ca. 20-30cm deep.
- Heavily shaded, turbid and large amount of leaf litter.
- No aquatic or riparian vegetation.
- No Great Crested Newts according to 2014 survey.
- Palmate Newts Lissotriton helveticus present according to DICE (Andrew Buxton, personal communication).

Proposed management :

- Selectively coppice / fell trees around southern, eastern and western margins to allow more light to penetrate and reduce leaf litter.
- De-silt to deepen and undertake riparian planting.
- Improve access for students from Woolf College – footpath and sitting area.

Pond 10, Jennison

- Rectangular shaped ca. 30m x 15m, ca. 50cm deep.
- Heavily wooded fringe but large size of pond allows light to penetrate to centre.
- Relatively clean water; waterlily covering 15% of pond, Yellow Iris frequent.
- Fish observed but no GCNs present based on 2014 survey.

Proposed management :

- Control trees and shrubs around margins to maintain direct sunlight.
- Monitor for New Zealand Pygmyweed.
- Create safe access to water's edge.

Pond 11, Park Wood

- Located in north-western corner of woodland.
- Rectangular shaped 20m x 5m and ca. 20cm deep.
- Heavily shaded, turbid and large amount of leaf litter.
- No aquatic or riparian vegetation.
- No information on amphibian presence/absence.

Proposed management :

- Selectively coppice / fell trees around southern, eastern and western margins to allow more light to penetrate and reduce leaf litter.
- Potentially enlarge pond to the east and west, and de-silt to deepen.
- Undertake herbaceous bankside and emergent planting from local source pond that lacks alien invasive plants.
- Improve access for students from Park Wood Courts – footpath and sitting area.

Plate 4.43: Pond 9, Woolf

Plate 4.44: Pond 10, Jennison

Plate 4.45: Pond 11, Park Wood

Ponds

Pond 12, GCN Experimental Ponds

- GCN Experimental Ponds – long term study being led by Professor Richard Griffith and Andrew Buxton, Durrell Institute of Conservation and Ecology (DICE).
- Located on western edge of Campus.
- Ca. eight small plastic sheet lined ponds, each 2m x 1m in size.
- Surrounded by tussocky grassland and Bramble, wider area a mosaic of hedgerows, scrub, and amenity grassland.
- Great Crested Newt pond experimentation area. Small population of Great Crested Newts identified from 2014 survey, although peak of 68 adults in 2017 now indicates a Medium population (Andrew Buxton, personal communication). Palmate Newts, Alpine Newts, Common Toads Bufo bufo (S. 41) and Grass Snakes Cornella austriaca
- (Sch. V; S. 41) also present.

Proposed management:

- Leave as is under control of DICE.

Plate 4.46: Pond 12, GCN Experimental Ponds

Pond 13 Blean Pastures Local Wildlife Site

- Blean Pastures Local Wildlife Site overlaps the western edge of the Northern Lands.
- Circular 8m x 8m with very little standing water as heavily choked by tall herbs; Reed Sweet-grass Glyceria maxima is dominant while Agrimony, Great Willowherb, and Common Fleabane are all frequent.
- No information available on amphibian presence/absence.

Proposed management :

- None as outside UoK boundary.

Plate 4.47: Pond 13 Blean Pastures Local Wildlife Site

Pond 14, North of Blean Pastures Local Wildlife Site ponds

- Very attractive pond, 15m west of UoK's western boundary.
- 10m x10m and up to 40cm deep.
- Species include Pondweed Potamogeton natans, Waterlily, Yellow Iris, Hemlock Water-dropwort, Water Mint and Great Willowherb.
- No information available on amphibian presence/absence.
- Proposed management - None as outside UoK boundary

Plate 4.48: Pond 14, North of Blean Pastures Local Wildlife Site

4.04.6 Building integrated vegetation

4.04.6 Green Roofs and Façades
Examples of vegetated architecture can be seen in a few of locations within the Campus (see Plates 4.49 to 4.56). Most notable of which is the sedum roof covering the Turing College restaurant. A modular green wall has also been installed on UELT Building including, which includes a mix of different herbs, grasses and ferns. Arguably most impressive was the Ivy-clad walls of Rutherford College, covering what otherwise is a fairly stark concrete façade.

Plate 4.49 , 50 Ivy to Rutherford College Wall

Plate 4.51 Sedum roof to Turing College Cafe

Plate 4.52 Sedum roof to Turing College Store

Plate 4.53 Living wall to Aphra Lumley Building

Plate 4.54 Clematis covering basement façade in Keynes College

Plate 4.55 Clematis vines on the stairs to the Jarman Building

Plate 4.56 Vines on Cornwallis storage building

4.04.7 Ornamental Planting

4.04.7 Ornamental Planting

While the landscape of the Campus Heart is predominantly tightly-mown amenity grassland, there is also a reasonable area of ornamental planting. While species have mostly been selected to provide good ground coverage and year-round colour, some non-native species are favoured by pollinating insects. Such species include lavender species, *Verbena bonariensis* and Elephant Ears *Bergenia cordifolia*. A selection of ornamental plants are shown in Plates 4.57 to 4.60.

The Campus Heart also includes many free-standing tree species. Many of these have been relatively recently planted although there are a good number of mature oaks which may be remnants of the former more widespread Ancient woodland that was present prior to the University's development and expansion. A selection of free-standing trees are shown in Plates 4.61 to 4.64.

Plate 4.57 Existing ornamental planting; Yellow Loosetrife and Elephant Ears are beneficial for pollinators

Plate 4.58 Existing ornamental planting; Lavender and Verbena are beneficial for pollinators

Plate 4.59 Ornamental grassland providing good ground cover and year-round colour, but of limited ecological interest

Plate 4.60 Euonymus fortunei 'Emerald 'n' Gold' - popular, bushy, variegated, evergreen shrub provides excellent groundcover and year-round colour but has limited wildlife value

Plate 4.61 Mature. former hedgerow oaks retained between the Turing and Keynes colleges

Plate 4.62 Mature Black Poplar along University Road

Plate 4.63 Mature Giant Redwood along University Road

Plate 4.64 Young birch, Turing College

4.04.8 Allotments and Test Beds

4.04.8 Allotment Area
There is a small allotment area on the western edge of the Campus Heart which is run by the Allotment Group/Oasis Garden Society, an enthusiastic group of students and local residents. The allotments complement adjoining landuses which include the GCN Experimental Ponds and an apiary (see Plates 4.65 and 4.66).

Plate 4.65 Passionate members of the UoK's Allotment Group/Oasis Garden Society.

Plate 4.66 Beehives next to the allotment area

4.05 Fauna

4.05.1 Badger *Meles meles*
The Estates Management Estates Environmental Plan states that Badgers (PBA) are present within the Campus although gives no information on the distribution of setts. Badgers are fully protected and when in their setts the protection includes protection against disturbance. Al- though various mammal runs were observed not definitive evidence of Badger was noted during the Phase 1 Habitat survey.

4.05.2 Otter *Lutra lutra*
An Environment Agency survey of Kent's waterways in 2010 found no evidence of Otter (Sch. 2; Sch. V; S. 41), although more recently evidence has been found along the Medway in west Kent. Further to this National Grid (2016) has reported Otter on the Nethergong Penn, which is a tributary of the River Great Stour and is in close proximity to Sarre Penn. As Otters continue to expand their range in Kent there is potential for Otters to also start inhabiting the Sarre Penn.

4.05.3 Water Vole *Arvicola amphibius*
Although the Water Vole (Sch. V; S. 41) is declining in Kent, according to the Kent BAP the county represents a stronghold for the species, with the species still present in the Stour valley. Furthermore, KMBRC pro- vide seven Water Vole records for the Great Stour in and around Canter- bury, just over 1km to south of the UoK. However, the relevance of the Stour records from Canterbury are questionable, as the Sarre Penn joins with the Great Stour, via the River Wantsum, ca. 12km to the north-east *('as the crow flies')* at Plucks Gutter. While the River Wantsum is also an important stronghold for Water Voles (Kentish Stour Countryside Partnership, 2009), no definitive Water Vole records from the upper reaches of the Sarre Penn were found in the research for the present report. Conditions along the UoK section of the Sarre Penn were assessed by the present authors as sub-optimal for Water Voles, primarily due to the heavily wooded riverine environment which inhibits development of meaningful bankside herbaceous vegetation which the species de- pends on for food and cover.

4.05.4 Dormouse
According to *The Dormouse Conservation Handbook* Dormice (Sch. 2; Sch. V; S. 41) are more abundant in southern England with the Kent being particularly densely populated relative to most other counties (Bright et al., 2016). Even in the south, however, Dormice are no longer present at 70% of sites where they were known to be 120 years ago (Kent Biodiversity Action Plan Steering Group, 1997).

The nearby Blean Woodland Complex would seem particularly suited to Dormice, and indeed presence of the species is referenced in the SSSI citations for West Blean and Thornden Woods and Ellenden Wood. KMBRC also report Dormice from a number of sites within and around the UoK, including two records from the vicinity of Brotherhood Wood (Table 4.4), while the UoK's Estates Environmental Plan document also highlights the presence of Dormice within the Campus (although the basis for this assertion is not made clear). Other KHBRC records come from countryside to the north-east, east, south, and south-west of UoK, all between 0.08km and 1.8km of the boundary.

The most optimal Dormouse habitat is within Brotherhood Wood and Park Wood and smaller connecting woodlands and hedgerows to the north. Given the mature woodland overhanging Sarre Penn, the stream is unlikely to function as a barrier to Dormouse movement within the Northern Land Holdings.

Bluebell Wood and other copses and hedgerows within the Parklands zone also offer potential habitat for Dormice. While a detailed Dormouse survey undertaken by LUC for the Chaucer Fields Development Environmental Statement found no evidence of Dormouse presence, it should be noted that this survey excluded the majority of Bluebell Wood, as well as Eliot Footpath Wood and St Stephen's Hill Wood.

Grid reference	Notes	Date of record
Within Site in vicinity of Brotherhood Wood		
TR1460	Within Site in vicinity of Brotherhood Wood	11/08/1978
TR16K	Within Site in vicinity of Brotherhood Wood	26/02/1992
Woodland/hedgerows in & near to Canterbury		
TR157593	4 records from Broad oak (Canterbury) Nature Reserve, Canterbury; 1km to the south of UoK Eastern Extension	2005
TR15875929	Vauxhall Lakes Nature Reserve, Canterbury; 1.2km to the south of UoK Eastern Extension	22/06/2008
TR157593	4 records from Broad oak (Canterbury) Nature Reserve, Canterbury; 1km to the south of UoK Eastern Extension	2005
TR15875929	Vauxhall Lakes Nature Reserve, Canterbury; 1.2km to the south of UoK Eastern Extension	22/06/2008
TR132580	Near Harbledown; 1km to south-east	01/08/2002
South-east of UoK		
TR15J	2 records from near A2/A2050 interchange; 1.8km to the south-east of UoK	07/01/1984
Tyler Hill Village, north-east of UoK		
TR137611	2 records from near Tyler Hill Village; 80m to north-east of Canterbury to Whistable Dismantled Railway Line	2005
North of UoK Eastern Extension		
TR150613	Great Hall Wood 0.6km to the north of UoK Eastern Extension	23/09/2011
TR151609	Little Hall Wood 0.3km to the north of UoK Eastern Extension	23/09/2011
TR159603	Viridor Quarry 0.5km to the south-east of UoK Eastern Extension	2001

Table 4.4 Dormouse Records Provided by KMBRC from in and around the UK

4.05.5 Bats

All UK bats (Sch. 2, Sch. V) have been recorded in Kent, although Greater Horseshoe, Lesser Horseshoe and Barbastelle are all thought to be locally extinct. The general wooded character of the landscape north of Canterbury provides good habitat for bats, particularly given the proximity to the Blean Woodland Complex.

The UoK landholding itself includes various habitats of value for foraging and commuting bats, including woodland, hedgerows, hay meadows, and water features (principally the wooded Sarre Penn Stream corridor). The Site's many mature trees provide potential roosting locations as do some of the buildings. With respect to the latter, older buildings probably provide the greatest opportunity, e.g. Beverley Farm House and some of the older buildings along Giles Lane. Tyler Hill Tunnel, the entrance to which is just to the north of Woolf College, might also support roosting bats.

Table 4.5 summarises bat records within 5km of the UoK that have been provided by Kent Bat Group / KMBRC. Table 4.6 summarises the 150 bat roost records from within or immediately adjacent to the UoK boundary. These roost records are concentrated in the following six locations:

4.0 Eliot Path Wood / Archbishop's School.
5.0 Eliot College.
6.0 Giles Lane / Turing College.
7.0 Park Wood / Park Wood College.
8.0 Rutherford College / Darwin College / St Stephen's Hill.
9.0 UoK eastern extension near Little Hall Farm

From the records it is not clear whether roosts are from buildings or trees, although with respect to the Eliot Path Wood/ Archbishop's School hibernation roost records, given the number of records (137) and the variety of species recorded, it is strongly suspected that the roosts are located in the Archbishop's Tunnel and/or buildings (or a single building) connected to the Archbishop's School. Note that the Archbishop's School adjoins UoK's south-eastern boundary. A hibernation roost (or roosts) was also identified somewhere in the vicinity of Eliot College.

With respect to the other four locations, roost types are unknown. Having said this, the presence of 40 pipistrelle bats from one roost near Rutherford College would suggest a potential maternity roost, although note though that this particular record is from 1990.

KMBRC has also provided 25 records of bats in flight from within the Campus, most of which were Common Pipistrelle with smaller numbers of Brown Long-eared and myotid bats. Bat emergence surveys of mature trees in the vicinity of the Chaucer Fields, undertaken by LUC (2011) for the Chaucer Fields Development Environmental Statement, recorded no bats, although small numbers of Common Pipistrelle and Soprano Pipistrelle were recorded from associated activity surveys.

Serotine Bat	*Eptesicus serotinus*	15	3	TR1459	12/07/2008
Daubenton's Bat	*Myotis daubentonii*	80	18	TR143595	28/01/2015
Whiskered Bat	*Myotis mystacinus*	6	1	TR143599	12/08/1992
Natterer's Bat	*Myotis nattereri*	12	68	TR143595	20/02/2015
Noctule Bat	*Nyctalus noctula*	54	1	TR143595	07/10/2005
Nathusius' Pipistrelle	*Pipistrellus nathusii*	5	0	TR143576	14/07/2004
Common Pipistrelle	*Pipistrellus pipistrellus*	312	50	TR141597	03/02/1999
Soprano Pipistrelle	*Pipistrellus pygmaeus*	181	36	TR143595	08/10/2006
Brown Long-eared bat	*Plecotus auritus*	40	82	TR143600	02/06/2016

Table 4.5 Summary of Bat Records from within 5km of the UoK

Location	Species	Comments
In vicinity of Eliot Path Wood & adjoining Archbishop's School (TR143595)		
Hibernacula	Unidentified bat species	7 separate records 1994-2013; 1-2 bats each
Hibernacula	Daubenton's bat	20 separate records 1985-2016; 1-4 bats each visit
Hibernacula	Brown Long-eared Bat	31 separate records 1987-2013; 1-3 bats each visit
Hibernacula	Myotid species	5 separate records 1991-2013; 1-5 bats each visit
Hibernacula	Common Pipistrelle	Single visit 2005; 6 bats
Hibernacula	Whiskered / Brandt's / Alcathoe	4 separate records 1991-2015; 1-2 bats each visit
Hibernacula	Natterer's Bat *Myotis nattereri*	69 separate records; 1-13 bats each visit
Near Eliot College TR141597		
Hibernacula	Common Pipistrelle	Single record 1998; 2 bats
Hibernacula	Pipistrelle species	Single record 1999; 1 bat
Between Giles Lane & Turing College		
Roost type unknown (TR136595)	Long-eared bat	2010 record; droppings only
Roost type unknown (TR136596)	Long-eared bat	2010 record; droppings only
Roost type unknown (TR135595)	Pipistrelle species	1989 record; observed from roost inspection
Roost type unknown (TR135595)	Bat species	1989 record; droppings only
Roost type unknown (TR136595)	Common Pipistrelle	2010 record; detector survey
In vicinity of Park Wood & Park Wood College (TR134597)		
Roost type unknown	Bat species	1987 record; droppings only
Rutherford College / Darwin College / St Stephen's Hill		
Roost type unknown (TR142598)	Bat species	1990 record; 40 bats observed from roost inspection
Roost type unknown (TR143599)	Whiskered Bat	1990 record; 1 bat observed from roost inspection
Roost type unknown (TR144601)	Bat species	1998 record; 1 bat
Eastern extension near Little Hall Farm		
Roost type unknown (TR146603)	Bat species	1987 record; droppings only
Roost type unknown (TR147603)	Brown Long-eared Bat	2005 record; bat observed from roost inspection
Roost type unknown (TR147603)	Brown Long-eared Bat	2006 record; bat observed from roost inspection

Table 4.6 Bat Roost Records from within or Immediately Adjacent to the UoK Boundary

4.05.6 Other Mammals

Although KMBRC hold 56 Hedgehog *Erinaceus europaeus* (S.41) records from within 2km of the UoK, there are only eight records from the last 10 years and only two from the last five years. The paucity of recent data probably reflects the nationwide downward trend in the population of this species. Nonetheless, the mix of habitats within the Campus including woodland, hedgerow, meadow, amenity grassland and wetland would seem suited to the species.

In Kent, numbers of Brown Hare (S.41) have declined dramatically and the species is now sparsely distributed in the county. Brown Hares are recorded most commonly from the north Kent and Romney Marshes (Kent Biodiversity Action Plan Steering Group, 1997). KMBRC hold no Brown Hare *Lepus europaeus* records from the Campus and only two from within 2km, the most recent of which was from 2001.

During survey the only mammals observed were Rabbits *Oryctolagus cuniculus* and Grey Squirrels *Sciurus carolinensis*, both of which were numerous.

4.5.5 Amphibians

According to the Kent Reptile and Amphibian Group (undated), Kent has a good population of GCNs (Sch. 2; Sch. V; S. 41) with The Blean Woodland Complex being a particular hotspot. As discussed, the UoK has eight ponds. A further four ponds have been identified just to the south-west of the Site in the grounds of St Edmunds School and two ponds within/near to the Blean Pastures Local Wildlife Site. Given the large size of the Site there are likely to be other ponds within 0.5km. Complementing the ponds the Campus has good terrestrial habitat for amphibians, including woodland, hedgerow, and meadow.

GCN records provided by KMBRC from within and adjacent to the Site are summarised in Table 4.7. All records from within the Campus are from the southern half, mostly in the vicinity of Ponds 1 and 2. Adjacent to the Site there are GCN records to the south-west (St Edmunds School), north-west (Tyler Hill Road, Blean), north-east (Tyler Hill village) and to the east (Little Hall Wood near to UoK's Eastern Extension).

In 2013 LUC undertook GCN surveys covering all ponds on the Campus as well as four ponds on adjoining land within the grounds of St. Edmunds School (Ponds 1-11). DICE is also monitoring GCNs from their Experimental GCN Pond (Pond 12). A summary of the results is provided in Table 4.11. Medium sized populations were recorded from Ponds 1 and 12, while Small populations were recorded from Ponds 2, 6, 7 and 11. Note though that two of the ponds (6 and 7) are within the grounds of St. Edmunds School.

According to the Estates Environmental Plan (Estates Department, 2014) there are also GCNs in Woody's Culvert, although it is currently assumed that Woody's Culvert is an alternative name for Pond 11 in Park Wood.

Common Toad (S.41) has also been recorded from Pond 12.

Species	Location	Date of record	Comments
UoK records			
GCN	TR141594	14/05/2015	Near to Pond 1
GCN	TR141594	28/04/2015	Near to Pond 1
GCN	TR1406359383	02/03/2013 - 13/03/2014	3 records between Ponds 1 or 2
GCN	TR1378059387	2004	Between Fonds 3 or 4
GCN	TR140593	25/05/2002	2 records near to Pond 1
Common Toad	TR136601	02/04/1996	Brotherhood Wood
Common Toad	TR137610	25/02/1998	Northern end of Canterbury & Whitstable Dismantled Rail Line, Tyler Hill village
Common Toad	TR1406359383	1994	Near to Pond 1
Common Toad	TR151605	02/10/1996	UoK Eastern Extension
Adjacent to Site			
GCN	TR132595	2015	Near to Pond 8, St Edmunds School
GCN	TR150607	06/11/1996 - 06/07/2000	9 records Little Hall Wood near to UoK Eastern Extension
GCN	TR13936096	1988-1998	4 records near village of Tyler Hill
GCN	TR124607	10-03-1997	Near Tyler Hill Road, Blean
GCN	TR136591	1995	Near to Ponds 5 & 6, St Edmunds School

Table 4.7 Amphibian Records from Within or Immediately adjacent to the UoK Boundary

Pond	GCN population[a] from 2014 survey	Other amphibians	Factors inhibiting GCN occupation
Ponds within UoK boundary			
Pond 1, Lower Eliot (Bluebell Wood)	Medium; 25	Smooth Newt, Palmate Newt *Lissotriton helveticus*	Shading; fish
Pond 2, Upper Eliot (Bluebell Wood)	Small; 2	Smooth Newt, Palmate Newt, Alpine Newt	Shading; fish; Giant Hogweed
Pond 3, Beverley Farm	Not present	Later survey undertaken for Turing College development identified newts but species not known	Shading; siltation; small & shallow
Pond 4, Keynes	Not present	Not present	Pollution; shading; siltation
Pond 5, St Edmund's School (outside of UoK)	Not present	Smooth Newt, Palmate Newt, Alpine Newt	Small; densely vegetated
Pond 6, St Edmund's School (outside of UoK)	Small; 4	Smooth Newt, Palmate Newt, Alpine Newt	Small
Pond 7, St Edmund's School (outside of UoK)	Small; 7	Smooth Newt, Palmate Newt, Alpine Newt	Excessive Reedmace; shallow
Pond 8, St Edmund's School (outside of UoK)	Not present	Palmate Newt	Limited aquatic vegetation
Pond 9, Woolf	Not present	Palmate Newt, Alpine Newt	Shading; siltation; limited aquatic vegetation
Pond 10, Jennison	Not present	Smooth Newt, Alpine Newt	Shading; fish; New Zealand Pygmyweed
Pond 11, Park Wood	Small; 1	Smooth Newt, Palmate Newt, Alpine Newt	Shading; siltation; limited aquatic vegetation
Pond 12, GCN Experimental Pond	Medium; 68 (2017 count by DICE, Andrew Buxton, pers. comm.).	Palmate Newt, Alpine Newt, Common Toad	Alpine Newt (non-native Schedule 9; potentially carrying chytrid fungus *Batrachochytrium dendrobatidis*)
Ponds outside UoK boundary			
Pond 13, Blean Pastures	Not known	Not known	Siltation; 100% riparian vegetative cover
Pond 14, North of Blean Pastures	Not known	Not known	-

Small - maximum counts up to 10; Medium - maximum counts between 11 and 100; Large - maximum counts over 100

Table 4.8 GCN Records from Ponds Within and Directly adjacent to the UoK

4.05.8 Reptiles

According to DICE, Grass Snakes (Sch. V; S.41) are present on the western side of the Campus near to the GCN Experimentation Pond (Pond 12), although no other reptile species have been recorded in this area (Andrew Buxton, pers. comm). The Estates Environmental Plan also states that reptiles are present within the Campus although gives no information on species or their distribution. KMBRC, however, hold two old Slow-worm records from between Giles Lane and Sports Centre and one from the Archbishop's School (south-east of Parklands). There are also multiple Grass Snake, Common Lizard (Sch. V; S.41) and Slow-worm (Sch. V; S. 41) records from Tyler Hill Pastures and Little Hall Woods, just to the north-east and east of the UoK respectively. Adders are also present within 2km of the Site. During survey a Grass Snake was observed along a hedgerow north of Tyler Hill Road.

4.05.9 Birds

All birds are protected under the Wildlife and Countryside Act 1981 against killing or injury along with their active nests. Table 4.12 lists birds of conservation concern (see RSPB, 2015) recorded within the Site boundary, all of which were recorded in the Parklands zone of the Campus. These species included Redstart, Spotted Flycatcher, Marsh Tit, Common Crossbill and Hawfinch. These are all typically woodland species, which potentially might utilise Blue- bell Wood and other smaller woodlands in the local area. No information is held, however, on the breeding status of any of these species within the Site.

Kingfishers (Sch. I) were regularly recorded along the Sarre Penn downstream of the Site (between Tyler Hill and Broad Oak) during a recent survey by Jacobs (2015) and so may also be present along the UoK section. Note though that, unlike conditions downstream, no substantial vertical banksides, which Kingfishers favour for nesting, were identified along the Campus section of the Sarre Penn.

During the present survey Blackcaps, Chiffchaffs, Whitethroat, Song Thrush (S. 41; Red List) and common tit species were widespread in hedgerows and woodlands. Great Spotted Woodpecker *Dendrocopos major*, Green Wood- pecker *Picus viridis* and Mistle Thrush *Turdus viscivorus* (Red List), all relatively charismatic species, were regularly recorded in and around the Campus Heart, making use of surrounding woodland and free-standing mature trees.

In terms of farmland birds, four singing Skylarks *Alauda arvensis* (S. 41; Red List) and two Yellowhammers *Emberiza citrinella* (S. 41; Red List) were recorded, while Kestrel *Falco tinnunculus* (Amber List) was also observed on one occasion.

Common English Name	Scientific Name	Protection / conservation status	No. records	Nearest record to UoK	Date of nearest record
Redstart	*Phoenicurus phoenicurus*	Amber List	7	UoK Parklands; TR1459	24-09-93
Spotted Flycatcher	*Muscicapa striata*	Red List; S. 41	20	UoK Parklands; TR1459	21-09-92
Marsh Tit	*Parus palustris*	Red List; S. 41	6	UoK Parklands; TR1459	24-11-93
Common Crossbill	*Loxia curvirostra*	Sch. I	6	UoK Parklands; TR1459	01-04-2012
Hawfinch	*Coccothraustes coccothraustes*	Red List; S. 41	31	UoK Parklands; TR1459	12-09-1997
Yellowhammer	*Emberiza citrinella*	Red List; S. 41	32	UoK Parklands; TR1459	28-03-1991

Table 4.9 Birds of Conservation Concern Recorded Within the UoK

		Protection / conservation status
Hobby	*Falco subbuteo*	S. 41
Nightjar	*Caprimulgus europaeus*	S. 41; Amber List
Common Crossbill	*Loxia curvirostra*	Sch. I
Nightingale	*Luscinia megarhynchos*	Red List
Lesser Spotted Woodpecker	*Dendrocopus minor*	Red List; S. 41
Woodcock	*Scolopax rusticola*	Red List
Marsh Tit	*Parus palustris*	Red List; S. 41
Tree Pipit	*Anthus trivialis*	Red List; S. 41
Cuckoo	*Cuculus canorus*	Red List; S. 41
Turtle Dove	*Streptopelia turtur*	Red List; S. 41

Table 4.10 Birds of Conservation Concern Recorded within The Blean According to Kent Wildlife Trust & Canterbury City Council

(These species could potentially occur on campus now or return with appropriate habitat management and enhancement.)

4.05.10 Fish

A study by Jacobs (2015) references EA fish monitoring data from the upper reaches of the Sarre Penn and concluded that the stream provides *'valuable habitat for salmonid populations in the area'.* Presence of Brown Trout *Salmo trutta* (S. 41) smolts indicate that some are undergoing metamorphosis to Sea Trout that will then migrate to sea for a year or more before returning to spawn in freshwater; providing that is that downstream barriers inhibiting passage can be circumnavigated. EA monitoring has also shown Eels *Anguilla anguilla* and Bullhead *Cottus gobio* to be present along the upper reaches of the Sarre Penn. All these species are good indicators of watercourse health. Atlantic Salmon *Salmo salar* (S. 41) have been recorded migrating within the wider Stour catchment, although there are no records from the Sarre Penn to the author's knowledge. The Sarre Penn also has a healthy range of coarse fish species including Roach *Rutilus rutilus*, Rudd *Scardinius erythrophthalmus* and Bream *Abramis brama*.

The coarse gravel substrate found along the UoK section of the Sarre Penn may be important spawning habitat Brown Trout and Bullhead. Shallow, stony riffles are also utilised by juvenile Bullhead, whereas sheltered sections created by woody debris, tree roots, leaf litter are preferred by adult fish, at least during daylight. Adult Brown Trout might also utilise the larger shaded pools as cool refuges and also during low flow conditions.

During the present survey a shoal of fish was observed near the Crab and Winkle Dismantled Railway crossing, although the species was not confirmed.

4.05.11 Invertebrates

Overview

The UoK includes various habitats important for supporting healthy invertebrate populations including woodlands, hedgerows, free-standing trees (with- in hedgerows, the Campus Heart and Parklands), meadows, the Sarre Penn Stream and ponds. The nearby Blean Woodland Complex includes many invertebrate rarities, some of which might also utilise the Site's various woodlands. Here we briefly discuss the Southern Wood Ant, the aquatic invertebrates of Sarre Penn Stream, and the potential presence of Heath Fritillary Butterfly.

Southern Wood Ant

The Blean Woodland Complex woods are famed for colonies of the iconic Southern Wood Ant Formica rufa (also known as Red Ant) which constructs towering and impressively engineered nest mounds from the woody materials of the forest floor. These nests were also found during the present survey in Brotherhood Wood and Park Wood. Common Cow-wheat (present in Brother-hood Wood) is not only the larval food plant of the rare Heath Fritillary Butterfly, but also has a special relationship with wood ants. The flowers produce a sugary liquid from tiny glands below the petals that the ants are attracted to and feed on. The seeds of the plant are very similar in appearance to the cocoons of the ant and are transported back to the nest where they can then germinate, helping the species disperse.

Aquatic invertebrates

Within Kent, the White-clawed Crayfish *Austropotamobius pallipes* (S. 41) has been recorded from the River Stour and indeed KMBRC report five records from the Canterbury section. The most recent of these records, however, is from 1987 and it is now believed populations are largely limited to the river's head-waters (Kent Biodiversity Action Plan Steering Group, 1997). As White-clawed Crayfish prefer watercourses with relatively hard mineral-rich waters, they are unlikely to be present along the Sarre Penn, the upper reaches of which flow over London Clay that give rise acidic conditions. Consultation with the Environment Agency should be undertaken however in the next phase of the project to verify this assertion.

Jacobs (2015) reference EA data for upper sections of the Sarre Penn that classify the Sarre stream as being of 'High' value for invertebrates (according to Water Framework Directive classification tables), reflecting the relatively good water and habitat quality. The diverse range of invertebrate fauna includes a large number of specimens from the family *Glossosomatidae*, or cased caddis. The *Glossosomatidae* family contains two genera, *Glossosoma* and *Agapetus* which are generally encountered in clean fast-flowing rivers and are absent from still and polluted waters. The most notable invertebrate sampling station was at Tyler Hill which is just downstream of the UoK landholding. Down- stream of Tyler Hill aquatic invertebrate assessments indicate declining habitat quality, which is likely due to channel straightening / deepening and agro- chemical runoff.

Heath Fritillary

The Heath Fritillary is one of Britain's most threatened butterfly species. The Blean Woodland Complex is a major stronghold for the species and contains approximately 60% of all UK colonies (Butterfly Conservation, undated). In the Blean Woodlands the Heath Fritillary uses sunny clearings such as coppice coupes or recently clear-felled woodland where its larval food plant, Common Cow-wheat, is abundant.

While there are no recent records of Heath Fritillary from the woodlands within the Campus, there is potential given the mix of Ancient woodland, presence of Common Cow-wheat (in Brotherhood Wood at least) and the recent re-introduction of coppice management (again in Brotherhood Wood).

4.06 Invasive Species

4.06 Invasive species
Alien invasive Schedule 9 listed species recorded during the Phase 1 Habitat survey include:

10.0 Japanese Knotweed - Eliot Footpath Woodland (Area 111); this appears to have been recently treated with herbicide and no fresh growth was evident (see Plate 4.67).

11.0 Rhododendron - Giles Lane Wood (Areas 12 & 13); Park Wood (Area 14); and St Stephen's Hill Woodland (Area 113).

12.0 Giant Hogweed - Upper Eliot (Bluebell Wood) Pond (Pond 5) (see Plate 4.68).

The recent amphibian surveys have also revealed the presence of Schedule 9 listed Alpine Newt in Ponds 9, 10, 11 and 12. According to Andrew Buxton of DICE (pers. comm.) the local Alpine Newt population is known to carry the chytrid *Batrachochytrium dendrobatidis* fungus which can be transmitted to native UK amphibians. According to the UoK Biodiversity Management Plan, the chytrid fungus has been identified from two ponds. Schedule 9 listed New Zealand Pygmyweed *Crassula helmsii* has also been identified from Pond 10 according to the UoK Biodiversity Management Plan.

5.0 Assessing the importance of ecological features

5.0 Assessing the Importance of Ecological Features

5.01 Ecological Importance
A preliminary assessment of the ecological importance of individual habitat types and notable species/taxa is presented in Table 5.1.

The Campus' Heart, farmland and parkland includes a variety of habitat types and plant communities, most notable of which are the Ancient woodlands, the Sarre Penn Stream and the meadows of the Parklands. Blean Pastures County Wildlife Site overlaps with the western edge of the Campus, incorporating West Triangle Wood and sections of the Sarre Penn Stream and the Crab and Winkle Link cycleway.

These habitats in turn support a potentially rich faunal assemblage. The Campus includes populations of breeding Great Crested Newts and reptiles, and Dormice are also believed to be present. There are historic records of bats roosting within the Campus, although precise locations and roost types are unknown. A recent survey of the Sarre Penn just downstream of the Campus by the EA reveals that spawning Brown/Sea Trout are present, as well as Eel and Bulhead. Presence of these fish species, combined with a notable aquatic invertebrate community, is indicative of a healthy riverine environment. The Campus is also likely to support notable breeding bird and woodland invertebrate populations, although no detailed surveys for these taxa have been undertaken.

In assessing the ecological importance of features on the Campus it is equally important highlight its context. The UoK is broadly encompassed by the Blean Woodland Complex to the east, west and north; it is probably the largest area of contiguous/semi-contiguous Ancient woodland in England. Most of the woodlands are designated under various tiers of protection including SAC, NNR, SSSI and LWS, and support multiple protected species. Given that it sits within the **Blean Living Landscape** and also because of its considerable size and habitat mosaic, **the Campus should be seen as being integral to the wider landscape-scale habitat protection and restoration proposals.**

On the basis of the above summary and the further detail provided in Table 5.1, the Campus is considered to be of at least 'County' importance for nature conservation, and potentially of 'Regional' importance.

Resource	Summary description	Importance for Biodiversity
Context- Blean Woodland Complex	The UoK is broadly encompassed by the Blean Woodland Complex - probably the largest area of contiguous/semi-contiguous Ancient woodland in England - to the east, west and north. Most of the woodlands are designated under various tiers of protection including SAC, NNR, SSSI and LWS). Includes multiple protected species. In terms of landscape-scale habitat restoration, the Campus is seen as integral, being within the Blean Living Landscape Area.	International
The Site in its entirety	See summary above	At least County and perhaps Regional
Tyler Hill Meadows Local Nature Reserve	• Adjacent to the north-eastern corner of Campus. • One of the few remaining unimproved neutral grasslands in Kent.	County
Blean Pastures Local Wildlife Site	• Partly overlaps Campus. • Mosaic of habitats including woodland, tall herb/riparian vegetation, a section of the Sarre Penn Stream, and the Crab and Winkle Link cycleway (see below). • Local sites are typically categorised as being of 'County' value which, despite lack of recent management, would also seem appropriate in this case.	County
Little Hall and Kemberland Woods and Pasture Local Wildlife Site	• Adjacent to the UoK Eastern Extension • Broad-leaved woodlands, a series of unimproved and species-rich semi-improved neutral pastures and a section of the Sarre Penn Stream.	County
Sarre Penn Stream	The Sarre Penn Stream and associated bankside habitat is one of the most noteworthy feature of the Site. The stream shows many features of an un-modified (natural) watercourse. Although only a small part of the stream is within the Site, this section is integral to the ecological functioning of the upper catchment, and potentially support Bullhead, Eel and spawning Brown/Sea Trout. The stream is also ecologically important because it has fluvial and thus ecological connectivity to the Stour. The stream is also fringed by woodland, some of which is Ancient, and is partly designated under Blean Pastures Local Wildlife Site. Upstream of the Site is the Blean Woodland Complex.	County
Woodlands	UoK includes six areas of Ancient woodland covering ca. 16ha, plus areas of secondary woodland. West Triangle Wood, as well as a section of the adjoining Long Thin Wood, are components of Blean Pastures Local Wildlife Site. Their restoration and enlargement are seen as important elements in the Blean Living Landscape project. GCNs present and Dormice potentially widespread. Ecological importance of the woodlands potentially Regional but provisionally classified as County because: value for birds and invertebrates currently unquantified; neglected state of coppice management; fragmentation due to piecemeal development of UoK; and because of relative abundance of Ancient woodland locally and in the wider region.	At least County
Meadows (Southern Slopes)	Although not botanically rich, as a single coherent feature (and because of linkages with adjoining woodlands) they are of some ecological interest. They also have considerable landscape interest, being important both to the setting of the University, and to the context of the nearby World Heritage Site. GCNs present. Potential to be enhanced through introduction of grazing.	Local –(District)

Resource	Summary description	Importance for Biodiversity
Recently sown wildflower meadow (Turing College and Innovation Centre)	Much more herb-rich than those on the Southern Slopes, these appear to have been recently sown with a wildflower mix, which currently limits their ecological value compared with longer-standing grassland communities.	Local (Parish)
Campus Heart (excluding woodlands)	The majority of this area is intensively managed as amenity grassland, including large sports pitches, of low ecological value. However, when combined with the many scattered trees (including many mature oaks, potential remnants of former Ancient woodland) and ornamental planting, the landscape is certainly not without ecological interest. Given the abundance of mature Oaks and other trees a case could potentially be made for raising the value to Local - District.	Local (Parish)
Hedgerows	The Campus (primarily the Northern Land Holdings) includes a number of hedgerows, some of which may be categorised as Important in accordance with the Hedgerow Regulations. The hedgerow network may also be important in supporting protected species such as Dormice, GCNs and reptiles, and is also a foraging / commuting resource for bats. The hedgerow network is also important in achieving the Blean Living Landscape objective to reconnect woodlands and other semi-natural habitats. If the gap-ridden hedgerows could be restored the importance could potentially be at the Local-District level.	Local (Parish)
Ponds	The Campus's ponds are in a neglected state, being (to varying degrees) silted, polluted, overgrown by trees/shrubs, and in some cases inhabited by non-native invasive species. All these pressures inhibits their ecological potential and amenity interest. Nevertheless, the ponds do support a diverse amphibian population including GCNs. Potentially of Local (District) value if ecologically restored.	Local (Parish)
Arable and improved pasture (majority of the Northern Land Holdings)	These pasture was of limited botanical interest, although in terms of fauna they had some value e.g. for foraging Badgers and bats (attracted to insects associated with cattle dung).	Within the Immediate Zone of Influence of Site only
Dormouse	The Dormouse is a European Protected Species. Their abundance and distribution across the Site is unknown. It is provisionally assumed, given the number of woodlands and proximity to the Blean Woodland Complex that they are widespread although the valuation could be downgraded if subsequent survey work reveals them to be far less prevalent.	Possibly Local (District)
Bats	All bats are European Protected Species. The general wooded character of the landscape north of Canterbury appears generally good for bats, particularly given the proximity to the Blean Woodland Complex. The UoK landholding itself includes various habitats of value for foraging and commuting bats, including woodland, hedgerows, hay meadows, and water features (principally the wooded Sarre Penn Stream corridor). The Site's many mature trees provide potential roosting locations as do some of the buildings, and indeed there are 150 bat roost records from within or immediately adjacent to the UoK boundary (although most of these are believed to be from the Archbishop's Tunnel and/or School adjacent to the Campus). The status and precise location of roost records from within the Site are not known.	Local (District)

Resource	Summary description	Importance for Biodiversity
GCNs (and other amphibians)	GCN is a European Protected Species. While widespread throughout much of England and Wales, it is nonetheless scarce on a European scale. Ponds 1 and 12 support 'Medium' GCN populations while Ponds 2 and 11 support' Small' populations. GCNs also present in ponds within the neighbouring St Edmunds School site. The S. 41-listed Common Toad also present. Through creating new ponds and restoring existing ponds there is considerable potential for significantly enhancing the status of the Campus's amphibian population.	Local (District)
Reptiles	Mosaic of woodland edge, meadow, hedgerow and pond habitat provides reasonably good habitat for reptiles. Grass Snakes recorded on the western and northern sides of the Campus. Slow-worm and Common Lizard also potentially present.	Local (District)
Breeding birds	The Site's rich habitat mosaic provides potentially good breeding bird habitat, although no detailed surveys have been undertaken to our knowledge. Notable farmland species were recorded including Skylark, Yellowhammer and Kestrel, and Kingfisher has been recorded locally along the Sarre Penn. The woodlands in particular are likely to support good breeding bird numbers but whether they support rarities is unknown. The Campus certainly has good potential to attract a rich assemblage of species with good habitat management, given proximity to the Blean Woodland Complex.	Local (District)
Invertebrates	The Site's rich habitat mosaic provides potentially good invertebrate habitat, although no detailed surveys have been undertaken to our knowledge. Survey of aquatic invertebrates along a neighbouring (downstream) section of the Sarre Penn scored the stream as 'Good'. The Ancient woodlands in particular are likely to support a good assemblage of invertebrates.	Unkown at present but probably at least Local (Parish)
Fish	Bullhead, Eel and spawning Brown/Sea Trout have been recorded just downstream of the Campus. Sarre Penn is also believed to support of good coarse fish population.	Local (District)

High-level Overview of Ecosystem Service Provision
The key ecosystem services being provided by the various habitats within the Site are summarised as follows:

Food production
The Northern Land Holdings are primarily under agricultural production which provide food. The University also has a small allotment area (see also below). Woodlands, meadows (see Plate 5.1), hedgerows and even some areas of ornamental planting provide extensive and high-quality foraging opportunities for pollinators which in turn help pollinate various crop species.

Flood water attenuation and water quality
The Campus's various woodlands are particularly effective in attenuating runoff entering the Sarre Penn Stream and ultimately the River Stour, both of which are susceptible to flooding. Meadow habitat on the Parklands will also contribute but to a lesser extent, and both habitats also reduce diffuse pollution entering watercourses. The greatest benefits come from the riparian and floodplain woodland which abuts both banks of the Sarre Penn Stream the length of its Campus section. Submerged roots and boughs combined with deadwood all serve to slow the flow of stream further reducing flood risk downstream. By stabilising banksides, riverine woodland also reduces sedimentation which in turn protects trout spawning areas and fish stocks (Plate 5.2).

Ameliorating climatic extremes
In addition to sequestering carbon from the atmosphere woodland and free-standing trees also provide substantial local cooling (see Plate 5.3). Heat gain in direct sun would be more significant were the Campus Heart to consist of a greater area of hardstanding.

Recreation and Health and wellbeing
A range of bodies, including Government agencies, have promoted the physical and psychological health benefits of access to greenspace. The Campus includes an abundance of greenspace, although quality and access could be improved in various areas. A network of footpaths extends across the Parklands zone, while the land to the north includes a number of Public Rights of Way, and most notably, the very popular Crab and Winkle Link. The Crab and Winkle Link is a 7-mile cycle path linking Canterbury with the harbour in Whit- stable (Plates 5.4 and 5.5). Given the activities of DICE, the Allotment Group/Oasis Garden Society, School of Anthropology and Conservation and The University of Kent Conservation Society, the Campus's wildlife would specifically seem to be providing much enjoyment to some students and staff. As the Concept Master Plan highlights, however, greenspaces within and around the Campus Heart are fairly homogenous and are not reaching their full potential in terms of biodiversity value and associated and landscape and recreational value. The key ecosystem service benefits of the allotment are amenity value and associated improvements in health and wellbeing benefits as food output is negligible (Plate 5.6).

Plate 5.1: **Newly created meadow opposite Turing College benefitting pollinators**

Plate 5.2: **Sarre Penn wooded corridor; woodland attenuates run off, improves water quality and stabilises banksides**

Plate 5.4: **Crab and Winkle Link signage**

Plate 5.5: **The Campus Heart includes many Mature Oaks which provide shade and an evaporative cooling effect**

Plate 5.3: **Cycling on the Crab and Winkle Link – a very popular cycle way**

Plate 5.6: **University Community Garden managed by the Allotment Group / Oasis Garden Society**

6.0 Gap Analysis

6.0 Gap Analysis

6.01 Protective Species Surveys
Whether further ecological survey work is required depends in large part on the nature and arrangement of specific development proposals and the habitats that would be potentially affected. Having said this, further survey work should also be carried out to better understand the ecology of the Campus, thereby informing green infrastructure restoration, enhancement and management proposals.

Detailed surveys of the following protected species is likely to be required at some time during future development:

Bats
If potential roost sites are destroyed, e.g. buildings are mature trees. Bat activity surveys may also be required if there are major proposals to change the landscape which might impact on foraging and commuting corridors.

Dormice
Survey would particularly be required if woodland and hedgerow habitat is potentially being lost or fragmented. Even if woodland areas are not being directly affected we recommend consideration is given to carrying out a site-wide Dormouse survey to assess indirect impacts (such as recreational attrition) and inform management proposals.

Badgers
No signs of Badger were noted during the present surveys, although precautionary checks for their presence should be made in relation to all new development.

Great Crested Newts
If ponds are affected or if there is potential significant loss of associated terrestrial habitat. Note that although a detailed survey was undertaken in 2014, data are likely to be considered out of date for Natural England licensing purposes.

Reptiles
If significant areas of suitable habitat are affected, e.g. meadow, hedgerow, scrub, and woodland edge.

Breeding birds
A breeding bird survey is proposed given the large area of Ancient woodland within the Campus and in the wider landscape, and because the noteworthy species associated with this habitat type. Note also that UoK also includes scarce farmland bird species. Even where there is no direct threat to the Ancient woodland we suggest survey to inform management and potential indirect disturbance impacts.

Fish
Survey is proposed to assess which fish species are present in the Sarre Penn, and in particular whether Brown/Sea Trout are spawning along the Campus section.

Invertebrates
Invertebrate survey of the Campus's woodlands and Sarre Penn is proposed for similar reasons.

Surveys for all these species are seasonally constrained and would need to be scheduled the moment reasonably specific development proposals have been formulated to avoid delay to the programme.

For some species such as Hedgehog, their presence in all suitable habitat should be assumed when developing mitigation or enhancement proposals.

6.02 Habitats Regulations Assessment
The emerging Planning and Environmental Strategy notes that the northern part of the University estate is within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence and Thames Medway & Swale Estuaries 6km Zone of Influence (Special Policy Areas – European Sites).

The Canterbury District Local Plan (CDLP) was subject to a Habitats Regulations Assessment (HRA), which resulted in a number of modifications to policies during the plan preparation period. This concludes that the adopted policies along with the avoidance, monitoring and mitigation measures to be put in place will ensure that the development proposals outlined in the CDLP will not have a likely significant effect on a European site or Ramsar site.

It should be noted that any proposals for areas outside of the University Campus would not have been subject to Sustainability Assessment (SA) or Habitats Regulations Assessment (HRA). Subject to appropriate mitigation being embedded into proposals and any necessary additional off-site/financial mitigation being identified, the Framework Masterplan proposals are unlikely to have significant environmental effects such as to require Sustainability and Environmental Appraisal (SEA) or have significant effects on European habitats or species in the surrounding area such as to require an Appropriate Assessment (AA). Such mitigation is likely to include implementing strategies that ensure that there are no significant adverse effects on air quality or recreational use of the Blean Complex (Policy SP11) and making financial contributions pursuant to Policy SP6 (Strategic Access Management and Monitoring Mitigation Measures for the coastal Special Protection Areas and Ramsar sites).

The emerging Planning Strategy also refers to the Strategic Access Management and Monitoring Plan (2014). Following significant decline for important bird species in Kent, Canterbury City Council (CCC) has worked with Natural England to develop Strategic Access Management and Monitoring Strategies (SAMMS) for protected sites. This assesses likely visitor numbers and costs to mitigate the adverse effects of visitors on the Special Protection Area's (SPA's) in the District (including the Swale SPA). According to CCC's Constraints Map, the northern part of the Campus and University-owned to the north of Tyler Hill Road is within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence.

Guidance on CCC's website sets out the required financial contributions for new housing in this Zone.

6.03 Consultation
The views and advice of the various UoK organisations will be integrated as the Framework Masterplan is developed including:

- Estates Management
- The Environmental Sustainability Team
- DICE and School of Anthropology and Conservation
- Farm Management
- Allotment Group / Oasis Garden Society – allotment area (western edge of Site near Estates Management yard).
- The University of Kent Conservation Society

Please note that Natural England, Environment Agency and the Kent Wildlife Trust have already been consulted on the Framework Masterplan to date. The draft Consultation Statement (which has been circulated) includes comments received from the Environment Agency and Kent Wildlife Trust.

Liaison with all of the relevant nature conservation organisations will continue throughout the Framework Masterplan process.

	January	February	March	April	May	June	July	August	Sept	October	November	December
PHASE 1 HABITAT SURVEY												
BATS - Summer roost & activity survey												
BATS - Tree survey for bats												
BATS - Hibernation roost survey												
BIRDS - Winter birds surveys												
BIRDS - Breeding birds surveys												
BIRDS - Migratory birds surveys												
REPTILES												
BADGER												
BREEDING SURVEY (Nest Tubes) - Dormice												
INVERTEBRATES												
BREEDING POND SURVEYS - Great Crested Newts												
WATER VOLE												
OTTER												
WHITE CLAWED CRAYFISH												

Table 6.1 - Possible and Optimal Survey Seasons
graphic: bsg-ecology

"Science can only ascertain what is, but not what should be, and outside of its domain, value judgements of all kinds remain necessary."

Albert Einstein

7.0 Summary


STEP INTO NATURE

7.0 Summary

The University of Kent is located just to the north of the City of Canterbury at the western end of the Stour Valley Slopes. The Campus and adjoining University-owned land sits in a strategically important location from an ecological perspective, being encompassed by extensive areas of Ancient woodland to the east, west and north. In combination, these woods form the Blean Woodland Complex, which is probably the largest area of contiguous / semi-contiguous Ancient Woodland in England.

The Campus itself also includes a number of Ancient woodlands, which together with other semi-natural habitat, should be viewed as integral to the wider woodland complex. Woodland cover on the University estate had been more extensive in the recent past as maps from 1816 attest, and certainly the on-site ancient woodland has been greatly fragmented since 1963. The Campus also includes many free-standing mature trees, hedgerows, meadows, ponds and the Sarre Penn stream. A section of the Sarre Penn Stream and adjoining woodland forms part of Blean Pastures County Wildlife Site. The Campus' faunal assemblage includes Badgers, Dormice, bats, amphibians (including GCNs), reptiles, various fish species (including Brown/Sea Trout, Bullhead and Eel) and invertebrates.

In spite of these various ecological assets the environment is suffering from various pressures, which includes recent development. For example, coppice management of the woodlands has been neglected; many of the ponds are heavily silted, polluted, overgrown by tree/shrubs and colonised by alien invasive species; and many hedgerows in the north of the estate have developed substantial gaps, fragmenting the farmland landscape corridors.

In addition, other components of the Site are not realising their full ecological potential. Large areas of the Campus Heart (including drainage features) for example are managed as low-cut amenity grassland, while the annual biannual mowing regime being undertaken on the Parklands will probably take many years to achieve a botanically rich sward, not least because arisings are often left in place.

The UK as a whole has a low woodland cover compared to most countries in Europe (it ranks number 36 out of 48 states); Kent is one of the most wooded counties in the UK, with the Blean being perhaps the largest Ancient woodland in the UK, which suggests that this special sylvan asset should be prominent in the Framework Masterplan thinking.

Pyramidal Orchid taken in Park Wood LE 6/17

8.0 References

Jackdaw - the smallest crow - a sociable creature that can be acrobatic in flight seen near the Estates OfficeLE 6/17

8.0 References

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9.0 Appendices

Appendix A: Target Notes Descriptions (see Figure 4.1 for locations)

- TN1 - Church to St Cosmas and St Damian; and attractive feature along the Crab and Winkle Link cycle path.
- TN2 - Four singing Skylarks and two Yellowhammers recorded in surrounding fields and hedgerows respectively
- TN3 - Tyler Hill Tunnel entrance, Canterbury and Whitstable dismantled railway line
- TN4 - Un-surveyed pond in woodland outside Campus boundary
- TN5 - Location of recently coppiced woodland
- TN6 - Flower-rich closely mown amenity grassland
- TN 7 - Modular green wall has also been installed on UELT Building
- TN8 - Greater abundance of fine grasses and flowers in meadow between Eliot Path and Bluebell Wood
- TN9 - Archbishop's Tunnel entrance, Canterbury and Whitstable dismantled railway line; potential bat roost location for multiple species
- TN10 - Un-surveyed pond in residential garden outside Campus boundary
- TN11 - Community garden / allotment
- TN12 - Apiary
- TN13 - Clematis intertwined into mesh façade of Jarman Building fire escape
- TN14 - Ivy-clad walls, Rutherford College
- TN15 - Rabbit-cropped flower-rich glade within the Eliot Footpath Woodland
- TN16 - Recently sprayed Japanese Knotweed in the Eliot Footpath Woodland
- TN 17 - Sedum roof on Turing College Restaurant
- TN18 - Beverly Farm House
- TN19 - SuDS lagoons; one lagoon has a closely mown amenity sward while the other is planted with riparian herbs and grasses
- TN20 - A double privet hedge encloses historic track extending through the Chaucer Fields
- TN21 - Mature Black Poplar

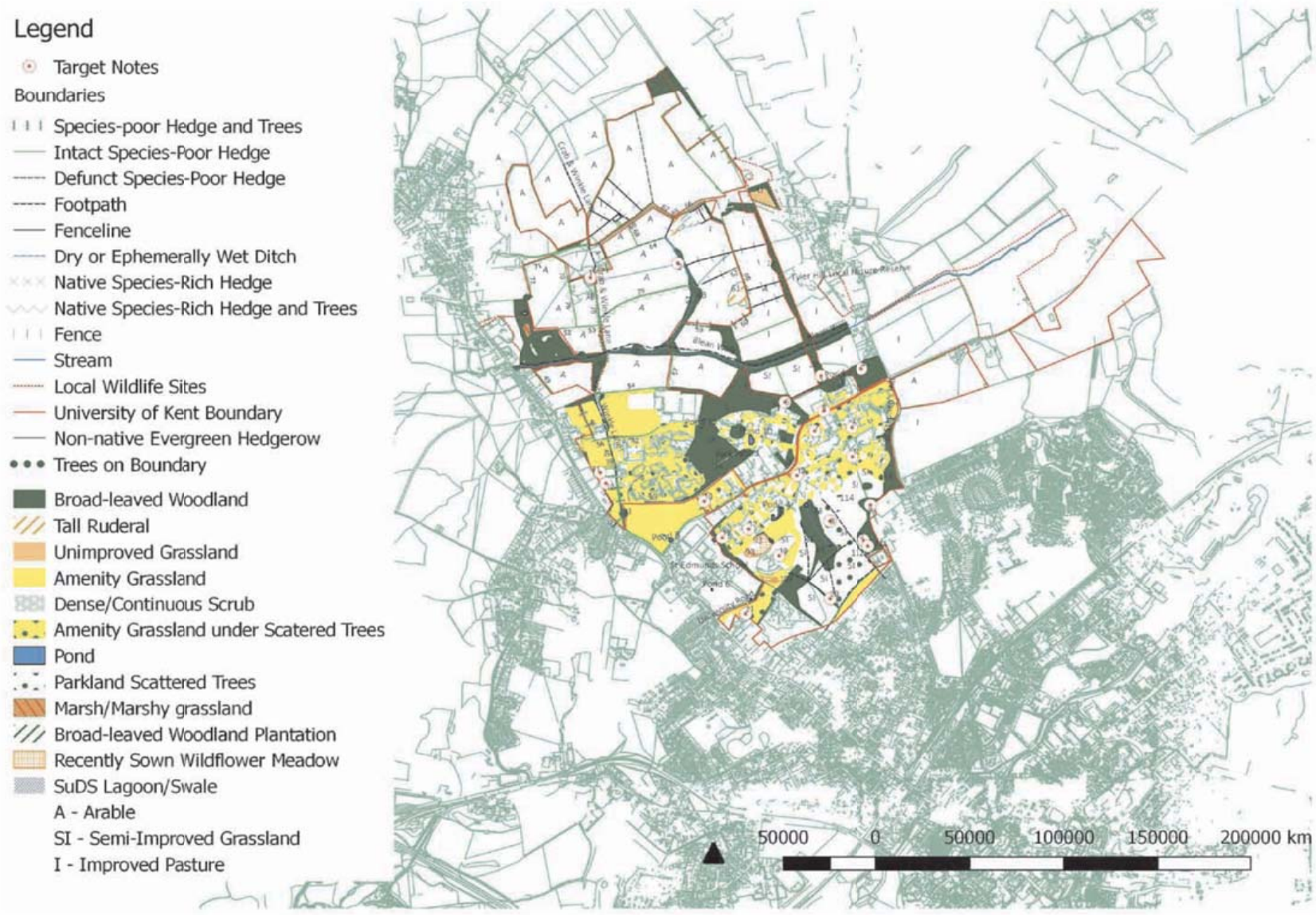

Figure 4.1 Locating Target Notes

Appendix B: Plant Species List - Woodlands

Common English Name	Scientific Name	5	6	7	10	12	13	14	15	17	20	31	50	51	58	63	83	89	90	94	10(	10.	10:	11	11:	11:
Alder	*Alnus glutinosa*									R							O				F					
Apple	*Malus domestica*																							R		
Ash	*Fraxinus excelsior*	F		A						F	A	O	A		F						F		R	F	F	O
Aspen	*Populus tremula*				O						R		F	O						O						
Beech	*Fagus sylvatica*	R	O			R		R								R										
Bittersweet	*Solanum dulcamara*															R										
Black Bryony	*Dioscorea communis*										F															
Black Knapweed	*Centaurea nigra*										R															
Black Poplar	*Populus nigra*															R										
Blackthorn	*Prunus spinosa*								F				F			A					0				O	
Bluebell	*Hyacinthoides non-scripta*	A	F	R	O	O	A	F (ID) A		F				A			D							O		
Bracken	*Pteridium aquilinum*																			O						
Bramble	*Rubus fruticosus agg.*			A		A	D				A		A		A		F		F		0		O	F	A	O
Buttercup	*Ranunculus sp.*							R		R			O													
Cherry	*Prunus avium*	R							O	O							R							R		O
Cleavers	*Galium aparine*										R		R													
Common Cow-wheat	*Melampyrum pratense*	R																								
Cow Parsley	*Anthriscus sylvestris*																						O			
Common Nettle	*Urtica dioca*									F						F			A	F	F			F	A	
Crack Willow	*Salix fragilis*																R	R	D							
Dogwood	*Cornus sanguinea*												F	O							0					
Elder	*Sambucus nigra*									O	O					F			O		R					
An elm	*Ulmus sp.*						R							R												
Enchanter's Nightshade	*Circaea alpina*	R									O			O											O	
Field Maple	*Acer campestre*	F		A				R	F		F		F			O	O			O	0	O		O		
Garden Privet	*Ligustrum ovalifolium*			0					O		O	R														F
Goat Willow	*Salix caprea*	O											A			O	O	O								
Gorse	*Ulex europaeus*																	R								
Grey Willow	*Salix cinerea*															O								O		
Ground Ivy	*Glechoma hederacea*									R																
Guelder-Rose	*Viburnum opulus*	R						R																		
Hairy Woodrush	*Luzula pilosa*	R																								
Hart's-Tongue	*Phyllitis scolopendrium*									O				R												
Hawthorn	*Crataegus monogyna*	R		A					F	O	F	O			O	A	O				0	F	R	O	O	F

Common English Name	Scientific Name	5	6	7	10	12	13	14	15	17	20	31	50	51	58	63	83	89	90	94	10(	10.	10:	11	11:	11:
Hazel	*Corylus avellana*							F		O	F		O	D	F		O				D				O	F
Hogweed	*Heracleum sphondylium*										R		O													
Holly	*Ilex aquifolium*	O	O			O	F	F				O	R				O				D				R	O
Holm Oak	*Quercus ilex*										R															
Honeysuckle	*Lonicera periclymenum*	O						O				R					F									
Hornbeam	*Carpinus betulus*	F	F								O		O								R	R		O	O	
Ivy	*Hedera helix*	A		D					F	O	F	D									A		F	D	D	O
Lords and Ladies	*Arum maculatum*									O																
Male-fern	*Dryopteris felix-mas*	O						O		O	O														O	
Norway Maple	*Acer platanoides*	R		A																		D	F			F
Pedunculate Oak	*Quercus robur*	D	F	R	D	F	A	F	O	D	F	D	F	D	D	A	F	A	O	O	F		R	O	O	O
Pendulous Sedge	*Carex pendula*									R	O		R	R												
Red Campion	*Silene dioica*	R											O				O									O
Rhododendron	*Rhododendron sp.*					R	O	R				R												R		
A rose	*Rosa sp.*	R		R			R		R		R		O	O	R	R					O					
Rowan	*Sorbus aucuparia*	R	R		O	O		R												O	R					
Silver Birch	*Betula pendula*	O			O			F									D							F		
Snowberry	*Symphoricarpos albus*	R		F																						
Spear Thistle	*Cirsium vulgare*																R									
Spindle	*Euonymus europaeus*												R			R										
Sweet Chestnut	*Castanea sativa*	A	F	O	O	D	A	D			O						R				O			R		
Sycamore	*Acer pseudoplatanus*	R			R			O		F		O			R			F	R		D	D	O	D	F	F
Weeping Willow	*Salix babylonica*																R									
Wood Anemone	*Anemone nemorosa*		O											F			F									
Wood Avens	*Geum urbanum*																						O			
A dock	*Rumex spp.*			O				R		O			O				O						O		O	
Wood False-brome	*Brachypodium sylvaticum,*							R			O															
Wood Melick	*Melica uniflora*	O																								
Wood-sedge	*Carex sylvatica*	O											O													O
Yew	*Taxus baccata*																				R					

Table A.1: University of Kent Campus botanical species list - woodlands

Appendix B: Plant Species List - Hedgerows

Common English Name	Scientific Name	54	56	57	59	60	62	64	65	66	67
Ash	*Fraxinus excelsior*			O		O				O	
Black Bryony	*Dioscorea communis*			O							O
Blackthorn	*Prunus spinosa*			F	F	D	D		A	F	F
Bracken	*Pteridium aquilinum*		O								
Bramble	*Rubus fruticosus agg.*	F		O	D	O	A	A	F	O	F
Cleavers	*Galium aparine*							A			
Common Nettle	*Urtica dioca*							D			
Dog's-Mercury	*Mercurialis perennis*			O							
Dogwood	*Cornus sanguinea*			O					O	R	A
Elder	*Sambucus nigra*				O	O		O			O
Elm	*Ulmus sp.*					O					O
Field Maple	*Acer campestre*	A				O			O	O	O
Grey Poplar	*Populus x canescens*	A	O								
Grey Willow	*Salix cinerea*					O		O		O	
Hawthorn	*Crataegus monogyna*			F	A	O	F	D	F	F	O
Hazel	*Corylus avellana*			O							A
Holly	*Ilex aquifolium*			O	R						
Holm Oak	*Quercus ilex*		F								
Horse-chestnut	*Aesculus hippocastanum*	R									
Hornbeam	*Carpinus betulus*		F	O							
Ivy	*Hedera helix*								F		
Leyland Cypress	*Cupressus x leylandii*		F								
Lombardy Poplar	*Populus nigra*	F									
Pedunculate Oak	*Quercus robur*			D	O	R			O	O	
A rose	*Rosa sp.*	O	R	O		R	R				O
Spindle	*Euonymus europaeus*			O						R	

Common English Name	Scientific Name	22	24	27	28	30	32	33	34	35	36	39	40	41	42	45	46	47	48	52	53
Ash	*Fraxinus excelsior*		R				O		R						R		F	F	O		O
Beech	*Fagus sylvatica*				D									D							
Blackthorn	*Prunus spinosa*	D	A	O			A	D				A	A		F	F	F	F	O		F
Bramble	*Rubus fruticosus agg.*	O	F					F	R		F	F	F	F	F	O			F		A
Buckthorn	*Frangula alnus*																		R		
Cherry	*Prunus avium*																F		R		
Cotoneaster	*Cotoneaster sp.*													F							
Crack Willow	*Salix fragilis*																	R			
Dogwood	*Cornus sanguinea*		O			O															
Elder	*Sambucus nigra*	O									F	O			O	O			O		O
An elm	*Ulmus sp.*		R				O	O													
Field Maple	*Acer campestre*		O			F									R		F	F	O		
Goat Willow	*Salix caprea*																	O	F	F	
Grey Poplar	*Populus x canescens*					R															
Grey Willow	*Salix cinerea*																		D	D	
Hawthorn	*Crataegus monogyna*	F	A	O		F	A	F			D	A	A		D	D	F	F	O		F
Hazel	*Corylus avellana*					F	R											F			O
Holly	*Ilex aquifolium*				O													F			
Holm Oak	*Quercus ilex*								O												
Horse-chestnut	*Aesculus hippocastanum*					R															
Honeysuckle	*Lonicera periclymenum*						O														
Hornbeam	*Carpinus betulus*	O																			
Ivy	*Hedera helix*	F					F	O													
Laurel	*Prunus laurocerasus*								D												
Leyland Cypress	*Cupressus x leylandii*									D											
Lombardy Poplar	*Populus nigra*																	R			
Ornamental shrub				D																	
Pedunculate Oak	*Quercus robur*	O							F								F	O		O	
Rose	*Rosa sp.*			R			R					O						R	R		O
Silver Birch	*Betula pendula*		O			R															
Sycamore	*Acer pseudoplatanus*			R			O	O	F		O							O			

Table A.2: University of Kent Campus Botanical Species List - Hedgerows

Appendix B: Plant Species List - Grasslands

Common English Name	Scientific Name	21	27	75	86	87	93	97	99	104	106	112	114	115
Bird's-foot Trefoil	*Lotus corniculatus*	O	F	R		O	O	O	F			F	O	F
Black Knapweed	*Centaurea nigra*						R	O	F					
Black Medick	*Medicago lupulina*	O					D	F						
Black Mustard	*Brassica nigra*						O							
Bristly Oxtongue	*Picris echioides*	R					F	R				R		
Broad Buckler Fern	*Dryopteris dilatata*													
Broad-leaved Dock	*Rumex obtusifolius*			O			F	F	O	O				
Broad-leaved Willowherb	*Epilobium montanum*												O	
A buttercup	*Ranunculus* sp.			O										
Cock's-foot	*Dactylis glomerata*			A	F	O		O	F	R	F		O	R
Colt's-foot	*Tussilago farfara*													
Common Bent	*Agrostis capillaris*			R	O	O		R		F	O		O	D
Common Chickweed	*Stellaria media*													F
Common Mouse-Ear	*Cerastium fontanum*					R							O	
Common Nettle	*Urtica dioica*			R							R			
Common Sorrel	*Rumex acetosa*				O	R				R	R	O	F	R
Common Spotted Orchid	*Dactylorhiza fuchsii*			R										
Common Vetch	*Vicia sativa*				O									
Corncockle	*Grostemma githago*							R						
Creeping Buttercup	*Ranunculus repens*	O										F		O
Creeping Cinquefoil	*Potentilla reptans*	O				R		O				F		
Creeping Thistle	*Cirsium arvense*								O	R				
Crested Dog's-tail	*Cynosurus cristatus*						D	F	F				F	
Cut-Leaved Crane's-bill	*Geranium dissectum*	R	R			R		R			R	R	R	
Daisy	*Bellis perennis*	F	F									F		
Dandelion	*Taraxacum officinale agg.*	O											R	
Dove's-Foot Crane's-bill	*Geranium molle*	R												
False Oat-grass	*Arrhenatherum elatius*			D	D	A		O	F	F	A		O	
Field Bindweed	*Convolvulus arvensis*		O		O					F			O	
Goat's-beard	*Tragopogon pratensis*					R								
Hairy Tare	*Vicia hirsuta*						R			R				
Hard Rush	*Juncus inflexus*			R										
Hawkweed Species	*Hieracium* sp.	F												
Hogweed	*Heracleum sphondylium*			O	R	R					O			
Mallow	*Malva sylvestris*	R	R			R		R					R	
Meadow Barley	*Hordeum brachyantherum*					A	R	F	F				F	
Meadow Buttercup	*Ranunculus acris*				O	O	R	O	O	R	O		O	O
Meadow Foxtail	*Alopecurus pratensis*					R	O		O	R	R			
Meadow Vetchling	*Lathyrus pratensis*													
Oxeye Daisy	*Leucanthemum vulgare*	R						A	F(ID)	A				
Perennial Rye-grass	*Lolium perenne*								O	O	R			O
Red Campion	*Silene dioica*								R					
Red Clover	*Trifolium pratense*							R		R	O			F
Red Fescue	*Festuca rubra*						O	F				F	O	
Ribwort Plantain	*Plantago lanceolata*	O	O				R		F	O				O
Rough Meadow-grass	*Poa trivialis*										O			O
Selfheal	*Prunella vulgaris*	F							F		F			F
Smaller Cat's-tail	*Phleum pratense* spp. *bertolonii*													O
Soft-rush	*Juncus effusus*							R						
Spear Thistle	*Cirsium vulgare*								O	R				
Sweet Vernal-Grass	*Anthoxanthum odoratum*						F	F				O	O		R	O
Tall Fescue	*Festuca arundinacea*							R						
Weld	*Reseda luteola*								R					
White Campion	*Silene latifolia*								R					
White Clover	*Trifolium repens*	D					R	R	F	F	O			F
Yarrow	*Achillea millefolium*	R	R											O
Yorkshire-fog	*Holcus lanatus*				A	A	A	F	D	A	A	A		A	O

Table A.3: University of Kent Campus Botanical Species List - Grasslands

Appendix C: Habitat suitability index assessment of ponds (reproduced from LUC [2011] report)

Pond	HSI Score (value)	Key issues reducing habitat quality for GCN
1	0.65 (average)	• Historical records of a small numbers of goldfish present which may prey upon young GCN. Not seen in the current survey. • Overtime may become choked with growth of reedmace *Thypha latifolia* (not currently a problem). • Covered in duckweed.
2	0.32 (poor)	• Heavily polluted with grey/blue sheen and bad smell. • Large fish population which may prey upon GCN.
3	0.55 (below average)	• Pond fairly small and dries out frequently. • Lacking aquatic plants for GCN egg laying.
4	0.43 (poor)	• Poor water quality – water very turbid. • Large waterfowl population which may prey on GCN and damage aquatic vegetation used for GCN egg laying. • Poor cover of aquatic vegetation.
5	0.53 (below average)	• Fairly small. • Dries out frequently. • Dense vegetation.
6	0.59 (below average)	• Fairly small. • Poor surrounding terrestrial habitat comprised of amenity grassland which offers low quality foraging and shelter for GCN. • Tennis balls in water
7	0.76 (good)	• Reedmace was noted to be over dominant and may increase risk of drying out as observed in 2011. • Pond shallow and may need localised deepening to prevent drying out. • Dense vegetation of duckweed. • Many fallen branches around pond shore.
8	0.47 (below average)	• Lack of aquatic vegetation. • Lacking connectivity to other nearby ponds. • Rabbit warren on north shore. • 2 chairs in pond
9	0.58 (below average)	• Heavily over shaded and lacking of aquatic vegetation. • Poor water quality perhaps resulting from decomposing leaves.
10	0.68 (average)	• Poor connectivity to other nearby ponds. • Relatively poor surrounding terrestrial habitat (amenity grassland and built-up areas).
11	0.69 (average)	• Poor connectivity to other nearby ponds. • Low cover of aquatic vegetation needed for GCN egg laying.

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