

London Organising Committee of the
Olympic Games and Paralympic Games Ltd

Eton Dorney - Ecological Survey Report

October 2010



Planning application

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1.0 Introduction

Background

- 1.1. This statement is prepared on behalf of the London Organising Committee of the Olympic and Paralympic Games (LOCOG) and the Olympic Delivery Authority (ODA). The statement is submitted in support of the planning applications for the Eton Dorney Olympic and Paralympic venue, which will host Olympic Rowing and Canoe Sprint events and Paralympic Rowing events.
- 1.2. The Eton Dorney venue falls within the administrative boundaries of two Local Authorities, namely South Buckinghamshire District Council (SBDC) and Royal Borough of Windsor and Maidenhead (RBWM). The site also falls within the boundaries of Buckinghamshire County Council (BCC). For the purposes of these planning applications, the venue comprises Dorney Lake, Windsor Racecourse and the River Thames as the three principal components.
- 1.3. This submission consists of five planning applications which comprise the following:
 - Planning application for the Temporary Pedestrian River Crossing submitted to SBDC;
 - Planning application for the Temporary Pedestrian River Crossing submitted to RBWM;
 - Planning application for the Olympic Transport Hub at Windsor Racecourse submitted to RBWM;
 - Planning application for Eton Dorney Rowing Lake overlay submitted to SBDC; and
 - Planning application for the Variation of Condition 15 of planning permission SBD/8201/05, submitted to BCC.
- 1.4. The full Descriptions of Development for the individual applications are set out within the supporting Planning Statement and on the relevant planning application forms.
- 1.5. This statement relates to the Eton Dorney venue and has been prepared for submission in support of each of the individual planning applications.
- 1.6. On 6 July 2005 the International Olympic Committee (IOC) awarded the 2012 Olympic and Paralympic Games (“2012 Games”) to London. The ODA is the public body responsible for developing and building the new venues and infrastructure for the 2012 Games and LOCOG is responsible for preparing and staging the Games, including the temporary venues and overlay.
- 1.7. Eton Dorney was selected as the venue for Olympic Rowing and Canoe Sprint events and Paralympic Rowing Events, as part of the “London Bid” for the Games.

- 1.8. London 2012 is required to apply for planning permission for operations and changes in use of land for the London 2012 Olympics and Paralympic events that constitute development requiring planning permission.

Objectives of Study

- 1.9. This assessment has been prepared in support of the planning applications for the Eton Dorney Olympic and Paralympic venue. It is based on the findings of ecological surveys that have been carried out at the site during 2008 and 2010. The survey objectives were to determine the baseline ecological conditions and to provide an evaluation of the ecological status of the site. This information is then used to assess the likely significance of the impacts on ecology resulting from the development.
- 1.10. This report summarises the ecological baseline conditions and then assesses the likely significant impacts of the development. Where these are assessed as significant, mitigation measures are proposed to reduce or offset these impacts. Proposals are also included to ensure the development incorporates biodiversity enhancing features.

General Description of Site

- 1.11. The site is situated approximately 0.5km south of the village of Dorney, Buckinghamshire and 1.0km south of the M4 Motorway (centred on OS grid reference SU 928 780). The site comprises Eton College rowing lake and surrounding land, covering an area of approximately 176ha. Habitats within the site boundary include a rowing lake, amenity grassland, semi-improved grassland, broadleaved woodland, ponds, scrub and standard trees. The River Thames marks the south-western and south-eastern boundary of the site and mixed farmland marks the north-eastern and north-western.
- 1.12. The majority of the surrounding land includes scattered residential properties within mixed farmland.

Outline of Proposed Development

- 1.13. The proposed development comprises the temporary buildings and structures required to stage the events (hereafter referred to as 'event facilities') at Dorney Lake and on Windsor Racecourse including a temporary pedestrian river crossing to connect the two sites. It also includes improvements to the towpaths along the River Thames to facilitate canoe sprint training during the 2012 Games.
- 1.14. With the exception of towpath improvements along the River Thames, there will be no new permanent infrastructure and all event facilities will be removed after completion of the events.

Nomenclature

- 1.15. The common name only of flora and fauna species is given in the main text of this report; however, Latin names are used for species where no common name is available. A full list of all species recorded on site during the surveys is given in Appendix A with their Latin names. All plant names follow the nomenclature of Stace (1997).

2.0 Methods

Desktop Study

- 2.1. In 2008 the Thames Valley Environmental Record Centre (TVERC) and Buckinghamshire and Milton Keynes Environmental Records Centre (BMKERC) were both asked to provide any information on records of protected and/or notable species within a 2km (4km for bats) radius of the site and locations of any statutory and non-statutory site designations in the area.
- 2.2. The 'Local Live' website was accessed for aerial views of the site and used as a visual aid to help put the site into context with its surroundings and to identify any potential features of interest in the surrounding land.
- 2.3. The Multi-Agency Geographical Information for the Countryside (MAGIC) website was consulted for information on statutory site designations in the area.
- 2.4. The National Biodiversity Network (NBN) website was also consulted for information on records of protected and notable species in the area.

Extended Phase 1 Habitat Survey

- 2.5. Phase 1 Habitat Survey is a survey method and habitat classification system that was developed by the Nature Conservation Council, now Joint Nature Conservation Committee (JNCC, 2007) to map habitats and land use categories to a 'consistent level and accuracy'. Vegetation and habitats are mapped using standard colour codes, allowing rapid visual assessment of the extent and distribution of different habitat types. Where appropriate, Target Notes highlight potential features of interest. An extended Phase 1 habitat survey also records provisional signs of protected or notable species and assesses the potential suitability of the habitats on site and within the accessible surroundings to support such species.
- 2.6. Three areas were surveyed on site: The main Dorney Lake site where the event facilities including a security fence and grandstands will be located; sections of Windsor Racecourse proposed for a transport hub and a temporary pedestrian river crossing to connect the two sites; and the section of the River Thames towpath which is proposed for upgrades to facilitate canoe sprint training during the 2012 Games.
- 2.7. Surveys were undertaken of the site by Ecosulis on 31 July 2008 by Lisa Peirce and Hannah Gibbons, and on 29 June, 13 July and 21 July 2010 by Jo Clarke and James Tristram.

Assessment Methodology

- 2.8. The assessment and terminology used in this report is based on guidelines issued by the Institute of Ecology and Environmental Management (IEEM) in 2006.
- 2.9. The values assigned to habitats (referred to as receptors) adopts the recommendations for evaluating habitats given in the IEEM guidelines. The geographical value categories used in this assessment are: International (i.e. Europe), National (i.e. England), County (Buckinghamshire), District (South Bucks/Windsor and Maidenhead), Local (Dorney) and Site (i.e. within the immediate zone of influence only). The site as a whole has been assessed using criteria set out by Ratcliffe (1977) as a guide (Appendix 3).
- 2.10. The recommendations for predicting and characterising ecological impacts contained in the IEEM guidelines (2006) have been followed in broad terms.

Significance Assessment

- 2.11. The significance of the impacts has been assessed for each ecological receptor in the form of habitats and species from both the construction and the operational phases of the proposed development. The full range of effects from all stages of the development and their impacts on each of the ecological receptors identified at the site is set out within the text. If significant, the impact is identified as positive or negative.
- 2.12. Positive – Advantageous or beneficial impact to an ecological receptor
- 2.13. Negligible/Insignificant (neutral) – An effect that is likely to have a negligible influence, irrespective of other effects
- 2.14. Negative - Detrimental or adverse impact to an ecological receptor

Residual Impacts

- 2.15. The residual impacts of the development have been considered in the short-term (up to two years post development) with consideration to the longer-term. Impacts have been assessed as significant or not significant and whether beneficial or adverse against the Assessment criteria following the guidelines by IEEM (2006).

3.0 Results

Desktop Study

- 3.1. The results of the desktop study, including information from the local records centre (TVERC and BMKERC) and web-based search (including MAGIC, NBN and Local Live websites) have been combined and categorised into the following headings; Designated Sites (Statutory and Non-statutory), Species, and Habitats. The results are summarised below.

Designated Sites

- 3.2. MAGIC website informed that no statutory designated sites lie within the site boundary. There are two statutory sites located within 2km of the site: Bray Pennyroyal Field Site of Special Scientific Interest (SSSI) and Sutherland Grange Local Nature Reserve (LNR).
- 3.3. The information obtained from MAGIC website regarding the SSSI and LNR is summarised below.

Site	Location	Description
Bray Pennyroyal Field SSSI	0.2km south of the site	This site comprises a single field adjoining the River Thames to the south-east of Bray and represents one of the few Berkshire localities for the nationally rare pennyroyal (<i>Mentha pulegium</i>)
Sutherland Grange LNR	0.1km east of the site	The site comprises meadow habitats and supports a huge variety of flowers, grasses, butterflies, beetles, moths and nesting birds

- 3.4. TVERC and BMKERC indicate that no non-statutory wildlife sites fall within the site boundary but 12 non-statutory site designations are present within 2km of the site. Of particular note are: Dorney Common and Cress Brook, a non-statutory Local Wildlife Site (LWS), which supports rough semi-improved grassland and a brook, is adjacent to the northern boundary; and Greenway Corridor (including York Stream) non-statutory Wildlife Heritage Site (WHS) located 0.1km west of the project site and designated for its riparian habitats

Species

- 3.5. TVERC and BMKERC both provided records of notable and protected species within a 2km radius of the site (4km for bats). These records of species of note are summarised below.

Species	No. of records in 2km search area	Closest record to site
Kingfisher	11	On site
Shoveler	1	On site
Greylag goose	1	On site
Little ringed plover	6	On site
Hobby	2	On site
Snipe	5	On site
Oystercatcher	3	On site
Mediterranean gull	1	On site
Black-tailed godwit	2	On site
Wood sandpiper	3	On Site
Common greenshank	3	On site
Snow bunting	2	On site
Green sandpiper	3	On site
Fieldfare	3	On site
Stag beetle	56	On site
White-clawed crayfish	1	0.5km west of site
Grass snake	1	1.4km west of site
Water vole	8	1km north of site
Brown galingale	1	0.5km north of site
Pennyroyal	4	0.2km south-west of site
Daubenton's bat	1	Adjacent to south-east of site
Noctule bat	4	1km north-east of site
Pipistrelle bat	31	On site
Brown long-eared bat	4	0.4km west of site

3.6. NBN Gateway holds records for protected and/or notable species within the 10km grid SU97 in which the site lies. A full table of the records is provided as Appendix D. Only those records from 2000 onwards and located either within the 10km grid square or within 2km of the site (4km for bats) are included. Species recorded include:

- Plants: Cornflower
- Bats: Noctule and soprano pipistrelle
- Birds: Nightjar, house sparrow, woodlark
- Invertebrates: Stag beetle

Habitats

3.7. Beyond the River Thames grassland fields lie to the south and moderate density residential housing associated with west Winsor to the east. The River Jubilee lies 1.2km north of the site, with the M4 just beyond, past which lies further moderate density residential housing associated with Slough. A gravel pit, Bray Marina and a large lake lie 600m to the south-west of the site. A large expanse of woodland lies 1.9km south of the site.

Extended Phase 1 Habitat Survey

3.8. The three survey areas are described below in terms of their component habitats and shown on Figures 1-2.

Dorney Lake

3.9. The following habitat types were recorded within the Eton Dorney survey area, and their distribution is mapped on Figure 1.

- Standing water
- Amenity grassland
- Semi-improved grassland
- Woodland
- Hedgerows
- Standard trees
- Buildings and hard-standing

Standing water

- 3.10. The rowing lake comprises the central section of the survey area. In total the lake is approximately 2km in length and 0.25km wide. A narrow length of amenity grassland divides the lake into two distinct parallel sections. The lake banks are shallow and gravelly with redshank, goat willow saplings, gypsywort, curled dock, hard-rush, water forget-me-not, water-mint, pennyroyal, toad-rush, marsh speedwell, yellow iris, pendulous sedge, great willowherb, lesser pond-sedge, hemp agrimony and common fleabane.
- 3.11. The gravel banks above the water line comprise compressed meadow-grass, dwarf spurge, common bird's-foot-trefoil, smooth tare, sheep's-fescue, scented mayweed, black bindweed, common poppy, common sorrel and mugwort.
- 3.12. Five ponds are present on site (Target Notes 1-5, Figure 1). Details of each pond are summarised below.

Pond	Description
Target Note 1, Figure 1	Approximately 100m in length and 20m wide with shallow banks comprising common bulrush, jointed-rush, common spike-rush, hard rush, water plantain, common fleabane and common club-rush
Target Note 2, Figure 1	Approximately 20m in length and 15m wide with shallow banks comprising common bulrush, jointed-rush, common spike-rush, hard-rush, water plantain, common fleabane and common club-rush
Target Note 3, Figure 1	Approximately 175m in length and 90m wide with shallow banks comprising common bulrush, jointed-rush, common spike-rush, hard-rush, water plantain, common fleabane and common club-rush. All banks are accessible to grazing sheep
Target Note 4, Figure 1	Approximately 160m in length and 10m wide with shallow banks with jointed rush, hard-rush, fine-leaved pondweed, water plantain and pennyroyal. All banks are accessible to grazing sheep
Target Note 5, Figure 1	Approximately 30m in length and 5m wide with shallow banks comprising hard-rush, yellow iris, water plantain and Canadian water-weed

Amenity Grassland

- 3.13. Amenity grassland comprises the majority of the site. The grassland appears very regularly managed and had a sward height of below 5cm at the time of survey. Species present include perennial rye-grass, red fescue, daisy, common bent, black medick, meadow crane's-bill, common mouse-ear, bristly ox-tongue, greater plantain, dandelion, red clover, ribwort

plantain, oxeye daisy, mouse-ear hawkweed, common sorrel, common bird's-foot-trefoil and creeping thistle.

Semi-improved Grassland

- 3.14. A nature area encompasses a large area along the south-western boundary of the site, and the majority of this is dominated by semi-improved grassland habitat. Some areas around newly planted trees are long and relatively unmanaged, but the majority of this habitat within the nature area is sheep grazed and comprised a very short sward at the time of survey. Species present within the rough grassland include barren brome, cock's-foot, perennial-rye grass, cat's-ear, chicory, hare's-foot clover, field bindweed, ribwort plantain, goat's-beard, wild carrot, common nettle, false oat-grass and hogweed. The grazed grassland includes perennial rye-grass, crested dog's-tail, common bent, red fescue, Timothy, oxeye daisy, selfheal, common bird's-foot-trefoil, white clover, yarrow and common knapweed.

Woodland

- 3.15. Several stands of semi-mature woodland exist on site. Species present within these stands include sycamore, hawthorn, alder, field maple, silver birch, hazel, beech, buckthorn, elder, horse-chestnut, dog-rose, aspen, hornbeam, crack-willow and blackthorn. Species within the ground flora include dog violet, rosebay willowherb, perforate St John's-wort, creeping buttercup, colt's-foot, wild teasel, mugwort, ivy, common nettle, bramble and spear thistle.
- 3.16. Numerous stands of young woodland plantation are present on site, particularly along the north-eastern site boundary. The majority of these woodland stands appear to be approximately 10 to 15 years old, although some areas have been planted more recently, and include species such as apple, cherry, poplar, yew, guelder-rose, aspen, dog-rose, silver birch, pedunculate oak, pines, alder and ash. Some of the blocks of woodland have a dense canopy with a ground flora including ivy, common nettle, wood avens, herb-Robert, bramble and cleavers.
- 3.17. Young woodland plantation blocks with an open nature have a ground flora including dwarf spurge, blunt-leaved fluellen, common ragwort, Canadian fleabane, weltd thistle, black bindweed and redshank.

Hedgerows

- 3.18. A newly planted hedgerow marks the south-western boundary of the site. Species present within this hedgerow include hawthorn, blackthorn and dog-rose.

Standard Trees

- 3.19. Numerous young, semi-mature and mature standard trees are present on site. Standard trees on site include pedunculate oak, horse-chestnut, poplar, sycamore and London plane.
- 3.20. A large poplar tree, Target Note 6, Figure 1, on site, shows characteristics of the native black-poplar, with no glands present at the base of the leaves and the smaller branches being downward pointing.

Buildings and Hardstanding

- 3.21. Three buildings are situated on the Eton Dorney site. The club house building (Target Note 7, Figure 1) is a two-storey building made from breeze blocks, glass, metal, wooden panels and a flat metal roof.
- 3.22. The building highlighted by Target Note 8, Figure 1 is a large boat shed with a domed roof. This building is constructed from wood and metal and is light and airy due to the presence of wire gridding under the roof.
- 3.23. A finishing tower is present at the end of the amenity grassland island that separates the two sections of lake (Target Note 9, Figure 1). The tower is a three-storey building predominantly comprising wood and glass. Additional small plastic huts are located along the amenity grassland area.
- 3.24. Hardstanding present on site is un-vegetated due to regular use, however gravel adjacent to some hardstanding areas comprise ruderal and arable weed species such as bristly ox-tongue, round-leaved fluellen, scarlet pimpernel, dove's-foot crane's-bill, red dead-nettle, black medick, common field speedwell, thyme-leaved sandwort and dwarf spurge.

Windsor Racecourse

- 3.25. The majority of habitats present on Windsor Racecourse are man-made and intensively managed for amenity use (shown on Figure 2). The site is dominated by mown amenity grassland, building complexes and associated hard-standing. More semi-natural habitat is present at the boundaries of the site, alongside the River Thames, which comprises belts of mature trees including ash, sycamore, willow, lime and hawthorn. Mature hedgerows are also present on site, which are mainly dominated by hawthorn.

River Thames Towpath

- 3.26. The section of River Thames towpath surveyed is shown on Figure 1. The path is well-used by walkers, dog walkers and cyclists and currently comprises a gravel and earth path approximately 1m in width. Habitats to the north of the path include a recently laid hawthorn

hedgerow, managed grassland and tall ruderals, and some strips of young and semi-mature trees. A wooden fenceline marks the boundary between the towpath and the Dorney Lake site.

- 3.27. Habitats to the south of the footpath are those along the banks of the River Thames. In sections bank erosion means that the towpath is immediately alongside the river, but in other sections a strip of vegetation is present for up to 20m between the path and the river. The intervening vegetation includes sections of reedbed fringe, patches of scrub and tall ruderals, and occasional mature and semi-mature trees. The habitat appears managed immediately alongside the towpath, with areas of mown and strimmed vegetation, however where the vegetation strip is wider this appears mostly unmanaged, with expanses of scrub, self-sown saplings and tall ruderals. The majority of the trees and scrub along the river appear self-sown, and it is likely that reedbed fringe was previously a more dominant habitat along this stretch of the river, but has been shaded out for the majority of its length. The majority of the banks are semi-natural earth banks, supported for large lengths by extensive tree root systems, or fronted by reedbed fringe, however some sections now comprise artificial banks in the form of concrete or metal sheeting.

Field Observations and Consideration to Protected/Notable Species

Flora

- 3.28. A large area of the site is heavily managed, with large areas of short mown amenity grassland, and well managed areas of young plantation woodland. A nature reserve is present along the south-western boundary of the site, including large standard trees, and areas of sheep grazed grassland.
- 3.29. Pennyroyal, a species listed upon Schedule 8 of the Wildlife and Countryside Act (1981) and a red data book listed species, was found on site upon the south-western bank of the rowing lake and upon the bank of the pond highlighted by Target Note 4, Figure 1. Pennyroyal is a Nationally Scarce plant which inhabits seasonally wet habitats, such as those at the edge of ponds, and habitats supporting this species tend to have very short grass, and experience grazing or disturbance throughout the year. Bray Pennyroyal Field SSSI is designated for its population of this species, and lies across the River Thames, approximately 0.2km south.
- 3.30. No other rare plants were noted on the site, however the mosaic of habitats along the River Thames corridor provides an important green corridor for associated wildlife. Small sections of reedbed fringe, an uncommon habitat locally, are present along sections of the river, and this habitat is important for a wide range of invertebrates and birds that are associated with it.

- 3.31. No invasive species listed on Schedule 9 of the amended Wildlife and Countryside Act 1981 were noted on site at the time of the survey, however a detailed botanical survey was not undertaken.

Mammals

Badgers

- 3.32. No signs of badger, such as setts, prints, foraging signs or hairs, were noted during the survey, however due to the size of the site and the presence of woodland and scrub areas it is possible that some signs may have been present but not identified during the survey. The site provides suitable foraging habitat in the form of grassland and berry bearing scrub species. TVERC and BMERC provided no records of badger within the 2km search area, however the NBN Gateway indicates that badger have been recorded within the 10km grid square in which the site is situated. It is possible that badger may use the site occasionally for foraging and refuge, however given the lack of evidence it is not considered that the site forms an important part, if any, of any badger group's territory.

Bats

- 3.33. The majority of trees on the Eton Dorney site are considered to offer negligible roosting suitability (no features suitable for use by bats as roost sites apparent), as most within the plantation areas are young and lacking in suitable features to support roosting bats, however a number of mature trees were identified as offering suitability due to the presence of suitable features such as cracks, split limbs, holes or ivy coverage. These trees are shown on Figure 1. Mature trees along the boundary of Windsor Racecourse are considered likely to offer some roosting potential to bats, however the majority of these were not surveyed in detail as no direct impacts are anticipated to the majority of this habitat. Two trees adjacent to the location of the pedestrian bridge were surveyed, and are considered to provide low suitability to roosting bats due to the presence of arboreal ivy. A detailed survey of the trees along the River Thames Towpath survey area was not undertaken, however some mature trees were noted to contain split limbs that provide suitable roosting features.
- 3.34. Buildings on site are not considered to offer suitable bat roosts as they are in a good state of repair and do not have cracks, hole or crevices suitable to provide access opportunities for bats. In addition the style and construction of the buildings are generally considered to be unsuitable for roosting bats.
- 3.35. TVERC and BMERC provided records of four bat species within the 4km search area including noctule, pipistrelle, brown long-eared and Daubenton's bat. In addition the NBN Gateway provides records of noctule and soprano pipistrelle bats within the 10km grid square.

- 3.36. The River Thames provides a green corridor which is likely to be important for commuting and foraging bats. Hedgerows on the Dorney Lake site offer suitable commuting paths for bats and the mosaic of semi-improved grassland, amenity grassland, lakes, ponds, hedgerows and standard trees provide high quality foraging habitat for bats. The mature trees, woodland areas, ponds and areas of rough grassland are likely to provide the most suitable foraging areas for bats, with the amenity grassland and hard-standing areas of limited value.

Dormice

- 3.37. The woodland patches and hedgerow habitats on site are considered to offer some suitability for dormice, although the majority have limited understorey and limited connectivity to larger suitable areas of woodland. A large area of woodland lies 1.9km south of the site, however this is isolated from habitats on site by the River Thames. The NBN Gateway data search, TVERC and BMERC did not provide any records for this species within 2km of the site.

Water Vole

- 3.38. According to the NBN Gateway water voles have been recorded within the 10km grid in which the site lies. In addition TVERC and BMERC indicate that this species has been recorded several times within the 2km search area, the closest 1km north of the site.
- 3.39. The water bodies on the Eton Dorney site including the rowing lake and the ponds are not considered to offer suitable habitat to water voles due to the presence of shallow bank profiles, which are inadequate for burrowing and their relative isolation from other water courses due to the presence of large expanses of amenity grassland. The River Thames does provide suitable habitat for water voles. A detailed survey was not undertaken of the entire length of the habitat, but a check for burrows and other field signs was undertaken in the location of the proposed pedestrian bridge crossing on both sides of the bank within the Eton Dorney and Windsor Racecourse areas, and also at the proposed pontoon location for canoeists along the River Thames towpath. The banks at the bridge location do have suitability for water voles, however no burrows or other signs were noted in the immediate vicinity. This stretch of the river appears to be used frequently for mooring by boats. The pontoon location is adjacent to a length of hard-engineered bank with no suitability for water vole.

Otters

- 3.40. No records of otters are present for the local area, however the River Thames provides good habitat for this species, with suitable refuge habitat within the associated bankside vegetation.
- 3.41. Woodland and dense scrub adjacent to the River Thames on both the Dorney Lake and Windsor Racecourse sites offers suitable sheltering and holt building habitat for otters, but the

intensively managed nature of the remainder of these sites makes the majority of habitats unsuitable for otters.

Birds

- 3.42. Birds identified during the survey include grey heron, mute swan, blackbird, common tern and skylark. Habitats of value to nesting and foraging birds including hedgerows, woodland, standard trees, amenity grassland, semi-improved grassland, ponds and the lake are present within the site boundary, and the site is likely to support a range of common bird species associated with the surrounding mixed agricultural land.
- 3.43. The site is also known to support a range of species such as greylag goose, Mediterranean gull, black-tailed godwit, wood sandpiper, greenshank, snow bunting, green sandpiper and fieldfare, according to local records held (all of which are listed upon Schedule 1 of the Wildlife and Countryside Act 1981). The majority of these species are associated with the rowing lake and are passage migrants or winter visitors to the UK.

Reptiles

- 3.44. Suitable habitat for foraging, commuting and hibernating reptiles includes scrub, hedgerows rough grassland. Ponds and the lake provide suitable habitat for amphibian prey, especially for grass snake. Habitats on site are suitable to support the more common species of reptile, namely common lizard, grass snake and slow worm. TVERC and BMERC provided a single reptile record, grass snake, approximately 1.4km west of the site. The NBN Gateway provided records of grass snake and common lizard from within the 10km grid square.

Amphibians

- 3.45. Habitats suitable for breeding, foraging and hibernating amphibians are present on site including ponds, the lake, hedgerows, rough grassland and woodland. The ponds and the lake are considered to offer suitable breeding habitat for newts as they are all vegetated with species such as water mint which offer suitable egg-laying substrates for these species. Large numbers of waterfowl, however, limit the suitability of these water bodies for amphibians, due to a higher risk of predation.
- 3.46. The NBN Gateway data search, TVERC and BMERC did not provide any records of newts within 2km of the site.

Invertebrates

- 3.47. Invertebrates identified on site include the bloody-nose beetle, holly blue butterfly, meadow brown butterfly, speckled wood butterfly, gatekeeper butterfly, large white butterfly and numerous species of damselflies and dragonflies.
- 3.48. Habitats suitable for foraging invertebrates are present on site in the form of flowering plants, dead wood and leaf litter. The structural diversity on site is likely to provide suitable habitat to a variety of invertebrates, including stag beetle, a UK BAP species, for which there are numerous records held for the site and local area.

Ecological Evaluation

- 3.49. The table below provides an evaluation of habitats on site and adjacent habitats, based upon the results of the desktop study and ecological field survey.

Receptor	Qualifying Criteria	Ecological Value
Habitats		
Standing water	<p>The lake supports numerous bird species listed upon Schedule 1 of the Wildlife and Countryside Act (1981)</p> <p>The margins of the rowing lake and pond highlighted by Target Note 4, Figure 1 support pennyroyal, a species listed upon Schedule 8 of the Wildlife and Countryside Act (1981)</p> <p>Provides suitable habitat for amphibians, foraging bats, grass snake and invertebrates</p>	<p>Lake: District to County Value</p> <p>Graveled banks supporting pennyroyal: Regional Value</p>
Amenity grassland	Provides suitable habitat for foraging hedgehogs and badgers, invertebrates, low quality foraging habitat for bats and foraging habitat for birds, reptiles and amphibians	Site Value
Semi-improved grassland	Provides suitable habitat for foraging hedgehogs and badgers, invertebrates, foraging habitat for bats and foraging habitat for birds, reptiles and amphibians	Local Value
Woodland	Provides suitable habitat for roosting and foraging bats, sheltering habitat for otters, nesting and foraging birds, badgers, hibernating reptiles and amphibians and invertebrates	Local Value

Receptor	Qualifying Criteria	Ecological Value
Habitats		
Hedgerows	Provides suitable habitat for commuting and foraging bats, foraging and nesting birds, foraging and commuting reptiles and amphibians, invertebrates, foraging badgers and dormice	Local Value
Standard trees	Provides roosting and foraging habitat for bats, nesting and foraging habitat for birds and habitat for invertebrates The site may support a mature native black-poplar tree	Local Value
Buildings and hard-standing	Provides suitable habitat for basking reptiles and nesting birds	Site Value
River Thames	Provides a green corridor and important habitats suitable for a wide range of local wildlife including	Regional Value

4.0 POTENTIAL IMPACTS

4.1. Identification of the impacts of the development proposals is based on the planning application drawings and follows the current IEEM Guidelines for Ecological Impact Assessment (2006) in broad terms. The impacts have been assessed both for the habitats (receptors; refer to Table 4 above) recorded on and adjacent to the site, and for those species potentially present on site. The mitigation section aims to avoid negative impacts through sensitive timing or adjustments to location, and to minimise unavoidable impacts through additional measures specifically targeted at the component receptors.

Proposal

4.2. The proposed development comprises the temporary buildings and structures required to stage the events at Dorney Lake and on Windsor Racecourse including a temporary pedestrian river crossing to connect the two sites. It also includes improvements to the towpaths along the River Thames to facilitate canoe sprint training during the 2012 Games.

4.3. The key event facilities required to accommodate the proposed development at the project site are:

- Use of the rowing lake and return lane for the Rowing and Canoe Sprint events including spectator seating and associated event facilities at the southern end of the lake
- Operational compounds and athlete areas at the southern end of lake
- Use of the River Thames for canoe sprint training
- Paralympic transport hub at the Dorney Lake site
- Use of Windsor Racecourse to accommodate the Olympic bus and coach transport hub
- Temporary pedestrian river crossing across the River Thames to connect the transport hub at Windsor Racecourse to the venue at Dorney Lake, which will include some piling works within the river
- Additional facilities – utilities, use of existing internal roads, lighting, cabling and perimeter fencing throughout the project site.

4.4. With the exception of towpath improvements along the River Thames, there will be no new permanent infrastructure and all event facilities will be removed after completion of the events.

- 4.5. The set up period for the temporary pedestrian river crossing will be from November 2011 to March 2012. The installation of other temporary facilities will commence in spring 2012 and the event itself will take place in summer 2012. The removal of event facilities will commence in September 2012 and will be completed before winter.

Set Up and Removal Phase Impacts

Habitats

Eton Dorney Lake

- 4.6. The majority of the habitats on site are highly managed, with the majority of the development occurring on hard-standing and very short mown amenity grassland, and species present are likely to be habituated to the frequent sporting events held at the site, which is likely to minimise impacts from the proposed development.
- 4.7. Small-scale habitat loss will occur at the site as a result of the installation of the security fencing, and the construction of the temporary pedestrian crossing. The alignment of the security fencing has been carefully positioned to minimise vegetation loss, with very limited loss of mature trees. One small section of mixed native hedge will be removed at the north of the site, and four mature willows are proposed for removal adjacent to the River Thames at the eastern end of the site. Facilitative pruning will be undertaken in a number of areas to ensure a 2m clearance alongside the security fence; this will include pruning of mature horse chestnut and sycamore woodland blocks at the eastern end of the site. Partial removal of seven tree groups is also likely to be required, comprising mainly young mixed plantation areas approximately 10-15 years old. The tree schedule lists 825 individual trees and 77 groups, with an estimated total of over 6,500 trees on the Eton Dorney site, so the loss of these trees to facilitate installation of the fencing does not represent a significant amount of tree cover on site.
- 4.8. A small area of habitat loss will also occur on the Eton Dorney site as a result of the temporary pedestrian crossing. A number of options for the design of the temporary pedestrian river crossing have been considered during the design process, taking into account a variety of constraints, including the proximity of trees within and adjacent to the proposed crossing area. Further restrictions on the design of the pedestrian river crossing have been imposed by the management of the Windsor Race Course such that the final design was required to avoid encroaching onto the racecourse as well as the maintenance at all times of a 3m wide access route between the temporary pedestrian crossing infrastructure and the railings of the western end of the racecourse. To minimise the footprint of the bridge and avoid the need for large access ramps, it is currently proposed to have lifts either side of the bridge to facilitate disabled access. Able-bodied spectators will use steps to enter and exit

the bridge. On the western bank the temporary pedestrian river crossing is anticipated to require the loss of four trees, with further losses likely to be avoided by facilitative works (pollarding, pruning or crown reduction) to a further eight trees, comprising mainly mature white willow.

- 4.9. Construction vehicles will use existing roads and tracks throughout the site, so additional vegetation loss or damage from construction machinery is not anticipated. Cranes will be used to lift the majority of facilities into place, avoiding additional damage to existing habitats.
- 4.10. Some dust may be generated at the project site during set up from vehicles travelling over unpaved ground during dry weather. Due to the nature of the proposed development, the effect of dust on existing receptors is likely to be small scale and temporary and it is not considered that this would have a significant impact on habitats present on site.
- 4.11. There is potential for polluting substances to cause ground and water contamination issues on site. The risk of pollution incidents will be managed through implementation of an Environmental Management Plan (EMP) by the Contractor. This will include a Pollution Prevention and Control Plan and emergency plans for pollution incidents, and therefore the risk of significant impacts is considered to be very low.
- 4.12. Lighting and noise disturbance will be increased during the set-up and removal phases, however these would impact on species associated with the various habitats and has therefore been considered within the species section below.

Windsor Racecourse

- 4.13. As for the Eton Dorney site the majority of the habitats at the Windsor racecourse site are highly managed, with the majority of the facilities occurring on hard-standing and very short mown amenity grassland, and species present are likely to be habituated to frequent sporting events held at the site, which is likely to minimise impacts from the proposed development.
- 4.14. Habitat loss on the site will be minimal, and will comprise the loss of a short section of hawthorn hedgerow within the south of the site to facilitate coach access into the coach holding and loading area, and the anticipated loss of five mature trees, and crown reduction of an additional two, at the eastern boundary of the site to allow for the temporary pedestrian river crossing. The tree loss will comprise two ash and three sycamore, with crown reduction of two white willow, which sit in a group on the eastern bank of the River Thames.
- 4.15. Construction vehicles will use existing roads and tracks throughout the site, so additional vegetation loss or damage from construction machinery is not anticipated. Cranes will be used to lift the majority of facilities into place, avoiding additional damage to existing habitats.

- 4.16. There is potential for polluting substances to cause ground and water contamination issues on site. The risk of pollution incidents will be managed through implementation of an Environmental Management Plan (EMP) by the Contractor. This will include a Pollution Prevention and Control Plan and emergency plans for pollution incidents, and therefore the risk of significant impacts is considered to be very low.
- 4.17. Lighting and noise disturbance will be increased during the set-up and removal phases, however these would impact on species associated with the various habitats and has therefore been considered within the species section below.

River Thames

- 4.18. The works to facilitate canoe sprint training along the River Thames will comprise:
- Creating a safe, level surface suitable for cycling – dips in the existing surface will be filled and a compressed gravel surface will be laid
 - Vegetation removal to improve visibility from the towpath to the river
 - Installation of a pontoon and potentially other access points to the river along the one kilometre stretch.
- 4.19. In addition the construction of the temporary pedestrian river crossing is likely to take place partly from within the river corridor. Installation of the temporary pedestrian river crossing will be more complex and working methods will be developed as the design of the proposed development progresses. It is likely that the materials required for the pedestrian river crossing will be brought in by boat rather than by road. Piles will be driven into the river bed adjacent to either bank to form the foundations for the bridge structure. The construction of the crossing will cause additional disturbance to the river habitat in the form of noise, siltation, and vibration. The impacts will be temporary and of short duration and are unlikely to have a significant impact on river habitats in the long-term, however there is potential for significant impacts to associated species, which is discussed further in the species section below. Detailed methodology for the bridge construction will take ecology into account and appropriate mitigation measures will be designed into any detailed working methodology.
- 4.20. Upgrading of the existing towpath may require small amounts of vegetation clearance in some sections of the path which are currently very narrow. Existing vegetation along the towpath is well managed, including regularly cut grassland and some sections of tall ruderals, and the loss of small patches of this habitat is not considered to be significant. Widening of the path will result in the loss of seven small immature trees; however the removal of mature trees or important marginal habitats such as reedbed will be avoided. Some pruning of overhanging branches may be required to allow construction machinery to access the path.

- 4.21. Some habitat loss will occur to improve visibility from the towpath to the river. Removal of mature trees and areas of higher biodiversity value, for example marginal reedbed habitats, will be avoided. The works will result in the loss of some areas of tall ruderals and scrub, which will be trimmed down to approximately 300mm. Some immature and self-sown hawthorn and sycamore of less than 75mm diameter will be pruned or coppiced to increase visibility but allow for regeneration, and a total of 30-32 immature trees will be removed. Care has been taken to limit vegetation clearance to ensure that a green corridor is maintained in some form along the length of the towpath. The removal of mainly self-sown saplings and some scrub is not considered to significantly impact the river corridor, as although this habitat provides refuge for species associated with the river corridor, this habitat is abundant in the local area, and the removal of some shading impacts from the trees and scrub will allow other marginal habitats such as reedbed habitat and more diverse ground flora to establish. All standing and lying deadwood will be retained, with the exception of any that provides a risk to health and safety, and all arisings will be removed off site.
- 4.22. The installation of a pontoon for access into the river for canoe training is not considered to significantly impact the River Thames habitat. The pontoon will be a floating structure and will be located against a stretch of bank which has been reinforced with concrete and has no associated marginal vegetation. The footpath link between this training area and the canoe day village within the Eton Dorney site will utilise an existing gateway and no additional vegetation clearance will be required to facilitate this access.

Designated sites

- 4.23. No direct impacts are anticipated to any of the adjacent designated sites. The River Thames provides intervening habitat between the main site and the SSSI and LNR, which will minimise any indirect impacts of increased noise and lighting. These sites are designated primarily for flora, and fauna associated with them are likely to be habituated to some extent to increased noise and lighting due to sporting events held at the venues. Considering the above and given the temporary nature of the proposals, no significant adverse impacts are anticipated to any designated sites within the local area.

Species

Flora

- 4.24. All areas of site where pennyroyal has been identified will be retained and no direct impacts are anticipated to this species, however where site construction areas are not fully marked and sensitive areas cordoned off, there is risk of damage to plants from machinery and site workers. There is potential for indirect impacts such as dust during site set-up to affect the growth of some plants, however this is unlikely to be significant to the population. There is

also a risk that pollution from accidental spills could affect the habitat of this species, and cause the loss of some plants.

Bats

- 4.25. The majority of trees with suitability for roosting bats will be retained, and all trees with moderate and high suitability will be retained, however a number of trees with low suitability for bats will be lost during construction for the temporary pedestrian river crossing. Additional roosting sites may be lost as part of pruning works associated with vegetation clearance along the River Thames corridor and the security fencing, however no trees with suitability for roosting bats are proposed for removal as part of vegetation removal associated with these works.
- 4.26. Some vegetation clearance will take place on site, however within the Eton Dorney and Windsor Racecourse sites this will be limited to small patches of vegetation clearance, and mainly of young trees, one small hedgerow section and scrub. Suitable foraging habitat and commuting routes are abundant in the local area, and it is not considered that the loss of this small area would have a significant impact on local bat populations. Vegetation clearance along the River Thames corridor will be undertaken during the winter and in phases over an extended period which will minimise impacts to species using the corridor, including bats. Vegetation loss will be limited to immature trees and areas of scrub and tall ruderals, and the presence of adjacent vegetation along the river will ensure that a green corridor is maintained for commuting bats.
- 4.27. No lighting is anticipated for works along the River Thames corridor, with the exception of the temporary pedestrian river crossing construction works. The set up and construction period for the crossing is expected to run between November 2011 and March 2012, primarily during the bat hibernation season, which will ensure that lighting causes minimal disruption to bat commuting and foraging along the river corridor. The set-up period on the Eton Dorney site is expected to commence in spring 2012. Some construction lighting will be used on this site, which may affect more light intolerant species of bat, and may temporarily dissuade them from using the site for commuting or foraging. Given the temporary nature of this impact, and the location of the adjacent river corridor and large sections of the site that will not be directly affected by lighting, it is not considered that this will have a significant impact on local bat populations.

Dormice

- 4.28. The site is considered to be sub-optimal for dormice, with limited understorey within the young woodland plantation, and due to the isolation of the site from any large areas of suitable woodland habitat. The majority of habitat with some suitability for dormice will be retained on

site, however some loss of one small hedgerow section and patches of bramble scrub will take place due to the erection of the security fence. The timing of vegetation removal over the winter, combined with the fact that vegetation removal would all be above ground, with no root systems affected, will minimise any potential for harm to dormice, which hibernate at ground level. It is not considered that the temporary loss of these very small sections of sub-optimal habitat would have a significant impact on dormice should they be present, however these works would need to be undertaken sensitively to avoid potential disturbance.

Water Voles and Otters

- 4.29. Disturbance to the banks of the River Thames would be limited to the small section associated with the temporary pedestrian river crossing. No burrows or signs of water vole or otter activity were recorded in the immediate vicinity during the Phase 1 survey undertaken in July 2010, however the banks do provide a suitable profile for burrowing. Should burrows be present at the time of works these could be damaged or destroyed by construction works.
- 4.30. The vegetation clearance along the River Thames corridor will impact habitats on the bank top, including immature trees and scrub, which are not generally used by water voles, but may be used occasionally by otters as refuge. These habitats will be cut above ground level and will therefore continue to provide some level refuge, and are expected to quickly regenerate. Only small sections of habitat will be lost, and given the surrounding high levels of vegetation cover the function of the river corridor habitat is not considered to be significantly affected and no fragmentation of habitat is anticipated. The loss of immature trees and scrub may also allow existing reedbed habitats to spread, providing additional high quality habitat for water voles.
- 4.31. Disturbance in the form of lighting and noise may temporarily decrease the suitability of the area to water voles and otters and they may be temporarily dissuaded from using the habitats immediately adjacent to the temporary pedestrian river crossing, putting pressure on adjacent habitats and resources. Given the small area of habitat to be affected, the temporary nature of the disturbance and the lack of current use of this area by water voles or by otters for refuge, however, means that these impacts are not likely to be significant.
- 4.32. Habitats on the Windsor Racecourse and Eton Dorney site are not considered to be suitable for otters or water voles, with the exception of the retained site boundaries, and therefore works in these areas would not directly impact either species, however there is potential for pollution through accidental spills or surface-water contamination to affect suitable habitats within the River Thames corridor if not properly controlled.

Birds

- 4.33. Vegetation clearance will be timed to avoid the bird nesting season, and will be phased to minimise impacts to nesting birds. Suitable nesting habitat is abundant in the local area, and the loss of small patches of habitat due to clearance along the River Thames corridor and for the security fence on the Eton Dorney site is not anticipated to have a significant impact on local breeding bird populations.
- 4.34. The lake habitat will not be directly affected by any of the set-up works, although noise and lighting associated with these works will cause temporary disturbance to birds using the lake for the duration of this activity. Numerous birds use the lake habitat on site, but the majority of rare and notable species are passage migrants and over-wintering species, and therefore site set-up from spring 2012 would avoid impacts to the majority of these species. Races are frequently held at the site and therefore birds using these habitats are likely to be habituated to some levels of disturbance associated with frequent activity.

Reptiles and Amphibians

- 4.35. Vegetation clearance will be undertaken during the winter and will not affect below-ground structures, and therefore will avoid impacts to reptiles and amphibians. The retention of the majority of suitable habitat on site combined with the presence of large areas of good quality habitats adjacent to the site means that the small amount of habitat to be lost is not considered to be significant to local reptile or amphibian populations.
- 4.36. The majority of machinery associated with the set-up and removal phases will be operating on habitats comprising hard-standing and heavily managed amenity grassland, which are generally unsuitable for reptiles and amphibians, however without mitigation there is potential for these species to be injured during the works.
- 4.37. Noise and vibration during the works may dissuade these species from the immediate area for the duration of the works, however the retention of the majority of suitable habitats on site and the abundance of high quality habitats in the surrounding areas means that any density dependent impacts are unlikely to be significant.

Other Species

- 4.38. Fish using the River Thames would be affected by noise, silt and vibration as a result of the temporary pedestrian river crossing works, which will require piling into the river bed. These works are proposed for winter 2011/2012, and are therefore likely to avoid the more sensitive spawning season for the majority of species, however fish are likely to be temporarily dissuaded from the construction area for the duration of the works, and this may increase pressure on surrounding resources.

- 4.39. Care has been taken to avoid the removal of those habitats likely to be of most value to invertebrates, including water bodies, mature trees, species rich grassland and woodland. The loss of some immature trees and patches of scrub are likely to affect invertebrates, however, impacts are not considered to be significant. Without sensitive vegetation removal, however, dead wood habitat suitable for stag beetle may be lost as part of vegetation removal works on site.

Operational Phase Impacts

Habitats

Eton Dorney and Windsor Racecourse

- 4.40. The majority of the habitats on site are highly managed, with the majority of the development occurring on hard-standing and very short mown amenity grassland, and species present are likely to be habituated to frequent sporting events held at the site, which will act to lower impacts from the proposed development. Given the nature of the development any impacts are likely to be temporary and reversible, and of similar type to existing events.
- 4.41. The number of people at the Rowing and Canoe Sprint events for the London 2012 Games will be significantly higher than those present at previous events at the site, and higher levels of disturbance are anticipated. This will have a negative impact on the value of the habitats for wildlife due to disturbance and potential damage from trampling and littering, along with an increase in noise and visual disturbance. The vast majority of spectators will, however, be restricted to a relatively small section of the site which is dominated by amenity grassland, and therefore disturbance to more ecologically valuable habitats will be limited.

River Thames

- 4.42. The River Thames towpath has high levels of current use for recreation including by dog-walkers, cyclists and joggers. Although this path will be used by athletes and coaches during the games the associated diversion of the well-used public footpath means that disturbance levels along this stretch of the river are unlikely to increase significantly. Designated routes will be provided to ensure that there is no additional damage or disturbance to surrounding vegetation, and emergency access routes will use existing paths to the river bank. The site will not be used at night and therefore no additional lighting is proposed.

Designated sites

- 4.43. No direct impacts are anticipated to any of the adjacent designated sites. The River Thames provides intervening habitat between the main site and the SSSI and LNR, which will

minimise any indirect impacts of increased noise and lighting. These sites are designated primarily for flora, and fauna associated with them are likely to be habituated to some extent to increased noise and lighting due to sporting events held at the venues. Considering the above and given the temporary nature of the proposals, no significant adverse impacts are anticipated to any designated sites within the local area.

Species

Bats

- 4.44. The temporary loss of small areas of low quality foraging habitat is not considered to significantly affect local bat populations. The events will take place during the day and therefore additional disturbance to foraging and commuting bats will be limited. Some lighting will be required for the operational back of house activities at the Eton Dorney site and at the access and exit points to the temporary pedestrian river crossing, however this will be mainly low level (post-curfew lighting of 1 lux or lower) and will be directional to avoid light spill onto adjacent habitats as far as practicable. This may temporarily disrupt flight paths of more light sensitive bat species, however the majority of habitats on site, and along the River Thames corridor will remain largely unaffected. Generalist bat species such as pipstrelle, are known to be able to tolerate light levels above 14 lux, however more sensitive species such as Myotis species and Daubenton's are recorded to avoid emerging from roosts until light levels fall below 1 lux. Without a sensitive lighting scheme it is possible that more sensitive bat species will be temporarily dissuaded from using potential tree roosts on site.

Dormice

- 4.45. The loss of a very small area of sub-optimal habitat is not considered likely to affect any dormice population that may be present on site. Some additional disturbance in the form of noise and lighting will occur for the duration of the events (approximately one week for the test event in 2011, and seven weeks for the Olympic events in 2012), however the majority of habitats suitable for dormice will be located outside of the areas of highest disturbance such as the main spectator areas. Animals present on site are likely to be habituated to some levels of disturbance associated with the current usage of the site for similar events.

Water Voles and Otters

- 4.46. The loss of some immature trees and small patches of scrub is unlikely to affect these species given the abundance of surrounding habitat. Although the towpath is proposed for use by athletes and coaches the associated temporary diversion of the existing public footpath in this area means that overall disturbance levels are unlikely to increase significantly. Use of this section of the towpath will be restricted to daytime hours only and both water voles and otters

are likely to be habituated to similar low level disturbance. Some lighting will be required at the access and exit points to the temporary pedestrian river crossing, however this will be mainly low level (post-curfew lighting of 1 lux or lower) and will be directional to avoid light spill onto adjacent habitats as far as practicable. The majority of habitats on site, and along the River Thames corridor will remain largely unaffected.

Birds

- 4.47. The timing of the events means that passage and migrant species will not be affected. Breeding birds on site are likely to be habituated to some levels of disturbance, and large areas of suitable habitat in the form of woodland and hedgerows will be located beyond the perimeter fencing for the events, and therefore will not be subject to high levels of disturbance. Given the abundance of suitable surrounding habitat, and the short timescale of possible disturbance (approximately seven weeks) it is not considered that any density dependent impacts would be significant.

Reptiles and Amphibians

- 4.48. The development will temporarily increase levels of disturbance across the site. Reptiles are susceptible to disturbance and may be dissuaded from using parts of the site whilst the events are taking place, however the majority of disturbance will be located in areas of habitat currently sub-optimal for reptiles such as hard-standing and mown amenity grassland, and the temporary loss of these habitats is not considered to have a significant impact.

Other Species

- 4.49. Lighting and disturbance may temporarily lower the quality of some habitats on site, however given the highly managed nature of the majority of habitats affected and the abundance of similar habitat in the local area, this impact is likely to be minimal.
- 4.50. There is potential for litter and accidental spills to impact fish within the River Thames during the events.

5.0 Proposed Mitigation

Inherent Mitigation

- 5.1. Habitat retention and protection has been considered within the design of the proposals, which aim to have minimal ecological impact. Within the Eton Dorney site the majority of event facilities will be erected within heavily managed areas of low ecological value, including hard-standing and amenity grassland. None of the ponds on site will be directly affected by the works, or the vegetated shoreline of the lake, and care has been taken to minimise removal of trees and mature vegetation. The loss of small patches of habitat as a result of the required security fencing has been unavoidable, however the alignment of the fencing has been carefully designed for minimal vegetation removal, and avoiding removal of mature trees. No below ground works will be undertaken, and all structures will be removed following completion of the events, allowing affected habitats to regenerate and ensuring that any impacts will be temporary and reversible.
- 5.2. Within Windsor Racecourse the removal of five mature trees will be necessary to facilitate the construction of the temporary pedestrian river crossing, however all other trees are proposed for retention. To minimise the footprint of the bridge and to avoid the need for large access ramps, it is currently proposed to have lifts either side of the bridge to facilitate disabled access. All other event facilities on this site will be erected within areas of highly managed amenity grassland, or on existing hard-standing.
- 5.3. Vegetation removal along the River Thames corridor has been carefully designed to minimise impacts to associated habitats and species. Vegetation loss will be restricted to immature trees, scrub and tall ruderals, and these will be cut to approximately 300mm above ground level to allow regeneration. All sections of more notable habitat such as reedbed fringe will be retained on site and will not be directly affected by the works. The vegetation removal will take place over the winter and in a phased approach, which will minimise impacts to associated species. The location of the pontoons within the river has been carefully positioned to take advantage of existing hard-engineered banks, and will therefore avoid impacts to river banks and associated vegetation.
- 5.4. A programme of tree planting will be implemented on removal of the event facilities to replace those trees lost as part of the works. Trees will be replaced with identical species to those lost, and will be of local provenance.

General Mitigation Measures

- 5.5. The risk of pollution incidents will be managed through implementation of an Environmental Management Plan (EMP) by the Contractor. This will include a Pollution Prevention and Control Plan and emergency plans for pollution incidents. This will be especially relevant

during the temporary pedestrian river crossing works, where additional procedures will be incorporated to ensure that disturbance to the river corridor habitat is minimised, such as the use of silt screens during the piling works.

- 5.6. Protective measures for all retained features will be in place prior to construction works commencing on site, including appropriate species licences (there is no requirement for species licences based on current baseline information), tree/hedgerow protection fencing and protected species fencing, as required, and appropriate signage. These will be maintained throughout the duration of the works.
- 5.7. Where practicable all vegetation removal will take place outside of the bird-breeding season and will be phased to minimise impacts. If removal works are unavoidable during this season then vegetation will be checked thoroughly by an ecologist prior to removal. Some arisings will be kept on site and shredded to create wood piles with some logs left unshredded and used to create logpiles.
- 5.8. A Precautionary Method of Works (PMW) will be prepared outlining sensitive site clearance methods, including detail in respect to timing and species including bats, birds, dormice, reptiles and amphibians.
- 5.9. A general ecological briefing will be given to construction site workers informing them of the ecological value of habitats and species present on site, protection measures put in place safe working methods relating to ecology, and contingency plans in case of discovery of a significant species during works.
- 5.10. All of the above measures will be detailed in an Environmental Management Plan (EMP) prepared prior to works commencing.

Mitigation for Species

Bats

- 5.11. Prior to any tree works all trees proposed for loss or pruning will be assessed for their suitability to support roosting bats by an experienced ecologist. Should any of the trees contain suitable features for roosting bats an appropriate mitigation strategy will be drawn up, including further survey where appropriate. Should bats be found to be present a licence would be obtained from Natural England prior to any works to the tree supporting the roost, and would include a detailed Method Statement to ensure the maintenance of favourable conservation status. Where no bats are found the mitigation strategy would include for exclusion of bats, sensitive timing of removal, and the use of soft-felling techniques as appropriate, which would be detailed within the PMW.

- 5.12. Vegetation removal will be phased to minimise impacts to bats, however the limited vegetation removal proposed is not considered likely to significantly impact foraging or commuting bats.
- 5.13. Construction of the temporary pedestrian river crossing will take place over winter to avoid impacts to bats using the river corridor. Lighting during the set-up and removal phases will be kept to a minimum, and directional lighting will be used to minimise disturbance to adjacent habitats such as the river corridor. Lighting required within the main Eton Dorney and Windsor Racecourse areas will be subject to a detailed design and this will be undertaken in liaison with ecologists to ensure that light spill on to sensitive habitats such as the river corridor, woodland areas and any mature trees with suitable roosting features is avoided or kept to a minimum, and encompasses the advice contained in the Bat Conservation Trust's 'Bats and Lighting in the UK' document published by the Institute of Lighting Engineers.

Dormice

- 5.14. Vegetation removal over winter and at least 300mm above ground will avoid potential harm to dormice. This species will be included within the site-wide PMW to ensure that site set-up and removal phases do not affect dormice.

Water Voles and Otters

- 5.15. The location of the temporary pedestrian river crossing will be managed to ensure that the habitats are sub-optimal for water vole and otter, through regular strimming, and the site will be monitored for signs of use by either species. An Ecological Clerk of Works will be present during appropriate stages of the crossing construction to undertake a final check prior to construction and to monitor construction throughout.
- 5.16. An adequate vegetation corridor will be maintained along the River Thames route to ensure that its function as a green corridor for species including otter and water vole is maintained.
- 5.17. The CEMP will ensure that adequate provision is made to ensure that procedures are in place to avoid water pollution.

Birds

- 5.18. Vegetation removal will be undertaken under the PMW and primarily during the winter to avoid impacts to nesting birds. Where this is not possible clearance will be preceded by an inspection by an Ecological Clerk of Works, who will implement exclusion zones around any active nests recorded until the chicks have fledged.

Reptiles and Amphibians

- 5.19. Vegetation removal will take place primarily over the winter but will not affect below ground structures and therefore will avoid potential impacts to hibernating reptiles and amphibians. None of the ponds will be directly affected by the proposals, and the majority of high quality habitat present across the sites will not be affected, such as the long semi-improved grassland, woodland and hedgerows. Reptiles and amphibians will be included within the PMW to ensure that there is no risk of killing or injury due to construction machinery, however machinery will generally be limited to areas of hard-standing and highly managed amenity grassland, which will also lower the risk of harm.
- 5.20. The provision of log piles within the site will provide additional refuge and hibernation habitats for these species.

Other species

- 5.21. The use of silt screens and provision of an EMP aims to minimise disturbance to fish within the River Thames during the set-up and removal phases. These phases are proposed for winter to avoid the sensitive spawning season for the majority of species.
- 5.22. The retention of high quality habitats across the site and the temporary nature of the development will ensure that other local wildlife such as invertebrates are not significantly affected in the long-term. Dead wood habitats will be retained in-situ, and the provision of log piles on site will provide additional suitable habitat for this species.

6.0 Residual Impacts

Receptor	Residual Impacts	
	Post-Development (1 year)	Post-Development (10 years)
Water bodies	Negligible	Negligible
Amenity grassland	Minor significant negative	Negligible
Semi-improved grassland	Negligible	Negligible
Woodland	Negligible	Negligible
Hedgerows	Negligible	Negligible
Standard trees	Minor significant negative	Negligible
Buildings and hard-standing	Negligible	Negligible

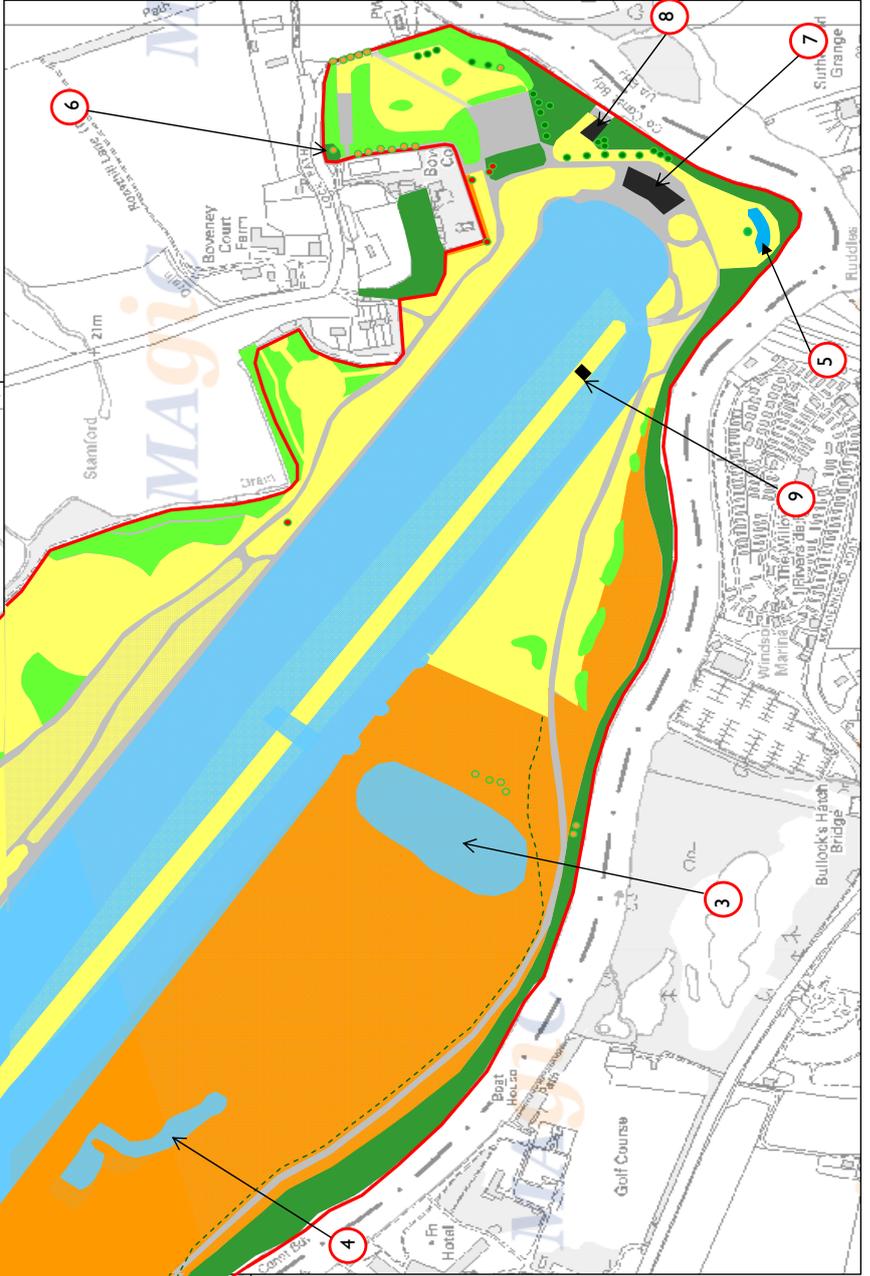
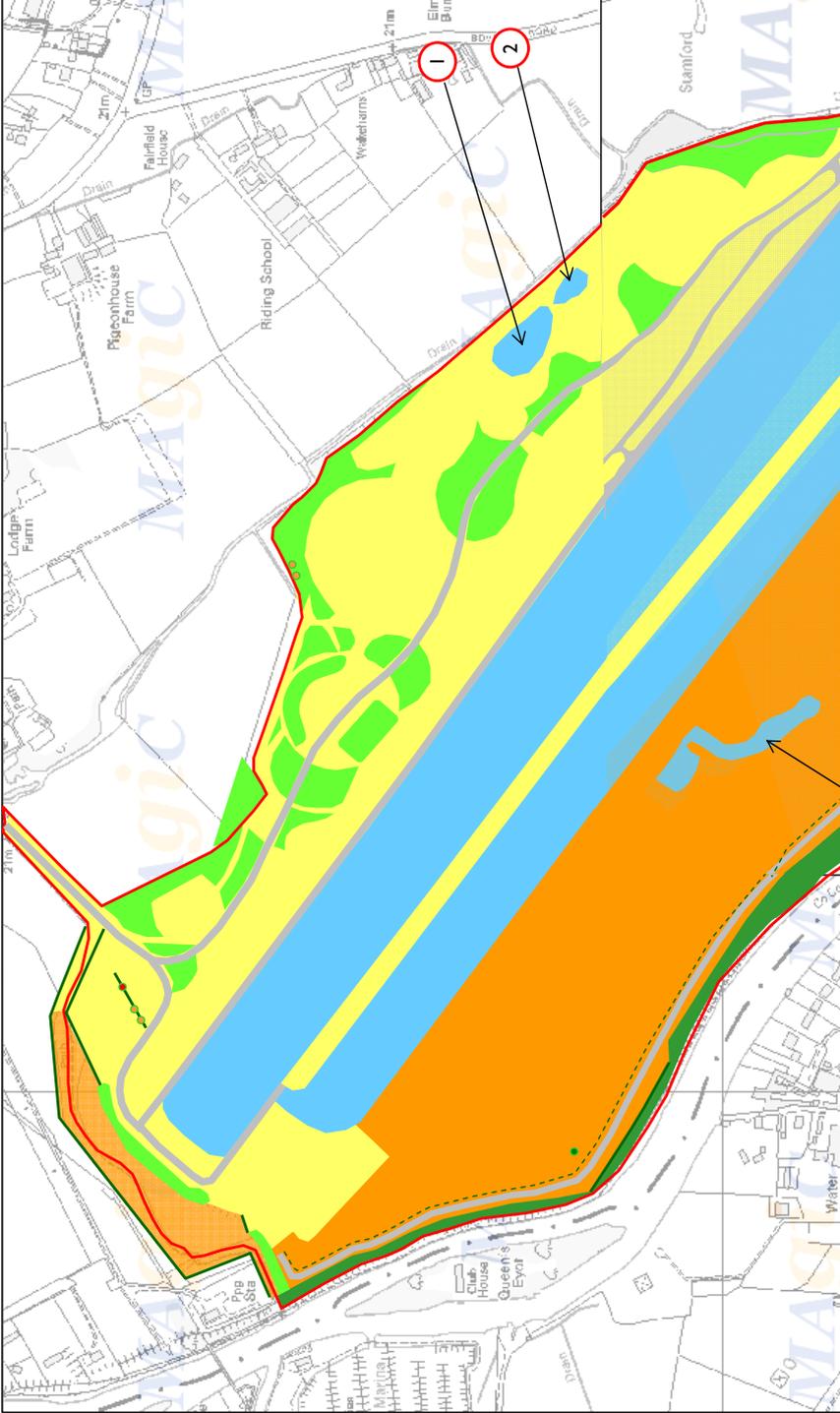
7.0 Conclusions

Summary of Assessment

- 7.1. The habitats on all three sites are generally highly managed and large areas of habitat on the Eton Dorney and Windsor Racecourse sites have very limited suitability for wildlife; however the site does support high quality habitats such as standing water and marginal habitats, semi-improved grassland and woodland which support notable species including pennyroyal and wintering/migrating birds, and have suitability to support other notable species such as bats. The sites are both used regularly for large events and therefore species present on the sites are likely to be habituated to some extent to associated levels of disturbance. Vegetation clearance and increased levels of disturbance may impact negatively on some species using the habitats, however this impact is temporary and reversible. High quality habitat is present surrounding the site, and phasing of the set-up works aims to minimise disturbance and ensure that high quality areas of habitat are retained on site, and all identified impacts are considered to be temporary and reversible, with no adverse impacts anticipated for the long-term.
- 7.2. Based on this assessment, the long-term residual impact of the development with regard to receptors is not significant. The adoption of best practice principles during the set-up and removal phase, combined with careful positioning of the event facilities and the temporary nature of the works will ensure that impacts to habitats and species are minimal, and not significant in the long-term.

Key

- Site boundary
- Amenity grassland
- Sheep-grazed grassland
- Standing water
- Young woodland plantation
- Semi-mature woodland
- Hard-standing
- Mature hedgerow
- Young hedgerow
- Tree with low bat suitability
- Tree with moderate bat suitability
- Tree with high bat suitability
- Target Note



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Client	LOGOG
Project	Eton Dorney Lake
Title	Phase 1 Plan of Lake
Date	Figure
June 2010	1
	SCHEMATIC ONLY

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Appendix 1: Species List

Flora	
Common Name	Latin Name
Alder	<i>Alnus glutinosa</i>
An apple	<i>Malus sp</i>
Ash	<i>Fraxinus excelsior</i>
Aspen	<i>Populus tremula</i>
Autumn hawkbit	<i>Leontodon autumnalis</i>
Barren brome	<i>Bromus sterilis</i>
Beech	<i>Fagus sylvatica</i>
Black bindweed	<i>Fallopia convolvulus</i>
Black medick	<i>Medicago lupulina</i>
Blackthorn	<i>Prunus spinosa</i>
Blunt-leaved fluellen	<i>Kickxia spuria</i>
Bramble	<i>Rubus fruticosus agg.</i>
Bristly ox-tongue	<i>Picris echiodes</i>
Brown galingale	<i>Cyperus fuscus</i>
Buckthorn	<i>Rhamnus cathartica</i>
Canadian fleabane	<i>Conyza canadensis</i>
Cat's-ear	<i>Hypochaeris radicata</i>
Chichory	<i>Chichorium intybus</i>
Cleavers	<i>Galium aparine</i>
Colt's-foot	<i>Tussilago farfara</i>
Common bent	<i>Agrostis capillaris</i>
Common bird's-foot-trefoil	<i>Lotus corniculatus</i>
Common bulrush	<i>Typha latifolia</i>
Common centaury	<i>Centaureum erythraea</i>
Common club-rush	<i>Schoenoplectus lacustris</i>
Common field speedwell	<i>Veronica persica</i>
Common fleabane	<i>Pulicaria dysenterica</i>
Common knapweed	<i>Centaurea nigra</i>
Common mouse-ear	<i>Cerastium fontanum</i>
Common nettle	<i>Urtica dioica</i>
Common poppy	<i>Papaver rhoeas</i>
Common ragwort	<i>Senecio jacobaea</i>
Common sorrel	<i>Rumex acetosa</i>
Common spike-rush	<i>Eleocharis palustris</i>
Compressed meadow-grass	<i>Poa compressa</i>
Crack-willow	<i>Salix cracca</i>

Flora	
Common Name	Latin Name
Creeping bent	<i>Agrostis stolonifera</i>
Creeping buttercup	<i>Ranunculus repens</i>
Creeping thistle	<i>Cirsium arvense</i>
Crested dog's-tail	<i>Cynosurus cristatus</i>
Curled dock	<i>Rumex crispus</i>
Daisy	<i>Bellis perenne</i>
Dandelion	<i>Taraxacum officinalis</i>
Dog-rose	<i>Rosa canina</i>
Dog violet	<i>Viola riviniana</i>
Dove's-foot crane's-bill	<i>Geranium molle</i>
Dwarf spurge	<i>Euphorbia exigua</i>
Elder	<i>Sambucus nigra</i>
Field bindweed	<i>Convolvulus arvensis</i>
Field maple	<i>Acer campestre</i>
Gypsywort	<i>Lycopus europaeus</i>
Goat's-beard	<i>Tragopogon Pratensis</i>
Goat willow	<i>Salix caprea</i>
Greater plantain	<i>Plantago major</i>
Great willowherb	<i>Epilobium hirsutum</i>
Guelder-rose	<i>Viburnum opulus</i>
Hard rush	<i>Juncus effusus</i>
Hare's-foot clover	<i>Trifolium arvense</i>
Hawthorn	<i>Crataegus monogyna</i>
Hazel	<i>Corylus avellana</i>
Hemp agrimony	<i>Eupatorium cannabinium</i>
Herb-Robert	<i>Geranium robertium</i>
Hogweed	<i>Heracleum sphondylium</i>
Hornbeam	<i>Carpinus betulus</i>
Horse-chestnut	<i>Aesculus hippocastanum</i>
Ivy	<i>Hedera helix</i>
Jointed-rush	<i>Juncus articulatus</i>
Lesser pond-sedge	<i>Carex acutiformis</i>
Marsh speedwell	<i>Veronica scutellata</i>
Meadow buttercup	<i>Ranunculus acris</i>
Meadow crane's-bill	<i>Geranium pratense</i>
Mouse-ear hawkweed	<i>Pilosella officinarum</i>
Mugwort	<i>Artemesia vulgaris</i>

Flora	
Common Name	Latin Name
Oxeye daisy	<i>Leucanthemum vulgare</i>
Pedunculate oak	<i>Quercus robur</i>
Pennyroyal	<i>Mentha pulegium</i>
Perennial rye-grass	<i>Lolium perenne</i>
Perforate St John's-wort	<i>Hypericum perforatum</i>
Pendulous sedge	<i>Carex pendula</i>
Red clover	<i>Trifolium pratense</i>
Red dead-nettle	<i>Lamium purpureum</i>
Red fescue	<i>Festuca rubra</i>
Redshank	<i>Persicaria maculosa</i>
Ribwort plantain	<i>Plantago lanceolata</i>
Rosebay willowherb	<i>Chamerion angustifolium</i>
Scarlet pimpernel	<i>Anagallis arvensis</i>
Scented mayweed	<i>Matricaria recutita</i>
Selfheal	<i>Prunella vulgaris</i>
Sheep'sfescue	<i>Festuca ovina</i>
Silver birch	<i>Betula pendula</i>
Smooth tare	<i>Vicia tetrasperma</i>
Spear thistle	<i>Cirsium vulgare</i>
Sycamore	<i>Acer pseudoplatanus</i>
Thyme-leaved sandwort	<i>Arenaria serpyllifolia</i>
Timothy	<i>Phleum pratense</i>
Toad-rush	<i>Juncus bufonius</i>
Tubular water-dropwort	<i>Oenanthe fistulosa</i>
Walnut	<i>Juglans regia</i>
Water forget-me-not	<i>Myosotis scorpioides</i>
Water mint	<i>Mentha aquatica</i>
Water plantain	<i>Alisma plantago-aquatica</i>
Wetted thistle	<i>Carduus crispus</i>
White clover	<i>Trifolium repens</i>
Wild carrot	<i>Daucus carota</i>
Wild service-tree	<i>Sorbus torminalis</i>
Wild teasel	<i>Dipsacus follonum</i>
Wood avens	<i>Geum urbanum</i>
Yellow iris	<i>Iris pseudacorus</i>

Appendix 2: Defining Ecological Values

Institute of Ecology and Environmental Management

The examples contained in the table below are only for general guidance and other considerations may apply, e.g. features of low value in isolation but which are subject to cumulative national decline may be afforded higher values in certain circumstances.

Level of Ecological Value	Examples of Criteria
International	<p>An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, Ramsar site, Biogenetic Reserve)</p> <p>A sustainable area of a habitat listed in Annex I of the Habitats Directive, or smaller areas of such habitat that are essential to maintain the viability of a larger whole</p> <p>A sustainable population of an internationally important species, e.g. a UK Red Data Book species, species listed under categories 1 or 2 of the UK BAP, or listed under Annex IV of the Habitats Directive</p> <p>Sites supporting a breeding population of internationally important species or supplying a critical element of their habitat requirements</p>
National	<p>A nationally designated site (SSSI, ASSI, NNR, MNR) or a discrete area that meets the selection criteria for national designation (e.g. SSSI selection guidelines)</p> <p>A sustainable area of a priority habitat identified in the UK BAP, or smaller areas of such habitat that are essential to maintain the viability of a larger whole</p> <p>A sustainable population of a nationally important species or a site supporting such a species, i.e. a species listed on Schedules 5 and 8 of the W&CA (as amended) which is a UK Red Data Book species that is not listed as being of unfavourable conservation status in Europe, of uncertain conservation status or of global concern in the UK BAP</p> <p>A non-Red Data Book species that is listed as occurring in 15 or fewer 10km squares in the UK (categories 1 and 2 of the UK BAP). Also sites supporting a breeding population of such a</p>

Level of Ecological Value	Examples of Criteria
	<p>species or supplying a critical element of their habitat requirements</p>
Regional	<p>Sustainable areas of key habitat identified in the relevant Regional BAP or smaller areas of such habitat that are essential to maintain the viability of a larger whole</p> <p>Sustainable areas of key habitat identified as being of Regional Value in the appropriate Natural Areas profile</p> <p>A population of a species listed as being nationally scarce (i.e. occurring in 16 - 100 10km squares in the UK, or in a Regional BAP or relevant Natural Area on account of its regional rarity or localisation. Sites supporting a breeding population of such a species or supplying a critical element of their habitat requirements</p> <p>Sites, which exceed the County-level designations but fall short of SSSI selection guidelines, where these occur</p>
County/ Metropolitan	<p>Semi-natural ancient woodland greater than 0.25 ha</p> <p>County/Metropolitan sites and other sites which meet the ecological selection criteria for designation</p> <p>A sustainable area of habitat identified in a county BAP</p> <p>A population of a species that is listed in a county/metropolitan 'red data book' or BAP on account of its regional rarity or localisation. Also sites supporting a breeding population of such a species or supplying a critical element of their habitat requirements</p>
District	<p>Semi-natural ancient woodland smaller than 0.25 ha</p> <p>Sustainable areas of habitat identified in a sub-county (district/borough) BAP or in the relevant Natural Area profile</p> <p>Sites/features that are scarce within the district/borough or which appreciably enrich the district/borough habitat resource</p> <p>A diverse and/or ecologically valuable hedgerow network</p> <p>A population of a species that is listed in a district/borough BAP</p>

Level of Ecological Value	Examples of Criteria
	because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation. Also sites supporting a breeding population of such a species or supplying a critical element of their requirements
Local	Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or local neighbourhood, e.g. isolated species-rich hedgerows
Site	Small patches of poor semi-improved grassland, amenity grassland not used by badgers
Negligible	Areas of little current or potential ecological value

Appendix 3: An Ecological Evaluation

The Criteria for Evaluation

The criteria for evaluation have been adopted from the widely used set developed by Ratcliffe (1977). These were originally conceived to provide a systematic framework for the selection of Sites of Special Scientific Interest (SSSI) by the Nature Conservancy Council (NCC), but have since been adopted and adapted widely by ecologists, for example in Local Authorities and Wildlife Trusts.

The criteria used in this report are drawn from these widely applied criteria. They are:

Size

In general, larger sites are more highly valued than smaller ones, all else being equal. However, relative size to similar sites and other local sites should be considered. The area of a site is also important in management terms, i.e. whether short-term neglect/disturbance or any small changes would lead to the loss of a site's interest.

Diversity

One of the most important site attributes is the variety of communities and species which is largely dependent on diversity of habitat. Large numbers of species, particularly when represented by large populations, are to be valued. Diversity can also be related to habitat instability that may affect management prescriptions.

Naturalness

Ecosystems least modified by man tend to be rated more highly. However, most sites are influenced by man, the degree and nature of which is important.

Fragility

This reflects the degree of sensitivity of habitats, communities and species to environmental change. Fragile sites often represent ecosystems that are highly fragmented, dwindling or difficult to re-create.

Typicalness

The typical and commonplace within a field of ecological variation are also of value.

Recorded History

The existence of a scientific record of long-standing adds considerably to the value of a site.

Permanence

A site that has been occupied by a semi-natural habitat for a long time is usually more valuable than one that has only recently arisen. This is because they have had time to acquire rich assemblages of plants and animals.

Lack of Modification

Adverse influences from humans, such as inappropriate management regimes and pollution, will reduce the quality of an area.

Rarity

Rarity is concerned with communities and habitats as well as species. The presence of rare species adds to overall ecological value especially when a habitat also ranks highly on other criteria. The habitat type too may also be nationally or regionally rare.

Position in an Ecological Unit

In the event of two sites being of equivalent intrinsic value, the close proximity of one site to a highly rated example of another type increases the value of the site. The presence of other areas of semi-natural habitat adjacent or close to a site enhances the value of both habitats.

Potential Value

Certain sites could, through appropriate management or even natural change, eventually develop a nature conservation interest substantially greater than that existing at present.

Intrinsic Appeal

While science may view all creatures as equal, pragmatism dictates that in nature conservation it is realistic to give more weight to the more popular appeal of some species, groups or habitats than others.

These criteria provide a useful basis against which to evaluate the intrinsic ecological quality of a site, but in an urban area it is also important to consider the value of an area to the local people (GLC 1985). Thus the appeal of a site, its educational and amenity value, as well as its accessibility as a wildlife area, need to be included in the evaluation.

The survey results were assessed and evaluated using these criteria as a guide.

Appendix 4: Data Search Results

Species	Distance from Site
Plants	
Cornflower	Within 1km of the site
Mammals	
Noctule bat	Within 1km of the site
Soprano pipistrelle	
Birds	
European Nightjar	Within 10km of the site
House sparrow	Within 100m of the site
Wood lark	Within 10km of the site
Invertebrates	
August thorn	Within 2km of the site
Beaded chestnut	Within 2km of the site
Blood-vein	Within 2km of the site
Brindled beauty	Within 2km of the site
Buff ermine	Within 2km of the site
Cinnabar	Within 2km of the site
Dark spinach	Within 2km of the site
Dot moth	Within 2km of the site
Dusky thorn	Within 2km of the site
Ear moth	Within 2km of the site
Garden tiger	Within 2km of the site
Ghost moth	Within 2km of the site
Grayling	Within 10km of the site
Grey dagger	Within 2km of the site
Knot grass	Within 2km of the site
Lackey	Within 2km of the site
Large nutmeg	Within 2km of the site

Species	Distance from Site
Midas tree-weaver	Within 10km of the site
Mottled rustic	Within 2km of the site
Oak hook-tip	Within 2km of the site
Rosy rustic	Within 2km of the site
Rustic	Within 2km of the site
Sallow	Within 2km of the site
September thorn	Within 2km of the site
Small heath	Within 10km of the site
Small phoenix	Within 2km of the site
Small square-spot	Within 2km of the site
Stag beetle	Within 100m of the site
White admiral	Within 10km of the site
White ermine	Within 2km of the site
White-letter hairstreak	Within 10km of the site