Appendix 4.6

Lighting Impact Assessment

SHIPTON QUARRY DEVELOPMENT
OXFORDSHIRE

ENVIRONMENTAL IMPACT ASSESSMENT:

LIGHTING

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CONTENTS

1.0 INTRODUCTION

1.1 The following report details the possible environmental impact of the exterior lighting provision at the proposed new developments at the Shipton Quarry site.

1.2 It is considered that there is undoubtedly a "need to light", but that this should be done in the most environmentally unobtrusive way as possible. The aim of this assessment is to identify a lighting layout for the development proposals which takes account of where lighting impacts are likely and incorporates measures to minimise any effects of lighting the proposals.

2.0 ASSESSMENT APPROACH:

2.1 Light and people's perception of it are a complex interaction and vary from person to person. There are therefore recognised standards for evaluation that are based on current good practice. Light Pollution criteria are to be found in the following publications:

i) Guidance Notes for the Reduction of Obtrusive Light - ILE, 2005
ii) Lighting in the countryside: Towards good practise - DCLG, 1997

The above *Institution of Lighting Engineer's* (ILE) publication refers to four environmental zones E1-E4, which are based on background brightness, for which a number of limiting, technical parameters are given.

These are listed below, together with their values for the most appropriate zone for the site, which have been assessed as: E1- Intrinsically Dark landscapes.

TABLE 1 Light Technical Parameters for Assessing Obtrusive light

Impact/Effect	Measure	ILE Limitations for Zone E1	ILE Limitations for Zone E2
Sky Glow:	Upward light ratio (ULR) %	0	2.5
Light into windows:	Vertical illuminance (LUX)	1 (from public road lighting only)	1
Source intensity:	Candelas	0	0.5
Building luminance:	Candela/m^2	0	5

To help understand the above, the following lighting terminology should be helpful:

Light is a type of radiation and forms part of the electromagnetic spectrum visible to the eye. It is measured in ***lumens (lm)***.

The **upward light ratio** of an item of lighting equipment, is the ratio of its light output, when installed on site, at and above the horizontal to its total light output, and is measured as a lumen ***percentage (%).***

The amount of light falling on a surface is known as **illuminance** and is measured in ***lumens per square metre*** or ***lux.***

While "illuminance" is easy to calculate and measure and is therefore widely used, the eye does not see this, but rather the light radiated or reflected off a surface. This is known as **luminance**, or brightness. It is measured in ***candelas per square metre (cd/m^2)*** and if the surface is specular, can differ with the angle of view.

The term ***candela (cd)*** or (Kcd = 1000 cd), is by itself a measure of light **intensity** or glare.

2.2 The methodology will therefore take the form of designing a suitable lighting scheme to the required performance and safety requirements of the operator, taking the above guidance into account. The final scheme will then be assessed in line with the above identified potential impacts against the appropriate technical parameters given in Table 1.

TABLE 2 Levels of Significance for Assessing Obtrusive light

Impact/Effect	Measure	Impact Significance if ILE Limitations for Zone E1are achieved	Impact Significance if ILE Limitations for Zone E2 are achieved
Sky Glow:	Upward light ratio (ULR) %	Negligible	Negligible
Light into windows:	Vertical illuminance (LUX)	Negligible	Minor
Source intensity:	Candelas	Negligible	Minor
Building luminance:*	Candela/m^2	Negligible	Minor

* As it is not the intention to architecturally illuminate any of the buildings, the fourth parameter "building luminance" will not be relevant to this project.

3.0 BASELINE: EXISTING ENVIRONMENT

3.1 Full details of the day-time visual impact are given in Chapter 4 of the Environmental Statement Volume 1.

3.2 The proposed site is currently a disused quarry and cement works lying to the north of Oxford Airport directly adjacent to Shipton-on-Cherwell and the River Cherwell. The area is well screened and direct views into the site are limited to the northern fringe around Bunkers Hill and Enslow. The river valley is designated an Environmentally Sensitive Area and is a relatively dark landscape that allows a beautiful view of the night sky, weather permitting.

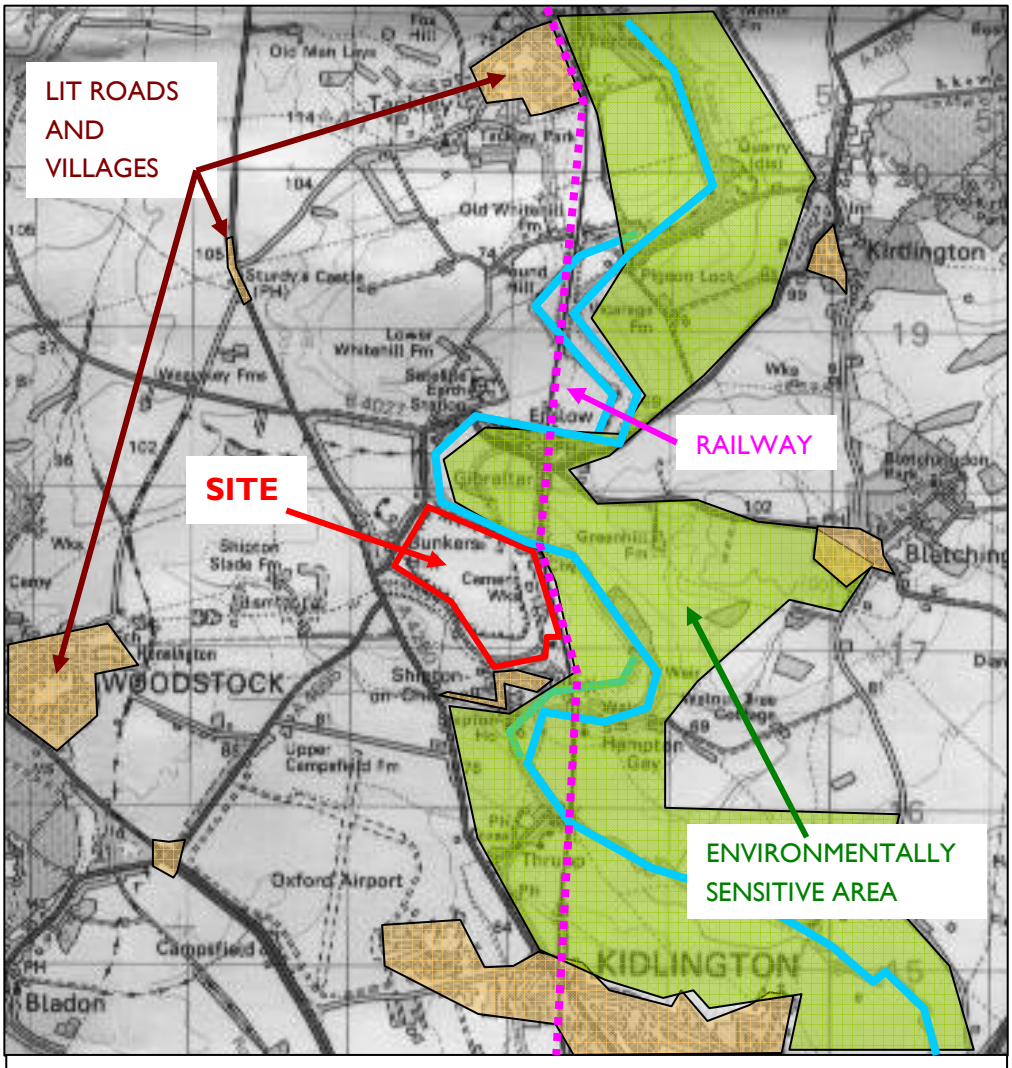


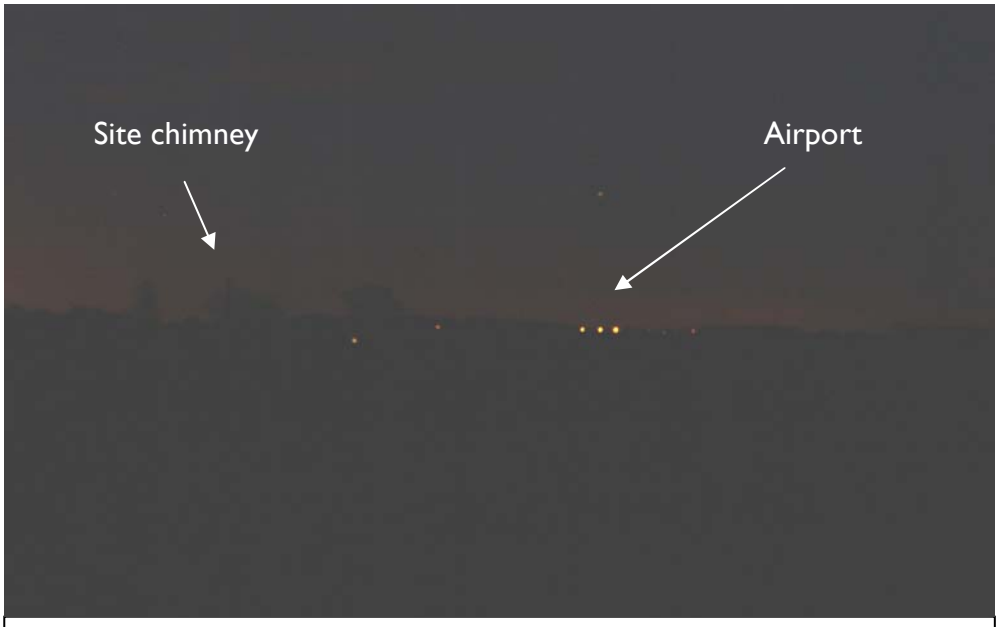
Figure 1: General location layout showing surround "lit" environment

3.3 Figure 1 clearly shows the general layout of the site context with the valley floor containing the river and the Oxford Canal together with the sparsely lit villages around its perimeter. Road vehicles and the railway line, which is the main route from Oxford through to Birmingham, are the major transient sources of light that cross this otherwise relatively dark landscape.

3.4 Due to the relative darkness of the area, a photographic record of the current baseline has been difficult to obtain in that little if any images could be recorded from the daytime viewpoints as assessed in Chapter 4. However, some idea of the existing surrounding nightscape can be ascertained from the following photographs:

i) Views looking across site from the south west

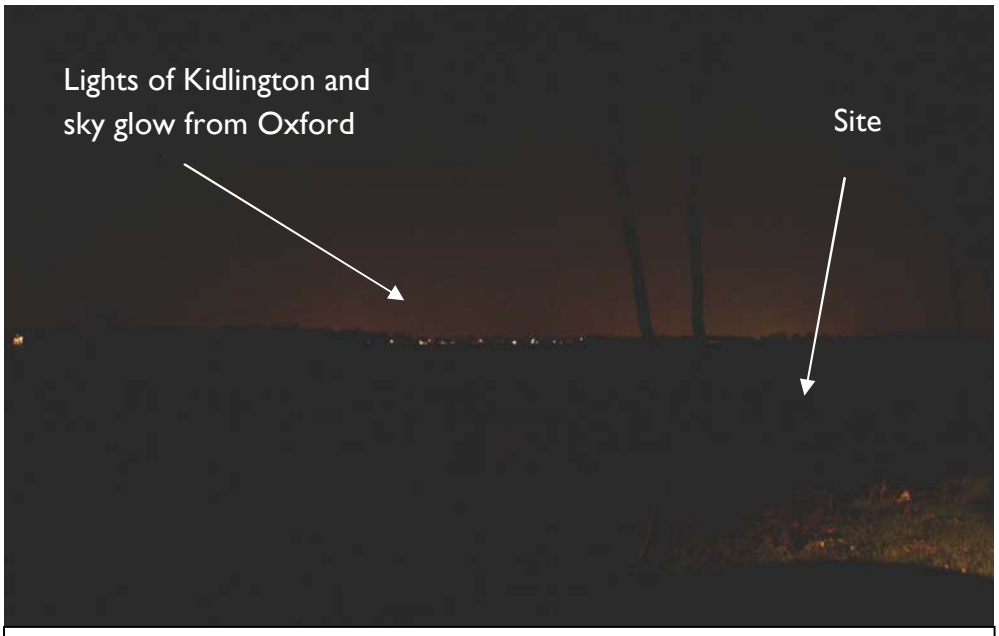
This view P1 taken from the outskirts of Woodstock show the existing cement works chimney and the developments around Oxford Airport.



P1: View from Woodstock (Hensington) looking north-east

ii) Views looking across site from the north

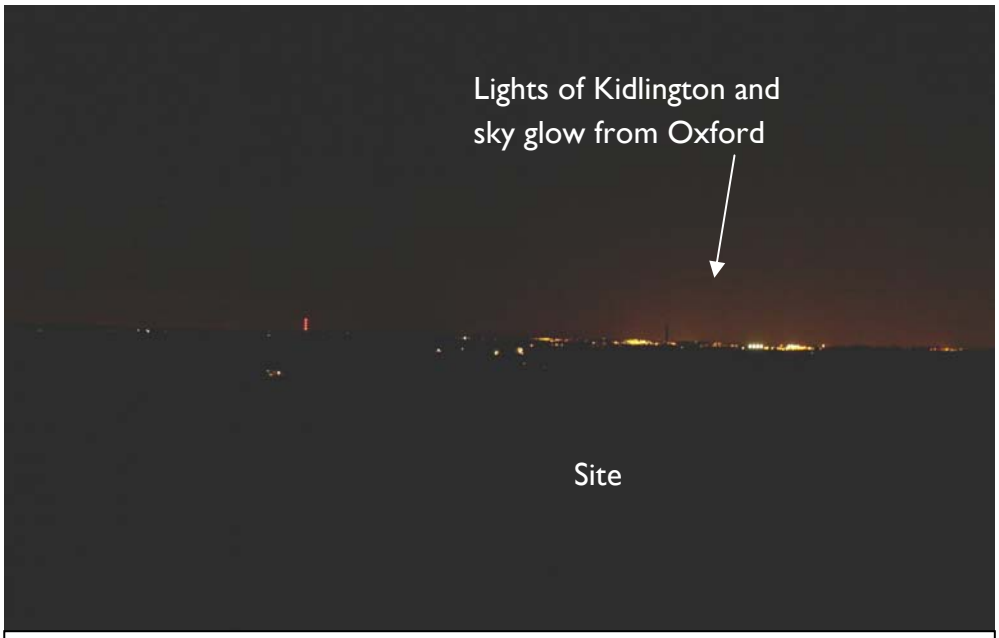
Looking across the site from the north, the main impact are of the lights of Kidlington and on the horizon, of the sky glow of Oxford and Abingdon.



P2: View from A 4095 above Enslow looking south

iii) Views looking across site from the north east

This view shows more clearly the lights of Kidlington and the area around Oxford Airport as well as the further sky glow. The chimney of Didcot Power Station is also visible on the horizon to the left.



P3: View from Kirtlington looking south west

3.5 The overall baseline condition is therefore of a localised dark landscape in which the transient lights from motor vehicles and passenger trains occasionally make an impact and from which the wider lit environment is only perceived when looking at the far horizon.

4.0 PROPOSED LIGHTING DESIGN & MITIGATION

4.1 The installation has been designed around the requirements of *STVA* and *EWS,* the rail operators, which calls for average levels of illuminance of 60 Lux E_H for the rail yards and 30 Lux E_H for the active storage yards, the later being lowered to 15 lux E_H after curfew.

4.2 Restricting the height of lighting columns to 12m or below, together with the existing and proposed structural landscaping, will screen the site from most residential properties. With regard to the issue of limiting the wider environmental and sky glow impact, this will be controlled though the use of luminaires with a zero, or very low upward light ratio (ULR) in line with the requirements of the ILE Environmental Zone E1. Ideally, the ULR should be zero, which will be achieved by the road lighting luminaires suggested for the redesigned road junction (see Chapter 2) (See Fig 2).

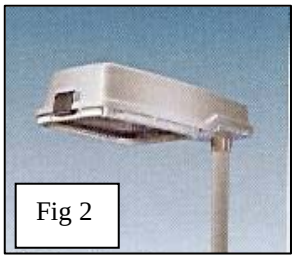


Fig 2

4.3 However, for the main working areas that require a much higher level of lighting, such a limit could only be achieved at the expense of an excessive number of luminaires which of themselves would produce much higher lighting levels beneath the lighting columns that are required (i.e. greater that 250Lux for an average requirement of 60Lux) that in itself would add to the upward reflected light which would add to the sky glow. The luminaire proposed therefore, while not having a full horizontal cut-off, does have a very low upward light ratio of only 0.83 - under 1%. See Fig 3.


Fig 3

4.4 For the Rail Storage Area a spacing of around 48m, produces an average illuminance of around 72 Lux with a maximum level of only 112 Lux under each column (as shown in Figure 4). The luminaires are mounted in pairs on 12m columns and each utlizes a 90.000 lumen (600w) high pressure sodium lamp.


Fig 4

4.5 The remaining working areas around the aggregates depot and the PDI unit will be lit using the same system as for the rail storage area which can be dimmed or switched off when not required.

4.6 For the Open Storage Area similar luminaires, mounted in pairs on 12m columns but each utilizing only 56.000 lumen (400w) high pressure sodium lamps, with a spacing of around 50m, produce an average illuminance of around 38 Lux with a maximum level of only 83 Lux under each column.

4.7 The choice of the above well designed luminaires should alleviate the need to use any cowls or hoods although if any individual luminaire is found to be obtrusive then these can be fitted to the offending unit.

4.8 For the perimeter fence security lighting, it is envisaged that a integral CCTV and infra-red spot lighting system will be installed as shown in Fig 5. Being infra-red this will not be visible apart from a dull glow when looking into the lights themselves.

Fig 5

4.9 With regard to the new road junction, as noted in paragraph 4.2 this will be lit by luminaires as shown in Fig 2, mounted on 10m columns each utilizing a 10.500 lumen (100w) high pressure sodium lamp.

Figure 6 overleaf shows the proposed layout of the above mentioned luminaires which are highlighted as types A, B and C.

Please note that illuminance levels in LUX are "initial" values as new, using a maintenance factor of 1.0 i.e. a worst case scenario for obtrusive light.

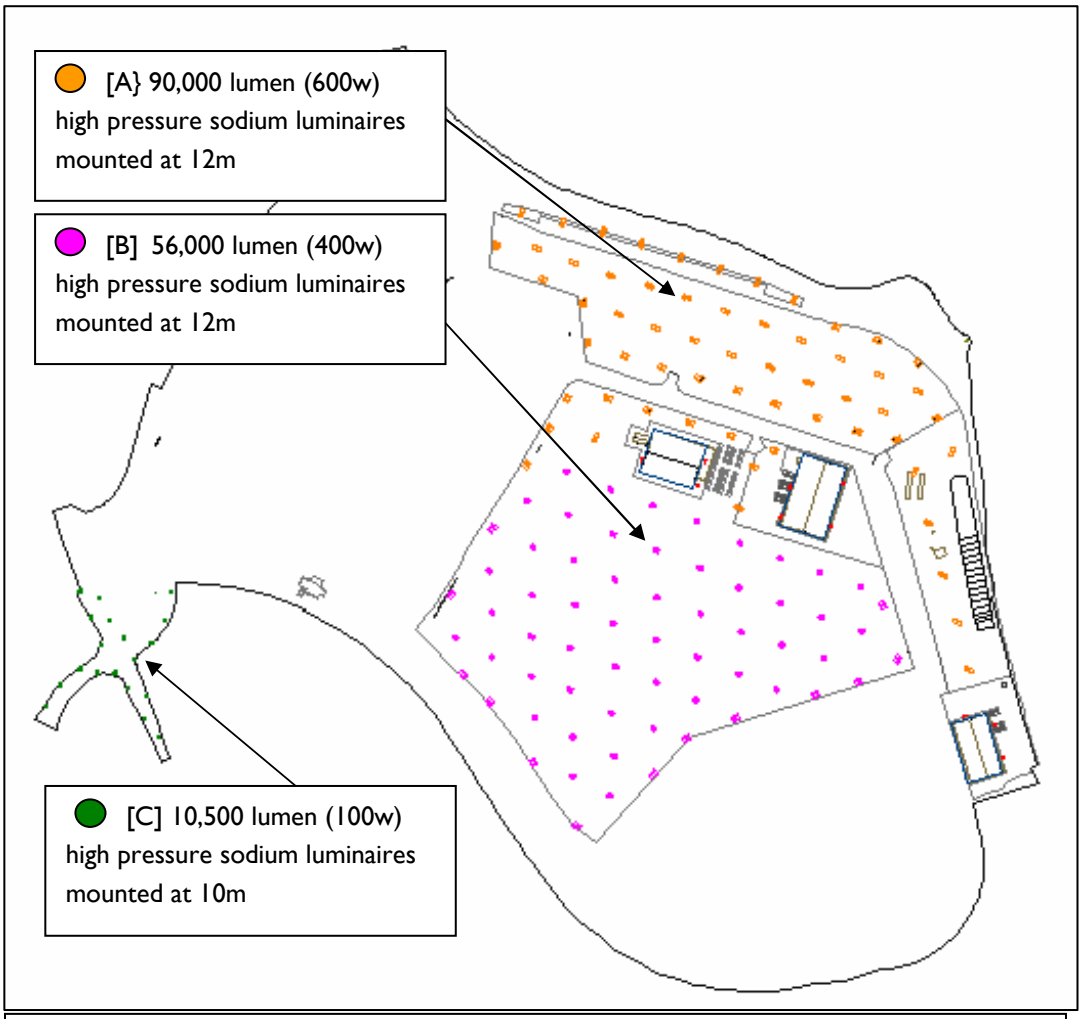


Figure 6: Indication of proposed lighting installation.

4.9 The exact positioning of the columns on site may, due to the complexity of the site layout and ground conditions, be liable to alteration as the detailed siting of the scheme progresses. However the overall layout should not change significantly from that shown above.

5.0 KEY IMPACTS AND LIKELY SIGNIFICANT EFFECTS

5.1 As noted in Section 2, the key lighting impacts, other than for the Infra-red CCTV security lighting that will not be visible to the human eye, will be:

- Sky Glow
- Light Trespass
- Source Intensity /Glare

For each of these the likely significant effects should be minimal as long as the above recommended technical specifications are adhered to.

5.2 In line with the above, the following is an assessment of the likely significant effects of the proposed installation on the wider environment:

5.2.1 Sky Glow

The use of the near cut-off lighting equipment proposed in Section 4 will ensure that the Upward Light Ratio (ULR) for the installation shall be minimal. While not meeting precisely the zero requirements for "direct" uplight for a dark landscape, the level is under 1%, and as explained in para. 4.3 will ensure that the total upward light, both direct and reflected is kept to a minimum, which in turn will make certain that there is little if any additional sky glow. This will accordingly help to preserve the dark skies found in this part of the country. The effects of the lighting proposals on Sky Glow are therefore assessed as negligible.

5.2.2 Light Trespass

Due to the site layout, topography and the careful choice of luminaires, the light trespass both horizontally and vertically will be negligible outside of the site where no existing residential properties should receive any additional light trespass. Figure 7 shows how the horizontal light trespass is contained and with careful choice of optic and siting of the columns it has also been possible to reduce the levels along the vegetated corridor between the car storage area and the rail yard to minimise the effect on the ecology present therein.

With regard to the ecology outside of the site, as is also shown in Fig 7, the light spill along the northern boundary is generally under 5 lux, a relatively low level well below that of "dusk", and reduces to moonlight levels within a short distance of the site boundary. The effects of lighting on the ecological resources at the site are fully considered in Chapter 5 of the Environmental Statement.

With regard to the vertical light trespass into windows, no residential properties will receive any measurable level, so complying with the E1 limit of zero. The effect of light trespass from the proposals on sensitive receptors is therefore assessed as of negligible significance.

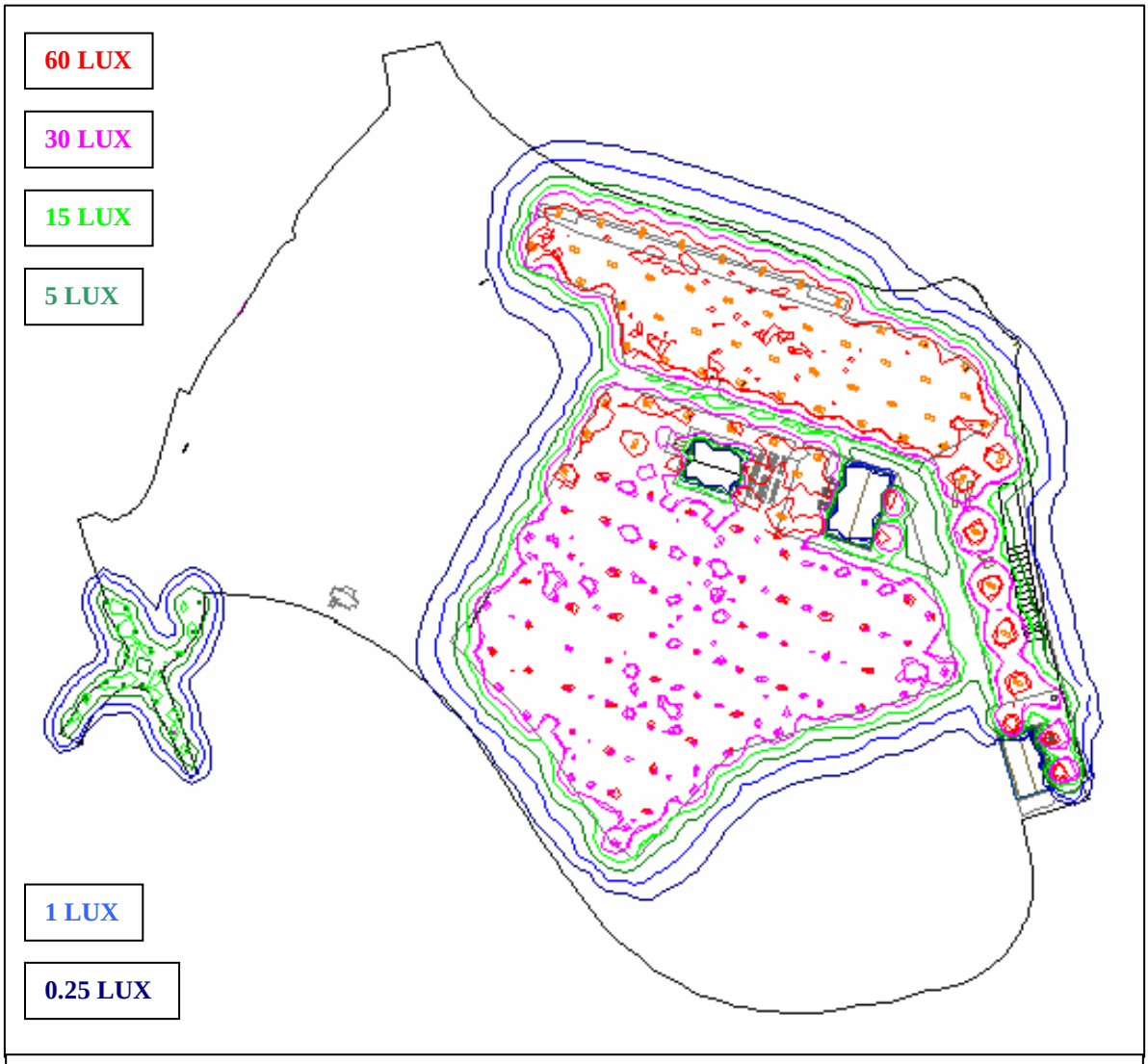


Figure 7: Indication of horizontal light trespass from proposed lighting installation

5.2.3 Source Intensities

Using near cut-off luminaires in which no view of the bare lamp or reflector is seen at or above the horizontal, any views into the site at or above this angle should not see any obtrusive spots of light. Below the horizontal from northern locations such as *Bunkers Hill* or *Enslow* the low mounting height of 10/12m will ensure that most luminaires are screened from sight by vegetation.

While the ideal E1 limit of zero may not be met, any intensity will be well below the 0.5 kcd. level suggested for the next higher zone (E2) and the significance of the effect to those few properties before mentioned is assessed as minor.

6.0 SUMMARY

6.1 The proposed lighting scheme has been designed to meet all the relevant safety criteria required by STVA and EWS, the rail freight operators, together with current good environmental practice.

6.2 The luminaires proposed contain high performance optics and have a near horizontal cut-off which direct all of their light onto those areas required. The lighting scheme is therefore efficient in its use of energy, using the minimum amount required.

6.3 The light will be well contained within the proposed development, only those local viewpoints with a direct view into the site, (see Photo P2), could potentially experience any noticeable impact and this has been assessed as minor in nature. From all other viewpoints surrounding the site, both light trespass and glare have been assessed as minimal and there should be negligible obtrusive light into the sky or into the wider environment.

6.4 All lighting will be dimmed or switched off when not required and the main overnight security lighting around the perimeter fence will be by infra-red CCTV, thereby negating any impacts from this source of lighting on surrounding receptors.

Chapter 5 (Revised)

Ecology

5 ECOLOGY

Table 5.6: Impact Assessment during Construction

Replace Table 5.6 with the following attached table:-

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
Woodland and scrub (Local / Parish to District / Borough value)				
Site clearance for mineral extraction and new road junction.	The loss of dense scrub represents a negative impact upon an area of 2.85ha representing 46.7% of the available resource. This will be a permanent, irreversible impact occurring once during Phases 1-4.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at Local/Parish to District/Borough level: **certain**	Creation of 3.2ha wood/scrub and 1.9ha scrub habitat (predominantly[1] native species) (see below)	**Certain negative effect** on conservation status in the medium term: **significant** at Local/ Parish to District/ Borough level.
Retention of habitat	Retention of northern and western woodland / scrub habitats comprising 3.5ha (57.4%). Permanent, positive impact.	**Positive effect** on conservation status**: certain** Therefore **significant positive effect** at Local/Parish to District /Borough level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status: **significant** at Local/ Parish to District/ Borough level.
Creation of new, predominantly[1] native species woodland / scrub habitat	Positive permanent impact of 4.1ha representing 67% (158% area lost) of resource during Phases 1-7.	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at Local/Parish to District/Borough level: **near certain**	Management of created habitat to maintain and enhance value.	**Near certain positive effect** on conservation status in the long term: **significant** at Local/Parish to District/ Borough level.
Accidental damage to retained habitats	Accidental damage represents a negative impact of unknown magnitude or extent. Potentially spans whole construction period (6yrs). Potentially reversible depending on degree of damage. Could occur at any stage and any level of frequency depending upon	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at Local/Parish to District/Borough level: **probable**	All retained habitat to be temporarily protected during the construction period with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained throughout the construction phase.	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**

[1] Use of a small quantity of evergreen tree / shrub species may be required in areas also required for screening.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	care of contractors			
Site clearance resulting in habitat fragmentation	Permanent irreversible impact. The area of scrub to be lost due to mineral extraction shows poor connectivity but nevertheless strong linear feature (Phase 1). New road access will cause second breach in strong linear feature (Phase 4). Negative impact of 2.85ha (46.7% resource) of unknown extent.	**Negative effect** on conservation status: **near certain** Therefore **significant negative impact** at Local/Parish to District / Borough level: **near certain**	Creation of new corridor habitat (see below)	**Near certain negative effect** on conservation status in medium term: **significant** at Local / Parish to District / Borough level.
Creation of new corridor habitat	Permanent positive impact involving creation of new off-site tree belt to east of railway (Phase 1) linking to canal / river corridor to north and south and disused railway corridor to south; new internal planted belt in approximate area of that lost linking to tree belt / disused railway corridor to south and restoration area (Phase 2~~/3~~). Extensive woodland / tree planting around new road junction (Phase 1). Strengthening existing hedgerow corridor along access track and 826m new hedgerow network (Phase 1).	**Positive** effect on conservation status: **near certain** Therefore **significant positive effect** at Local/Parish to District/ Borough level: **near certain**		**Near certain positive effect** on conservation status in long term: **significant** at Local / Parish to District / Borough level.
Unimproved / semi-improved neutral grassland (County value)				
Site clearance for mineral extraction and development	Permanent, negative, irreversible impact involving loss of 2.2ha (63% of the resource) mostly during Phase 1.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at County level: **certain**	Creation of species-rich neutral /calcareous grassland (see below).	**Certain negative effect** on conservation status in the medium term: **significant** at County level.
Retention of habitat	Permanent, positive impact involving retention of 1.3ha (37% of resource) along northern boundary.	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at County level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status: **significant** at County level.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
Creation of unimproved neutral / calcareous grassland	Positive, permanent impact of **c.11ha**~~3.8ha~~ (ie creation of **500%**~~173%~~ of the resource lost) during Phase **3-**7 plus reptile receptor site (3.4ha) during Phase 1.	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at County level: **near certain**	Management of created habitat to maintain and enhance value.	**Near certain positive effect** on conservation status: **significant** at County level.
Accidental damage to retained habitats	Accidental damage represents a negative impact of unknown magnitude or extent. Potentially spans whole construction period (6yrs). Potentially reversible depending on degree of damage. Could occur at any stage and at any level of frequency depending upon care of contractors.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	All retained habitat to be temporarily protected during the construction period with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained throughout the construction phase.	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Springs (District value)				
Site clearance and infill	Negative impact of loss of 625m / 100% of resource during Phases 1-6. Permanent irreversible impact.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at District level: **certain**	Creation of swale habitat (see below)	**Certain negative effect** on conservation status: **significant** at District level.
Creation of **spring habitat along valley bottom of geological exposure** and swale, ~~and~~ locally deepened to provide wetter habitat	Positive, permanent impact during Phase**s** 4-**6** of **c.600**~~410~~m, **96**~~66~~% of length of spring habitat lost.	**Positive effect** on conservation status: **probable** Therefore **significant positive impact** at District level: **probable**	Management of created habitat to maintain and enhance value.	**Probable positive effect** on conservation status: **significant** at District level.
Risk of pollution to springs and newly created swale during construction	Negative, short-term impact on resource. Potentially reversible although spring resource to be lost. Could occur at any stage, frequency depending upon care of contractors.	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact** at District level: **unlikely**	Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to springs and swale **(Chapters 9 and 11 refer).**	**Unlikely negative effect** on conservation status, therefore **not significant**.
Altered hydrology habitats	No significant effect is anticipated on	~~**To be assessed**~~		

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
off-site as a result of proposed development.	ground water levels beyond quarry boundary. There is a possibility that the water chemistry may alter which will be subject to further tests.			
Swamp / marginal vegetation (District value)				
Retention of resource	Positive, permanent impact through retention of 0.54ha (100% of resource).	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at District level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status: **significant** at District level.
Risk of pollution to lake and associated vegetation during construction	Negative impact of unknown magnitude potentially affecting 100% of resource. Possibly reversible over time. Timing and frequency unpredictable.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at District level: **probable**	Implementation of precautions such as a trench and petrol interceptors to capture road run-off to prevent / minimise risk of pollution. **Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution (including dust) to springs and swale (Chapters 9 and 11 refer).**	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Water level changes	Negative, permanent impact of water level rise of c. 0.8m affecting 100% of the resource, potentially over duration of a few weeks from Phase 3.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at District level: **probable**	Re-profiling of banks and translocation of vegetation where feasible to facilitate adaptation of marginal vegetation.	With mitigation **unlikely** negative effect on conservation status: therefore **not significant**.
~~Expansion of resource~~	~~Positive, permanent impact of the creation of 1.6ha representing 300% of resource during Phase 3.~~	~~**Positive effect** on conservation status: **certain**~~ ~~Therefore **significant positive impact** at District level: **certain**~~	~~Management of created habitat to maintain and enhance value.~~	~~**Certain positive effect** on conservation status, therefore **significant** at District level.~~
Open water (County value)				
Draining and infilling of quarry	Permanent, negative, irreversible impact comprising loss of 3.15ha (61.2%) of the current (2006) extent	**Negative effect** on conservation status: **certain**	~~Creation of 1.6ha new reedbed (see below).~~ Additional species-rich grassland, scrub / woodland and	**Certain negative effect** on conservation status, therefore **significant** at County level.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	and 21.9ha (91.6%) maximum extent during the Phases 1-6 period	Therefore **significant negative impact** at County level: **certain**	~~reedbed~~**hedgerow** beyond that required as mitigation will, in part, compensate for the loss of open water.	
Retention of triangular lake	Positive, permanent impact comprising retention of 2.0ha of water (38.8% of the current (2006) extent)	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at County level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status, therefore **significant** at County level.
Risk of pollution to lake during construction	Negative impact of unknown magnitude potentially affecting 100% of resource. Possibly reversible over time. Timing and frequency unpredictable.	**Negative effect** on conservation status: **unlikely / probable** Therefore **significant negative impact** at County level: **unlikely / probable**	Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to lake **(Chapters 9 and 11 refer)**.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Water level changes	Neutral, permanent impact of water level rise of c. 0.8m affecting 100% resource during Phase 3.	**No effect** on conservation status: **certain** Therefore **no significant impact** at County level: **certain**		**No effect** on conservation status: **not significant.**
Ephemeral / short perennial vegetation (County value)				
Site clearance and development	Negative, permanent, irreversible impact of loss of 2.5ha (80% resource) during Phases 1-6.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at County level: **certain**	Retention and creation of habitat (see below)	**Certain negative effect** on conservation status, therefore **significant** at County level.
Retention of habitat	Positive, permanent impact of retention of 0.7ha (21.5% of resource).	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at County level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status, therefore **significant** at County level.
Creation of ephemeral / short perennial habitat	Positive, permanent (subject to management) impact of creation of **c.3.5ha**~~1.5ha~~ (**140%**~~60%~~ of area lost) ephemeral / short perennial	**Positive effect** on conservation status: **near certain**	Management of created habitat to maintain and enhance value. Ephemeral habitat also likely to persist along geological trail if	**Near certain positive effect** on conservation status, therefore **significant** at County level.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	vegetation during Phases 3-4**7**.	Therefore **significant positive impact** at County level: **near certain**	substrate suitable.	
Hedgerows (Local/Parish to District value with respect to bats and birds) (see below)				
Buildings (Local/Parish value with respect to bats and birds) (see below)				
Flora (County value)				
Site clearance and development	Negative, permanent, irreversible impact due to loss of 4 out of 16 (25%) county important species including Nationally Scarce blue pimpernel and UK BAP cornflower (although latter two associated with imported fill material) during Phases 1-6. Negative impact also on populations of two county important species (pyramidal orchid and wild liquorice) although will probably not completely destroy populations.	**Negative effect** on conservation status of six species: **certain** Therefore **significant negative impact** at County level: **certain**	Cornflower and blue pimpernel associated with imported fill and therefore not strictly native to quarry. Cornflower is widely used in seed mixes and may not be of native origin. Translocation of flowering rush and small pondweed to retained lake. Partial translocation of wild liquorice **and pyramidal orchid** or harvesting of seed to sow within retained / created habitats. Retained habitats will retain majority of important plant species.	After mitigation, **unlikely negative effect** on conservation status of two species associated with imported fill, therefore **not significant**.
Retention of key habitats	Positive, permanent (subject to management) impact allowing retention of 12 out of 16 (75%) county important plant species.	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at County level: **near certain**	Management of retained habitat to maintain and enhance value.	**Near certain positive effect** on conservation status, therefore significant at **County** level.
Creation of new habitat (especially unimproved grassland, marginal / swamp, swale/pool and ephemeral)	Positive, permanent (subject to management) impact extending habitat resource for county important species: unimproved neutral / calcareous grassland (**c.11ha/500%**~~3.8ha/173%~~ of area lost plus 3.5ha reptile receptor site); **marshy**~~swamp~~ vegetation (3.1ha, **100%**~~300%~~ of current resource); and	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at County level: **near certain**	Management of created habitat to maintain and enhance value.	**Near certain positive effect** on conservation status, therefore significant at **County** level.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	ephemeral vegetation (**3.5ha, 140%**~~1.5ha, 60%~~ of area lost) during Phases 3-7.			
Raising water level of lake	Potential negative impact on 3 county important plant species (19% of resource) potentially resulting in loss of these species. Irreversible, short-term impact (over few weeks) during Phase 3.	**Negative effect** on conservation status of three species: **uncertain** If unable to adapt resulting in loss of species, **significant negative impact** at County level If all species able to adapt, **no significant impact**	Reprofiling of banks and translocation where possible to facilitate adaptation of marginal vegetation.	With mitigation **unlikely negative effect** on conservation status; therefore **not significant**.
Accidental damage to retained habitats	Negative impact. Magnitude, extent, duration and frequency unpredictable. Could occur at any phase of development. May be reversible.	**Negative effect** on conservation status: **unpredictable**	All retained habitat to be protected with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained throughout the construction phase.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Accidental pollution of lake	Potential negative impact on 3 county important plant species (19% of resource) potentially resulting in loss of these species. Potentially reversible effect over time. Timing and frequency unpredictable.	**Negative effect** on conservation status of three species: **probable** Therefore **significant negative impact** at County level: **probable**	Implementation of precautions such as a trench with interceptors to capture road run-off to prevent / minimise risk of pollution. Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to lake **(Chapters 9 and 11 refer).**	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Bats (District to County value)				
Demolition of buildings	Negative, permanent, irreversible impact through loss of 1-2 roosts used by small numbers of common species during Phase 1; loss of at least 2 feeding perches / night roosts and two possible single male roosts	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact** at District to County level: **unlikely**	Provision of **50** suitable bat boxes on retained trees / new buildings to compensate for loss of roost sites. **Visitor centre to be designed to provide roost opportunities such as within the roof void and**	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	of pipistrelle and long-eared bats (100% building roosts).		**behind timber cladding. A bat hibernation chamber will also be provided.** Demolition of buildings to avoid maternity and hibernation periods i.e. to be undertaken during April / May or September / October.	
Site clearance for mineral extraction	Potential negative, permanent, irreversible impact through loss of potential roost habitat (ivy-clad poplars with potential for small numbers of crevice-dwelling bats and tree 23) during Phase 1.	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact** at District to County level: **unlikely**	Provision of **50** suitable bat boxes on retained trees to compensate for loss of roost sites. Timing to avoid maternity and hibernation periods i.e. to be undertaken during April / May or September / October.	After mitigation, **unlikely negative effect** on conservation status, therefore **not significant**.
Retention of northern woodland belt with greatest tree roost potential.	Permanent, positive impact. Retention of the majority of trees with significant roost potential. Actual roost presence or status unknown.	**Positive effect** on conservation status: **probable** Therefore **significant positive impact** at District to County level: **probable**		**Probable positive effect** on conservation status, **significant** at District to County level.
Site clearance / drainage of water bodies / in-filling for mineral extraction and development	Negative, irreversible impact due to loss of foraging habitat used by 8 out of a total of 13 species (c. 50% of species) recorded within Berkshire, Buckinghamshire and Oxfordshire during Phases 1-6. Loss of 3.15ha (61.2%) open water (current extent) / 21.9ha (91.6%) (max. extent). Loss of 4.2ha (36.5%) scrub / grassland to east.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at District to County level: **certain**	Creation and retention of habitat (see below)	**Certain negative effect** on conservation status; **significant** at District to County level.
Retention and enhancement of linear scrub and woodland foraging / commuting habitat to west and north, linear hedgerow and poplar / conifer windbreak to south.	Permanent, positive impact (7.3ha, 63.5% of scrub / woodland habitat, 1120m hedgerow / windbreak to south)	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at District to County level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status; **significant** at District to County level.
Retention of triangular lake of	Permanent, positive impact. 2.0ha	**Positive effect** on	Management of retained habitat to	**Certain positive effect** on

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
greatest foraging value of the water bodies to bats	(38.8% of current extent / 8.4% of max extent).	conservation status: **certain** Therefore **significant positive impact** at District to County level: **certain**	maintain and enhance value.	conservation status, **significant** at District to County value.
Pollution of retained lake affecting foraging value	Negative impact, could affect entire 2ha /100% of retained resource. Potentially reversible over time. Duration, timing and frequency of impact unpredictable.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at District to County level: **probable**	Implementation of precautions such as a trench and interceptors to capture road run-off to prevent / minimise risk of pollution. Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to the lake **(Chapters 9 and 11 refer)**.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Creation of scrub / woodland habitat, species-rich grassland, **marshy habitat**, swale / pool and hedgerow habitat.	Permanent positive impact during Phases 1-7: wood / scrub 4.1ha (158% of area lost); species-rich grassland (**c.11ha/500%**~~3.8ha / 173%~~ area lost plus 3.5ha reptile receptor area); **marshy habitat**~~reedbed~~ **3.5**~~1.6~~ha (~~3~~**1**00% of current resource); swale / pool /**wet valley** **c.600**~~410~~m (**96**~~66~~% of length of spring habitat lost); hedgerows 826m plus 330m gapping up (120% of resource, 367% of habitat lost).	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at District to County level: **certain**	Management of created habitat to maintain and enhance value.	**Certain effect** on conservation status, therefore **significant** at District to County level.
Accidental damage to retained habitats	Negative impact. Magnitude, extent, duration and frequency unpredictable. Could occur at any phase of development. May be reversible.	**Negative effect** on conservation status: **unpredictable**	All retained habitat to be protected with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained throughout the construction phase.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Habitat fragmentation	Negative, irreversible impact due to habitat fragmentation (Phase 1 - scrub habitat to east, Phase 4 - disused railway line corridor), 510m linear habitat (17% of total resource).	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact** at District to County	Creation of new habitat corridors (see below)	**Unlikely negative effect** on conservation status in medium term: **not significant**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
		level: **unlikely**		
Creation of new corridor habitat	Permanent positive impact during Phases 1-7 of new tree / shrub belt to east of railway line linking with river / canal corridor to north and south and disused railway line to south (Phase 1); strengthening of existing hedgerow corridor to south (Phase 1); extensive new wood / scrub planting around new road junction (Phase 1); new wood / scrub corridor between aggregate depot and rail storage area and central storage area linking through to restoration area (Phases 2-3); and new internal hedgerow network (Phases 3-7). Total new linear habitat 1690m (plus 826m internal hedgerow network) (330% of area lost to be replaced).	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at District to County level: **near certain**	Management of created habitat to maintain and enhance value.	**Near certain effect** on conservation status in long term, therefore **significant** at District to County level.
Noise disturbance from clearance, mineral extraction, filling, recycling and construction operations.	Negative impact, Phases 1-~~6~~**7**.	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact at** District to County level: **probable/unlikely**	None possible	**Unlikely negative effect** on conservation status; therefore **not significant**.
Breeding birds (District/Borough to County value)				
Site clearance	Negative permanent impact. Loss of 2.85ha (46.7%) of dense scrub habitat, 7.6ha (100%) of low-lying **(bare)** and 3.4ha (100%) of mid-height **(marshy)** plateau habitat used by breeding plovers, buildings used by breeding kestrel, open flooded lake habitat (1.07ha / 100%) used by breeding tufted duck, island habitat used by breeding terns (since 1999 following flooding of quarry) during	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at District/Borough to County level: **certain**	Timing of works to avoid sensitive breeding periods (i.e. February / March to July / August, seasonally dependent). Retention and creation of habitat (see below). Installation of stock dove nest boxes along woodland edge habitat, **kestrel nest boxes and peregrine nest platforms. Enhancement of visitor centre to provide nesting opportunities for**	**Certain negative effect** on conservation status: **significant** at District to County level.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	Phases 1-6.		**swallows (if possible).**	
Retention of key habitats	Positive, permanent impact. Retention 3.5ha (57.4%) woodland and scrub habitat and central lake (2.0ha, 38.8% of current extent / 8.4% of max. extent)	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at District/Borough to County level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status: **significant** at District to County level.
Creation of new habitat	Positive, permanent impact: Scrub / wood 4.1ha (67% of resource / 158% area lost) (Phases 1-7); hedgerow 826m plus 330m gapping up (367% of habitat lost) (Phases 3-7); **marshy**~~reedbed~~ **plateau** habitat **4.35ha**~~1.6ha~~ (~~300~~**128**% of current resource); **c.600**410m swale **and wet valley**, locally deepened (**96**~~66~~% of length of spring habitat lost); **3.35ha bare plateau (44% area lost) and 3.5ha**~~1.5ha~~ **high** plateau habitat ~~(13.6% resource lost)~~.	**Positive effect** on conservation status: **certain** ~~(except plover habitat)~~ Therefore **significant positive impact** at District/Borough to County level: **certain**	Management of created habitat to maintain and enhance value. Installation of stock dove **and kestrel nest boxes**, barn owl boxes, **peregrine nest platforms** and possibly artificial sand martin bank. **Enhancement of visitor centre to provide nesting opportunities for swallows (if possible).**	**Certain positive effect** on conservation status in long term ~~(except plover habitat)~~; **significant** at District to County level.
Accidental damage to retained habitats	Negative impact. Magnitude, extent, timing and frequency unpredictable. Potentially reversible over time. Duration: throughout Phases 1-7.	**Negative effect** on conservation status: **probable** (depends on extent and location) Therefore **significant negative impact** at District/Borough to County level: **probable**	All retained habitat to be protected with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained throughout the construction phase.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Accidental pollution to triangular lake affecting foraging value	Negative impact, could affect entire 2ha / 100% of resource. Potentially reversible over time. Duration, timing and frequency of impact unpredictable.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at District/Borough to County level: **probable**	Implementation of precautions such as a trench and interceptors to capture road run-off to prevent / minimise risk of pollution. Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to lake **(Chapters 9 and 11 refer)**.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
Disturbance (noise, human, **vehicular**, ~~lighting~~)	Negative, medium term impact during Phases 1-7. May be partially accustomed to disturbance.	**Negative effect** on conservation status: **probable** in the medium term Therefore **significant negative impact** at District/Borough to County level in the longer term: **probable**	The majority of birds nest in peripheral habitats. Ground nesting birds such as plovers will need to be closely monitored and worked around if attempting to breed.	**Negative effect** on conservation status in the medium term **probable**: therefore **significant at** District / Borough to County level
Wintering birds (County value)				
Drainage and infill of quarry resulting in loss of habitat	Negative, permanent impact. Loss of 3.15ha (13.2% of the current extent) / 21.9ha (91.6% of the max. extent) open water, ~~and~~ 625m of spring habitat **and 3.4ha marshy habitat used by wintering jack snipe** during Phases 1-6.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at County level: **certain**	Retention and creation of habitat (see below).	**Certain negative effect** on conservation status; **significant** at County level.
Retention of triangular lake	Positive, permanent impact; 2.0ha (38.8% of the current extent / 8.4% of the max. extent) **including a small area of marsh used by wintering jack snipe.**	**Positive effect** on conservation status: **unlikely** ~~(except for jack snipe)~~ Therefore **significant positive impact** at County level: **unlikely**	Management of retained habitat to maintain and enhance value.	**Unlikely positive effect** on conservation status ~~(except jack snipe)~~; therefore **not significant**
Accidental pollution to triangular lake affecting foraging value	Negative impact, could affect entire 2ha (100% of retained resource). Potentially reversible over time. Duration, timing and frequency of impact unpredictable.	**Negative effect** on conservation status: **unpredictable** Therefore **significant negative impact** at County level: **unpredictable**	Implementation of precautions such as a trench and interceptors to capture road run-off to prevent / minimise risk of pollution. Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to the lake **(Chapters 9 and 11 refer)**.	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Raising water level of lake	Negative, permanent impact resulting in loss of County to Nationally important jack snipe roost (up to **8**~~7~~ birds).	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at County to National	Re-profiling of banks and translocation where possible to facilitate adaptation of marginal vegetation. **Creation of marshy and spring habitats (see below).**	With mitigation **unlikely** to have negative effect on conservation status: **not significant.**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
		level: **certain**		
Habitat creation	Positive, permanent impact through creation of up to **4.35ha**~~1.6ha~~ of **marshy habitat**~~reedbed~~ representing ~~300~~**128**% of resource and **600**~~410~~m, **96**~~66~~% of length of spring habitat lost during Phases 3-~~4~~**7**.	**Positive effect** on conservation status: **unlikely** Therefore **significant positive impact** at County level: **unlikely**	Management of created habitat to maintain and enhance value.	**Unlikely positive effect** on conservation status: **not significant.**
Noise/human/**vehicular** disturbance	Negative impact throughout construction phase affecting almost entire quarry.	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at County level: **certain**		**Certain negative effect** on conservation status; **significant** at County level.
Reptiles (District/Borough)				
Site clearance and infill of quarry.	Negative, permanent impact resulting in loss of 3.5ha (71%) of reptile habitat during Phases 1-6. **Potential of killing / injury to reptiles.**	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at District / Borough level: **probable**	Retention and creation of reptile receptor habitat (see below). **Advance translocation of reptiles from areas to be affected to receptor site.**	**Probable negative effect** on conservation status; **significant** at District / Borough level
Retention of habitat	Positive, permanent impact through retention of 1.3ha (c29%) of reptile habitat.	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** District / Borough level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status; **significant** at District / Borough level.
Habitat creation	Positive, permanent impact (subject to appropriate management). 3.5ha (100%). Pre-Phase 1.	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at District / Borough level: **near certain**	Management of created habitat to maintain and enhance value.	**Near certain positive effect** on conservation status; **significant** at District / Borough level.
Accidental damage to retained habitats	Negative impact. Magnitude, extent, timing and frequency unpredictable. Potentially reversible over time. Duration: throughout Phases 1-7.	**Negative effect** on conservation status: **unpredictable**	All retained habitat to be protected with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
			throughout the construction phase.	
Habitat fragmentation	Negative, permanent impact, loss of 540m potential corridor habitat at eastern end (with poor connectivity to north) during Phase 1.	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact** at District / Borough level: **unlikely**	Creation of new corridor habitat (see below)	**Unlikely negative effect** on conservation status; therefore **not significant**.
Creation of new corridor habitat	Permanent positive impact during through creation of new corridor habitat east of railway linking into river / canal corridor to north and south, disused railway to south and receptor site (Phase 1); new corridor between aggregate depot, rail storage yard and storage area to restoration area (Phase 2~~–3~~); strengthening of corridor to south; and new internal hedgerow corridor. 1690m new corridor habitat provided (313% of area lost) (plus 826m internal hedgerows gained).	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at District / Borough level: **near certain.**	Management of created habitat to maintain and enhance value.	**Near certain positive effect** on conservation status; **significant** at District / Borough level.
Amphibians (Local/Parish to District)				
Draining and infilling of quarry	Negative, permanent impact through loss of temporary pool with high population smooth newts during Phases 3-6	**Negative effect** on conservation status: **certain** Therefore **significant negative impact** at Local / Parish to District level: **certain**	Habitat creation (see below)	**Certain negative effect** on conservation status; **significant** at Local / Parish to District level
Habitat creation	Positive, permanent impact of creation of pool habitat along swale and pond within reptile receptor area during Phases 1-4.	**Positive effect** on conservation status: **probable** Therefore **significant positive impact** at Local / Parish to District level: **probable**	Management of created habitat to maintain and enhance value.	**Probable positive effect** on conservation status **significant** at Local / Parish to District level
Accidental pollution to triangular lake	**Negative impact, could affect entire 2ha (100% of retained resource).**	**Negative effect on conservation status:**	**Implementation of precautions such as a trench and**	**With mitigation near-certain not to have negative effect**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	Potentially reversible over time. Duration, timing and frequency of impact unpredictable.	**unpredictable** **Therefore significant negative impact at Local/Parish to District level: unpredictable**	**interceptors to capture road run-off to prevent / minimise risk of pollution. Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution (including dust) to the lake (Chapters 9 and 11 refer).**	**on conservation status, therefore not significant**
Invertebrates (County, certain habitats)				
Site clearance and infilling of quarry	Negative, permanent impact; loss of 2.7ha species-rich grassland / scrub habitat to east plus 0.2ha to north (45.7% of resource) and 625m of spring (100% of resource) mostly during Phase 1.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Retention and creation of habitat (see below)	**Probable negative effect** on conservation status, **significant** at County level
Retention of key habitats	Positive, permanent impact; retention of species-rich grassland / scrub habitat to north and west (3.44ha / 54% of resource), triangular lake (2.0ha, 100% of resource).	**Positive effect** on conservation status: **certain** Therefore **significant positive impact** at County level: **certain**	Management of retained habitat to maintain and enhance value.	**Certain positive effect** on conservation status **significant** at County level
Habitat creation	Positive, permanent impact, Phases 1-7 (subject to appropriate management). **C.11ha**~~3.8ha~~ (**500%**~~173%~~) of species-rich grassland (plus 3.5ha reptile receptor area), 4.1ha (144% of the area lost) of wood / scrub, **c.3.1ha**~~1.6ha~~ (~~3~~**1**00% resource) of **marshy**~~swamp / marginal~~ habitat (Phase 3), **c.600**~~410~~m of swale / pool (**96**~~66~~% of length of spring habitat lost) (Phase 4), **3.5ha of ephemeral / short perennial vegetation and 5 geological exposures re-exposing cliff habitat.**	**Positive effect** on conservation status: **near certain** Therefore **significant positive impact** at County level: **near certain**	Management of created habitat to maintain and enhance value.	**Near certain positive effect** on conservation status **significant** at County level.
Accidental damage to	Negative impact. Magnitude, extent,	**Negative effect** on	All retained habitat to be protected	With mitigation **near certain**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
retained habitats	timing and frequency unpredictable. Potentially reversible over time. Duration: throughout Phases 1-7.	conservation status: **unpredictable**	with scaffold pole and chestnut pale fencing. The integrity of the fencing will be monitored and maintained throughout the construction phase.	not to have negative effect on conservation status, therefore **not significant**
Accidental pollution to triangular lake	Negative impact, could affect entire 2ha (100% of resource). Potentially reversible over time. Duration, timing and frequency of impact unpredictable.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Implementation of precautions such as creation of a trench and interceptors to capture road run-off to prevent / minimise risk of pollution. Best practice construction measures to be employed on site by contractors to minimise the risk of spillages and pollution **(including dust)** to the lake **(Chapters 9 and 11 refer)**.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Water level changes	Negative, permanent impact of water level rise of c. 0.8m over few weeks during Phase 3 affecting marginal and aquatic vegetation (habitat and food source).	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Re-profiling of banks and translocation of vegetation to facilitate adaptation of marginal vegetation.	With mitigation **probable** negative effect on conservation status: **significant** at County level.

Table 5.7: Impact Assessment during Operation

Replace Table 5.7 with the following attached table:-

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
Woodland and scrub (Local/Parish to District value)				
	No perceived impacts		Implementation of management plan **(Appendix 5.3 refers)** to maintain and enhance retained and created habitats	
Unimproved/semi-improved neutral grassland (County value)				
Dust / litter along boundary with rail storage yard	Permanent, negative effect affecting 625 linear m of habitat.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Management plan **(Appendix 5.3 refers)** to allow for regular litter picking. Signage along boundary to inform of wildlife area. Dust suppression measures recommended **(Chapter 9 refers)**.	With mitigation **unlikely** to have negative effect on conservation status, therefore **not significant**
New swale habitat				
Pollution through inappropriate site drainage	Negative impact, potentially affecting entire resource. Magnitude, duration, timing and frequency unpredictable but potentially reversible over time.	**Negative effect** on conservation status: **extremely unlikely** Therefore **significant negative impact extremely unlikely**	Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas.	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Swamp/marginal vegetation (District Value)				
Pollution through inappropriate site drainage	Negative impact, potentially affecting entire resource. Magnitude, duration, timing and frequency unpredictable but potentially reversible over time.	**Negative effect** on conservation status: **extremely unlikely** Therefore **significant negative impact** at District level: **extremely unlikely**	Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake	With mitigation **near certain** not to have negative effect on conservation status, therefore **not significant**
Open Water (County Value)				
Pollution through inappropriate site drainage	Negative impact, potentially affecting entire lake. Magnitude, duration, timing and frequency unpredictable	**Negative effect** on conservation status: **extremely unlikely**	Storage and batching plant areas to be drained via petrol interceptors prior to discharge to	With mitigation **near-certain** not to have negative effect on conservation status, therefore

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	but potentially reversible over time.	Therefore **significant negative impact** at County level: **extremely unlikely**	attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake	**not significant**
Ephemeral/short perennial vegetation (County Value)				
	No perceived impacts		Management plan as above **(Appendix 5.3 refers)**	
Hedgerows (Local/Parish to District Value)				
	No perceived impacts		Management plan as above **(Appendix 5.3 refers)**	
Flora (County Value)				
Dust / litter along boundary with rail storage yard	Permanent, negative effect affecting 625 linear m of habitat.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Management plan **(Appendix 5.3 refers)** to allow for regular litter picking. Signage along boundary to inform of wildlife area. Dust mitigation measures recommended **(Chapter 9 refers)**.	With mitigation **unlikely** to have negative effect on conservation status, therefore **not significant**
Pollution through inappropriate site drainage	Negative impact, potentially affecting entire lake. Magnitude, duration, timing and frequency unpredictable but potentially reversible over time.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Bats (District to County Value)				
Disturbance to bats (lighting / noise)	**Light spill beyond development area not anticipated to be significant (Appendix 4.6 refers).** Permanent negative effect of ~~light spill (24 hours) and~~ disturbance to northern woodland habitat adjacent	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact at** District to County level: **unlikely**	~~Baffling of lighting in sensitive areas to minimise light spill~~ **Lighting designed to minimise night glare. Main security surveillance around perimeter of site to be by infra-red CCTV**	**Probable negative effect** on conservation status **unlikely**; therefore **not significant**.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
	to rail storage yard. ~~and~~ **New** internal corridor habitat **will be subject to moderate light pollution (well below dusk light levels) and noise disturbance.**		**to minimise security lighting. Non-essential lighting (i.e. in centre of car parking / general storage areas to be dimmed in accordance with the lighting strategy (Appendix 4.6) between 22:00 and 06:00.**	
Pollution through inappropriate site drainage affecting foraging potential	**Negative impact, potentially affecting entire lake. Magnitude, duration, timing and frequency unpredictable but potentially reversible over time.**	**Negative effect on conservation status: unlikely** **Therefore significant negative impact at District to County level: unlikely**	**Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake**	**With mitigation near-certain not to have negative effect on conservation status, therefore not significant**
Breeding Birds (District/Borough to County value)				
Disturbance to breeding birds (lighting / noise / ~~movement~~ **/ vehicular / human).**	Permanent negative effect of disturbance to breeding birds (human activity / noise / lighting), primarily adjacent to rail storage yard and new planting area surrounding car storage areas. Certain species will be more sensitive to disturbance than others.	**Negative effect** on conservation status: **unlikely** Therefore **significant negative impact** District to County level: **unlikely**	~~Baffling of lighting in sensitive areas to minimise light spill.~~ **Lighting designed to minimise night glare and spill. Main security surveillance around perimeter of site to be by infra-red CCTV to minimise security lighting. Non-essential lighting (i.e. in centre of car parking / general storage areas to be dimmed in accordance with the lighting strategy (Appendix 4.6) between 22:00 and 06:00. Main access road / rail storage area to be screened from conservation area by native hedgerow / scrub planting.** Access to restoration area to be restricted / regulated minimising disturbance. **Provision of bird screens at strategic locations.**	After mitigation **unlikely negative effect** on conservation status; therefore not **significant**.

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
Pollution through inappropriate site drainage	**Negative impact, potentially affecting entire lake. Magnitude, duration, timing and frequency unpredictable but potentially reversible over time.**	**Negative effect on conservation status: unlikely** **Therefore significant negative impact at District to County level: unlikely**	**Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake**	**With mitigation near-certain not to have negative effect on conservation status, therefore not significant**
Wintering Birds (County Value)				
Disturbance **(lighting / noise / vehicular / human)** to wintering birds	Potential disturbance from **lighting / noise /** vehicle movements **and human activity**. Wintering bird interest will be much reduced, however, during the operational phase.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	~~Hedgerow along access road to screen from restoration area.~~ **Lighting designed to minimise night glare. Main security surveillance around perimeter of site to be by infra-red CCTV to minimise security lighting. Non-essential lighting (i.e. in centre of car parking / general storage areas to be dimmed. in accordance with the lighting strategy (Appendix 4.6) Main access road / rail storage area to be screened from conservation area by native hedgerow / scrub planting.** Access to restoration area to be restricted / regulated minimising disturbance. **Provision of bird screens at strategic locations.**	With mitigation **unlikely** to have negative effect on conservation status: **not significant**
Pollution through inappropriate site drainage	**Negative impact, potentially affecting entire lake. Magnitude, duration, timing and frequency unpredictable but potentially reversible over time.**	**Negative effect on conservation status: unlikely to probable** **Therefore significant negative impact at County level: unlikely to probable**	**Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake**	**With mitigation near-certain not to have negative effect on conservation status, therefore not significant**

Proposed activity	Characterisation of unmitigated impact on feature	Significance without mitigation and confidence level	Mitigation and enhancement	Residual significance and confidence level
Reptiles (District/Borough Value)				
			Implementation of management plan **(Appendix 5.3 refers)** to maintain and enhance retained and created habitats	
Amphibians (Local/Parish to District Value)				
Pollution of aquatic habitat through inappropriate site drainage	Negative impact. Extent, magnitude, duration, timing and frequency unpredictable but potentially reversible over time.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at Local / Parish to District level: **probable**	Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake.	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Invertebrates (County Value – specific features)				
Pollution of aquatic habitat (lake and locally deepened swale) through inappropriate site drainage	Negative impact. Extent, magnitude, duration, timing and frequency unpredictable but potentially reversible over time.	**Negative effect** on conservation status: **extremely unlikely** Therefore **significant negative impact** at County level: **extremely unlikely**	Storage and batching plant areas to be drained via petrol interceptors prior to discharge to attenuation basin / R. Cherwell. Swale only to take water draining from vegetated areas. No surface water drainage will feed into retained lake.	With mitigation **near-certain** not to have negative effect on conservation status, therefore **not significant**
Dust / litter along boundary with rail storage yard	Permanent, negative effect affecting 625m of habitat.	**Negative effect** on conservation status: **probable** Therefore **significant negative impact** at County level: **probable**	Management plan **(Appendix 5.3 refers)** to allow for regular litter picking. Signage along boundary to inform of wildlife area. Dust mitigation measures recommended **(Chapter 9 refers)**.	With mitigation **unlikely** to have negative effect on conservation status, therefore **not significant**

Table 5.8: Residual impacts

Replace 5.8 with the follOwing attached table:-

5.1.1 The table below summarises the significance of the residual impacts on each of the valued ecological receptors after mitigation and enhancement.

Valued ecological receptor	Potential Impacts	Residual significance	Significance level
During construction			
Woodland and scrub	Habitat loss / retention / creation / enhancement: Habitat fragmentation:	-ve in medium term; +ve in long term -ve in medium term; +ve in long term	Local/Parish to District
Unimproved / semi-improved grassland	Habitat loss / retention / creation / enhancement:	-ve in medium term; +ve in long term	County
Spring habitat~~Locally deepened swale~~	Habitat loss / creation: Off-site implications:	-ve **in medium term, -ve to neutral in long term** ~~To be assessed~~ **Not Significant**	District
Swamp / marginal	Habitat retention / creation : Water level rise:	+ve Not significant	District
Open water	Habitat loss / retention:	-ve	County
Ephemeral / short perennial	Habitat loss / retention / creation:	~~-ve~~**Neutral**	County
Hedgerows	Habitat loss / retention / creation:	-ve in medium term, +ve in long term	Local/Parish to District
Flora	Habitat loss / retention / creation / enhancement:	Not significant	County
Bats	Roost loss / retention / creation: Habitat loss / retention / creation / enhancement: Habitat fragmentation: Disturbance during construction	Not significant -ve in medium term, -ve to neutral in long term -ve in medium term, positive in long term Not significant	District to County
Breeding birds	Habitat loss / retention / creation / enhancement: Disturbance:	-ve to neutral in long term -ve in medium term	District to County
Wintering birds	Habitat loss / retention / creation / enhancement: Disturbance:	-ve -ve **in medium term**	County
Reptiles	Habitat loss / retention / creation / enhancement: Habitat fragmentation:	Neutral to +ve -ve in medium term, +ve in long term	District/Borough
Amphibians	Habitat loss / retention / creation:	-ve to neutral	Local/Parish to District

Valued ecological receptor	Potential Impacts	Residual significance	Significance level
Invertebrates	Habitat loss / retention / creation / enhancement:	-ve in medium term, +ve in long term (grassland / scrub) -ve in medium term, -ve to neutral in long term (spring)	County (certain habitats)
During operation			
Woodland and scrub	No perceived impacts[1]	Not significant	Local/Parish to District
Unimproved / semi-improved grassland	Dust / litter along boundary with rail storage yard	Not significant	County
Springs (swale)	Pollution through inappropriate site drainage	Not significant	District
Swamp / marginal	Pollution through inappropriate site drainage	Not significant	District
Open water	Pollution through inappropriate site drainage	Not significant	County
Ephemeral / short perennial	No perceived impacts[1]	Not significant	County
Hedgerows	No perceived impacts[1]	Not significant	Local/Parish to District
Flora	Dust / litter along boundary with rail storage yard	Not significant	County
Bats	Disturbance	Not significant	District to County
Breeding birds	Disturbance	Not significant	District to County
Wintering birds	Disturbance	Not significant	County
Reptiles	No perceived impacts[1]	Not significant	District/Borough
Amphibians	Pollution through inappropriate site drainage	Not significant	Local/Parish to District
Invertebrates	Pollution through inappropriate site drainage Dust / litter along boundary with rail storage yard	Not significant Not significant	County (certain habitats)

[1] Subject to implementation of appropriate management strategy.

Replace Para 5.4.4 with:-

5.4.4 ~~A residual negative impact at the District level will remain for springs, the entire resource being lost to the development with only partial compensation in the form of a swale.~~ A significant adverse impact at County level will remain for open water habitat, but this habitat has been transient and temporary in that it is natural flooding with varying degrees of human influence through pumping. The existing expanse of water within the quarry was presenting an increased risk of bird strike to users of nearby Oxford Airport, and its reduction will help to alleviate this safety issue. Additional areas of habitat to be created, including species-rich grassland, woodland/scrub and **hedgerows** ~~reedbed~~, beyond those required for mitigation purposes, will go some way towards compensating for the loss of open water habitat within the quarry. ~~Ephemeral habitat will also experience a net loss in extent, but this is a transient habitat by nature and would not persist within the quarry without continued disturbance. The implementation of a management plan for the retained and restored areas may enable the ephemeral interest within the quarry to persist within the longer term~~.

Replace Para 5.4.5 with:-

5.4.5 The flora within the quarry will experience a net loss of two County important species. These two species, however, have arrived at the quarry with imported fill material and are therefore not native to the site. The cornflower in particular may not be native in origin, this species being widely used in seed mixes. The loss of these two species is not considered to have a significant effect on their conservation status. The site will experience a loss in species diversity within the breeding bird assemblage due to the net loss of open water ~~and plateau habitats~~. Despite this, other species will probably be encouraged such as red listed and UK BAP common linnet ~~and reed bunting~~. Red listed and UK BAP skylark may be attracted to breed within the open grassland areas. The wintering bird fauna will also experience a significant negative residual effect at the County level for which it is not possible to mitigate against within the quarry or its vicinity due to the risk of bird strike to users of the Oxford Airport. As for open water above, additional areas of habitat created including species-rich grassland, woodland/scrub and **hedgerows** ~~reedbed~~, beyond those required for mitigation purposes, will go some way towards compensating for the loss of open water habitat within the quarry. It is anticipated that it will be possible to retain the County to Nationally important jack snipe roost. Breeding and wintering birds are also likely to experience disturbance during the construction phase. Residual negative to neutral effects will be experienced by invertebrates through the loss of spring habitat supporting the Notable soldier fly *Oxycera pygmaea* and water beetles *Hydroglyphus pusillus* and *Laccobius sinuatus* ~~with only partial compensation through the creation of a swale~~.

Replace Para 5.4.10 with:-

5.4.10 In advance of works affecting reptile habitat, the reptiles will be moved to an area of habitat specially created for the purpose **in accordance with current best practice guidelines (English Nature, 1994, JNCC, 1998 and HGBI, 1998)**. Fish within areas to be drained will be captured and relocated under consent from the Environment Agency, under Section 30 of the Salmon and Freshwater Fisheries Act, 1975 (as amended).

Replace Para 5.4.13 with:-

5.4.13 In terms of policy requirements (Section 5.2 refers) the mitigation strategy has been devised to minimise (through the retention of key habitats such as the woodland and scrub habitat to the north and west and associated species-rich grassland, ephemeral vegetation and the central vegetated pond) and/or compensate for adverse effects (such as through the creation of new areas of species-rich grassland, ephemeral vegetation, wetland habitat, scrub/woodland/hedgerow habitat and reptile habitat) as advised within PPS9. Proposals also seek to maintain/enhance/add to biodiversity interests (PPS9, RPG9, Policy E2, draft SE Plan, Policy NRM4 and the Cherwell LP, Policy EN22) through the production and implementation of a management plan **(Appendix 5.3 refers)** and creation of habitats above those required for mitigation purposes, such as species-rich grassland **and** woodland/scrub/hedgerow habitat ~~and swamp/marginal vegetation~~. Creation of new habitats is also advised under the Cherwell Local Plan Policy C4.

Replace Para 5.4.15 with:-

5.4.15 The mitigation strategy has been designed to minimise damage to the County Wildlife Sites (Draft SE Plan, Policy NRM4, Oxford Structure Plan, Policy EN2 and the Cherwell Local Plan, Policy C1 refer) through the retention of key features and restoration of ~~in excess of one third of~~ **approximately half of** the quarry for wildlife. The only significant loss of interest of the CWS is in the loss of open water and spring habitat and the breeding and wintering bird habitat it supported.

Mechanisms for Ensuring Delivery

Replace Para 5.4.18 with:-

5.4.18 It is recommended that an Environmental Action Plan (EAP) is prepared encompassing the ecological proposals and mitigation requirements. It is recommended that implementation of the EAP is made a condition of any planning consent. Three other documents are also proposed and should be included within the EAP. These are:

1) A detailed mitigation and monitoring strategy;
2) A Working Method Statement for site contractors; highlighting the ecological importance of the site and detailing measures required to minimise impact upon wildlife and habitats during construction; and
3) A management plan to address the long-term management of the site for the benefit of wildlife **(the proposed contents of which are included at Appendix 5.3).**

5.5 Summary

Mitigation

Replace Para 5.5.9 with:-

5.5.9 During the operational phase, drainage of all storage and batching plant areas will be treated prior to discharge. The swale will only receive clean water from vegetated areas and there will be no drainage into the retained lake. Litter picking and dust mitigation measures should minimise any impact on the retained habitat adjacent to the rail storage depot. Baffled lighting in sensitive areas should minimise light spill. Public access to the restoration area will be ~~restricted~~ **regulated** minimising disturbance and the area will be screened from the access road by a new hedgerow. An ecological management plan will be devised to maintain and enhance the habitats.

Conclusions

Replace Para 5.5.10 with:

5.5.10 The proposals will result in the loss of springs and some of the open water habitat currently present at the quarry. There will be a decrease in species diversity within the breeding bird assemblage due to the net loss of open water ~~and plateau habitats~~, but despite this, other species will be encouraged by the new habitats created as part of the restoration area once construction disturbance has ceased. The wintering bird fauna will experience a loss of open water habitat for which it is not possible to mitigate within the quarry or its vicinity due to the risk of bird strike to users of the Oxford Airport. Invertebrates will also experience a loss of spring habitat but compensation is provided through the creation of **compensatory habitat** ~~a swale~~.

Appendix 5.1 (Revised)

Ecological Survey Report

SHIPTON QUARRY,
SHIPTON-ON-CHERWELL,
OXFORDSHIRE

ECOLOGICAL SURVEY REPORT

Prepared for Kilbride

August 2006

***Landmark Ref**: 06/SA/1876*

Client** **Kilbride

This document was produced under Landmark Environmental Consultants contract for.

WRITTEN		CHECKED		AUTHORISED	
INITIALS	DATE	INITIALS	DATE	INITIALS	DATE
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CONTENTS

1.0 INTRODUCTION

An ecological survey and assessment report was produced by Landmark Environmental Consultants Ltd in July 2003 for Bride Parks Ltd describing the results of an Extended Phase I habitat survey of Shipton Quarry, and breeding and wintering bird surveys and Phase 1 habitat survey of the Option Land[1] conducted in 2002/03 (Landmark, 2003). The 2003 report identified the potential importance of the quarry site to a range of ecological features. Further detailed ecological surveys were recommended in order to gain a full understanding of the ecological components of the site and surrounding land. This information was required in order to conduct an impact assessment and formulate mitigation strategies appropriate for the valued habitats and species present in response to a proposal to develop part the site.

During 2004 and 2005, the quarry site (including a 500m buffer from the quarry site boundary) and the Option Land were subject to further ecological surveys, as follows:

Shipton Quarry

Updated Phase I habitat survey
Flora
Bats
Badgers (*Meles meles*)
Otters (*Lutra lutra*)
Water voles (*Arvicola terrestris*)
Reptiles
White clawed crayfish (*Austropotamobius pallipes*)
Great crested newts (*Triturus cristatus*)
Invertebrates

Option Land

Extended Phase I habitat survey

500m distance from the quarry site (other than Option Land)

Phase I habitat survey

In addition to this, information was also gathered through data searches.

This report details the methods and results for the ecological surveys conducted as described above. An ecological assessment has then been made for those species and habitats identified as occurring within the quarry site and a preliminary ecological assessment has been made of the habitats and species supported, or potentially supported, within the Option Land and within 500m of the quarry site boundary.

Shipton Quarry is situated approximately 15km to the north of the city of Oxford, and 12km to the east of Woodstock (**Figure 1** refers). The small village of Shipton-on-Cherwell is situated immediately to the south of the site. The River Cherwell bounds the north of the quarry site, beyond which is predominantly agricultural farmland. The Oxford to Birmingham railway bounds the east and the A4095 the north-west. The quarry access road forms the southern boundary. The site currently comprises a worked out quarry and cement works, approximately 67.18ha in size. Cement was produced at the site from 1929 until the 1980s.

Shipton Quarry was an active limestone quarry up until the mid 1980s. Activity in the quarry recommenced following granting of planning permission for infilling to stabilise the cliffs. Pumping to manage water levels in the quarry was gradually reduced from 1998 with the consequence that the extent of water within the quarry increased dramatically.

[1] The "Option Land" comprises adjacent farmed fields on which the client had an agreement to purchase should they be required by the emerging development proposal

Pumping recommenced in 2002/03. Hence, over the operational life of the quarry, the environment at Shipton Quarry has been a highly dynamic one.

The land surrounding the quarry is predominantly agricultural farmland bounded by hedgerows. There are also areas of pasture and other grassland types including marshy grassland and small woodlands. Linear features which provide connection with the wider countryside include road networks, the River Cherwell, the Oxford Canal and the railway line.

The majority of the Quarry (approximately 62.6ha) is also designated as a County Wildlife Site (CWS) in recognition of the habitats present and the flora and fauna recorded within the area.

The Option Land, totalling c.120ha, is included within the potential development package as a mitigation resource for development within the quarry (**Figure 2** refers).

All of the ecological surveys were conducted by suitably qualified and experienced ecologists, holding appropriate licences where necessary and Members of the Institute of Ecology & Environmental Management.

2.0 METHODS

2.1 Data search

The 2002/03 data search was updated to include the most recent records of wildlife species occurring within the quarry site, the Option Land and within 2km (4km with respect to bats) of the quarry boundary. The following organisations were contacted:

- Thames Valley Environmental Records Centre (TVERC)
- Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT)
- Oxfordshire Bat Group
- Oxfordshire Badger Group
- Oxfordshire Ornithological Society
- Environment Agency

English Nature's Natural Areas and the Oxfordshire Wildlife and Landscape Study (OWLS) were also consulted for contextual information.

2.2 Field survey methods

2.2.1 Phase 1 Habitat Survey

An Extended Phase 1 habitat survey (IEA, 1995) of Shipton Quarry and the Option Land, and a Phase I habitat survey of the land within 500m of the quarry (additional to the Option Land) was conducted during June and July 2005.

The Phase 1 habitat survey method was developed by the Nature Conservancy Council (now Joint Nature Conservation Committee) to provide, relatively rapidly, a record of the semi-natural vegetation and wildlife habitat over large areas of the countryside. It is a classification based principally on vegetation augmented by reference to topographical and substrate features. Habitats are mapped using standard colour codes with further information provided by means of dominant species codes and descriptive target notes. Extended Phase 1, as described in the Institute of Environmental Assessment's (now the Institute of Environmental Management and Assessment) *Guidelines for Baseline Ecological Assessment*, encompasses the collation of further information on habitat features of particular value to different ecological groups such as plants, fungi, lichens, mosses and faunal groups. The Extended Phase 1 Habitat Survey should form the first stage of the ecological assessment of a site and is used to identify whether further, more detailed species surveys are required.

Plant species nomenclature follows Stace (1997).

2.2.2 Botanical survey

The entire quarry was surveyed over four visits during June and July 2005. The survey comprised a Phase 1 habitat survey with detailed species lists being compiled for each of the habitats encountered. Within each habitat, each species recorded was assigned a DAFOR frequency rating (D – dominant, A – abundant, F – frequent, O – occasional, R – rare).

2.2.3 Bat survey

Building bat surveys

The buildings on site were surveyed by Clarke Webb Ecology Limited on behalf of Landmark Environmental Consultants Ltd in July 2004. Thirteen buildings were surveyed in total, which ranged from single storey concrete buildings to very high, large structures and cylindrical towers. The majority of buildings are flat roofed and do not contain roof voids. Several subterranean areas were also noted beneath buildings.

All of the buildings were surveyed during daylight for evidence of use by bats including:

- the presence of free-hanging bats or bats within crevices within the building structures;
- bat droppings, urine stains or feeding remains on horizontal and vertical surfaces (e.g. floors, window panes, foliage) within and around buildings;
- the presence of potential access routes for bats into likely roosting sites and indications (such as scattered droppings or urine staining around entrances) of use of such potential access points by bats;
- any other evidence of use by bats.

A repeat survey of the buildings and any underground structures was undertaken on 31 July 2006.

Evening emergence watches

A watch was maintained for bats emerging from them over dusk on the 19 July, 19 and 26 September 2004. On the first survey, two surveyors patrolled separately around the building from 21:00 to 22:40 hours (sunset occurred at around 21:10). On the other two surveys, a single surveyor patrolled the buildings for 90 minutes commencing 15 minutes before sunset. The surveyors were equipped with heterodyne and/or broad-band bat detectors to aid in bat detection and species identification. The first two surveys concentrated the survey on Buildings 9-13, the third on buildings 1-8.

A repeat emergence survey was undertaken on 31 July 2006 in conjunction with the repeat building survey. Bat detectors used were a static Anabat recording onto a compact flash card and a Duet (Frequency Division) and Peterson (Time Expansion) detectors linked to a minidisk recorder.

Sunrise watches

A watch was maintained for bats flying around and/or entering them on the 20 July, 20 and 27 September 2004. On the first survey two surveyors patrolled separately around the buildings between 03:45 and 05:30 (sunrise occurred around 05:15). On the other two surveys a single surveyor patrolled the buildings for 105 minutes commencing 90 minutes before sunrise. The surveyors were armed with heterodyne and/or broad-band bat detectors to aid in bat detection and species identification. The first two surveys concentrated on Buildings 1-8, and the third on buildings 9-13.

A repeat dawn swarming survey was also undertaken on 1 August 2006 in conjunction with the repeat building survey. Bat detectors used were a static Anabat recording onto a

compact flash card and a Duet (Frequency Division) and Peterson (Time Expansion) detectors linked to a minidisk recorder.

Tree bat survey

The Phase I Habitat Survey conducted by Landmark Environmental Consultants during 2002 and 2003 identified the presence of trees within the site that could potentially support roosting bats. The trees within the quarry site were, therefore, subject to a detailed survey to identify trees containing bat roosts or those with the potential to be used by bats as roost sites.

Trees featuring signs of maturity or damage were targeted during the survey. These trees were assessed using binoculars for the following features:

- Obvious holes, cavities and splits, dense ivy etc.
- Dark staining on the tree below a hole
- Staining around the hole caused by natural oils in bats' fur
- Tiny scratch marks around the hole caused by the bats' claws
- Droppings and/or urine stains below a hole
- Audible noise (squeaking or chattering) coming from a tree
- Bat droppings within a hole or the smell of bats

Surveyed trees were tagged and numbered for future identification using durable plastic plant stem tags attached to a branch or stem. The tree survey was undertaken on 20 May 2005 by two experienced bat ecologists both of whom hold English Nature bat licenses.

Foraging and commuting bat surveys

Foraging and commuting bat surveys aim to detect the species of bat using the site and for what purpose. These surveys also highlight important features used by bats for foraging and/or commuting purposes. Three surveys were undertaken using two teams of two ecologists. The surveys began at dusk and continued for up to 2 hours following dusk.

The following equipment was used:

- *Bat Box Duet* (heterodyne and frequency division) bat detectors with minidisk recorders
- *Tranquility* time expansion bat detector with digital Dictaphone.

Recordings taken during each survey were later analysed using *Batscan* and *Bat Sound* software in combination with field notes to identify species and activity (social calls, feeding buzzes, etc).

During each survey different parts of the site were targeted, where health and safety permitted, with the aim of gaining a reasonable coverage of the site.

Following each survey the bat activity recorded was plotted onto a plan of the quarry in order to highlight the areas and habitats of most frequent or persistent bat activity.

The foraging and commuting bat surveys were conducted on 5 July, 19 July and 2 August 2005 during suitable weather conditions (warm, still evenings >10^{o}C but in mid summer >15^{o}C, that provide optimal conditions for emergence and foraging, insect activity being significantly reduced at low temperatures).

2.2.4 Badger survey

The Quarry was systematically searched for evidence of badger (*Meles meles*) activity. The banks, tree lines and hedges within and bordering the site, all areas of accessible scrub and woodland and any open areas within the site, were examined for evidence of badger activity. An additional 30m surrounding the site was also carefully examined

(where possible) for evidence of badger activity. Any evidence of activity was noted, including the presence of tracks, paw prints, hair on fencing and thorny vegetation, scratch posts, dung pits, latrines and snuffle holes. The badger survey was conducted on 6 May 2005.

The locations of any badger sett holes were recorded together with information on their status, number of holes present and level of activity observed. The status of the sett entrances recorded was assessed according to Neal and Cheeseman (refer to **Appendix I**).

2.2.5 Otter survey

The lake edges within the quarry site and the edge of the site bounding the River Cherwell was searched for evidence of otter (*Lutra lutra*). Evidence including spraints, holts, couches, paths and slides, feeding remains and paw prints were searched for. The survey was conducted on 6 May 2004 and 20 May 2005.

2.2.6 Water vole survey

A survey of the lake margins within the quarry and the banks of the River Cherwell was made for evidence of occupation by water voles (*Arvicola terrestris*). In particular features including holes in the banks, droppings, tracks and feeding remains were searched for (Strachan, 1998). The water vole survey was conducted on 6 May 2004 and 20 July 2005.

2.2.7 *Bird surveys*

Bird species nomenclature follows Dudley *et. al*. (2006)

Breeding birds

A breeding bird survey was conducted between April and July 2002 on the following dates: 3 April, 8 March, 6 June and 2 July. The survey method broadly followed the British Trust for Ornithology's Common Bird Census method (Marchant, 1983). Singing males were plotted on maps and any other observations of activities associated with breeding such as mating, birds carrying food or nest material and the presence of young birds was also noted. The results of all the surveys were then combined in order to try and identify bird territories. Bird territories were defined by multiple registrations of the same species of bird at given locations within the site.

Wintering birds

A winter bird survey was also conducted between September 2002 and March 2003. Total counts of each species wintering on the water bodies within the site were made at monthly intervals.

2.2.8 Reptile survey

Approximately 235 reptile refugia, comprising roofing felt and corrugated tin, were placed 10m to 20m apart within suitable habitat around the quarry site (**Figure 11** refers). The refuges were left for a period of two weeks to become established and to allow reptiles time to find them. Seven visits to check the refugia were then conducted when conditions were considered to be suitable for locating reptiles (*i.e*. intermittent or hazy sunshine with little or no wind and temperatures between 9 and 18^{o}C) as recommended by the Herpetofauna Worker's Manual (2003) and Froglife (1999). Surveys were undertaken on the following dates: 23 April, 6 May, 21 May, 3 September, 15 September, 24 September and 1 October 2004.

2.2.9 White clawed crayfish survey

This survey was undertaken to establish if native white-clawed crayfish (*Austropotamobius pallipes*) was present either in the various quarry waterbodies or in the adjacent River Cherwell.

Trapping was employed to search for crayfish as the quarry lakes and River Cherwell are too deep to employ netting or manual searching methods. Commercial crayfish traps were used ('Trappy' brand, Smålandsmjärden AB, Sweden). Traps were baited with fresh mackerel, placed in the water at dusk and retrieved the next morning.

Trapping of two large areas of water within the quarry took place on the nights of 5/6 July and 6/7 July 2004. Twenty-eight traps were used on the first occasion, and 35 traps on the second. Traps were placed at approximately 10m intervals around the margins of the lakes, although it proved impossible to access some sections of the lake margins. Trapping of the River Cherwell was carried out over on the 15/16 July. Twenty traps were placed at approximately 10m intervals between SP48031771 (upstream) and SP47851778 (downstream).

In order to comply with current legislation, the survey was carried out by a holder of an English Nature Crayfish survey licence. Permits from the Environment Agency (Form FR2) were also obtained to cover the survey in both the quarry and the River Cherwell. Grid references were obtained using a hand held GPS system (Garmin GPS12).

2.2.10 Great crested newt survey

At the time of survey, Shipton Quarry had four large areas of water together with some temporary pools and flushes. A presence/absence survey for great crested newts (*Triturus cristatus*) was undertaken of the four large water bodies, temporary pools and flushes were also examined for the presence of great crested newts during this survey.

The presence/absence survey method for great created newts recommended by English Nature (EN 2001) suggests that three survey methods (torch survey, bottle-trapping and egg search) be used at each visit. Because of the nature of the site and the underlying rock substrate, it proved impossible to place a significant number of bottle traps around most of the margins of the various lakes, so bottle trapping was not employed during the survey.

Due to the length of lake margin to be searched, the site was divided in half for the purposes of the survey. The eastern half included Lake 1 (the largest area of open water) and its surroundings, the western section included Lakes 2, 3 and 4 (**Figure 12** refers) Torchlight surveys and egg searches were carried out on the eastern section of the site on 29 April, 4 May, 11 May and 18 May 2004. The western lakes were surveyed on 31 April, 2 May, 7 May and 20 May.

2.2.11 Invertebrate survey

Invertebrate samples were collected on 17 May, 16 June, 27 June, 4 August and 13 September 2005. Terrestrial invertebrate samples were taken with both a butterfly net and sweep net. Beating was used to sample invertebrates visiting hedgerow flowers and foliage, and direct searching was used to look for invertebrates under debris or associated with dead wood. Where possible, species identifiable in the field were recorded and released. Other specimens were killed with ethyl-acetate for subsequent identification, with specimens being identified to species. A collection of voucher specimens has been retained for the majority of the scarce and local species identified, the exceptions being Lepidoptera and Odonata where field identification was used in all cases.

Some ad-hoc aquatic invertebrate sampling of some of the smaller pools and seepages was carried out at during 2004 and 2005 during the amphibian and terrestrial invertebrate

surveys. Invertebrates were collected using a D-framed pond net with 1 mm mesh and stored in 70% alcohol for examination off site.

A full aquatic invertebrate survey was undertaken in 2006 with samples collected on 20 May 2006. Grid references for each sample station were obtained using a handheld GPS system (Garmin GPS12). Samples were collected using a D-frame dip net with a 1mm mesh. The sample sites were netted and the resulting bag of debris tipped into two shallow water filled trays. Half an hour was spent at each site collecting aquatic invertebrates, with 10 minutes spent searching the water body and 20 minutes sorting the catch. Invertebrates were recorded as they crawled out of the debris and swam around in the trays. Species that could be identified in the field were noted and released, those requiring more detailed examination were killed and stored in 80% alcohol for subsequent laboratory identification.

All the retained samples were examined off-site. Where possible, specimens were identified to species, though larval Diptera were only identified to family level. Some aquatic beetles of the genera *Haliplus* cannot reliably be separated to species without dissection of male specimens, specimens from those samples yielding only females are identified as *Haliplus ruficollis* agg.

2.3 Survey limitations

Although all surveys have been timed to be undertaken during the optimum survey periods, the surveys, nonetheless, cannot provide a comprehensive coverage of all species present within the site. Due to seasonal limitations records of any plants or animals that may appear at other times of the year and were therefore not evident at the time of visit, may have been overlooked.

The environment at Shipton Quarry has been constantly changing throughout the duration of the surveys. Whilst every effort has been made to keep the survey data, there may inevitably have been changes at the site since the surveys were undertaken.

Full access was available to Shipton Quarry and the Option Land. Land beyond these areas was surveyed from public rights of way with the aid of binoculars.

Many of the structures surveyed during the building bat survey are high, derelict and unsafe. It was thus not possible to access many of the upper areas. It is possible that these elevated areas contain potential roosting sites for bats. There are also a large number of fairly well-disbursed buildings on the site. While we are confident that the presence of any roosts of significant size would have been detected during evening emergence and/or sunrise watches it is possible that roosts comprising individual or small numbers of bats may have been overlooked.

2.4 Ecological evaluation methods

Habitats and species identified within the study areas were assigned ecological values on a scale between international and within the immediate zone of influence only in accordance with Guidelines for Ecological Impact Assessment in the UK (IEEM, 2006). Please refer to **Appendix II** for methods of ecological evaluation and to **Appendix III** for details of protected habitat and species legislation.

In addition to the UK BAP, the following local BAPs have also been consulted: Oxfordshire Local BAP (2000) and Cherwell BAP (2005-2010).

3.0 RESULTS

3.1 Data search results

Full data search results are given at **Appendix IV** including a plan illustrating the location of statutory and non-statutory designated sites. The findings are summarised below.

Thames Valley Environmental Records Centre (TVERC)

TVERC responded with the following statutory and non-statutory sites occurring within 2km of Shipton Quarry:

Three Sites of Special Scientific Interest (SSSI):

Shipton-on-Cherwell & Whitehill Farm Quarries (Geological)
Kirtlington Quarry (Geological)
Rushy Meadows (Ecological)

Six County Wildlife Sites (CWS):

Bunkers Hill Quarry
Bletchingdon Quarry
Enslow Marsh
Kidlington Meadows
Oxford Airport Meadows/Langford Meadows
Bletchingdon Road Verge (East)

The citations for the above sites are included at **Appendix IV**.

The following is a selection of the legally protected and nationally rare / scarce species recorded within the search area since 1990:

Table1: Shipton Quarry

English Name	Scientific Name	Year of record	Status
Scarce blue-tailed damselfly	*Ischnura pumilo*	1990	Nationally Scarce
A leafhopper	*Macrosteles frontalis*	1990	Nationally Scarce
Loosestrife flea-beetle	*Lythraria salicariae*	2001	Nationally Scarce

Table 2: 2km search area

English Name	Scientific Name	Year of record	Status
A ground beetle	*Bembidion gilvipes*	1998	Nationally Scarce
A ground beetle	*Pterostichus anthracinus*	1998	Nationally Scarce
A ground beetle	*Acupalpus exiguus*	1998	Nationally Scarce
A ground beetle	*Oodes helopiodes*	1998	Nationally Scarce
A ground beetle	*Chlaenius nigricornis*	1998	Nationally Scarce
A ground beetle	*Harpalus ardosiacus*	2000	Nationally Scarce
A ground beetle	*Harpalus azureus*	2000	Nationally Scarce
A ground beetle	*Harpalus schaubergerianus*	2000	Nationally Scarce
A leafhopper	*Macrosteles quadripunctata*	2001	Nationally Scarce
A plant bug	*Halticus saltator*	1998	Nationally Scarce
Badger	*Meles meles*	2000	Protection of Badgers Act 1991
Common kingfisher	*Alcedo atthis*	2002	Schedule 1, W&CA 1981
Common lizard	*Lacerta vivipara*	2002	Schedule 5, W&CA 1981
Flax flea-beetle	*Longitarsus parvulus*	1998	Nationally Scarce

English Name	Scientific Name	Year of record	Status
Fringed water lily	*Nymphoides peltata*	1998	Nationally Scarce
Large-leaved lime	*Tilia platyphyllos*	2002	Nationally Scarce
Slow worm	*Anguis fragilis*	1999	Schedule 5, W&CA 1981
Stinking hellebore	*Helleborus foetidus*	1990	Nationally Scarce
Water vole	*Arvicola terrestris*	2001	Schedule 5, W&CA 1981

Bat records

The table below details the data search results relating to bat species provided by TVERC and OBG:

Table 3: Bat records held for Shipton Quarry and within 4km of the quarry boundary

Bat species		Details
common name	**Scientific name**	
Pipistrelle species	*Pipistrellus* sp.	19+ known roosts within 4km of the quarry site Several records of grounded bats Recorded within Blenheim Park, Oxford Canal, Woodstock, Bladon, Wootton, Kidlington, Shipton-on-Cherwell and Blechington.
Noctule	*Nyctalus noctula*	Recorded within Blenheim Park and Woodstock
Brown long-eared	*Plecotus auritus*	Four known roosts within 4km of the quarry site Recorded within Blenheim Park, Bladon, Wootton, Shipton-on-Cherwell, Bletchington and Heathfield
Serotine	*Eptesicus serotinus*	One roost known within 4km of quarry site Recorded within Woodstock, Kidlington and Wootton
Barbastelle	*Barbastella barbastellus*	Recorded within 4km of the quarry site
Daubenton's	*Myotis daubentoni*	Recorded within 4km of the quarry site

The Environment Agency (EA)

The EA responded with the following information:

- The fish species listed below occur within the River Cherwell and Oxford Canal:

  Roach (*Rutilus rutilus*)
  Bleak (*Alburnus alburnus*)
  Common bream (*Abramis brama*)
  Silver bream (*Blicca bjoerkna*)
  Chub (*Leuciscus cephalus*)
  Pike (*Esox lucius*)
  Mirror carp (*Cyprinus carpio*)

- This section of the Oxford Canal is a designated Cyprinid Fishery under the EC Freshwater Fisheries Directives;
- Records of water vole, otter (*Lutra lutra*) and native crayfish are held for the search area;
- The EA will normally insist on a 10m buffer strip along any watercourse to protect the value of the watercourse as a wildlife corridor.

Oxfordshire Ornithological Society (OOS)

The Oxfordshire Ornithological Society has been monitoring the site since 1972 during which period 131 species of bird have been recorded as breeding, wintering or on migration (Bruckner, 2003 and additional data). Of these, 49 have only been recorded as occasional visitors and five escapees and feral species have also been recorded. The Society has assessed the quarry as being of County importance for the breeding birds associated with its open water and marginal habitats. The site is also described as being of County importance for wintering jack snipe (*Lymnocryptes minimus*). Since the draining of the quarry, however, many of these habitats have been lost.

Species recorded include:

Common pochard *(Aythya ferina)*
Eurasian teal *(Anas crecca)*
Grey partridge *(Perdix perdix)*
Osprey (*Pandion haliaetus*)
Peregrine falcon (*Falco peregrinus*)
Ringed plover (*Charadrius hiaticula*)
Little plover *(Charadrius dubius)*
Northern lapwing (*Vanellus vanellus*)
Common redshank *(Tringa totanus)*
Eurasian oystercatcher *(Haematopus ostralegus)*
Common snipe *(Gallinago gallinago)*
Jack snipe *(Lymnocryptes minimus)*
Common tern *(Sterna hirundo)*
Little grebe *(Tachybaptus ruficollis)*
Water rail *(Rallus aquaticus)*
Stock pigeon (*Columba oenas*)
European turtle dove (*Streptopelia turtur*)
Common raven *(Corvus corax)*
Common kingfisher *(Alcedo atthis)*
Sand martin *(Riparia riparia)*
Common linnet *(Carduelis cannabina)*
Reed bunting *(Emberiza schoeniculus)*
Common bullfinch (*Pyrrhula pyrrhula*)
Cetti's warbler (*Cettia cetti*)

The OOS have also made available monthly count data undertaken since 2004.

English Nature's Natural Areas

English Nature has divided England into 120 'Natural Areas' described as areas of the countryside identified by their unique combination of physical attributes, wildlife, land-use and culture (English Nature, 1998). Natural Areas provide a useful framework for assessing species and habitats beyond the traditional administrative boundaries. In the UK Biodiversity Action Plan they are described as:

"… biogeographical zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation."

Shipton-on-Cherwell quarry lies within the Cotswolds Natural Area. Over 80% of the Natural Area is farmed. Nationally the area comprises the most extensive farmed area of semi-natural habitat, predominantly unimproved limestone grassland. It also supports a significant ancient woodland resource (> 10,000ha) comprising approximately 3.6% of the area. Parkland is also an important feature of the area. Wetland habitats are limited due to the underlying limestone geology. Springs and streams feeding the tributaries of the upper Thames generally have high water quality and support species such as white-clawed crayfish, otter and water vole, they also comprise important fisheries and the associated marginal vegetation supports high invertebrate interest. Bat populations in the

Cotswolds are important in a National context, especially for breeding and hibernating populations of lesser and greater horseshoe bats (*Rhinolophus hipposideros* and *R. ferrum-equinum*).

Oxfordshire Wildlife and Landscape Study (OWLS)

OWLS is a three year landscape and biodiversity appraisal whose main purpose was to investigate the landscape character and biodiversity resource of the county and to use the results of the survey work to help safeguard, maintain and enhance this resource. The study identifies 24 different landscape types supported by a detailed description of the landscape character and associated habitat with strategic guidelines to help safeguard, maintain and enhance the resource.

Shipton-on-Cherwell quarry falls within the Estate Farmlands landscape type which comprises a well-ordered landscape of large arable fields, plantations and parklands supporting a wide range of locally important habitats. Priority habitats such as ancient, semi-natural woodland, species-rich hedgerows and calcareous grassland can also be found. This is a relatively large landscape type, which supports a range of locally important habitats including deciduous woodlands, plantations, semi-improved grassland and species-poor hedges with trees. Parkland, with its associated mature trees, grassland and lakes, is a characteristic feature throughout this landscape type, with Rousham being a good example. There are a few blocks of ancient woodland surrounding the Cotswold Wildlife Park, and there are fragments of limestone grassland at places like Shipton Quarry and a steep embankment near Tackley. The extent and distribution of priority habitats, however, is very fragmented, small and localised. Species-rich hedgerows border some old tracks and green lanes such as the Icknield Way. Bioscores[2] are generally higher in those areas where there is a combination of locally important habitats and surviving priority habitats.

3.2 Field survey results (Shipton Quarry)

*3.2.1 Shipton Quarry Extended Phase I habitat and botanical survey (**Figure 3** and **Appendix V** refer)*

Woodland and scrub

A strip of woodland (target note 1) runs along the northern boundary of the site between the quarry and the River Cherwell. The woodland is unmanaged with fallen dead wood and lies on a steep bank dropping down to the river. The canopy comprises frequent ash (*Fraxinus excelsior*) with occasional sycamore (*Acer pseudoplatanus*) and locally occasional silver birch (*Betula pendula*). Crack willows (*Salix fragilis*) occur along the riverside. The understorey comprises occasional to frequent elder (*Sambucus nigra*), occasional hawthorn (*Crataegus monogyna*) and rare to occasional dog rose (*Rosa canina*) and blackthorn (*Prunus spinosa*). Field maple (*Acer campestre*) and gooseberry (*Ribes uva-crispa*) were locally occasional. The ground flora is locally sparse although there was abundant cover of moss comprising a limited number of species. There were no ground flora species which were particularly frequent throughout the woodland. Locally frequent species included wood false brome (*Brachypodium sylvaticum*), enchanter's nightshade (*Circaea lutetiana*), male fern (*Dryopteris filix-mas*), cleavers (*Galium aparine*), ground-ivy (*Glechoma hederacea*), common ivy (*Hedera helix*), common nettle (*Urtica dioica*) and wood avens (*Geum urbanum*).

A second strip of scrub / woodland occurs along the western boundary of the site (target note 2) comprising field maple, hawthorn, blackthorn, traveller's-joy (*Clematis vitalba*), English elm (*Ulmus procera*), ash, elder, dogwood (*Cornus sanguinea*), hazel (*Corylus avellana*) and spindle (*Euonymus europaeus*). The ground flora is sparse with common ivy, ground-ivy, common nettle, black bryony (*Tamus communis*) and lord's-and-ladies (*Arum maculatum*). A few pockets of species-rich grassland occur within this area.

[2] A scoring system devised for the project based on the number of habitats present, the type of habitat, the size, extent, proximity and condition of each habitat and the relative status of each habitat (SAC/SSSI/CWS).

At target note 3 by the railway is a small scrub / wooded bank with ash, sycamore and hawthorn.

Scrub also occurs along the cliff top to the east of the quarry predominantly comprising blackthorn, hawthorn and bramble (*Rubus fruticosus* agg.) with some dog rose and elder (target note 4). Scattered scrub is also present on the cliff face comprising willow (*Salix* sp.), hawthorn, sycamore and blackthorn (target note 6).

There is a poplar / conifer windbreak to the south of the quarry (target note 7) and a line of poplars and scrub at target note 5 with hawthorn, laurel (*Prunus laurocerasus*), bramble, privet (*Ligustrum* sp.), teasel (*Dipsacus fullonum*), blackthorn, field rose (*Rosa arvensis*) and grey willow (*Salix cinerea*).

Grassland and marsh

The most established and diverse area of grassland (unimproved) occurs along the northern margin of the site between the woodland and the quarry (target note 9). The grass component comprises occasional to locally frequent creeping bent (*Agrostis stolonifera*) and wood false brome and occasional red fescue (*Festuca rubra*). Sixty-eight herbaceous species were recorded from this area including a high proportion of ruderal species such as rosebay willowherb (*Chamerion angustifolium*), creeping thistle (*Cirsium arvense*), teasel, willowherbs (*Epilobium* spp.), nipplewort (*Lapsana communis*) and common ragwort (*Senecio jacobaea*). Ephemeral species are also represented including scarlet pimpernel (*Anagallis arvensis*), thyme-leaved sandwort (*Arenaria serpyllifolia*), blue fleabane (*Erigeron acer*) and scentless mayweed (*Tripleurospermum inodorum*). Frequent species include common knapweed (*Centaurea nigra*), ground-ivy, perforate St. John's-wort (*Hypericum perforatum*) and creeping cinquefoil (*Potentilla reptans*); occasional to frequent rough hawkbit (*Leontodon hispidus*), common bird's-foot trefoil (*Lotus corniculatus*) and self-heal (*Prunella vulgaris*) and occasional yarrow (*Achillea millefolium*), agrimony (*Agrimonia eupatorium*), common mouse-ear (*Cerastium fontanum*), broad-leaved willowherb (*Epilobium montanum*), blue fleabane, hedge bedstraw (*Galium mollugo*), square-stalked St. John's-wort (*Hypericum tetrapterum*), ploughman's spikenard (*Inula conyza*), common ragwort, lesser trefoil (*Trifolium dubium*) and white clover (*Trifolium repens*). Wild liquorice (*Astragalus glycyphyllos*) was locally dominant, wild basil (*Clinopodium vulgare*) locally frequent to abundant and common spotted orchid (*Dactylorhiza fuchsia*), fairy flax (*Linum catharticum*), germander speedwell (*Veronica chamaedrys*), common centaury (*Centaurium erythraea*) and hairy violet (*Viola hirta*) locally frequent. Less frequent species of note include rare to occasional pyramidal orchid (*Anacamptis pyramidalis*), yellow-wort (*Blackstonia perfoliata*) and greater knapweed (*Centaurea scabiosa*), locally occasional common restharrow (*Ononis repens*), bee orchid (*Ophyrs apifera*), wild parsnip (*Pastinaca sativa*), hoary plantain (*Plantago media*) and cowslip (*Primula veris*) and rare common stork's-bill (*Erodium cicutarium*) and common broomrape (*Orobanche minor*).

Below this area at target note 11 is an area which had been recently herbicided. In 2003, this area supported a similar flora to the unimproved grassland at target note 9 and remnant species recorded indicate that it maintained a similar flora at the time of spraying.

There is a small, species-rich grassy clearing at target note 12 comprising perforate St. John's-wort, common nettle, water figwort (*Scrophularia auriculata*), self-heal, scentless mayweed, common centaury, spear thistle (*Cirsium vulgare*), travellers'-joy, enchanters' nightshade, ground-ivy, creeping buttercup (*Ranunculus repens*), common fleabane (*Pulicaria dysenterica*), creeping cinquefoil, gypsywort (*Lycopus europaeus*), scarlet pimpernel, blue fleabane, yarrow, hawthorn, fairy flax, ribwort plantain (*Plantago lanceolata*), white clover, creeping bent, ox-eye daisy (*Leucanthemum vulgare*), great willowherb (*Epilobium hirsutum*), hard rush (*Juncus inflexus*), germander speedwell, common knapweed (*Centaurea nigra*) and water mint (*Mentha aquatica*).

The grassland at target note 13 comprises a similar species composition to target note 9 above, but less diverse and with frequent to abundant common ragwort. The following grasses were recorded: frequent common bent (*Agrostis capillaris*) and occasional to frequent red fescue. A total of 43 herbaceous species were recorded including frequent perforate St. John's-wort, occasional to frequent creeping cinquefoil and creeping buttercup and occasional agrimony, willowherbs (locally frequent), blue fleabane, nipplewort, ribwort plantain, self-heal, bramble and scentless mayweed. Biting stonecrop (*Sedum acre*) was locally frequent to abundant.

The scrub-bordered, grassy track at target note 14 supports frequent perforate St. John's-wort, occasional / locally frequent ground-ivy and occasional teasel, field forget-me-not (*Myosotis arvensis*), common ragwort and common mouse-ear. Hairy violet is locally frequent to abundant and suckering blackthorn and creeping cinquefoil, locally frequent. Other less frequent species include common knapweed, thyme-leaved speedwell, self-heal, yarrow, hawkbit (*Leontodon* sp.), blue fleabane, ladies bedstraw (*Galium verum*), cowslip, ploughman's spikenard and scarlet pimpernel.

The area of semi-improved grassland at target note 15 comprises frequent common bent, occasional to frequent red fescue and occasional cock's-foot (*Dactylis glomerata*) with the following herbaceous species: occasional to frequent field forget-me-not and ladies bedstraw, occasional common bird's-foot trefoil, creeping cinquefoil, creeping thistle, germander speedwell, hemlock (*Conium maculatum*), perforate St. John's-wort, teasel and white clover, locally abundant common nettle and common ragwort and locally frequent ground-ivy. There was no agrimony, blue fleabane or ploughman's spikenard in contrast with the above areas.

The two banks bordering the track at target note 16 support fairly diverse grassland. A total of 44 grassland species plus six scrub species were recorded from the western bank comprising frequent common bent and red fescue with occasional black medick (*Medicago lupulina*), common bird's-foot trefoil, common ragwort, smooth hawk's-beard (*Crepis capillaris*) and garlic mustard (*Alliaria petiolata*, locally frequent). Rare to occasional species include cock's-foot, cut-leaved crane's-bill (*Geranium dissectum*), hogweed (*Heracleum sphondylium*), ladies bedstraw, ox-eye daisy, ploughman's spikenard, wild parsnip and yarrow. Travellers'-joy was locally dominant, teasel locally abundant to dominant and black mustard (*Brassica nigra*), false oat-grass (*Arrhenatherum elatius*) and hairy violet, locally frequent. Other notable species recorded at lower frequency (rare) include agrimony, common knapweed, common sorrel (*Rumex acetosa*), fairy flax and wild carrot (*Daucus carota*). The eastern bank is less diverse supporting 30 grassland species but otherwise similar in composition to the eastern bank. The grasses common bent and red fescue are frequent with occasional to frequent common bird's-foot trefoil, occasional common mouse-ear and teasel and rare to occasional cock's-foot, colt's-foot (*Tussilago farfara*), creeping cinquefoil, false oat-grass, hoary ragwort, white clover, wild carrot and yarrow.

No species were recorded as frequent at target note 17 indicating a patchy sward which is still developing. Field forget-me-not and creeping thistle were occasional, all other species being recorded as local or rare. Teasel, ground-ivy, white clover, creeping buttercup, field horse-tail (*Equisetum arvense*), fairy-flax and tufted hair-grass (*Deschampsia cespitosa*) were locally frequent and common ragwort, hairy sedge (*Carex hirta*) and creeping thistle locally occasional to frequent. Wild parsnip, ploughman's spikenard, self-heal, perforate St. John's-wort, common bird's-foot trefoil, colt's-foot, great willowherb, creeping cinquefoil, false oat-grass, glaucous sedge (*Carex flacca*), rosebay willowherb (*Chamerion angustifolium*), water mint, bristly ox-tongue (*Picris echioides*), curled dock (*Rumex crispus*), cut-leaved crane's-bill and yarrow were locally occasional.

The area at target note 18 represents marshy grassland and is the only area of marshy grassland within the quarry. It comprises frequent hard rush with brookweed (*Samolus valerandi*), common centaury, gypsywort, water mint, common fleabane and a species of sedge (*Carex* sp.).

Tall herb

The vegetation at target note 19 represents a large area of tall herb vegetation on an area for recent infill. This area was subject to herbicide treatment subsequent to the survey. Both ruderal and grassland species typical to the site and occasional garden escapes were recorded. A total of 99 species were recorded including occasional to frequent false oat-grass, creeping thistle, teasel, ox-eye daisy and scentless mayweed, occasional mugwort (*Artemisia vulgaris*), spear thistle, hoary ragwort (*Senecio erucifolius*), cut-leaved crane's-bill, perforate St. John's-wort, ploughman's spikenard, common bird's-foot trefoil, black medick, field forget-me-not, ribwort plantain, meadow-grass (*Poa* sp.), creeping buttercup, common ragwort, white clover and common wall speedwell (*Veronica arvensis*), occasional / locally frequent bristly ox-tongue, broad-leaved dock (*Rumex obtusifolius*) and lesser trefoil and locally frequent rosebay willowherb, great willowherb and colt's-foot.

The area of tall herb at target note 20 was sparser than the above (approximately 60% cover) and was also subsequently herbicided. Ribwort plantain, ox-eye daisy, white clover and bristly ox-tongue were frequent, lesser trefoil occasional to frequent, mugwort and weld (*Reseda luteola*) occasional and silverweed (*Potentilla anserina*), prickly sow-thistle (*Sonchus asper*), creeping cinquefoil and willow, locally frequent. A single plant of cornflower (*Centaurea cyanus*) was also recorded.

The area at target note 21 had already been herbicided at the time of survey, but had probably supported a similar flora as the area at target note 19.

The area at target note 22 supported abundant teasel, frequent bramble, common ragwort and false oat-grass, occasional to frequent cut-leaved crane's-bill and perforate St. John's-wort, locally dominant Lucerne (*Medicago sativa*), locally frequent to abundant common bird's-foot trefoil, creeping cinquefoil and rosebay willowherb and locally frequent colt's-foot, common nettle, creeping buttercup, creeping thistle, rat's-tail fescue (*Vulpia myuros*) and silverweed. Keeled-fruited cornsalad (*Valerianella carinata*) was also recorded.

The area at target note 23 supported occasional to frequent scentless mayweed and willowherbs (*Epilobium* spp.) and occasional creeping buttercup and hoary willowherb (*Epilobium parviflorum*). Other species recorded include locally occasional Canadian fleabane (*Conyza canadensis*), celery-leaved buttercup (*Ranunculus sceleratus*), field penny-cress (*Thlaspi arvensis*) and small balsam (*Impatiens parviflora*).

Target notes 24 and 25 represent mounds of spoil recently imported into the quarry with tall herb vegetation. Notable species recorded include sticky groundsel (*Senecio viscosus*) and fool's parsley (*Aethusa cynapium*). Other areas of tall herb vegetation occur at target notes, 26, 27 and 29.

The area at target note 28 is an area of rocky mounds with frequent bristly ox-tongue, occasional to frequent field forget-me-not and occasional ploughman's spikenard, lesser trefoil, common bird's-foot trefoil, bramble, common mouse-ear, creeping thistle and wall speedwell (*Veronica arvensis*). Ox-eye daisy and rat's-tail fescue were locally frequent. Other species recorded include bulbous buttercup (*Ranunculus bulbosus*), fern grass (*Catapodium rigidum*), common centaury, perforate St. John's-wort, tufted hair-grass, hoary willowherb and figwort sp. (*Scrophularia* sp.).

Inundation vegetation

Large parts of the currently drained quarry floor support vegetation that, although not regularly inundated, is similar in composition to inundation vegetation. These areas were, until relatively recently, under water. Target note 32 represents the most established area comprising frequent toad rush (*Juncus bufonius*) and brookweed, occasional blue water speedwell (*Veronica anagallis-aquatica*) and scentless mayweed and occasional to locally frequent water mint. Other species recorded include redshank (*Persicaria maculosa*), common fleabane, gypsywort and silverweed.

Vegetation at target notes 33-35 is of similar composition although of more recent origin. Typical species include brookweed, hoary willowherb and common centaury.

Swamp / marginal vegetation

Target notes 36, 40 and 41 represent springs with common spikerush (*Eleocharis palustris*), bulrush (*Typha* sp.), hard rush, figwort sp., water plantain (*Alisma plantago-aquatica*), brookweed, great willowherb, jointed rush (*Juncus articulatus*), water mint and hemp agrimony (*Agrimonia eupatorium*).
There is a small cut-off lake at target note 39 with water plantain, flowering rush, small pondweed (*Potamogeton berchtoldii*), branched bur-reed (*Sparganium erectum*), water crowfoot (*Ranunculus* sp.) and gypsywort.

Target notes 42-48 refer to the central lake. Around the margins of the lake are a few areas dominated by lesser bulrush (*Typha angustifolia*, target notes 42 and 43) with associated species including water mint, gypsywort, bittersweet (*Solanum dulcamara*), water horsetail (*Equisetum fluviatile*), greater / lesser pond sedge (*Carex riparia / C. acutiformis*, both recorded from this lake), common spike-rush (local), hemp agrimony and purple-loosestrife (*Lythrum salicaria*, local). A large water lily (ornamental?) is also present in one of these areas. Common club-rush and common reed (*Phragmites australis*) are also locally dominant. Other aquatic / marginal flora includes water-crowfoot, Nuttall's waterweed (*Elodea nuttallii*), hard rush, mare's-tail (*Hippuris vulgaris*) and water forget-me-not. A single bee orchid was recorded on the eastern margin of the lake in 2003. Scattered marginal scrub comprises dog-rose, bramble, grey willow, traveller's-joy, hawthorn and sycamore. The lake overspills at the southern end into the partially drained lake where grey willow scrub, great horsetail (*Equisetum telmateia*), gypsywort, bramble, great willowherb, false fox sedge (*Carex otrubae*), water mint, bittersweet and common fleabane occur. The western margin supports goat willow scrub, osier (*Salix viminalis*), lesser pond sedge and great willowherb and the raised causeway much great horsetail, wood avens, docks (herbicided), teasel, hoary willowherb, creeping thistle, bristly ox-tongue and creeping cinquefoil. Along the western margin (target note 46) is an area dominated by common reed with some purple loosestrife, lesser pond sedge and hemp agrimony. Along the northern margin of the lake (target note 47) is a sedge dominated area with greater and lesser pond sedges, water mint, great willowherb, gypsywort, mare's-tail, common fleabane, hemp agrimony, jointed rush (where sedge less vigorous), bulrush (local). Hard rush, brookweed, common reed, toad rush, sweet-flag (*Acorus calamus*), common spike-rush, fool's water-cress (*Apium nodiflorum*) and common club-rush (*Schoenoplectus lacustris*) were also recorded here in 2003. In the centre of the lake is a small island covered with willow. The northern bank (target note 48) is dominated by willow scrub with ash, traveller's-joy, dog rose and bramble.

There is a small swamp area at the eastern end of the woodland at target note 1 bordered by a species-rich hedgerow supporting lesser/greater pond sedge, Himalayan balsam (Impatiens glandulifera), yellow iris (*Iris pseudacorus*), reed canary-grass (*Phalaris arundinacea*), great willowherb, hedge bindweed (*Calystegia sepium*) and common nettle.

Open water

Following cessation of quarrying, water levels within the quarry ceased to be maintained. Open water within the quarry, therefore became extensive until pumping was recommenced in recent years. Standing open water is currently confined to a few, relatively small expanses of water plus an impounded triangular small lake (target notes 42-48 refer). Aquatic flora species recorded include small pondweed (*Potamogeton berchtoldii*) from the small cut-off lake (target note 35) and the spring at target note 37, a water-crowfoot (target note 35 and the impounded triangular lake) and fennel-leaved pondweed (*Potamogeton pectinatus*), Nuttall's waterweed and mare's-tail from the impounded triangular lake. Common stonewort (*Chara vulgaris*) was also recorded from several localities within the quarry.

Ephemeral / short perennial vegetation

Short perennial / ephemeral vegetation occurs at several locations around the quarry. At target note 49 at the southern end of the quarry this comprises frequent great willowherb and rat's-tail fescue, occasional / locally frequent common bird's-foot trefoil, ox-eye daisy and teasel, occasional bramble, common mouse-ear, field forget-me-not, perforate St. John's-wort, scentless mayweed and self-heal, locally abundant lesser trefoil and locally frequent curled dock, ground-ivy, pearlwort (*Sagina* sp.), ploughman's spikenard and rosebay willowherb. Other species recorded include blue fleabane, common centaury, fern grass, sea mouse-ear (*Cerastium diffusum*), parsley piert (*Aphanes arvensis*) and wild parsnip.

The area at target note 51 comprises frequent to abundant rat's-tail fescue with occasional creping thistle, field forget-me-not and teasel, locally abundant evening primrose (*Oenothera* sp.) and locally frequent sea mouse-ear and willowherb.

The area at target note 53 at the northern end of the quarry comprises frequent to abundant moss, frequent perforate St. John's-wort and common ragwort, occasional to frequent self-heal and occasional common centaury, blue fleabane, ploughman's spikenard, ox-eye daisy, creeping cinquefoil, creeping buttercup and bramble. Common bird's-foot trefoil is locally abundant and common bent, wild basil (*Clinopodium vulgare*), willowherb, ground-ivy, common restharrow, thyme-leaved speedwell and hairy violet, locally frequent. Other species recorded include agrimony, thyme-leaved sandwort, wild liquorice, yellow-wort, common stork's-bill and fairy flax. The areas at target notes 57 and 58 support similar vegetation.

The area at target note 54 in the western corner of the quarry supports sparse vegetation with procumbent pearlwort (*Sagina procumbens*), thyme-leaved sandwort, scarlet pimpernel, parsley piert, Canadian fleabane, red bartsia (*Odontites vernus*) and field madder (*Sherardia arvensis*). The adjacent area at target note 55 supports greater vegetation cover with frequent scentless mayweed and spear-leaved orache (*Atriplex prostrata*), occasional pineappleweed (*Matricaria discoidea*), knotgrass (*Polygonum aviculare*, locally frequent) and hoary willowherb and locally frequent redshank. Other species of note recorded here include field pansy (*Viola arvensis*), sun spurge (Euphorbia helioscopia), fool's parsley and blue pimpernel (*Anagallis arvensis* ssp. *foemina*).

The area on the bank at target note 56 supports frequent scentless mayweed and occasional spear thistle and prickly sow-thistle. Pellitory-of-the-wall (*Parietaria judaica*) was also recorded here.

Hedgerows

There are few hedgerows within the quarry, the main one running parallel to the inside of the access track dominated by hawthorn. There is a defunct hedgerow at target note 59 comprising young ash trees, wych elm (*Ulmus glabra*, rare), bramble and hawthorn opposite which is some planted pine, cypress and poplar. At target note 60 there is a fence plus young sycamore, hawthorn, poplar, ash and goat willow (*Salix caprea*). The small swamp area at the eastern end of the woodland at TN1 is bounded by a species-rich, defunct hedge comprising ash, hawthorn, field maple, blackthorn, elder, crack willow and hop (*Humulus lupulus*). At target note 61 there is a defunct hedgerow comprising sycamore, elder and two poplars.

Bare ground and spoil

Parts of the quarry currently support bare ground either as a result of draining down of the quarry, disturbance or the importation of soils.

3.2.2 Bat survey

Building bat survey results

Adjacent to the now disused Shipton-on-Cherwell Quarry workings is a former cement works. Many of the cement work buildings have been demolished but a number of (mostly) derelict structures still remain. Brief descriptions of these remaining structures are given below and their locations shown on **Figure 5**:

Building 1. Derelict 3 storey concrete structure. Safe access only up to second storey

Building 2. Flat roofed single storey concrete block weighbridge

Building 3. Cylindrical steel tower with sheet metal enclosure and steel plate water tank

Building 4. Derelict concrete 3-4 storey structure (hoppers) plus basement. Remains of steel-framed structure on roof. Safe access only up to second storey

Building 5. Three-tower imperforate concrete silo structure with access at ground level only

Building 6. Tall circular concrete chimney. No safe internal access.

Building 7. Derelict, high, steel-framed shed with sides missing. Partial single-skin metal roof cladding

Building 8. Three bay concrete silo structure with concrete plant housing on roof and concrete tunnel below. Safe access only to concrete tunnels

Building 9. Derelict single-storey concrete block warehouse with pitched asbestos roof with no lining. Single large roof space

Building 10. Occupied 2 bay steel farmed asbestos clad workshop building. Pitched asbestos roof with partial fibre board lining. No roof space.

Building 11. Flat roofed single storey concrete block weighbridge. No internal access. Well sealed.

Building 12. Small derelict fuel pump shelter. Steel clad.

Building 13. Single storey concrete block 'canteen'. Concrete flat roof

Most of the buildings are constructed form cast concrete with few cracks and crevices suitable for use by crevice-dwelling bats. Most of the structures are also open to the elements and do not appear to provide spaces of a suitable size, darkness and/or shelter suitable for occupation by free-hanging bats during the daytime. Buildings 9 and 10 are those most likely to present roosting opportunities for crevice-dwelling bats.

The findings of the building survey are detailed below:

Building 9. A single, fairly old bat dropping of an appearance consistent with those of long-eared bats (*Plecotus* sp) was found on the floor of the roof space.

Building 10. Three bat droppings were found scattered around on equipment within the workshop. Two of these dropping were of an appearance consistent with those of pipistrelle bats (*Pipistrellus* sp.) and the third was of an appearance consistent with those of long-eared bats. None of the droppings were particularly fresh and all were in places occupied during the daytime.

Building 13. A single, fairly old bat dropping of an appearance consistent with those of long-eared bats was found on the floor.

No other evidence was found for use of any of the buildings by bats.

The repeat building survey undertaken in 2006 covered the above buildings and an additional three buildings as described below.

Building 1: A derelict 3 storey concrete structure, partially demolished. High light levels throughout building due to damage to structure. No access to any of building apart from ground floor. Unsuitable as a roost site, apart from small room on the second floor that could be used as a night/feeding perch. No evidence of bats.

Building 2: A derelict single storey flat roofed weighbridge building. Windows and doors replaced with chainlink net creating high light levels. No cracks or voids visible. No evidence of bats.

Building 3: A steel plate water tower supported on a brick wall base. Evidence of bats found in void below tower. Fresh droppings and moth wings (orange underwing).

Building 4: Derelict 3 storey concrete structure. Moderate to high light levels throughout. Concrete beginning to deteriorate creating cracks. No evidence of bats.

Building 5: Three joined concrete towers containing steel lined silos. Access to base of towers only. Access doors into the silo bases have not all been blocked providing a damp void with low light levels. Evidence of bats found in two of the silo bases. 25-30 droppings were scattered in the blocked doorway of the eastern most silo and 1 bat dropping in the central silo.

Building 6: A tall circular concrete chimney, no access possible but there could be voids in the structure. No evidence of bats.

Building 7: A derelict high steel framed shed with open sides and a partially clad single skin metal roof. No evidence of bats.

Building 8: A three bay concrete silo structure with concrete plant housing on the roof and a concrete tunnel system below. The tunnels are open at either end with moderate light levels. Access to three of the six silos via grilled opening at there bases. The internal void of the silos is vast with the ceilings at about 30 metres. Light levels are very low with light entering through the grilled openings and a small roof hatch. No evidence of bats. Inside the middle silo below the roof hatch were 2 owl pellets (barn owl size) and feeding remains and pellets were found on the ground next to the vertical conveyor belt on the outside. These were associated with a peregrine nest on the roof.

Building 9: A single storey concrete walled asbestos clad, pitched roof, former office building. Internally, the building is divided into various offices and rooms. Fire damage and broken windows have allowed accelerated structural damage through rain water entry. Scattered bat droppings were found in two of the rooms and 7 bat droppings were found on and around the loft hatch. 4 further droppings were found in the roof space.

Building 10: An occupied 2 bay steel framed asbestos clad steel fabrication shop. It has a pitched asbestos roof with partial fibreboard lining. There is no roof void. No evidence of bats.

Building 11: A flat roofed, single storey concrete block weighbridge. The windows are boarded and the roof is covered in a tarpaulin. No evidence of bats.

Building 12: Demolished.

Building 13: A single storey concrete block structure with a concrete flat roof. There are no windows and the door is open allowing moderate internal light levels. No evidence of bats but potential feeding/night perch.

Building 14: A single storey, block walled flat concrete roofed pump house. No door and no voids. Scattered fresh bat droppings in two corners.

Building 15: A single storey, brick walled, flat concrete roofed building. No door but entrance partially blocked with scrub. No evidence of bats.

Building 16: A single storey concrete block structure with a concrete flat roof. There are obvious cavities, the door was ajar and there was a small hole in the wall. 40 plus bat droppings in two corners and along two walls.

Evidence found was largely attributed to long-eared bats although some of evidence in Building 9 attributed to pipistrelle.

Evening emergence surveys

19 July 2004

- Air temperature at sunset was 17.0 ^{o}C, cloud cover was 2/8, wind strength was 0 on the Beaufort Scale and no rain fell during the watch.
- No bats were seen to emerge from any of the buildings watched.
- At 21:30 hours a single pipistrelle bat of unknown species flew passed the eastern end of Building 10.
- From 22:00 hours to the end of the survey at 22:40 hours pipistrelle bats were regularly detected and seen foraging in between Buildings 9 and 10 and around scrub and trees to the north and the south of these buildings. At least 2 individuals were present. While most activity was attributable to common pipistrelles (*Pipistrellus pipistrellus*), soprano pipistrelles (*Pipistrellus pygmaeus*) were detected on at least 2 occassions.
- Individual myotis bats (*Myotis* sp) were detected foraging around trees and scrub to the north of Building 9 on at least 2 occasions between 22:10 and 22:40 hours.
- A noctule bat (*Nyctalus noctula*) was detected commuting across the site at 22:30 hours.

19 September 2004

- Air temperature at sunset was 13.1oC, cloud cover was 5/8, wind strength was 0-1 on the Beaufort Scale and no rain fell during the watch. Sunset occurred at around 19:10 hours.
- No bats were seen to emerge from any of the buildings watched.
- From 19:35 hours pipistrelle bats (*Pipistrellus* sp.) were detected flying and foraging on site between Buildings 1 and 4. At least 3 bats were present. Occasional foraging passes by pipistrelle bats were also detected elsewhere on site. Foraging activity continued until the survey was terminated. Both common pipistrelles (*Pipistrellus pipistrellus*) and soprano pipistrelles (*Pipistrellus pygmaeus*) were identified as being present.

26 September 2004

- Air temperature at sunset was 13.4^{o}C, cloud cover was 1/8, wind strength was 1-2 on the Beaufort Scale and no rain fell during the watch. Sunset occurred at around 18:55 hours.
- No bats were seen to emerge from any of the buildings watched.
- From 19:25 hours (30 minutes after sunset) individual pipistrelle bats were intermittently detected flying and foraging around nearby trees and scrub. Where identifiable to species all bats were common pipistrelles.

31 July 2006

Buildings 5, 14 and 16 were monitored. No bats were seen or recorded emerging from these buildings.

The survey began at 20:55hrs and ended at 22:00hrs due to heavy rain and an increase of wind speed to force 5.

Readings taken at the beginning of the survey on 31/07/06:

Wind speed force 3 to 4.
Temp 17.2 c.
Cloud cover 8/8.
Dew point 14.9 c.
Humidity 86.6%.

The first bat was recorded at 21:05hrs flying between Building 3 and 14 all subsequent recordings took place between Buildings 14, 16 and the water bodies.

Bats recorded: Common pipistrelle
Soprano pipistrelle
Noctule
Serotine
Lesser Horseshoe

Sunrise surveys

20 July 2004

- Air temperature at sunrise was 8.5^{o}C, cloud cover was 3/8, wind strength on the Beaufort Scale was 0 and no rain fell during the watch.
- No bats were seen or detected flying up to or entering any of the buildings watched.
- On 3 occasions between 03:50 and 04:05 individual common pipistrelle bats were detected commuting across the site. On one of these occasions a feeding buzz was heard.
- On two occasions (03:58 and 04:38 hours) individual noctule bats were detected commuting across the site.

20 September 2004

- Air temperature at sunrise was 13.5^{o}C, cloud cover was 8/8, wind strength on the Beaufort Scale was 2 and no rain fell during the watch. Sunrise occurred at around 06:45 hours.
- No bats were seen or detected anywhere on site during the survey.

27 September 2004

- Air temperature at sunrise was 14.9^{o}C, cloud cover was 8/8, wind strength on the Beaufort Scale was 1 and no rain fell during the watch. Sunrise occurred at around 06:55 hours.
- Single pipistrelle bats were seen and detected flying and foraging around and within each of Buildings 1 and 4. These bats were continually active until 06:35 when they disappeared from both locations. Occasional passes by pipistrelle bats were also detected elsewhere on site up to this time but not after it. Where identifiable to species all bats were common pipistrelles.

1 August 2006

Buildings 8, 9 and 10 were monitored. No bats were seen entering the buildings, although a soprano pipistrelle was observed flying close to Building 9 for up to 5 minutes disappearing suddenly at 04.40 hrs (suggesting that it was roosting in the building).

The survey began at 03.50 hrs and ended at 05.00 hrs following a 20 minute period with no bats recorded.

Readings taken at the beginning of the survey on 01/08/06:

Wind speed force 2 to 3
Temp 14.7 °C
Cloud cover 4/8
Dew point 11.1 °C
Humidity 79.9%

The first bat was recorded at 04.10 hrs flying to the rear of building 9 and 10. All subsequent recordings took place to the rear of building 9.

Bats recorded: Common pipistrelle
Soprano pipistrelle
Brown long-eared
Lesser Horseshoe

In summary, the 2004 surveys found that three of the 13 buildings on site (Buildings 9, 10 and 13) had been used occasionally by a small number of long-eared (*Plecotus* sp.) and pipistrelle bats (*Pipistrellus* sp.), possibly as night roosts or during investigative visits. In 2006, five of 16 buildings (Buildings 3, 5, 9 and 14) showed evidence of use by bats, primarily long-eared but also pipistrelles in Building 9. These roosts comprised night roosts or feeding perches, possibly day roosts of solitary males, the roost in Building 9 being a day roost.

No bats were seen to emerge from the buildings surveyed during the evening emergence surveys. The following bats were, however, recorded foraging and commuting within the survey area:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Soprano pipistrelle (*Pipistrellus pygmaeus*)
- *Myotis* species
- Noctule (*Nyctalus noctula*)
- Serotine (*Eptesicus serotinus*)
- Lesser horseshoe (*Rhinolophus hipposideros*)

During the sunrise surveys no bats were detected entering the buildings on site. On 27 September, single pipistrelles were recorded flying around and within buildings 1 and 4 around dawn until they disappeared and it is possible that they could be roosting within these buildings. On 1 August 2006 a soprano pipistrelle was observed flying close to Building 9 for up to 5 minutes disappearing suddenly at 04.40 hrs (suggesting that it was roosting in the building). Brown long-eared, common pipistrelle, soprano pipistrelle, noctule and lesser horseshoe bats were recorded during the 2004 and 2006 emergence surveys.

Tree bat survey results

The majority of trees with features potentially attractive to bats were located around the upper slopes of the quarry (**Figure 6** refers). The trees within the centre of the quarry and to the west of the site were immature for the most part and do not contain features, such as hollows and crevices, normally associated with older trees.

The steep wooded bank along the north-eastern section of the site contained the highest proportion of trees with bat roost potential. These included a number of over-mature willow and ash trees situated along the river bank, some of which were old pollards and featured hollows, cracks and crevices. One ash tree in particular, situated within this wooded slope, contained many old woodpecker holes, which could be highly attractive to bat species such as noctule (tree number 7, **Figure 6** refers).

Several tree lines were surveyed including a row of mature poplars near to the buildings on site and another smaller group of semi-mature ash trees. The mature poplars were covered in ivy for the most part, which may be attractive to some crevice dwelling bats or may conceal features used by bats. The ash trees were also ivy covered and may, therefore, have some limited potential to be used by crevice dwelling bats. The tree line comprising poplar and conifer trees along the southern boundary of the site had no or very limited bat roost potential. An oak tree situated adjacent to this tree line, however, had many features potentially attractive to bats including fissures, snapped branches and holes (tree number 27, **Figure 6** refers).

Appendix VI details the full tree bat survey results.

2005 foraging and commuting bat survey results (**Figures 7a-c** and **Appendix VI** refer)

The following eight (possibly nine) species of bat were recorded during the foraging and commuting surveys conducted in 2005, within and directly adjacent to the site:

Within the site boundary

Common pipistrelle
Soprano pipistrelle
Noctule
Serotine
Long-eared
Daubenton's (*Myotis daubentonii*)
Myotis species (whiskered/Brandt's) (*Myotis mystacinus/brandtii*)

Immediately adjacent to the site boundary (as above but also including the following)

Nathusius' pipistrelle (*Pipistrellus nathusii*) (possible identification)
Natterer's (*Myotis nattereri*)

In addition, lesser horseshoe bat was recorded during the repeat emergence and dawn surveys of the buildings on 31 July and 1 August 2006.

Within the site the favoured habitats used by the bats were situated mainly to the east and south of the site and comprised hedgerows, tree lines and field / quarry edges. The quarry site is exposed and the bats evidently used these sheltered areas for foraging and commuting purposes, i.e. following linear, sheltered features and where invertebrates were present. Other well used habitats included the lakes and other smaller waterbodies within the site where foraging bats were recorded in relatively high numbers. The river and canal directly adjacent to the site supported the highest diversity of bat species where six of the species listed above were recorded including natterer's bats and what was thought to be Nathusius' pipistrelle.

The habitats to the south-west of the quarry appeared to be used by a limited range of commuting bats and the occasional foraging bat.

Several potential or actual roosts were located within the site. These included the large dilapidated buildings (building 4**, Figure 5** refers) where two common pipistrelles appeared to emerge from this building during the evening bat survey conducted on 2 August 2005. Two pipistrelle bats were also noted commuting at dusk from the farm buildings to the south of the site during the 19 July survey. These bats may roost within these buildings or structures nearby.

A small pump room building situated to the west of Building 4 (immediately down a steep slope) was also found to contain bat droppings (attributed to Daubenton's bat) suggesting that one or two bats have used this structure as a day and/or night roost. In addition to this, possible bat feeding evidence (butterfly wings) was noted within underground tunnel type structures (part of Building 7) indicating that bats (long-eared species) use these features as an occasional feeding perch. Bat activity around these buildings was fairly persistent, particularly during the survey conducted on 2 August.

During the surveys it was noted that bat activity was concentrated near to houses adjacent to the site. On several occasions at dusk, bats were noted flying towards the site from the direction of the houses. This was particularly apparent in the north-western and the eastern edge of the site and it is likely that some of these houses are used by bats as roost sites.

The full bat survey results are provided within **Appendix VI**.

3.2.3 Badger survey (**Figure 8** refers)

No badger setts were found to occur within the quarry or within 30m of the quarry boundary. Evidence of badger activity was, however, found in a number of places, predominantly to the south of the site. This activity included a small group of dung pits (target note 1 refers), one of which contained badger faeces, badger hair caught on barbed wire (target note 2) and a strong, well-used animal path (target note 3).

A possible disused sett (target note 4), discovered during initial ecological survey of the quarry site in 2002, was resurveyed for any signs of recent badger activity. The area comprises dense thorny scrub and free access during the survey proved difficult. Although a number of well used animal tracks occur here (target note 5), the area did not feature any evidence of badger sett activity. There is, however, much rabbit (*Oryctolagus cuniculus*) activity, including extensive burrow systems within this and many other parts of the site. Evidence of fox was also noted in and around the site boundary including actual sightings, faeces and a dead fox cub found near to the badger dung pits.

3.2.4 Otter survey

No evidence of otter was found around the lakes within Shipton Quarry. Evidence of otter was, however, found along the banks of the River Cherwell bounding the site. This included spraints situated on tree saddles (old pollard willows along the river bank) and a recently killed grass snake with obvious bite marks around its head and neck left coiled on rocks along the bank. Crevices between the rocks along the river bank may also be used as holt sites although no spraints were found here.

3.2.5 Water vole survey

No evidence of water vole was found within the quarry. Evidence of water vole was, however, seen along sections of the River Cherwell and Oxford Canal adjacent to the site. This included burrows, latrines and feeding stations. The highest concentration of burrows and activity noted was to the north of the site where the river and canal join. The river and canal banks in other areas were frequently densely vegetated and may well have concealed burrows and other evidence of water vole. The canal banks, however, were frequently constructed of solid materials rendering them unlikely to support water voles.

3.2.6 Birds

Breeding bird survey

A breeding birds survey carried out during 2002 (March to July) recorded 32 species around the quarry margin, and a further twenty species associated with the open water habitats of the quarry floor. The survey recorded a good range of resident and migrant

species. **Appendix VII** lists all the birds recorded during the breeding birds survey. Out of a total of 32 species recorded around the quarry margins, data analysis indicates that 15 of these are likely to have bred within the quarry including song thrush (*Turdus philomelos*), common linnet (*Carduelis cannabina*), reed bunting (*Emberiza schoeniclus*) and stock pigeon (*Columba oenas*) **Figure 9** refers). Twenty species were recorded associated with the open water, of which evidence suggests that five bred: greater Canada goose (*Branta canadensis*), common coot (Fulica atra), great crested grebe (*Podiceps cristatus*), tufted duck (*Aythya fuligula*) and little grebe (*Tachybaptus ruficollis*). It is likely that mallard (*Anas platyrhynchos*) also bred.

Data gathered by the OOS since 1972 (Bruckner, 2003 and subsequent data) has recorded a total of 53 species as breeding within the quarry. A number of these have only been recorded as occasional breeders: red-crested pochard (*Netta rufina*), common pochard (*Aythya farina*), great-crested grebe, black-headed gull (*Larus ridibundus*), barn swallow (*Hirundo rustica*), long-tailed tit (*Aegithalos caudatus*) and common raven (*Corvus corax*). In addition, northern lapwing (*Vanellus vanellus*) has not been recorded as nesting since 1998, house martin (*Delichon urbicum*) not since the 1980s when the building was demolished where it had nested and Eurasian tree sparrow (*Passer montanus*) not since the late 1980s. Common tern (*Sterna hirundo*) has only nested on the site since 1999 following cessation of pumping.

Wintering bird survey

A wintering birds survey was conducted for the 2002-03 winter period, from September to March, inclusive. This recorded 25 species wintering at the site, predominantly gulls and waterfowl with a peak count of almost 800 wintering birds. The species recorded in the greatest numbers were lesser black-backed gull (*Larus fuscus*), black-headed gull (*L. ridibundus*), northern lapwing, greater Canada goose, Eurasian teal (*Anas crecca*), common coot and herring gull (*Larus argentatus*). Full tables showing the species recorded on each visit for each of the three lake sections are reproduced at **Appendix VIII.**

Data provided by OOS since the above survey show that the peak counts of nine wintering species have declined (little grebe, great crested grebe, great cormorant (*Phalacrocorax carbo*), mute swan (*Cygnus olor*), greater Canada goose, Eurasian teal, common pochard, common moorhen (*Gallinula chloropus*) and common coot) coincident with draining of the quarry. The peak counts of three species (mallard and possibly common snipe and jack snipe), however, have apparently increased. Peak numbers of tufted duck have remained fairly constant and no real trend is observed with northern lapwing (the quarry is only occasionally visited by flocks) or amongst the gulls.

3.2.7 Reptile survey

Three species of reptile were recorded within the quarry: slow worm (*Anguis fragilis*), grass snake (*Natrix natrix*) and common lizard (*Lacerta vivipara*). Maximum counts of 27 slow worms (nine of which were juveniles), four juvenile grass snakes and four common lizards (two of which were juveniles) were recorded. The majority of slow worms were situated to the north-east, east and south of the site. Grass snakes were located within a central and southern strip of mixed vegetation and rock adjacent to the lakes, while common lizard was located in one area only to the south of the site (**Figure 11** refers). The full survey results appear at **Appendix IX**.

The maximum number of adults recorded for each of the three reptile species within each of the areas surveyed (**Figure 11** refers) appear below:

Table 4: Maximum number of adult reptiles recorded in each of the survey areas

Species	Area A	Area B	Area C	Area D	Area E	Area F	Area G
Slow worm	1	9	11	0	8	0	0
Common lizard	3	2	1	0	2	0	0

No adult grass snakes were recorded although juvenile and sub-adult grass snakes were recorded regularly, one or two on most occasions.

3.2.8 White-clawed crayfish survey

No native white-clawed crayfish were recorded from either of the two lakes in the quarry. A total of 125 non-native signal crayfish (*Pacifastacus leniusculus*) were removed from the traps placed in the River Cherwell.

*3.2.9 Great crested newt survey (**Figure 12** refers)*

The survey was carried out between the 30 April and 20 May 2004, during which time it is expected that great crested newts will be present in their breeding ponds. Visibility across most of the survey sites was excellent and observation could be made several feet down into the water. No great crested newt adults or eggs were recorded during the survey. A population of smooth newts (*Triturus vulgaris*) centred around some peripheral pools at the eastern end of Lake 1 was noted, with over 100 adult newts being recorded from one small (temporary) pool and terrestrial adults being found in the surrounding area. Frog (*Rana temporaria*) tadpoles were also recorded from this small pond. The main lakes themselves appeared to be of little interest to amphibians, with only one adult smooth newt being seen in the water at the eastern end of Lake 1. An adult toad (*Bufo bufo*) was found on land on the north side of Lake 1 and an adult frog was recorded from the south side of Lake 4.

Smooth newts, common toad and common frog were all encountered during the reptile survey with a maximum count of 12 smooth newts (comprising 7 adults and 5 juveniles on 1 October 2004), two common toads (juveniles) and one common frog. Tadpoles of both the common frog and common toad were recorded during the aquatic invertebrate survey.

Fish were recorded from Lakes 1, 2 and 3. Carp were recorded from Lake 2 and Perch from Lakes 1, 2 and 3. The visit to Lake 1 on 18 May 2005 recorded 20 perch, including a number of large individuals.

3.2.10 Invertebrate survey

A total of 211 species of invertebrate were recorded during the 2005 survey. Glow worm was also recorded during the bat surveys (along the northern margin of the site and along the eastern margin of the central lake). **Table 5** gives a summary of the various species of invertebrate recorded during the survey by Order and conservation status. Details of the criteria for the various conservation status categories are included in **Appendix II**. An overall species list and short notes for all of the Notable and Local species are provided at **Appendix X**.

Table 5: Number of invertebrate species recorded from each Order.

Order	Total Species	RDB 2 Species	Notable A Species	Notable B Species	Local Species
Odonata - Dragonflies & Damselflies	15	-	-	2	3
Orthoptera - Crickets & Grasshoppers	3	-	1	-	-
Hemiptera - True Bugs	10	-	-	-	2
Lepidoptera - Butterflies & Moths	28	-	-	1	4
Diptera - Flies	62	-	-	1	13
Hymenoptera - Bees, Wasps & Ants	53	2	1	5	9
Coleoptera - Beetles	35	-	-	2	11
Other orders	5	-	-	-	-
Total	**211**	**2**	**2**	**11**	**39**

Including species recorded in 2005 and 2006, a total of 58 species of aquatic invertebrate have been recorded from Shipton Quarry. The results of the survey are summarised in **Table 6**.

Table 6: Numbers of invertebrate species recorded from each order.

Order	Total Species	Notable B Species	Local Species
Pharyngobdellida – Leeches	1	-	1
Rhynchobdellida – Leeches	1	-	-
Mollusca - Snails	6	-	1
Amphipoda – Freshwater Shrimps	1	-	-
Odonata – Dragonflies & Damselflies	4	1	-
Ephemeroptera - Mayflies	4	1	1
Neuroptera – Alder-flies	1	-	-
Plecoptera - Stoneflies	1	-	-
Trichoptera – Caddisflies	2	-	-
Hemiptera – True Bugs	12	-	1
Diptera - Flies	1	-	-
Coleoptera – Beetles	24	3	11
Total	58	5	15

Although a useful indicator as to whether a particular site is 'good' or 'poor', the results in **Table 6** are based on purely quantitative data. A qualitative approach to the ranking of aquatic sites using water beetle communities has been developed by a number of authors (see Foster & Eyre 1992 for details and further references). Each species of beetle is assigned a points score, ranging from 1 for the commoner species through a geometric progression to 32 for the rarest species. Sites can then be ranked using the following hierarchy of factors:

The number of species listed in the British Red Data Book
A Species Quality Score (SQS), the site's mean points score per species
The number of Nationally Notable A species
The number of Nationally Notable B species
The total number of species (NOS)

The total points score for the site, i.e. SQS x NOS (= 'WET'), is included in the site listings because it has a measure of quality, a WET score of > 100 points generally indicating 'top sites'. It is, however, dependent on seasonal factors and the diligence of the surveyor or surveyors. The overall score for a site can be calculated on a cumulative basis from all records from the site. 'Good' sites that (on a national basis) have attracted more visits or visitors have therefore tended to accumulate greater aggregate scores.

A SQS of 2.0 or more usually indicates a 'good site', as do high species numbers and the presence of one Notable A species or several Notable B species. Samples from Shipton Quarry were taken from a range of sites, some of which were very small and only yielded 1 or 2 species of beetle. Rather than present individual sample site results, an overall SQS score for Shipton Quarry has been calculated on the basis of the survey data, resulting in an SQS score of 2.9. The SQS score is shown in **Table 7**, point scores for each species of water beetle used in the calculations are listed in the appendices.

Table 7: Shipton Quarry: SQS Score for aquatic Coleoptera

Sample Site	Site SQS Score	No Species (NOS)	Total Points (WET)	RDB Species	Notable A Species	Notable B Species
Shipton Quarry	2.9	23	66	-	-	3

3.3 Extended Phase I habitat survey of Option Land and Phase 1 habitat survey of remaining 500m buffer

The option land in the vicinity of the quarry falls into three main areas: to the north-west, south-west and east of the quarry. For ease of description, the target notes have been numbered A1-19 to the north-west, B1-6 to the south-west and C1-29 to the east. Target notes referring to land outside of the option land but within 500m of Shipton Quarry have been numbered D1-42 (**Figure 4** refers).

3.3.1 Habitats

Woodland

Several small wooded areas occur within the option land to the north-west, including the wooded area at target note A7 comprising sycamore, hawthorn, ash, horse chestnut (*Aesculus hippocastanum*) and field maple. Other areas include the wooded strip along a road at target note A8 comprising lime (*Tilia* sp.), elder, blackthorn, pedunculate oak (*Quercus robur*), hawthorn, laurel (*Prunus* sp.), ash and germander speedwell and the dense trees and scrub habitat with species including elder, blackthorn, hawthorn and poplar (*Populus* sp.) (target notes A9 and A10).

The disused railway embankment to the south-west of the quarry comprises a densely vegetated steep bank supports several mature tree species including ash.

Several tree lines / small woodland habitats occur along the River Cherwell to the east of the quarry and contribute to a continuous vegetated corridor adjacent to the towpath. The area at target note C16 comprises mature oak and ash trees, with younger willows. The ground flora is predominantly common nettle with a patch of common reed in a depression. Animal activity including paths and scrapes was noted here. The habitat at target note C17 comprises spindle, hawthorn and ash with a ground flora including garlic mustard, ground-ivy, common nettle, bramble and common ivy. A group of willow trees also occurs at target note C18 and the railway embankment at target note C19 is densely vegetated with hawthorn scrub and ash trees.

There is a large assemblage of mature trees within the option land to the east, some of which are reaching over-mature status. Many crack willow pollards are situated particularly along the river and canal banks. In addition, two large oak trees (*Quercus* sp.) are situated within the arable field to the south of the site (target note C13), a group of crack willows are present at target note C14 and a mature ash pollard is situated along the bank of the River Cherwell tributary (target note C15). Many of these trees feature hollows, splits, flaking bark and holes, which are likely to be attractive to birds and bats.

There are several areas of woodland within 500m of the site outside of the option land including broadleaved woodland (target note D19) and woodland found along the dismantled railway (target note D27). An area of wet woodland lies within 500m to the east of the site comprising Lombardy poplar (*Populus nigra 'Italica'*), crack willow, silver birch (*Betula pendula*), ash and oak (target note D42).

Plantation woodland

Mixed woodland has been planted along the edge of the arable field within the option land to the north-west (target note A11 refers). This woodland strip includes species such as sycamore, laurel, lime, ash, pine (*Pinus* sp.), hawthorn, blackthorn, dog-rose, pedunculate oak, privet, elder, bramble, field maple, dogwood and spindle. The ground flora comprises bittersweet, white campion (*Silene latifolia*), red dead-nettle (*Lamium purpureum*), garlic mustard, white bryony (*Bryonia dioica*), common nettle and wood avens. A fence separates the field from the strip of woodland.

In addition to those species already listed, the plantation at target note A12 also comprises copper beech (*Fagus* sp.), English elm, silver birch, horse chestnut, honeysuckle (*Lonicera periclymenum*), laurel, elder and traveller's-joy. Species found within the field margin include scarlet pimpernel (*Anagallis arvensis*), green field-speedwell (*Veronica agrestis*), field forget-me-not (*Myosotis arvensis*), white campion and a single spike of common broomrape.

The sports ground to the west of the quarry is fenced and bounded by a line of pine trees (target note A13). Arable weeds including scarlet pimpernel, common poppy (*Papaver rhoeas*) and oxeye daisy were noted on the field-side.

There is also an area of mixed plantation woodland (target note D23) and young planted broadleaved trees (target note D40) within 500m of the site.

Scrub

A small area of scrub with hazel is situated at target note A5 to the west of the quarry.

The disused railway embankment to the south of the quarry, bounded by post and wire fencing, comprises a densely vegetated steep bank with species including hawthorn, spindle, ash, blackthorn, elder, common nettle, bramble and common ivy (target note B3). Rabbits are prevalent along this feature.

Occasional scrub patches occur within the option land to the east, notably at target note C11 (comprising willow and hawthorn) and at target note C12 (ash, bramble, hawthorn, dog-rose, alder (*Alnus glutinosa*) and goat willow). Other areas of scrub are associated with copses and defunct hedgerows.

Grassland

The grassy track that bounds part of the southern edge of the field at target note A4 is about 5m wide and is bounded by a defunct hedgerow. Species present include white campion, crane's-bill (*Geranium* sp.), ribwort plantain, rough meadow-grass (*Poa trivialis*), cock's-foot and soft-brome (*Bromus hordeaceus*).

An area of poor semi-improved grassland surrounded by wooded strips occurs within the southern part of the north-western option land (target note A14). The dominating grass species is Yorkshire-fog (*Holcus lanata*). Other species noted include meadow buttercup (*Ranunculus acris*), upright brome (*Bromopsis erecta*), cock's-foot, meadow crane's-bill (*Geranium pratense*), false oat-grass, rough meadow-grass, forget-me-not, common mouse-ear, black medick and crested dog's-tail (*Cynosurus cristatus*). Anthills are frequent indicating little disturbance within the grassland. Cinnabar moth (*Tyria jacobaeae*), clouded yellow butterfly (*Colias croceus*) and speckled wood butterfly (*Pararge aegeria*) were also noted as was a buzzard (*Buteo buteo*) flying between wooded strips.

Two other areas of interest within the north-western option land included a corner of the pine 'hedge' which comprises semi-natural vegetation such as tall ruderal and short perennial species, and an area of short perennial vegetation (target note A15) including species such as red dead-nettle, common fumitory (*Fumaria officinalis*), white dead-nettle (*Lamium album*), garlic mustard, green field speedwell, scarlet pimpernel, shepherd's-purse (*Capsella bursa-pastoris*), spurge (*Euphorbia* sp.), common poppy, white campion and pineappleweed.

A small pasture field of poor semi-improved grassland occurs to the north of the disused railway embankment to the south of the quarry (target note B1). Species present include Yorkshire-fog (*Holcus lanatus*), smooth meadow-grass (*Poa pratensis*), false-oat grass, cock's-foot, white clover, spear thistle, common ragwort, soft-brome and common mouse-ear. The grass has not been grazed recently and has subsequently become rough and rank in places.

The field at target note C1 to the south comprises rough, poor, semi-improved grassland. It is cattle and possibly horse grazed, although none were present at the time of survey. Common nettle and creeping thistle dominate areas within this grassland although local sedge (*Carex* sp.) and rush (*Juncus* sp.) patches also occur. A depression in this field (target note C2) contains a group of crack willow (*Salix fragilis*) and hawthorn with a dense covering of common nettle.

A large proportion of land within 500m of the site beyond the option land consists of improved grassland.

Marsh

An area of marsh occurs within the option land to the east (target note C7). It comprises dense common reed and sedges. A further area of marshy grassland with bulrush, sedge, reed grass and willow patches occurs at target note D7. There are also some small areas of marshy grassland bordering the stream that comes off of the canal to the north of the site (target note D41).

Tall herb

Situated within the option land to the east of the quarry is a small area of tall, ruderal vegetation (target note C3), comprising cleavers (*Galium aparine*), common nettle, common poppy and white campion. Patches of scrub also occur here. A large grass and scrub covered mound also occurs at the edge of this field at target note C4, comprising fescue (*Festuca* sp.), bent (*Agrostis* sp.), bladder campion (*Silene vulgaris)* and white campion.

Standing and running water

The River Cherwell bounds the eastern margin of the eastern area of option land and the Oxford Canal dissects part of the southern section of this area of option land. The banks of this tributary are steep, although cattle have poached some areas while gaining access for drinking. Large old and coppice trees occur along the tributary banks and the far bank is wooded for the most part. A small patch of ragged robin (*Lychnis flos-cuculi*) was noted growing along the bank at target note C5 and many birds were noted along this section of river including a family of kingfishers. The tributary leaves the main river via a weir and common terns (*Sterna hirundo*) were noted fishing in the calm waters adjacent to the weir (target note C6). Bank-side vegetation includes bittersweet, common reed, cut leaved crane's-bill, tall grasses, common nettle and yellow water-lily (*Nuphar lutea*) at the water's edge. At target note C29 there are overhanging crack willows immediately along the bank of the river, with emergent species such as common reed.

A towpath runs alongside the main river to the east of the quarry flanked by hedgerows, woodland copses and marshy grassland along the option land side of the river. Many barn swallows and other birds were noted foraging over the river and reed buntings were seen and heard within adjacent vegetation. Bank-side vegetation includes cow parsley (*Anthriscus sylvestris*), meadowsweet (*Filipendula ulmaria*), dock species (*Rumex* sp.), red clover (*Trifolium pratense*) and creeping buttercup.

Within 500m of the quarry, the River Cherwell meanders southwards running along the northern boundary of the quarry. At target note D21, the bank is vegetated with crack willow, elder, hawthorn, sycamore, ash and gypsywort. Some of the aquatic and emergent flora noted include yellow, water lily, yellow iris, water crowfoot and duckweed (*Lemna* sp.) and the bank is being poached by livestock.

The Oxford canal runs through part of the option land to the south. Its banks are well vegetated for the most part. Species include cock's-foot, false oat-grass, common poppy, hogweed (*Heracleum sphondylium*), cow parsley, cleavers, willowherb, ash scrub, meadowsweet, horsetail (*Equisetum* sp.), yarrow, meadow crane's-bill and ribwort plantain. Hoverflies and damselflies were noted along the towpath and a pair of Eurasian reed warblers (*Acrocephalus scirpaceus*) was seen foraging here.

The Oxford Canal runs from the River Cherwell within 500m to the north east of the site where a local narrow boat owner reported to have seen water rail (*Rallus aquaticus*), great cormorant, mallard, common moorhen, water vole and mink (*Mustela vison*) within the last two years (target note D39). Within 500m of the site there is a stream that leads off of the canal at target note D41.

Both the canal and river and their towpaths are well used for recreational purposes.

Due to the proximity of the site to the River Cherwell and Oxford Canal, detailed botanical surveys of the sections adjoining the quarry were also undertaken. The south-western bank of the R. Cherwell is heavily shaded by the adjoining woodland; vegetation was sparse although occasional hemp agrimony and meadowsweet were recorded. Branched bur-reed was locally occasional and water figwort and wild angelica (*Angelica sylvestris*) rare. The north-eastern bank was surveyed with binoculars from the south-western bank. Great willowherb and floating sweet-grass (*Glyceria fluitans*) were frequent and meadowsweet, common nettle, marsh ragwort (*Senecio aquaticus*), creeping thistle, figwort, hemp agrimony and reed canary-grass were occasional. A St. John's-wort (*Hypericum* sp.) was rare to occasional and marsh woundwort (*Stachys palustris*) locally occasional. The channel is approximately 10m wide with a silty substrate. Yellow water-lily was occasional, lesser duckweed (*Lemna minor*) and water-starwort (*Callitriche* sp.) locally frequent and water-plantain locally occasional. There was a broken off mat of vegetation with Himalayan balsam, blue water-speedwell, forget-me-not and yellow water lily and trapped vegetation in the channel with water-mint and fool's water-cress.

The south-western verge of the canal had been recently strimmed, however the following species were recorded: frequent meadowsweet, occasional marsh bedstraw (*Galium palustre*), water figwort, great willowherb, valerian (*Valeriana* sp.) and wild angelica and locally frequent branched bur-reed, silverweed, creeping cinquefoil and yellow loosestrife (*Lysimachia vulgaris*). The following species were also recorded but at low frequency: meadow crane's-bill, giant fescue (*Festuca gigantea*), marsh ragwort, square-stalked St. John's-wort (*Hypericum tetrapterum*), amphibious bistort (*Persicaria amphibia*), gypsywort and marsh woundwort. The north-eastern bank was again surveyed from the opposite side of the canal through binoculars. Lesser/greater pond sedge was frequent to locally dominant, meadowsweet occasional and hedge bindweed, common nettle, great willowherb, reed sweet-grass, common club-rush, branched bur-reed, Himalayan balsam, cleavers and yellow iris locally frequent. Other species recorded at lower frequency include purple loosestrife, bittersweet and reed canary-grass. Ash trees were locally occasional. Yellow water-lily, lesser duckweed and water-plantain were recorded in the channel.

Two ponds were noted within the option land to the east of the quarry. One of these is situated within the pasture field to the south at target note C20. This is a reasonably small pond, shaded by a hawthorn and large field maple, containing clear water with some water-starwort and a limited amount of emergent vegetation. A ditch, leading from the tributary of the River Cherwell, feeds into this pond. This ditch, flanked by patchy hawthorn and willow scrub with some mature crack willow pollards, contains a diverse range of aquatic plants including water forget-me-not (*Myosotis scorpioides*), water-starwort, brooklime (*Veronica beccabunga*), water mint and fools water-cress. It has been heavily poached by cattle and horses in places. Many banded demoiselles (*Calopteryx splendens*) were seen here.

The second pond in the eastern option land occurs at target note C16, within a small wooded area. Dense vegetation prevented close inspection of this pond, although it appeared to be choked with common reed and shaded by adjacent trees.

There is a large mill pond in the grounds of Shipton Manor which lies within 500m of the site to the south. The pond is surrounded by scattered maples (target note D20).

Quarries

Other than Shipton Quarry, Bletchingdon Quarry occurs within 500m of Shipton quarry (target notes D1 and D4).

Arable

The majority of the option land to the north-west contained cereal crops at the time of survey. Part of one field has been set-aside (target note A19) and has become colonised by arable weeds. A skylark was seen displaying over this part of the field.

The majority of the option land to the east is also arable, where a cereal crop was being grown at the time of survey. Arable weeds were restricted to the field edges and trackways and included pineappleweed, field poppy, common fumitory, field forget-me-not, white campion and cut-leaved crane's-bill.

A large proportion of the 500m buffer surrounding the quarry outside of the option land comprises arable land. Maize was noted as being grown in the field to the south of the disused railway line at the time of survey.

Hedgerows

The field to the west of the A4260 to the north-west of the quarry is bounded by hedgerows of varied structure. Many of these hedgerows have either become, or are becoming defunct due to gaps and lack of appropriate management. Some of the hedgerows appear to be species rich, such as at target note A2, which contains field maple, wild privet (*Ligustrum vulgare*), hawthorn, elder, spindle, blackthorn and bramble. The hedge bounding the south of this field comprises species including hawthorn, traveller's-joy, rose (*Rosa* sp.), field maple and English elm and supports hedgerow trees (target note A3).

The bridleway within the field to the east of the A4260 is overshadowed by hedgerows, trees and scrub with a ground-flora typical of woodlands (target note A16 refers). Species noted include field maple, spindle, dog-rose, hawthorn, English elm, elder, ash, bramble, dogwood, privet, common nettle (dominant), bladder campion, red campion (*Silene dioica*), hairy violet and white bryony. Nesting blue tits (*Cyanistes caeruleus*), grey heron (*Ardea cinerea*) pellets, broad-bodied chaser (*Libellula depressa*) and extensive rabbit burrowing was also noted here. Approximately halfway along, the bridleway opens up with a gappy hedgerow present on only one side of the path (target note A6). This hedge is dominated by field maple with spindle, dog-rose, white bryony, guelder-rose (*Viburnum opulus*), great mullein (*Verbascum thapsus*), white campion, bittersweet, common poppy and wild pansy.

Within the option land to the south of the quarry the westernmost hedgerow (target note B4) comprises elder, traveller's-joy, dogwood, ash, hawthorn, black bryony and wayfaring tree (*Viburnum lantana*). The hedge features several gaps and lacks appropriate management and as a result has become defunct. The hedgerow at target note B5 comprises ash, wild privet, hawthorn, elder and field maple. This hedge also features gaps but these have recently been infilled with new planting.

Hedgerows surround and dissect parts of the option land to the east of the quarry. The hedgerow bounding the west of the site along the railway line is intact in places comprising hawthorn, dog-rose, ash and traveller's-joy. Further to the north, the railway embankment contains mature elder, ash, hawthorn and dog-rose. Other parts of this hedge, particularly to the south, are gappy or comprise scrubby patches. The hedgerow dissecting the eastern option land (target note C8) is also defunct. Species present include hawthorn, elder and English elm, with ground flora comprising white campion, dock, false oat-grass, white dead-nettle, cleavers, garlic mustard, burdock (*Arctium* sp.), hogweed and thistle species.

Other hedgerows within the eastern option land occur along the canal to the south of the site and bounding the River Cherwell. The hedgerow situated along the river at target note C9 comprises ash, blackthorn, field maple and hop. Meadowsweet is also present and a number of animal tracks were noted leading into the hedge. A 5-6m wide hedgerow occurs further to the north of the river bank (target note C10). Species present include large crack willow pollards, goat willow, hawthorn, bramble and elder. Some gaps are present, which have been colonised by ruderal vegetation. At target note C21 an unkempt hedgerow runs along the south bank of the River Cherwell comprising willow, hawthorn, hybrid lime, buckthorn, common broomrape, greater mullein and burnet-saxifrage (*Pimpinella saxifraga*). The hedgerow at target note C29 runs alongside the footpath by the river and comprises meadow crane's-bill, hawthorn, field, maple, crack willow and ash.

In the wider area around the site (within 500m) an intact species-rich hedgerow runs along the road verge of the B4027 (target note D1). Species associated with this hedgerow include blackthorn, bramble, elder, honeysuckle, white bryony, field maple, ash, wych elm, privet, bittersweet and musk mallow (*Malva moschata*). There are species-poor hedgerows with trees (target note D5, D8 and D9), intact hedgerows (target note D29) and intact hedgerows with trees (D30). Target note D38 refers to an intact, species-poor hedgerow which is well maintained.

The road verge of Banbury Road (within 500m of the site) has a hedgerow associated with it (target note D31) with species comprising elder, blackthorn, honeysuckle, bramble and ash. Hedges abut the towpath of the canal in several places, target note D22 comprises species such as hop, elder and crack willow whereas target note D42 refers to a hawthorn hedge. A bank-side hedgerow with some willow standards is present along the stream leading off from the canal (target note D41).

Buildings

Two barns are situated within the southernmost corner of the arable field in the southern option land (target note B6). They are surrounded by hard standing and an assortment of arable weed species including pineappleweed, scarlet pimpernel, common field-speedwell (*Veronica persica*), common poppy and black medick.

3.3.2 Flora

Floral diversity within the Option Land appears to be limited to more common species, probably as a result of intensive farming methods (e.g. use of pesticides/herbicides and cattle grazing) and neglect or inappropriate management of other habitats such as the hedgerows. No red data list, nationally rare, scarce or county notable species were recorded within the Option Land.

3.3.3 Bats

During the evening bat surveys conducted around the quarry, many bats were also recorded foraging and commuting along the canal and river habitats. It is also likely that bats use the hedgerows, tree lines and other linear features within the Option Land for foraging and navigational purposes. During the bat surveys a number of bats were noted flying from the direction of houses and buildings adjacent to the quarry site at dusk suggesting that some of these buildings are used for roosting purposes. Many of the mature trees within the Option Land also offer roosting potential for bats, particularly the over-mature pollards lining the watercourses.

3.3.4 Badger

No setts were found during the Extended Phase I survey of the Option Land. One possible sett entrance with a large spoil heap was, however, found on the 500m boundary of the quarry site, to the north-east.

A large badger dung pit was found on the path with numerous badger snuffle marks and a path leading out into the adjacent field (**Figure 4,** target note A18 refers). Badger snuffle marks were noted on both sides of the track near to the dung pit. Several more badger dung pits were noted further along the track (to the west) (**Figure 4,** target note A19 refers). A badger access point was noted through the fence to the north of the north-western area of Option Land, where badger hairs were found caught on the fence (**Figure 4**, target note A20 refers).

3.3.5 Otter

Evidence of otter was found along the quarry side bank of the River Cherwell and it is likely that otter use both the canal and river for foraging and navigation. These watercourses are known to contain a varied and plentiful range of fish species, signal

crayfish and other associated wildlife attractive to foraging otter. The river banks in particular offer many holt and couch opportunities for otters.

3.3.6 Water vole

Evidence of water vole was found along the river banks immediately adjacent to the quarry site. The Oxford Canal is a stronghold for this species (Cherwell BAP, 2004). Habitat present (for shelter and foraging opportunities) is highly suitable in supporting this species as was evident at the time of survey. No evidence of American mink, a keen predator of water vole, was found during the survey, although it is known to occur within this area (Cherwell BAP, 2004) and a local narrow boat owner reported having seen mink in the last two years.

3.3.7 Birds

The following birds were recorded foraging, displaying and/or nesting within the Option Land habitats during the survey:

Table 8: Bird species recorded foraging, displaying and/or nesting within the Option Land

Bird species		Activity
Common name	**Scientific name**	
Barn owl	*Tyto alba*	Foraging over fields in the eastern Option Land
Barn swallow	*Hirundo rustica*	Seen foraging over river corridor
Blackcap	*Sylvia atricapilla*	Singing, foraging etc. around the eastern Option Land
Chaffinch	*Fringilla coelebs*	Singing, foraging etc. in all areas
Common blackbird	*Turdus merula*	Singing, foraging etc. in all areas
Common bullfinch	*Pyrrhula pyrrhula*	Calling and foraging near to the eastern Option Land
Common buzzard	*Buteo buteo*	Foraging over fields
Common kestrel	*Falco tinnunculus*	Foraging over site
Common kingfisher	*Alcedo atthis*	Family group seen along tributary of River Cherwell
Common tern	*Sterna hirundo*	Foraging over river
Common whitethroat	*Sylvia communis*	Heard singing
Eurasian reed warbler	*Acrocephalus scirpaceus*	Pair seen and heard singing in reeds along the canal (by drawbridge)
Eurasian sparrowhawk	*Accipiter nisus*	Dead bird seen near canal
European goldfinch	*Carduelis carduelis*	Foraging and singing over rough grassland (seeds) along watercourse banks
European greenfinch	*Carduelis chloris*	Singing, foraging etc. in all areas
European robin	*Erithacus rubecula*	Singing, foraging etc. in all areas
Great spotted woodpecker	*Dendrocopos major*	Family group seen within eastern Option Land
Great tit	*Parus major*	Singing, foraging etc. in all areas
Green woodpecker	*Picus viridis*	Heard calling from woodland habitat adjacent to river
Hedge accentor (dunnock)	*Prunella modularis*	Singing, foraging etc. in all areas
House martin	*Delichon urbicum*	Foraging over site
Northern lapwing	*Vanellus vanellus*	Flock of 13 birds seen flying over Option Land towards quarry lakes

Bird species		Activity
Common name	**Scientific name**	
Reed bunting	*Emberiza schoeniclus*	Many pairs seen foraging and nesting along river corridor
Sky lark	*Alauda arvensis*	Seen and heard displaying within eastern and south-western Option Land
Song thrush	*Turdus philomelos*	Heard and seen near drawbridge (eastern Option Land)
Tawny owl	*Strix aluco*	Heard calling from adjacent woodland
Winter wren	*Troglodytes troglodytes*	Seen and heard in all areas
Yellowhammer	*Emberiza citrinella*	Several heard singing in south-western Option Land hedgerows

3.3.8 Amphibians

Several habitats within the Option Land are capable of supporting amphibian species. Two ponds were noted within the eastern Option Land, although one of these appeared to be virtually dry. The other pond (**Figure 4**, target note C20) is likely to offer breeding and egg laying/spawning habitat. The watercourses are likely to be too fast flowing to support spawning. The majority of habitats present, therefore, are probably of value to amphibians during their terrestrial phase and connectivity through the landscape is likely to be via hedgerows, watercourses and their banks and the wooded habitats.

3.3.9 Reptiles

The Option Land contains habitats that are likely to be attractive to common reptile species, for example, rough grassland, scrub, hedgerows, watercourse banks and woodland edges.

3.3.10 Invertebrates

A range of invertebrate species were noted within the Option Land including butterflies (common blue and red admiral) recorded near to their food plants (common bird's-foot trefoil and common nettle respectively), many damselflies and banded demoiselles near to the watercourses, crickets, hoverflies and mayflies. The watercourses, hedgerows and less managed or farmed habitats evidently offer many more opportunities for invertebrate species.

4.0 TRENDS

Shipton Quarry was an active limestone quarry up until the mid 1980s. Activity in the quarry recommenced following granting of planning permission for infilling to stabilise the cliffs. Pumping to manage water levels in the quarry was gradually reduced from 1998 with the consequence that the extent of water within the quarry increased dramatically to the extent that it become of concern to the neighbouring airport due to the number of birds it attracted and associated increased risk of bird strike. Pumping recommenced in 2002/03. Hence, over the operational life of the quarry, the environment at Shipton Quarry has been a highly dynamic one. Some areas have remained undisturbed and have developed a diverse and valuable ecology. Other important habitats, notably the ephemeral / short perennial vegetation, are dependent upon disturbance within the quarry. If left unmanaged the quarry would flood once again again attracting large numbers of wintering birds and associated increased risk of bird strike to users of the airfield. It would, undoubtedly become a haven for wildlife, however, whether it would sustain this interest in the longer term in the absence of management is uncertain. Development of the quarry would enable at least part of the site to be maintained and managed for its wildlife interest. The wider countryside is intensively managed and is anticipated to remain so for the foreseeable future, possibly with further decline in biodiversity.

5.0 ECOLOGICAL ASSESSMENT

5.1 Communities and Habitat Features (Shipton Quarry)

5.1.1 Woodland and scrub

The strip of woodland along the northern boundary of the quarry is not especially diverse. Only three ancient woodland indicator species (field maple, hart's-tongue fern (*Phyllitis scolopendrium*) and wood speedwell (*Veronica montana*)) were recorded indicating that the woodland is unlikely to be of ancient origin. The woodland, nonetheless, provides an important linear habitat feature continuing northwards and eastwards along the River Cherwell beyond the quarry and linking with the railway corridor running north-south to the east of the quarry.

The strip of scrub / woodland along the western margin of the quarry is more diverse and contains pockets of species-rich grassland. This feature also provides an important linear habitat feature linking with the woodland belt described above to the north and the species-poor hedgerow and towards the disused railway corridor to the south of the quarry.

The dense / continuous scrub along the cliff-top along the eastern side of the quarry is species-poor. It too forms a linear habitat feature, but is relatively isolated.

The woodland along the northern boundary of the quarry is of importance to foraging / commuting bats and also offers roost potential in mature trees. Treelines to the east and south of the quarry also offer foraging / commuting potential. Scrub areas offer foraging potential to badgers. Woodland and scrub areas around the margins of the site offer nesting potential to birds (see below).

Woodland is listed as a priority habitat under the Oxfordshire Local BAP and both woodland and scrub as priority habitats under the Cherwell BAP.

The woodland and scrub features, especially along the northern and western margins are considered to be of **Local / Parish to District / Borough value**.

5.1.2 Grassland and marsh

The unimproved and semi-improved grassland (and also ephemeral / short perennial vegetation) represent a successional series of habitats culminating in the unimproved grassland. The latter is species-rich and includes the County Local species ploughman's spikenard, pyramidal orchid and common stork's-bill, County Very Local yellow-wort and the County Uncommon wild liquorice (Killick et al, 1998). The grassland is tending towards calcareous as indicated by the occurrence of wild basil, yellow-wort, wild parsnip and hoary plantain, but is not characterised by the presence of upright brome, tor grass or other calcicolous grasses and species such as rockrose (*Helianthemum nummularium*), salad burnet (*Sanguisorba minor*) and wild thyme (*Thymus polytrichus*) are absent and hence has been mapped as neutral.

The unimproved and semi-improved grassland areas are also of importance to reptiles and invertebrates (see below).

Lowland meadows (incorporating most areas of unimproved neutral grassland) are a priority habitat under the UK BAP. Neutral grassland is a priority habitat under the Oxfordshire Local BAP and grassland, grazing marsh and heathland (encompassing lowland meadows / neutral grassland), a priority habitat under the Cherwell BAP.

The grassland, especially the unimproved grassland along the northern boundary of the site, is considered to be of **county importance** due to the presence of several county important species and its BAP status.

There is only one, relatively small area of marshy grassland within the quarry which formerly bordered an expanse of water. This marshy grassland is not especially diverse, although it does support the county rare brookweed.

Marshy grassland (with the exception of formally managed coastal and floodplain grazing marsh) does not appear to feature in the national or local BAPs but provides an additional element of habitat diversity within the quarry and is assessed to be of value within the confines of the quarry i.e. within the immediate zone of influence.

5.1.3 Tall herb

The tall herb vegetation is of recent origin and comprises mainly common and widespread species together with some garden ornamentals although a wide diversity of species was recorded. The County Local species ploughman's spikenard is present although this is fairly widespread within the quarry. Other notable species recorded include the UK BAP priority species and County Scarce cornflower, target note 20) and the County Uncommon rat's-tail fescue (also recorded elsewhere within the quarry) and County Rare keeled-fruited cornsalad at target note 22. Self sustaining populations of cornflower are considered to be confined to three sites (one in Suffolk, one on the Isle of Wight and one in Lincolnshire). Isolated plants still occur over a large area of the south and east of England and in Wales, although many are due to introductions from wildlflower seed mixes (UK BAP species action plan).

Despite the occurrence of notable plant species, two of which occur elsewhere within the quarry and one which is likely to have arisen via imported fill material, the tall herb vegetation is considered to be of **limited floristic value**.

5.1.4 Inundation vegetation

The inundation vegetation within the quarry is of recent origin following draining of the water from the quarry. This vegetation is likely to be transitory, requiring regular inundation to maintain it, and is not currently very diverse. It does, however, support frequent brookweed, a county rare species (although this species was also recorded from the springs and margin of the central lake. Inundation vegetation is not a priority habitat under the UK or local BAPs. This vegetation is considered to be of **low value** in its current state and in that it will not be maintained under the current management regime of the quarry.

5.1.5 Swamp / marginal

A few spring lines have appeared on the quarry floor since draining. These currently support relatively diverse vegetation including the county rare brookweed. These spring lines are also of importance to reptiles and invertebrates (see below). The Cherwell BAP lists Shipton Quarry as a locality for 'flushes' which are included within the priority habitat of wetland. Flushes in the context of Phase 1 are defined as a type of minerotrophic mire and typically have an open or closed ground layer of bog mosses and / or other mosses together with small sedges and rush species. These do not feature at Shipton Quarry and it can only be assumed that the Cherwell BAP is referring to these springs. The Cherwell BAP prescribes protection of the remaining resource.

The spring lines are therefore valued of importance in a **District / Borough** context.

The only significant areas of marginal vegetation occur around the triangular lake, target notes 42-48 refer. Notable species recorded include county uncommon lesser bulrush and mare's-tale and county rare brookweed. Reed warbler and reed bunting (UKBAP and red-listed bird, see below) have been recorded nesting in these areas of marginal vegetation. There are no areas of common reed extensive enough to qualify as the UK, Oxfordshire Local BAP and Cherwell BAP priority habitat of reedbed. Small patches of marginal vegetation dominated by large sedges and other reeds on river margins and lakes, however, are included under the priority habitat of wetland under the Cherwell BAP which prescribes protection of the remaining resource.

Marginal vegetation is therefore valued as of **District / Borough value** although limited in extent.

5.1.6 Open water

This habitat became quite extensive following cessation of quarrying and water level control. It has, however, been significantly reduced in recent years on reinstatement of pumping. Only the triangular impounded lake had a well-developed aquatic flora including the County Uncommon mare's-tail. The County Scarce small pondweed was recorded from the small cut-off lake at target note 39 and the spring at target note 41. The water bodies are of importance to foraging bats and the triangular lake in particular is of importance to invertebrates. In the past, the expanses of water have been of importance to wintering birds. An exceptional smooth newt population was also recorded in peripheral pools at eastern end of the quarry. Eutrophic standing waters are a priority habitat under the UK BAP. Gravel pits and lakes are included under the priority habitat of wetland under the Oxfordshire Local BAP and water-filled mineral extraction sites (under which reference is made to Shipton Quarry) are included under the Aquatic priority habitat under the Cherwell BAP. The areas of standing water, notably the triangular lake at target notes 42-48, are considered to be of importance in a **County** context.

5.1.7 Ephemeral / short perennial

The ephemeral / short perennial vegetation is most diverse at target notes 53, 57 and 58 supporting the County Uncommon wild liquorice, County Local common stork's-bill and ploughman's spikenard and County Very Local yellow-wort. The County Uncommon rat's-tail fescue was recorded at target notes 49 and 51. The County Rare sea mouse-ear was recorded at target notes 15, 49, 50 and 51 but this species may be present elsewhere as this it is only evident early in the year and may, therefore, have been overlooked in some areas. The ephemeral / short perennial vegetation at target notes 54 and 55 is different in character being on imported fill rather than the natural substrate of the quarry. The County Very Local (and rather rare) blue pimpernel was recorded at target note 55. This vegetation does not feature in the UK or local BAPs. It does, nevertheless, support a number of species of county importance and represents a successional stage in the development of the species-rich grassland within the quarry. It is, therefore, considered to be of importance in a **County** context.

5.1.8 Hedgerows

Hedgerow habitat is very limited within the quarry and that present is species-poor. The hedgerows present are considered to be of **limited value** although they may provide valuable linear habitat (notably the hedgerow running along the access track to the south of the quarry). The hedgerows / tree line to the south of the quarry provide foraging / commuting habitat for bats (**Local / Parish to District / Borough value**) and limited nesting habitat for birds (within immediate zone of influence).

5.1.9 Buildings

Buildings within the site offer roosting opportunities for bats. Three of the thirteen buildings surveyed in 2004 produced evidence of occasional use by small numbers of bats possibly as night roosts or investigative visits whilst in 2006, five of 16 buildings (Buildings 3, 5, 9 and 14) showed evidence of use by bats as night roosts or feeding perches, possibly day roosts of solitary males, the roost in Building 9 comprising a day roost. Evidence of bats using the following buildings was also noted: Building 4, the farm buildings immediately to the south of the site and an underground tunnel beneath Building 7. The buildings are also used by nesting kestrel and peregrine (amber listed species). The value of the buildings with respect to bats and nesting birds is considered to be of **Local / Parish value** only.

5.2 Shipton Quarry - species assessment

5.2.1 Flora

The nationally scarce blue pimpernel was recorded (BSBI, 2005). Cornflower is a priority species under the UK BAP. The following locally important plant species were also recorded (Killick et al, 1998): County Local ploughman's spikenard, crested hair-grass, pyramidal orchid, common stork's-bill and flowering rush, County Very Local yellow-wort, spotted medick and blue pimpernel (very local and rather rare), County Uncommon wild liquorice, rat's-tail fescue, lesser bulrush and mare's tail, County Scarce cornflower and small pondweed and County Rare brookweed and sea mouse-ear.

The combined floristic interest of the quarry is of **County value** although this is primarily restricted to the unimproved and semi-improved grassland, the ephemeral habitats and the triangular, impounded lake.

5.2.2 Bats

Out of the 13 bat species recorded within Berkshire, Buckinghamshire and Oxfordshire, a total of nine (possibly 10) of these have been recorded within Shipton Quarry and the immediate surrounding land. Within Oxfordshire, pipistrelle and long-eared are the most numerous bats recorded. Records within Oxfordshire for the other species, however, are limited although the species recorded generally have widespread distributions, with the exception of lesser horseshoe bat. The latter species is listed as uncommon within Oxfordshire with only a small number of roosts recorded. The lesser horseshoe bat is restricted to south-west England and Wales.

All of those species present within and directly adjacent to the site are listed as priority species within the Oxfordshire BAP supported by the Cherwell BAP. Lesser horseshoe and common pipistrelle are also listed as UK BAP priority species. The lesser horseshoe bat is widespread throughout central and southern Europe, but has undergone severe decline in the northern part of its range (UK population is approximately 18,000). Although the common pipistrelle is abundant and widespread in the UK, this bat has undergone a significant decline in numbers this century (estimates suggest a population decline of approximately 70% between 1978 and 1993).

Significant numbers of these bat species were recorded foraging and commuting within the quarry and immediate surrounding land. In terms of IEEM's Guidance for ecological valuation, with respect to the range of bats recorded, the site is of **District / Borough to County Value** in that the site does supply a critical element of their requirements (i.e. feeding and commuting and some (limited) roosting habitat).

5.2.3 Badgers

Although no badger setts have been found on site, it is evident that the site or parts of the site are used by at least one badger social group; the used dung pits recorded at target note 1 (**Figure 8** refers) to the south of the quarry indicating a territorial boundary. It is likely that the foraging opportunities available to badgers within the site are seasonal, *i.e*. mainly berries and fruits from the scrub and hedgerow habitats. Badgers may also access the site to forage for small mammals such as juvenile rabbits, mice and voles. Earthworms, one of the badgers main prey items, are likely to be lacking within the site due to the limited soil and grassland areas.

The site is considered, therefore, to be of **Local / Parish value** to badgers.

5.2.4 Otters and water vole

No evidence of otter or water vole was recorded within the quarry.

5.2.5 Breeding birds

No nationally rare breeding species according to the British Birds Rarities Committee have been recorded from Shipton Quarry. Of the 32 species recorded from the terrestrial habitats in the quarry during breeding bird survey, four are red listed (RSPB, 2002, **Appendix II** refers) (three probably breeding) plus nine amber listed (four probably breeding). Ten out of the twenty species associated with the open water habitats are amber listed species (only 1 probably breeding).

Quarry margins

Red List – European turtle dove, song thrush, common linnet and reed bunting

Amber List – stock pigeon, common buzzard, common kestrel, green woodpecker, barn swallow, house martin, sand martin, blackcap and willow warbler (*Phylloscopus trochilus*).

Open water

Amber List – great cormorant, mute swan, common pochard, Eurasian teal, black-headed gull, Eurasian oystercatcher, northern lapwing, common snipe, common redshank and dunlin (*Calidris alpina*).

Of the above species, reed bunting, turtle dove, song thrush and linnet are all UK BAP priority species supported by the Cherwell BAP

In total 14 red listed and 53 amber listed species have been recorded from the quarry since 1972 (OOS) including 9 red listed and 16 (12 regularly breeding) amber listed breeding species. The nine red listed breeding species are given below:

European turtle dove
Song thrush
Common starling
House sparrow
Tree sparrow (not seen since late 1980s)
Common linnet
Common bullfinch
Yellowhammer (breeds along adjacent railway line, occasionally visits site)
Reed bunting

With the exception of common starling, house sparrow and yellowhammer, the above species are all priority species under the UK BAP, supported by the Cherwell BAP.

The site provides a diverse range of habitats and consequently supports a diverse breeding bird community including several declining bird species.

The following comments are extracted from the OOS report on Shipton Quarry:

- Ringed and little plovers have bred here for a longer continuous period than at any other site in the county
- With Otmoor it is Oxfordshire's most important breeding site for little grebes
- It is the first county site at which Eurasian oystercatchers have attempted to breed.
- Pairs of common pochard, listed on the UK rare breeding bird list, bred successfully here in recent years
- Common terns have extended their breeding range by nesting here
- European turtle doves have nested here for a longer continuous period than anywhere else in Oxfordshire.
- The number of breeding stock pigeons could not be equalled at any other site in the county although their breeding sites are now limited.

The breeding bird fauna is considered to be of value in a **District / Borough – County** context.

5.2.6 Wintering birds

The nationally rare (British Birds Rarities Committee) black-winged stilt has been recorded from the quarry (it visited for one day in June 1993, the first ever recorded in Oxfordshire). A total of 25 species were recorded during the winter bird survey including 14 amber listed species as follows:

Great cormorant, mute swan, common shelduck (*Tadorna tadorna*), gadwall (*Anas strepera*), Eurasian teal, shoveler (*Anas clypeata*), common pochard, northern lapwing, common snipe, green sandpiper (*Tringa ochropus*), black-headed gull, lesser black-backed gull (*Larus fuscus*), herring gull (*L.argentatus*), common kingfisher.

The results obtained from the winter bird survey were compared with the 2002/03 Wetland Birds Survey (WeBS, Cranswick *et. al*., 2000), to determine their regional and national importance. The peak counts for each species for each of the lakes and the site as a whole were compared with the following WeBS data **(Table 9, refers)**:

- The 1% threshold for national importance
- National WeBS total count

In all cases, the numbers that have been recorded at Shipton quarry are relatively low and do not qualify the site as being nationally important in winter for any of the species recorded. Nevertheless, some high counts were obtained for some species, relative to national WeBS peak counts recorded. In **Table 10** below, species are listed (in descending order) if the peak count calculated, as a percentage of the national WeBS peak count, is greater than 0.1 per cent.

Table 9: Peak counts for each lake and whole site, winter 2002/03, compared with national WeBS data

English name	Scientific name	Main Lake	Small Lake	Drained Lake	Whole site	National WeBS total	National Threshold	Whole site % WeBS total
Black headed gull	*Larus ridibundus*	450		50	500	215,295 Jan	19000 (10000†)	0.23
Common coot	*Fulica atra*	110	9	2	120	101,212 Oct	1730	0.12
Common kingfisher	*Alcedo atthis*	1			1	459 Sep	5†	0.22
Common moorhen	*Gallinula chloropus*	11	1		12	13,812 Oct	7500 (100†)	0.09
Common pochard	*Aythya ferina*	45		5	50	31,169 Jan	595	0.16
Common sandpiper	*Actitis hypoleucos*	6		3	9	1,246 Aug	?	0.72
Common shelduck	*Tadorna tadorna*	1			1	53,799 Jan	782	0.02
Common snipe	*Gallinago gallinago*	1		1	2	6,879 Nov	200†	0.03
Eurasian teal	*Anas crecca*	77	1	50-60	130-140	180,710 Jan	1920	0.08
Gadwall	*Anas strepera*	2			2	14,347 Dec	171	0.01
Great cormorant	*Phalacrocorax carbo*	22			22	17,605 Oct	230	0.12
Great crested grebe	*Podiceps cristasus*	7		1	8	8,518 Sep	159	0.09
Greater canada goose	*Branta canadensis*	96	1		97	54,678 Sep	Naturalised introduction 600†	0.18
Green sandpiper	*Tringa ochropus*	1			1	533 Aug	?	0.19
Grey heron	*Ardea purpurea*	1			1	4,285 Oct	50†	0.02
Herring gull	*Larus argentatus*	75			75	52,209 Oct	4500 (2500†)	0.14
Lesser black-backed gull	*Larus fuscus*	140			140	51,682 Aug	500	0.27
Little grebe	*Tachybaptus ruficollis*	11	2		13	4,941 Oct	78	0.26
Mallard	*Anas platyrhynchos*	20	1	4	25	135,313 Jan	3520 (2000†)	0.02
Mute swan	*Cygnus olor*	11	2	1	14	19,283 Nov	380***	0.07
Northern lapwing	*Vanellus vanellus*	200			200	291,643 Dec	20000**(5,000†)	0.07
Red crested pochard	*Netta rufina*	2			2	111 Jan	Vagrant & escape 10†	1.80
Ruddy duck	*Oxyura jamaicensis*	2			2	3514 Feb	41†	0.06
Shoveler	*Anas clypeata*	3			3	11,868 Jan	148	0.03
Tufted duck	*Aythya fuligula*	32	2		34	48,429 Dec	901	0.07
Total		793	13	82	854-864			

† denotes that a qualifying level different to the national threshold has been used.

** a site regularly holding more than 20,000 waterbirds (excluding non-native species) qualifies as internationally important by virtue of absolute numbers

*** International threshold (British population

Table 10: Relative importance of wintering species recorded for the whole site, based on peak winter counts

Species	Peak Count	% of national WeBS peak count
Red crested pochard*	2	1.80
Common sandpiper	9	0.72
Lesser black-backed gull	140	0.27
Little grebe	13	0.26
Black-headed gull	500	0.23
Common kingfisher	1	0.22
Green sandpiper	1	0.19
Great Canada goose*	97	0.18
Common pochard	50	0.16
Herring gull	75	0.14
Common coot	120	0.12
Great cormorant	22	0.12

* introduced species

The Table 11 below records the maximum peak counts between 2002/03 and 2005/06 incorporating data provided by OOS:

Table 11: Maximum peak counts 02/03-05/06 compared with National WeBS data[3]

English name	Scientific name	Max. peak count 02/03-05/06	Year of max. peak count	National count of relevant year	National threshold of relevant year
Bar-headed goose	Anser indicus	6	04/05	20	Escape
Black headed gull	*Larus ridibundus*	500	02/03	215,295	19,000 (10,000†)
Common coot	*Fulica atra*	120	02/03	101,212	1,730
Common kingfisher	*Alcedo atthis*	1	02/03	459	5†
Common moorhen	*Gallinula chloropus*	12	02/03	13,812	7,500 (100†)
Common pochard	*Aythya ferina*	50	02/03	31,169	595
Common sandpiper	*Actitis hypoleucos*	9	02/03	1246	?
Common shelduck	*Tadorna tadorna*	1	02/03	53,799	782
Common snipe	*Gallinago gallinago*	6	05/06	n/a (6,109-8,167 02/03-04/05)	n/a (200† for 02/03-04/05)
Common tern	*Sterna hirundo*	2	05/06	n/a (4,414-6,265 02/03-04/05)	n/a (200† for 02/03-04/05)
Eurasian teal	*Anas crecca*	130-140	02/03	180,710	1,920
Gadwall	*Anas strepera*	5	04/05	15,639	171
Great cormorant	*Phalacrocorax carbo*	25	03/04	18,792	230
Great crested grebe	*Podiceps cristasus*	8	02/03	8,518	1599
Greater Canada goose	*Branta canadensis*	97	02/03	54,678	600†
Green sandpiper	*Tringa ochropus*	3	05/06	n/a (463-533 02/03-04/05)	n/a (15† 02/03-04/05)
Grey heron	*Ardea purpurea*	1	02/03	4,285	50†
Herring gull	*Larus argentatus*	75	02/03	52,209	4500 (2500†)
Jack snipe	*Lymnocryptes minimus*	8	05/06	n/a (122-195 02/03-04/05)	n/a (5† 02/03-04/05)
Lesser black-backed gull	*Larus fuscus*	140	02/03	51,682	500

[3] Cranswick et. al. (2005), Collier et. al. (2005), Banks et. al. (2006).

English name	Scientific name	Max. peak count 02/03-05/06	Year of max. peak count	National count of relevant year	National threshold of relevant year
Little grebe	*Tachybaptus ruficollis*	13	02/03	4,941	78
Little plover	*Charadrius dubius*	1	04/05	225	10†
Mallard	*Anas platyrhynchos*	56	05/06	n/a (135,313-142,045 02/03-04/05)	n/a (2000† 02/03-04/05)
Mute swan	*Cygnus olor*	14	02/03	19,283	380***
Northern lapwing	*Vanellus vanellus*	200	02/03	291,643	20,000** (5,000†)
Northern pintail	*Anas acuta*	6	03/04	27,418	279
Red crested pochard	*Netta rufina*	2	02/03	111	Vagrant & escape 10†
Ruddy duck	*Oxyura jamaicensis*	2	02/03	3514 Feb	41†
Shoveler	*Anas clypeata*	3	02/03	11,868	148
Tufted duck	*Aythya fuligula*	65	03/04	57,149	901

† denotes that a qualifying level different to the national threshold has been used.
** a site regularly holding more than 20,000 waterbirds (excluding non-native species) qualifies as internationally important by virtue of absolute numbers
*** International threshold (British population)
n/a data not yet available for 2005/06

As for the 2002/03 data alone, none of the maximum peak counts for 02/03-05/06 exceed the national threshold of importance.

Although no qualifying threshold is set for jack snipe (jack snipe are difficult to monitor due to their secretive nature), the 02/03-04/05 reports lists sites with five or more birds and includes Shipton Quarry supporting a peak count of six birds in 2003/04 amongst 23 other sites, ranking as joint tenth in terms of numbers supported. The five year mean peak for the site in the 2003/04 WeBS report was five birds, with the site being ranked joint tenth in Great Britain. The quarry does not appear in the 04/05 report when only two birds were recorded. The 05/06 report is yet to be published, although eight birds were recorded.

The following comments are extracted from the OOS report (Bruckner, 2003):

- Shipton Quarry has higher counts of jack snipe than any other county site and is listed in the top nine sites in Britain in the Wetland Bird Survey of 1999-2000 (Musgrove et. al., 2001).
- It has attracted rarities such as a Temminck's stint and Oxfordshire's first ever black-winged stilt.

The winter bird fauna is considered to be of value in a **county** context with the site possibly qualifying as of national importance for wintering jack snipe.

5.2.7 Reptiles

According to the Key Reptile Sites criteria for selection (Froglife, 1999, see table below), the reptile numbers recorded within Shipton Quarry as a whole equate to a good population of slow worms and low populations of grass snakes and common lizards. The quarry is, however, a considerable area. Taking each separate survey area, however, the majority of areas only qualify as supporting low population levels, with Areas B and E qualifying as supporting good populations of slow worms and Area C an exceptional population. The site is also of note in supporting three species of reptiles and as such would qualify as a Key Reptile Site.

Table 12: Key Reptile Sites criteria

The figures below refer to the maximum number of adults seen by observation and / or under tins (placed at a density of up to 10 per hectare), by one person in one day.

Species	Low population	Good population	Exceptional population
Grass snake (*Natrix natrix*)	<5	5-10	>10
Common lizard (*Lacerta vivipara*)	<5	5-20	>20
Slow worm (*Anguis fragilis*)	<5	5-20	>20

Given that the slow worm is a common and widespread species, it is considered that the good population present is only of value in a **Local / Parish, possibly District / Borough** context. The low population of grass snake and common lizard is only of value in a **local** context. The combined interest is probably of value in a **District / Borough** context.

5.2.8 Great crested newts

The lack of any records of either adults or eggs of the great crested newt, together with the presence of predatory fish in most of the lakes, suggests this site does not hold a breeding population of this species. An exceptional population of > 100 adult smooth newt was recorded in one temporary pool. As with the slow worm above, given that the smooth newt is a common and widespread species, the population present is only of value in a **Local / Parish to District / Borough** context.

5.2.9 White clawed crayfish

The results of the survey indicate that Shipton Quarry does not appear to support a population of native white-clawed crayfish. The presence of the introduced signal crayfish in the River Cherwell is likely to have caused the loss of any native crayfish within this section of the river, as signal crayfish carry Crayfish Plague, a fungus disease which is invariably fatal to the native species. Any development of the quarry will therefore not have any impact on native crayfish populations.

5.2.10 Invertebrates

A total of 211 species of invertebrate were recorded from the site including 2 Red Data Book species (the solitary wasp *Philanthus triangulum* and the cleptoparasitic solitary bee *Sphecodes spinulosus*), 13 Nationally Notable species and 42 species with Local distributions. The most recent information of the distributions of some of these species suggests that the status of some is in need of revision, particularly that of the solitary wasp *Philanthus triangulum* which is currently listed as RDB 2. A more realistic assessment of the status of these invertebrates would arrive at a total of one Red Data Book Species, 11 Nationally Notable species and 44 Local species, with *Philanthus* now being classed as Local. However, until the publication of a revised Red Data book the current published statuses are those generally used for site assessment. Further details for individual species can be found in **Appendix X**.

Fifty-three species of Hymenoptera (Bees, Wasps and Ants) were recorded during the survey, including a number of parasitic or cleptoparasitic species. As can be seen from **Table 5, Section 3.2.10** above, the majority of the Rare, Notable and Local species found during the survey were bees, wasps or ants. Species recorded included both the cleptoparasite solitary bee *Sphecodes spinulosus* (RDB 2) and its host *Lasioglossum xanthopum* (Nb). The site also supports a large population of the Notable solitary bee *Osmia bicolor*.

Flies (Diptera) made the largest contribution to the species list, with 62 species being recorded. Hoverflies (Syrphidae) were well represented (29 species), together with 8 species of Soldier-fly (Stratiomyidae). The larvae of many species of Soldier-flies are aquatic, living in shallow water or at the muddy margins of water bodies. A good range of Soldier-flies, including the Notable species *Oxycera pygmaea* (Nb), were swept from the sparse vegetation growing around various small seepages and streams in the central part of the site. The Notable water beetles *Hydroglyphus pusillus* and *Laccobius sinuatus* were also recorded from these small streams.

A total of 58 species of aquatic invertebrate have been recorded from the various samples taken from sites within Shipton Quarry. These include 5 Nationally Notable species and 15 species with Local distributions. Combining this data with that from the terrestrial invertebrate survey carried out in 2005 above gives a total of 252 species recorded from the site, including two RDB species, 15 Nationally Notable species and 55 species with Local distributions.

The terrestrial invertebrate survey recorded 15 species of dragonfly from the site, while the aquatic invertebrate survey only found the larvae of four species. These included the Notable white-legged damselfly (*Platycnemis pennipes*) whose larvae were found in a small stream. It is likely that many of the 15 species recorded as adults do breed on the site. Although the larvae were not found, red-eyed damselflies (*Erythromma najas*), emperor dragonflies (*Anax imperator*) and southern hawkers (*Aeshna cyanea*) were all noted ovipositing at points around the site.

As has been noted previously, within the quarry are a number of large bodies of water. The levels in the majority of these fluctuate widely depending on the amount of water being pumped out of the quarry and as such have only a limited range of aquatic macrophytes present. Very few invertebrates were recorded from these sites and they are of little interest for aquatic invertebrates.

The water level in the lake in the central part of the quarry appears to be unaffected by the current pumping regime and, as such, has developed an extensive growth of emergent & submerged vegetation. This lake produced a good range of invertebrate species, as did some of the smaller ponds and seepages unaffected by the pumping regime.

There is one small, shallow stream present on site, which runs for approximately 150m before entering one of the large lakes. Whether this water arises from a natural spring or from leaks connected with the pumping operation is unclear. This is the only area of permanent running water on the site and was found to hold a number of specialist running water species including the white-legged damselfly (*Platycnemis pennipes*) (Nb), the Notable mayfly *Caenis robusta* and the water beetles *Agabus didymus* (Local) and *Elmis aenea*.

Twenty-three species of water beetle were recorded from the site including 3 Nationally Notable species. The SQS score of 2.9 indicates that the quarry is a good quality water beetle site, though the largest of the main water bodies hold few beetle species. Overall, the results of this survey indicate that Shipton Quarry has some areas of good quality aquatic invertebrate habitat.

At Shipton Quarry, only parts of the site are currently of high invertebrate interest. The majority of the invertebrate records came from along the northernmost section of the site which consists of a mix of scrub and more open, rabbit grazed areas; the western boundary strip of grass and scrub; the central, well vegetated pond and adjacent seepages; and the open, flower rich areas around the old cement factory buildings. Recent tipping of spoil and soils across much of the southern and western parts of the quarry has covered up much of the existing habitat with a mix of loose soil and rubble. These areas appear to be regularly sprayed with herbicide and there is little in the way of vegetation becoming established and are of little interest for invertebrates.

Brownfield sites such as Shipton Quarry are often noted as being important for a range of invertebrate species, particularly solitary bees and wasps. The combination of patches of sheltered, bare ground or plant stems for nesting sites and a range of floral resources can provide an appropriate habitat for a good range of species. Similarly, the seepages and shallow, slow flowing streams created as a result of some of the quarrying operations would appear to be an important resource for various soldier-fly species. Overall, results of this survey suggest that the site is important locally for invertebrates and at least part of the site could be graded as of **County** importance.

5.3 Communities and Habitat Features (Option Land as a whole)

Please note that habitat features below have only been given preliminary and / or potential ecological values as further detailed surveys would be required to fully determine their value.

Tree lines / woodland

The small patches of woodland or tree lines situated along the river corridor and along the disused railway line add to the diversity of habitats found within the Option Land. These habitats are connected via hedgerows, the small reedbed, the river bank and the railway embankment, so that a continuous wide corridor occurs. Several of the trees present within these features are also over-mature and, as described above, are wildlife habitats in their own right. The tree lines / woodland habitats, therefore, provide shelter and foraging opportunities to a range of wildlife species including birds, bats, other mammals, species of flora associated with woodland and hedgerow habitats, invertebrates, fungi and lichens. The connectivity through the landscape provided by these features is also of importance to commuting wildlife.

Woodlands are listed as a priority habitat within the Oxfordshire and Cherwell BAPs.

Preliminary and / or potential ecological value: Local / Parish to District / Borough value.

Trees

The occurrence of over-mature and damaged trees provides ecological diversity within the Option Land. Features associated with older and damaged trees are often used by a range of wildlife species such as bats, birds, invertebrates, fungi and lichens and are likely to provide a valuable resource in a predominantly agricultural landscape. Dead/decaying wood offers habitat potential to invertebrates and fungi.

Preliminary and / or potential ecological value: Local / Parish to District / Borough value.

Scrub

The patches of scrub within the Option Land add to the habitat diversity present there and subsequently increase the potential foraging and shelter habitat available to wildlife species. Scrub habitat is valuable to a range of species, including birds, bats, other large and small mammals and invertebrates.

Scrub habitat is listed as a priority habitat within the Cherwell BAP due to its value to species such as bullfinch, song thrush and turtle dove.

Preliminary and / or potential ecological value: Local / Parish Value

Grassland

The grassland within the Option Land comprises a mosaic of poor, semi-improved pasture, rough grassland and ruderal and/or relatively herb-rich grassland patches. This variety of grassland types offer many foraging and shelter opportunities for wildlife such as mammals (including bats), invertebrates, reptiles, amphibians and birds, some of which nest within grassland (sky lark and grey partridge, UK BAP and red listed species, were recorded here in 2003). The floral composition is not particularly diverse and is typical of these habitats in an agricultural landscape, although it could be improved with appropriate management.

Rough grassland is included within the Grassland, Grazing Marsh and Heathland Habitat Action Plan within the Cherwell BAP.

Preliminary and / or potential ecological value: Local / Parish value.

Marsh/reedbed

The small area of reedbed situated within the eastern option land (target note C7) is a potentially important habitat for a range of wildlife species. Birds such as reed buntings and reed warblers are often associated with reedbeds, while invertebrates, amphibians and some reptile species, particularly grass snake, are likely to forage and shelter in this habitat. The presence of this habitat, however small, within the Option Land increases the diversity of the area and is a valuable resource for wildlife species.

Reedbeds are listed as priority habitats within the UK, Oxfordshire and Cherwell BAPs.

Preliminary and / or potential ecological value: Local / Parish value.

Watercourses

The River Cherwell (including its tributaries) and the Oxford Canal and their banks are important habitats for a range of aquatic species of flora and fauna including water vole (UK BAP priority species, otter, bat species, common kingfisher, common tern and reed bunting. UK BAP priority species (include some of those listed above) associated with these habitats include white-clawed crayfish (although none were found during the 2005 survey of this section of river), depressed river mussel (*Pseudanodonta complanata*), fine-lined pea mussel (*Pisidium tenuilineatum*), southern damselfly (*Coenagrion mercuriale)*), Desmoulin's whorl snail (*Vertigo moulinsiana*) and tassel stonewort (*Tolypella prolifera*) (Cherwell BAP, 2005-2010). The Environment Agency classes this

section of the river and canal as highly productive with regards to fish species and is a designated Cyprinid Fishery under the EC Freshwater Fisheries Directive.

The watercourses provide wildlife species with linear foraging and commuting habitat, which connects to other valuable wildlife habitats and resources within an agricultural landscape.
Canals and Rivers and Ditches are listed as priority habitats within the Oxfordshire Local BAP whereas canals and rivers are included within the Aquatic priority habitat in the Cherwell BAP.

Preliminary and / or potential ecological value: District / Borough to County value.

Ponds

The ponds situated within the eastern Option Land (especially at target note C20) are of varying value to wildlife species. One of the ponds is heavily vegetated and may have areas of open water, although this could not be verified at the time of survey, while the other pond offers greater potential to breeding and spawning amphibians, possibly including the great crested newt. It is likely that both ponds offer habitat to a range of invertebrates, possibly grass snake and small mammals. The vegetation associated with the ditch feeding the open water pond is diverse compared to the pond itself (probably due to increased shading of the pond from surrounding trees). The flora within the reed covered pond could not be assessed at the time of survey.

Ponds are listed as a priority habitat within the Oxfordshire Local BAP and fall under the Aquatic Habitats Action Plan in the Cherwell BAP.

Preliminary and / or potential ecological value: Local / Parish value.

Arable

The arable fields contain limited floral diversity due to the use of herbicides and narrow margins adjacent to the hedgerows, woodland and reedbed. The crops do offer some shelter and limited foraging opportunities for mammals, invertebrates and birds, although the use of pesticides will also reduce the value of these habitats to wildlife. Winter stubble, where present, will also provide foraging opportunities for bird species.

Preliminary and / or potential ecological value: Low local value.

Hedgerows

Hedgerows are an important habitat within the landscape for many species of flora and fauna, particularly where intensive farming or residential landscapes occur. Their main features are that they provide connectivity between habitats and offer shelter, nesting places and foraging opportunities for species such as birds, bats, small mammals, invertebrates, reptiles and amphibians. In addition, hedgerows may often be complemented by a range of wildflowers, some of which are slow to colonise and are reliant on this habitat for survival.

The hedgerows within the Option Land range from intact and species-rich to defunct and species-poor. Many have been inappropriately managed and, as a result, have become defunct in places and their value to wildlife as corridor features has subsequently declined. It is likely that many of these hedgerows are also of historic value (i.e. present within the landscape since at least 1850).

The flowering and fruiting hedgerow species such as blackthorn, hawthorn, elder and dog-rose, are also likely to provide foraging opportunities for small mammals (mice and voles) and invertebrates, bats and birds including birds of prey and larger mammals such as fox and badger. The flowers may be attractive to bullfinch and the fruit is also likely to provide valuable food during the winter for a range of resident and migrant bird species. Both yellowhammer (red listed) and bullfinch (UK BAP and red listed), among many other bird species, have been recorded using hedgerows within the Option Land.

Ancient and/or species rich hedgerows are priority habitats within the UK BAP, while all hedgerows are included within the Oxfordshire and Cherwell BAPs.

Preliminary and / or potential ecological value: The historically and ecologically important hedgerows are of **Local / Parish to District / Borough value**. The more recent, less diverse and defunct hedgerows are of **Local / Parish value**.

Buildings

Two farm buildings occur within the Option Land to the south of the site (target note B6). These are large, predominantly metal structures, which may offer shelter and/or nesting sites to birds such as barn owl, barn swallow and European robin for example. During the bat survey several common pipistrelles were noted flying from the direction of these buildings at dusk, indicating that bats may use the buildings for roosting purposes.

Preliminary and / or potential ecological value: Local / Parish value.

5.4 Option land - species assessment

Please note that species below have only been given preliminary and / or potential ecological values as further detailed surveys would be required to fully determine their value.

Bats

The River Cherwell and Oxford Canal was found to support the greatest diversity of bat species (6 species including natterer's and possibly Nathusius's pipistrelle) during the foraging and commuting bat surveys. Other linear features within the option land also probably provide important foraging and commuting habitat and mature trees offer potential to roosting bats. The value of the river and canal to foraging bats is of at least **District / Borough value** with other features at a lesser value.

Badger

No badger setts have been identified although evidence of badger activity was recorded. A large proportion of the option land comprises arable farmland which only offers moderate foraging potential to badgers. Grazed pasture which is limited in extent, offers greater potential. Small copses, tree lines and hedgerows offer seasonal foraging potential. The option land is probably only of **Local / Parish value** to badgers.

Otter and water vole

Evidence of otter and water vole was found along the banks of the river and canal. Otter is a UK BAP priority species and water vole is a UK and Oxfordshire Local BAP priority species. Both species are supported by the Cherwell BAP. The presence of otter and water vole is of importance in a **County** context.

Birds

The option land supports a number of declining farmland species including five red listed species (common bullfinch, sky lark, song thrush, reed bunting and yellowhammer) and eight amber listed bird species (hedge accentor (dunnock), green woodpecker, house martin, common kestrel, northern lapwing, barn swallow and barn owl and kingfisher which are also listed on Schedule 1 of the Wildlife and Countryside Act, 1981, as amended) were recorded. Common bullfinch, sky lark, song thrush and reed bunting are all UK BAP priority species. The Option Land is assessed as of importance in a **Local / Parish, possibly District** / **Borough** context.

Reptiles, amphibians and invertebrates

Rough grassland, scrub, hedgerows, watercourse banks and woodland edges provide potential habitat for reptiles such as grass snake and slow worm and several ponds within the Option Land have potential to support breeding amphibians, potentially great crested newts. Finally the water courses, hedgerows and less intensively managed areas offer potential for invertebrate habitat. Further surveys would be required to determine the value of the option land to these species.

5.5 Overall evaluation

5.5.1 Shipton Quarry

A number of habitat features within the quarry have been assessed as being of District or County importance, however, there are also significant areas of low value. The most valuable features of the quarry are the unimproved and semi-improved grassland, open water (of significantly varying extent over the years), ephemeral / short perennial vegetation, marginal woodland and scrub areas, springs and swamp / marginal vegetation. It is largely these habitats which support the important species assemblages of Parish / District to County value i.e. flora, bats, breeding birds, wintering birds, invertebrates and reptiles. Although the whole quarry is designated a County Wildlife Site, it is only certain features within it which have been valued as of County importance. It should also be noted that, as an active quarry, the habitats and features within the site are constantly changing. Parts of the quarry, therefore, are considered to be of importance in a District / Borough to County context whereas other areas are of low value.

5.5.2 Option Land

The majority of the habitat features within the option land are provisionally assessed as of Local / Parish value only with the exception of mature trees and tree lines / woodland (Local / Parish to District / Borough) and water courses (District / Borough to County). With respect to species, bat interest associated with the river and canal has been assessed as being of at least District / Borough value, otter and water vole (again associated with the river and canal) as County value and birds as of Local / Parish to District value. Further surveys would be required to fully determine the value to species including amphibians, reptiles and invertebrates. Overall the option land is of value in a Local / Parish value although the river and canal is of District / Borough to County value.

5.5.3 500m buffer to quarry (other than the Option Land)

The habitats present within land surrounding the quarry site (other that the Option Land) are likely to support a range of species similar to that described for the Option Land. There is notably more woodland habitat within this area including wet woodland to the east of the site (a UK and local BAP habitat), also where many birds were observed and tawny owl (*Strix aluco*) was heard calling during the survey. Hedgerows and tree lines of varying diversity and structure continue to connect habitats within this area, forming an important network across the wider countryside. The River Cherwell, the Oxford Canal and the railway embankments (both live and disused) also provide refuge, foraging and connective habitat through the wider landscape for a wide range of aquatic and terrestrial flora, birds, mammals (e.g. bats, otter and water vole), reptiles, amphibians and invertebrates. Many of the habitats present in this landscape are BAP priority habitats (hedgerows, arable field margins, woodland, scrub, wetland etc.), which in turn are capable of supporting UK and local BAP priority species. Due to the diversity of flora and invertebrates present, Bletchingdon Quarry has been designated a County Wildlife Site and supports a range of habitats including lowland calcareous grassland, a UK, Oxfordshire and Cherwell BAP Priority Habitat.

5.6 Species Legislation

The table below details the protected species that have been identified as occurring or potentially occurring within the survey areas (please refer to **Appendices II** and **III** refer for further information).

Table 13: Protected species identified as occurring or potentially occurring within Shipton Quarry and the Option Land

Species	Shipton Quarry	Option Land
Bats	*	*
Badger	*	*
Otter	-	Probably
Water vole	-	Probably
Breeding birds	*	*
Barn owl	-	Probably
Reptiles	*	Probably
Great crested newt	-	Possibly

All wild mammals are protected under the Wild Mammals (Protection) Act 1996 against persecution, killing and injury.

The following habitats and species are listed on Section 74 of the CRoW Act (**Appendix III** refers):

Lowland meadow (including most areas of unimproved neutral grassland)
Eutrophic standing water
Cornflower
Common pipistrelle bat
Lesser horseshoe bat
Sky lark
Reed bunting
Grey partridge
Common bullfinch
European turtle dove
Song thrush

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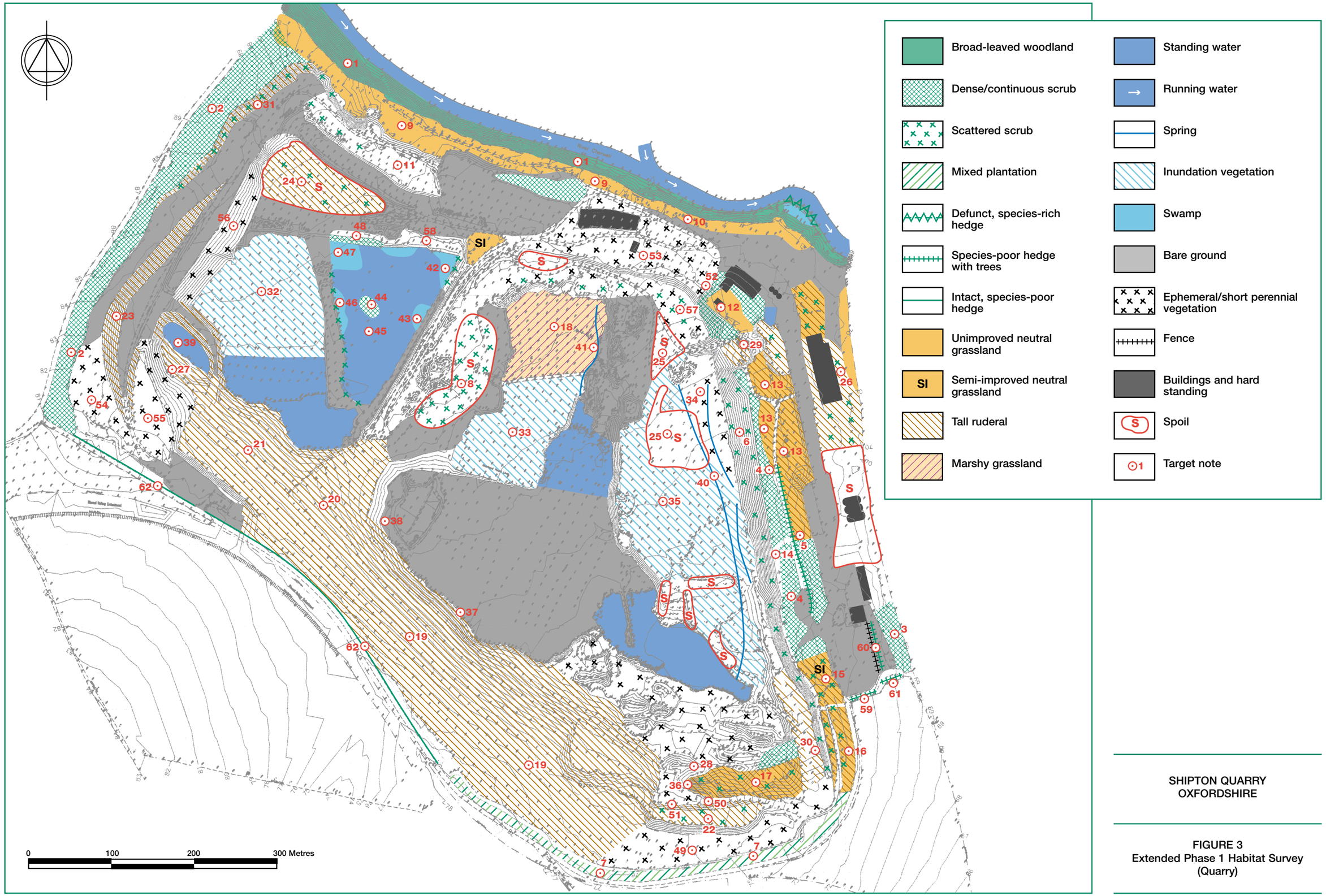
FIGURES



SHIPTON QUARRY
OXFORDSHIRE

FIGURE 3
Extended Phase 1 Habitat Survey
(Quarry)

Lakes surveyed

1 to 4 Refer to text

SHIPTON QUARRY
OXFORDSHIRE

FIGURE 12
Great Crested Newt Survey

APPENDIX I

BADGER SETT ENTRANCE CRITERIA

APPENDIX I: BADGER SETT AND ENTRANCE CRITERIA

Badgers live in social groups in underground burrow systems known as setts. Groups often have more than one sett in their territory with varied status and levels of use:

- The main sett is the most frequently used. It will have several holes with large spoil heaps and an obvious network of paths leading from it
- Annexe setts are regularly used with several holes but are smaller than the main sett. They are found close to the main sett and are connected by well-worn paths
- Subsidiary setts are further away with no obvious paths connecting them to other setts. These setts are not continuously active and have few holes
- Outlying setts are sporadically used with few holes and little evidence of Badger use. Fox or rabbit may take over outliers
- Single holes may be sporadically used and have little evidence of Badger use. Some may be occupied by breeding females. Fox may take over single holes.

Sett and Entrance Assessment criteria

- Well-used holes with bedding: same as below but with bedding material present at entrance
- Well-used holes: clear of any debris or vegetation and are obviously in regular use. May be evidence of recent excavation or fresh footprints
- Partially-used holes: not in regular use with debris such as leaves and twigs in the entrance and moss or other plants growing in and around the entrance. A minimal amount of clearance would be necessary for Badgers to continue using the hole
- Disused holes: have not been in use for some time and would require a considerable amount of clearance before they could be used. A very long-disused hole may be just a depression in the ground and the remains of a spoil heap.

APPENDIX II

ECOLOGICAL EVALUATION METHODS

APPENDIX II: Evaluation techniques

1.0 INTRODUCTION

A number of systems and criteria are available to assess the nature and extent of ecological interest found at any site. Draft Guidelines for Ecological Impact Assessment have been prepared by the Institute of Ecology and Environmental Management (2005), which have been employed below. The draft IEEM guidelines detail a recommended approach to the valuation of ecological receptors on the following scale:

- International importance
- UK importance
- National importance (England/Northern Ireland/Scotland/Wales)
- Regional importance
- County (or Metropolitan)
- District (or Unitary Authority, City or Borough)
- Local or Parish; and/or
- Within immediate zone of influence only

2.0 HABITATS AND FEATURES

Internationally important habitats are considered to be those listed on Annex I of the Habitats Directive. All internationally important examples, however, should have been designated within Special Areas for Conservation (SACs). Other examples should be considered to be of value at the level for which they are designated (see below). There are published guidelines for the selection of SACs (see Brown *et al*, 1997) and SPAs and Ramsar Sites (Stroud *et al*, 1990).

There are similar published criteria for the selection of nationally important Sites of Special Scientific Interest (SSSIs) (NCC, 1989), which give criteria for both habitats and species.

The majority of Local Authorities have a system of 'second tier' sites which do not wholly fulfil SSSI designation criteria, but which are, nonetheless, of local to regional value. Policies, encouraged by Government advice, recognise that protection should be extended beyond the statutory sites to include the best examples of wildlife habitats, populations of rare species and geological features remaining in the District and are particularly valuable in supplementing and supporting the national framework for SSSIs. Collis and Tyldesley (1993) sets out a framework for the selection of non-statutory sites of importance for nature conservation. The Hedgerow Regulations (1997) provide a useful framework for the assessment of the ecological importance of hedgerows.

It is possible that there may be habitats that do not fall within designated sites but are considered to meet the published selection criteria. Similarly it is possible that habitats within designated sites may not fulfil the criteria for designation in their own right. This may be due to the site having deteriorated or that they have been included for other reasons such as secondary or supporting value. If a habitat is considered to be in an unfavourable condition, consideration must be given to its potential value if restored. Consideration should also be given to secondary or supporting value where a habitat or feature may have no particular interest in itself but may perform an important ecological function such as a buffer against negative impacts or an important link between habitats. The presence of a diverse range of habitats can increase the value of a site.

3.0 SPECIES

A number of resources are available to assess the rarity and vulnerability of individual species. The **Red Data Book System** (RDB) utilises standard criteria defined by the International Union for the Conservation of Nature (IUCN, 1994, now the World Conservation Union, WCU) to classify the scarcity and conservation status of species of

flora and fauna. The Red Data Book/Red List system may operate at an International, National or Regional level (e.g. County Red Data Books).

The IUCN threat categories were revised in 1994 to: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, and Lower Risk. Taxa listed as Critically Endangered, Endangered or Vulnerable are defined as Threatened (Red list) species. Earlier Red Data Books classified species on the former IUCN criteria as: Extinct, Endangered (RDB1), Vulnerable (RDB2) and Rare (RDB3). The IUCN maintains a list of threatened species on a global scale.

In addition to IUCN criteria, there are also criteria to define nationally rare and nationally scarce vascular plants in Britain (Cheffings and Farrell, 2005). Currently these are defined to be:

> Nationally rare (NR) - Occurring in 15 or fewer hectads in Great Britain
> Nationally scarce (NS) - Occurring in 16-100 hectads in Great Britain

The latest red data book for insects was published in 1987 (Shirt, 1987) and some of the subsequent reviews which use the now superseded categories of Endangered (RDB1), Vulnerable (RDB2), Rare (RDB3) and Insufficiently known (RDBK). There have been subsequent reviews covering various groups of insects such as bees, wasps and ants (Falk, 1991) or some of the beetle families (Hyman and Parsons, 1992) published by the Joint Nature Conservation Committee (JNCC). The first JNCC publication to make use of the revised IUCN status system is the review of water beetle species (Foster, 2000), previous published reviews will be revised and republished using the new system.

Criteria for the selection of Nationally Notable insects (now termed Nationally Scarce and corresponding to the Nationally Scarce category for vascular plants) species generally follow Eversham (1983). These Nationally Notable/Scarce species are further divided into Notable A (present in 16-30 squares) and Notable B (31-100 squares).

Rare birds in Britain are defined as any species for which records would have to be verified by the British Birds Rarities Committee. County rarities are taken to include all national rarities and also any species listed in County bird reports requiring a full description, which should be submitted to the relevant County Recorder. The presence of rare birds at any time of year, including locally rare species, adds significantly to the ecological value of a site. However, in general, only rare birds with a regular pattern of occurrence at a site should be included in this category.

National and County distribution atlases and species reports such as county bird reports can provide valuable additional information for evaluation. They can also provide information on species status at the level of geographic coverage of the atlas. Species at the edge of their distribution (especially in the context of global change) and notably large populations of species that are uncommon or threatened in the wider context enhances a species value. A species that is rare and declining should be assigned a higher level of importance than one that is stable. Other rarity related evaluation criteria include the need to protect populations for which the UK holds a large / significant proportion of the international / European population. The presence of a diverse assemblage of species can enhance the value of a site.

4.0 OTHER RESOURCES

4.1 Natural Areas

English Nature has divided England into 120 'Natural Areas' described as areas of the countryside identified by their unique combination of physical attributes, wildlife, land-use and culture (English Nature, 1998). Natural Areas provide a useful framework for assessing species and habitats beyond the traditional administrative boundaries. In the UK Biodiversity Action Plan they are described as:

"… biogeographical zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation."

The Natural Area profiles provide contextual information to confirm temporal and spatial scope. They can provide information to aid evaluation of the relative importance of ecological receptors.

4.2 Biodiversity Action Plans

The **UK Biodiversity Action Plan** (BAP) published in 1994 (UK Biodiversity Steering Group, 1995-1999) highlighted 38 key habitat types, now termed priority habitats, which have been revised to include 26 non-maritime and 19 maritime priority habitats. Priority habitats are defined as those for which the UK has international obligations, are suffering high rates of loss, are rare, or are important for priority species. Priority species within the BAP system are either globally threatened or have declined by more than 50% in the last 25 years. The majority of habitats and species under the National BAP are included on the list prepared under S74 of the Countryside and Rights of Way Act (2000). The Biodiversity Strategy for England sets out the means by which the government will comply with its duty under S74, or promote the taking by others, steps to further the conservation of listed habitats and species. Biodiversity Action plans at lower levels such as regional and county have also been produced for many areas.

Selection of habitats and species for BAPs is on the grounds that they are in a sub-optimal state and does not imply any specific level of importance of a habitat or species. The value of priority habitats and species should be determined as described above. Only where a specific habitat or species action plan states that all areas of a particular habitat or all populations of a given species should be protected should the habitat or species be valued at the appropriate level of the BAP. BAPs can assist in ecological evaluation but must be reviewed on a case by case basis.

4.3 Bird Species of Conservation Concern

Bird Species of Conservation Concern in the UK, Channel Islands and Isle of Man was first published in 1996 and updated in 2002 (Gregory *et al*, 2002). The list is prioritised into species of high (red) and medium (amber) conservation concern; all other species are of lower (green) concern. Red-listed species are globally threatened according to IUCN (World Conservation Union) criteria or in rapid decline (greater than 50% over the past 25 years) in the UK, currently or historically and those that have declined historically and not shown a substantial recent recovery. Amber listed species are in moderate decline (25-49% over the past 25 years), rare breeders, localised or internationally important populations, of an unfavourable conservation status in Europe or those whose population has declined historically but made a substantial recent recovery. It should be noted that despite substantial declines, many red-listed species such as skylark *(Alauda arvensis)* and song thrush *(Turdus merula)* remain relatively common in the UK countryside. As for BAPs, inclusion of species on one of the lists is not sufficient in itself for assigning a level of value to the species concerned. Each species should be evaluated according to the guidelines above with reference to the criteria for inclusion of the species.

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APPENDIX III

LEGAL FRAMEWORK

APPENDIX III: LEGAL FRAMEWORK

1.0 PROTECTED SITES (EUROPEAN)

1.1 Special Areas Of Conservation (Sacs)

SACs are designated under **The Conservation (Natural Habitats &c.) Regulations 1994**, as amended in England in 2000 ('The Habitats Regulations') which implements The **European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora** 92/43/EEC (the 'Habitats Directive', EEC, 1992). Lists of candidate SACs (cSACs) have been submitted to the European Commission for approval. Both possible SACs (pSACs) and cSACs are treated by the planning system as if fully designated.

The Habitats Directive also refers to the need for nature conservation outside protected areas (Article 10) and measures to implement this article are incorporated in British legislation through the Habitats Regulations (HMSO, 1994) and ODPM Circular 06/2005 that accompanies PPS9. Article 10 of The EU Habitats Directive 1992 and Regulation 37 of the Conservation (Natural Habitats, & c.) Regulations 1994 states that:

"Member States shall endeavour, where they consider it necessary, in their land use planning and development policies and, in particular, with a view to improving the ecological coherence of the Natura 2000 network, to encourage the management of features of the landscape which are of major importance for wild flora and fauna.

Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems of marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species.

1.2 Special Protection Areas (Spas)

SPAs are designated through the **European Community Directive on the Conservation of Wild Birds** (79/409/EEC) (the 'Birds Directive', EEC, 1979). Under this Directive, the UK Government must also take special measures to conserve the habitat of species listed in Annex I of the Directive and all migratory species. Member States are required to classify the most suitable areas for these species as SPAs.

1.3 Ramsar sites

The Ramsar Convention (UNESCO, 1987) requires signatory states to protect wetlands that are of international importance, particularly as waterfowl habitats.

2.0 PROTECTED SITES (NATIONAL)

2.1 Sites of Special Scientific Interest (SSSIs)

The **Wildlife and Countryside Act (1981)** (as amended 1991 and varied 1998) (HMSO, 1981, 1991, 1998) requires English Nature, the Government body with authority for nature conservation in England, to designate areas which make a significant contribution to a national network of sites of nature conservation value as SSSIs.

The **Countryside and Rights of Way Act (2000)** (HMSO, 2000) came into force in full on 30 January 2001. The Act is in five parts. Part III relates to Nature Conservation and amends existing legislation (i.e. the Wildlife and Countryside Act (1981)) through improved protection and management of SSSIs, improved legal protection for threatened species and the provision of a statutory basis for biodiversity conservation.

2.2 Local Nature Reserves

Local Nature Reserves are designated under Section 21 of **The National Parks and Access to the Countryside Act (1949)** (HMSO, 1949) by principal local authorities. The

declaring local authority must have a legal interest in the land concerned. Local Nature reserves are designated for people and wildlife. They are places with wildlife or geological features of special interest locally and that give people special opportunities to study and learn about them or simply enjoy them and have contact with nature.

3.0 NON-STATUTORY SITES

The majority of Local Authorities have a system of 'second tier' sites which do not wholly fulfil SSSI designation criteria, but which are, nonetheless, of local or regional value. The policies, encouraged by Government advice, recognise that protection should be extended beyond the statutory sites to include the best examples of wildlife habitats, populations of rare species and geological features remaining in the area and are particularly valuable in supplementing and supporting the national framework for SSSIs.

4.0 PROTECTED FEATURES

4.1 Hedgerow Regulations

The **Hedgerow Regulations (1997)** (HMSO, 1997) were introduced to protect 'important' hedgerows in the countryside by controlling their removal through a system of notification. The Regulations apply to lengths of hedgerow greater than 20m in length, not adjoining residential curtilages. 'Important' hedgerows are defined within the Regulations on a variety of historical and/or ecological criteria.

4.2 Tree Preservation Orders (TPO's)

TPO's are made under Part VIII of the Town and Country Planning Act 1990 as amended by s23 of the Planning and Compensation Act 1991 and under the Town and Country Planning (Trees) Regulations 1999. They are made by local planning authorities to protect selected trees and woodlands if their removal would have a significant impact on the local environment and its enjoyment by the public. The criteria do not incorporate any specific considerations of ecological value. However, TPO's provide legal protection to trees prohibiting the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction.

5.0 PROTECTED SPECIES (EUROPEAN)

5.1 Plants

Certain plant species are listed under Annex IVb of the Habitats Directive under which it is an offence to deliberately pick, collect, cut, uproot or destroy such a plant.

Under the Bern Convention 1979, Contracting Parties are required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild flora species specified in Appendix 1. In the UK this is implemented through various national wildlife protection policies.

5.2 Bats

All British bats and their roosts are fully protected under international wildlife law against adverse effects including disturbance. Under the terms of the Bonn Convention, which encompasses the Agreement of the Conservation of Bats in Europe, there is a fundamental obligation to protect from damage or disturbance, sites which are important for the conservation status of bats. Such sites include those bats use for shelter or protection and important foraging areas.

5.3 Dormouse (*Muscardinus avellanarius*)

The dormouse is protected under Schedule 2 of the Habitats Regulations 1994 and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Taken together, the Regulations and Act make it illegal to intentionally or deliberately kill, injure or capture

dormice; deliberately disturb dormice and damage or destroy dormouse breeding sites or resting places.

5.4 Otter (*Lutra lutra*)

The otter is protected under Schedule 2 of the Habitats Regulations 1994 and Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Taken together, the Regulations and Act make it illegal to intentionally or deliberately kill, injure or capture otters; deliberately disturb otters and damage or destroy otter breeding sites or resting places.

5.5 Birds

In Britain all wild birds are granted legal protection under the EC Birds Directive and the Wildlife & Countryside Act 1981 (as amended). This legislation protects the birds, their eggs and nests whilst being built or in use.

Legal protection makes it an offence to intentionally kill, injure, take or have in possession any wild bird or egg. It is also an offence to intentionally damage or destroy the nest of any wild bird whilst it is being built or in use.

Under the Bern Convention 1979, Contracting Parties are required to take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II. In the UK this is implemented through various national wildlife protection policies.

5.6 Great Crested Newt

The great crested newt (*Triturus cristatus*) is fully protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) and the Conservation (Natural Habitats & c.) Regulations 1994 (and subsequent amendments). The legislation protects the newts and their places of shelter or protection, which may extend 500m from the breeding pond.

5.7 Inverts

Under the Habitats Regulations invertebrate species listed on Schedule 2 it is an offence to deliberately capture or kill, disturb, take or destroy eggs of such a species or to damage or destroy the breeding site or resting place of such an animal.

6.0 PROTECTED SPECIES (NATIONAL)

6.1 Plants

Statutory protection in Great Britain is provided by the Wildlife and Countryside Act (1981). The plants and fungi which have special protection are listed on Schedule 8 under which it is an offence to intentionally pick, uproot or destroy any plant on Schedule 8.

Five plant species are listed on the Weeds Act 1959 as injurious: common ragwort (*Senecio jacobaea*), broad-leaved dock (*Rumex obtusifolius*), curled dock (*Rumex crispus*), creeping thistle (*Cirsium arvense*) and spear thistle (*Cirsium vulgare*). The Act requires landowners to eliminate scheduled weeds to prevent their seeds contaminating neighbouring land. The Ragwort Control Act (2003) amends the Weed Act with respect to common ragwort.

Four species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 under which it is an offence to plant or otherwise cause to grow in the wild the scheduled species. Two are marine, the others being giant hogweed (*Heracleum mantegazzianum*) and Japanese knotweed (*Fallopia japonica*).

6.2 Wild Mammals

Under the Wild Mammals (Protection) Act 1996 it is an offence to mutilate, kick, beat, nail or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate and wild mammal with intent to inflict unnecessary suffering.

6.3 Badgers

Badgers are protected under the Protection of Badgers Act 1992. This Act makes it illegal to wilfully kill, injure or take any badger, or attempt to do so and it is an offence to intentionally or recklessly damage, destroy or obstruct access to any part of a badger sett. A licence from English Nature is required to allow works within the vicinity of a badger sett, and these works are only permitted between **1 July to 30 November inclusive**, *i.e*. outside of the breeding season for badgers. The following activities would require a licence:

- The use of very heavy machinery (including tracked vehicles) within 30m of any entrance of an active sett.
- The use of lighter machinery (wheeled vehicles) particularly for digging operations within 20m of any entrance of an active sett.
- Light work (hand digging and scrub clearance) within 10m of any entrance of an active sett.

6.4 Water Voles

The water vole (*Arvicola terrestris*) receives protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) in respect of Section 9(4) only. This protects the water vole's places of shelter or protection, but does not protect the voles themselves. Legal protection makes it an offence to intentionally damage, destroy or obstruct access to any structure or place used by water voles for shelter or protection or to disturb water voles while they are using such a place.

6.5 Birds

In Britain all wild birds are granted legal protection under the Wildlife & Countryside Act 1981 (as amended) and the EC Birds Directive. This legislation protects the birds, their eggs and nests whilst being built or in use.

Legal protection makes it an offence to intentionally kill, injure, take or have in possession any wild bird or egg. It is also an offence to intentionally damage or destroy the nest of any wild bird whilst it is being built or in use. Birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) are subject to special penalties.

6.6 Reptiles

The slow-worm (*Anguis fragilis*), grass snake (*Natrix natrix*), adder (*Vipera berus*) and common lizard (*Lacerta vivipara*) are protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) in respect of section 9(1) and 9(5) only. Under section 9(1) it is an offence to knowingly kill or injure a reptile. Section 9(5) refers to sale and trade.

6.7 Invertebrates

Statutory protection in Great Britain is provided by the Wildlife and Countryside Act (1981). The invertebrates which have special protection are listed on Schedule 5 under which it is an offence to intentionally kill, injure or take these invertebrates and intentionally or recklessly damage or destroy, or obstruct access to, any structure or place used for shelter or protection or disturb any such animal while occupying such a structure or place.

7.0 BIODIVERSITY CONSERVATION

In 2002, the Department of Farming and Rural Affairs (DEFRA) published a list of principally important species and habitats for the purposes of conserving biological diversity in England under Section 74 of the Countryside and Rights of Way Act 2000 in accordance with the 1992 UN Convention on Biological Diversity. The *Biodiversity Strategy for England* sets out the means by which the Government will comply with its duty under Section 74 to take or promote the taking by others of steps to further the conservation of listed habitats and species, including through the continued implementation of Action Plans.

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APPENDIX IV

DATA SEARCH RESULTS

COUNTY: OXFORDSHIRE SITE NAME: RUSHY MEADOWS

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authorities: Cherwell District Council, Oxfordshire County Council

National Grid Reference: SP481143

Ordnance Survey Sheet 1:50,000: 164 **1:10,000:** SP41 SE

Date Notified (Under 1981 Act): 1985 **Date of Last Revision:**

Area: 8.74 ha 21.59 ac

Description and Reasons for Notification

This site consists of a series of unimproved alluvial grasslands alongside the Oxford Canal, in which low-intensity, traditional management has produced rich meadow and fen communities containing several uncommon species. Meadow habitats of this type are now both rare and under threat in Britain. Rushy Meadows represents one of the few surviving sites in a district where such grasslands have declined in area following agricultural improvement and urban development.

The meadows are situated on terrace alluvium and gravels which have weathered to produce loamy soils of the Sutton 1 and Kelmscot series.

Rushy Meadows are a particularly fine example of a *Cynosurus cristatus-Centaurea nigra* meadow and pasture community. They largely conform to a sub-community characterised by the presence of meadow vetchling *Lathyrus pratensis*, although this type grades into several other grassland and tall herb communities.

The meadows are dominated by hard rush *Juncus inflexus* occurring in an open, species-rich sward. In damper areas common, brown and hairy sedges *Carex nigra, C. disticha* and *C. hirta* and tufted hair-grass *Deschampsia cespitosa* are major components, occurring in association with soft and sharp-flowered rushes *Juncus effusus* and *J. acutiflorus*, fleabane *Pulicaria dysenterica*, fen bedstraw *Galium uliginosum* and marsh horsetail *Equisetum palustre*. in drier areas red fescue *Festuca rubra*, sweet vernal and tall oat grasses *Anthoxanthum odoratum* and *Arrhenatherum elatius* dominate, but broadleaved species such as tufted vetch *Vicia cracca* and meadow vetchling remain prominent.

Less common species present include pepper saxifrage *Silaum silaus*, devil's bit scabious *Succisa pratensis*, heath grass *Danthonia decumbens*, marsh valerian *Valeriana dioica*, betony *Stachys officinalis*, early marsh orchid *Dactylorhiza incarnata* and distant sedge *Carex distans*. Of particular interest is water avens *Geum rivale* which is very uncommon in the Thames basin.

Of the tall fen communities, the most extensive contains meadowsweet *Filipendula ulmaria* and great willowherb *Epilobium hirsutum* as well as many of the wet meadow species noted above. This grades into a second type dominated by sharp-flowered rush *Juncus acutiflorus* and watermint *Mentha aquatica*. A third is dominated by lesser pond-sedge *Carex acutiformis*, accompanied by common reed, reed sweet-grass and reed canary-grass *Phragmites australis, Glyceria maxima* and *Phalaris arundinacea*, false fox-sedge *Carex otrubae* and wild angelica *Angelica sylvestris*.

Tall, species-rich hedges containing wayfaring tree *Viburnum lantana*, guelder rose *V. opulus*, hazel *Corylus avellana*, crack willow *Salix fragilis* and sallow *S. cinerea* enclose and sub-divide the meadows.

A broad, shallow, eutrophic ditch running north-south through the site is dominated by narrow-leaved water parsnip *Berula erecta*, erect bur-reed *Sparganium erectum*, water mint and reed sweet-grass. A balancing reservoir within the site supports dense stands of the uncommon marsh arrow-grass *Triglochin palustris* and bristle club-rush *Isolepis setacea*.

Notable bird species occurring at this site include breeding snipe and grasshopper warbler and over-wintering water-rail.

COUNTY: OXFORDSHIRE

SITE NAME: SHIPTON-ON-CHERWELL & WHITEHILL FARM QUARRIES

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authorities: Cherwell and West Oxfordshire District Councils, Oxfordshire County Council

National Grid Reference: SP474176, SP478186

Ordnance Survey Sheet 1:50,000: 164 **1:10,000:** SP41 NE

Date Notified (Under 1981 Act): 1986 **Date of Last Revision:** 20 March 1995

Area: 27.65 ha 68.3 ac

Description and Reasons for Notification

The Shipton-on-Cherwell Quarry currently exposes a section from near the base of the White Limestone (including the type section of the Shipton Member) up to the Lower Cornbrash; it is one of the most important sections in Oxfordshire for displaying the typical local Mid to Upper Bathonian lithostratigraphic succession. The highly fossiliferous Shipton Member of the White Limestone is well-displayed at Whitehill Farm Quarry. This quarry in addition displays large-scale cross-bedding in the overlying Ardley Member (not seen at Shipton), formed by storm-moved shelly-oolite shoals in a 'lagoonal' setting. These two localities illustrate the considerable variation in facies within the White Limestone locally, and they have been critical in palaeoecological, sedimentological and general facies studies of the White Limestone of central and eastern England. Shipton may be regarded as the type-section of the laterally extensive Forest Marble, and is undoubtedly the best location in the country for examining the rapid lateral facies changes seen within this formation; elsewhere the complex inter-relationship between oolitic/bioclastic sand-shoals and inter-shoal, slack-water muds which characterises the Forest Marble of the area is inadequately displayed. Some of the Forest Marble at Shipton contains transported elements of the diverse 'Bradfordian' fauna but much of it is unfossiliferous, although the tracefossil *Gyrochorte* occurs frequently. The Forest Marble here has been the subject of exhaustive sedimentological study. The fossiliferous Lower Cornbrash, thickly developed at Shipton, is characteristic of the Lower Cornbrash of much of Oxfordshire.

The northern corner of Shipton-on-Cherwell Quarry has been well-known for its fossil reptiles since 1820. It has yielded fine cranial remains of 5 or more long-snouted crocodiles (*Steneosaurus, Teleosaurus*) including type material of two species, from the *fimbriatus-waltoni* beds, and other units near the top of the White Limestone Formation. The type specimen of the dinosaur *Dacentrurus vetustus* (from the Lower Cornbrash here) is one of the earliest Stegosaurs known. Shipton-on-Cherwell Quarry has yielded the best extant collection of Middle Jurassic crocodiles in the world. It is of international importance as one of the best Upper Bathonian reptile sites known.

COUNTY: OXFORDSHIRE SITE NAME: KIRTLINGTON QUARRY

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authorities: Cherwell District Council, Oxfordshire District Council

National Grid Reference: SP494199

Ordnance Survey Sheet 1:50,000: 164 **1:10,000:** SP41 NE, SP42 SE

Date Notified (Under 1949 Act): 1955 **Date of Last Revision:** 1977

Date Notified (Under 1981 Act): 1986 **Date of Last Revision:**

Area: 3.3 ha 8.2 ac

Description and Reasons for Notification

Of only five Middle Jurassic mammal sites in the world (all of them British) Kirtlington has yielded by far the most diverse assemblage described to date. At least nine species of therian and prototherian mammals occur, together with a stratigraphically late tritylodontid. These occur in a discontinuous rootleted clay of probable marsh origin within the basal Forest Marble Beds (Upper Bathonian). The bed has yielded crocodilian, pterosaur and theropod dinosaur material. The richest mammal-bearing locality of Middle Jurassic age known anywhere in the world.

The Kirtlington Mammal Bed in the Forest Marble Beds at this site has also yielded a rich and diverse fauna of fish species based on teeth. These include Lepidotidae, Pycnodontidae and *Caturus*. The site is very rich in micro-shark teeth. Elasmobranchs include *Asteracanthus*, *Hybodus* and a lamnid.

OXFORDSHIRE WILDLIFE SITES CITATION

NAME: Langford Meadow GRID REF: SP480 153

DISTRICT: Cherwell ALERT MAP CODE: 41S02

TOTAL SIZE OF SITE (Ha): 10.8 ha

SITE DESCRIPTION:
Langford Meadow is a large area of wet unimproved neutral pasture and fen. This is a habitat which is now rare in Britain. The meadow is botanically rich with several species which are typical of unimproved wet neutral grassland including southern marsh orchid and pepper saxifrage.

The site is also very important for birds including several species which are of conservation concern in Britain. These include at least 6 pairs of reed bunting, a species which is on the Red list of birds of high conservation concern. Up to 56 snipe have been recorded on the site during the winter. This is possibly the greatest concentration of snipe at any site in Oxfordshire in the winter.

Langford Meadow was lightly grazed by cattle until about ten years ago but is now mostly unmanaged. Wide strips at the edges of the field and approximately one quarter of the northern end of the field have been mown this year. The central part of the field has a dense growth of greater willowherb. A stream arises from a small pond half way down the field. The site may hold water voles.

The ideal management for the site would be to re-establish grazing by cattle at a low stocking density. Under good conservation management it is possible that snipe, which are on the Amber list of species of medium conservation concern, could be encouraged to breed.

PRIORITY UK BAP HABITAT: Coastal and floodplain grazing marsh (neutral grassland); fen

PRIORITY UK BAP SPECIES RECORDED:
Reed bunting (6-8 pairs breeding)
Bullfinch (2 pairs breeding)
Skylark (not known to breed on site)
Song thrush (at least 2 pairs breeding)
Turtle dove (1998 – passage migrant)

OXFORDSHIRE BIODIVERSITY CHALLENGE SPECIES RECORDED:
Cuckooflower, ragged Robin, reed bunting, sedge warbler (up to 10 pairs breeding), **snipe** (up to 78 in winter 1999), **kingfisher** (occasionally visit ponds), **turtle dove**

RED DATA BOOK (RDB) SPECIES RECORDED:
-

NATIONALLY SCARCE (NSC) SPECIES RECORDED:
-

BIRDS OF CONSERVATION CONCERN (BoCC) RECORDED:
Red List Species: Reed bunting, bullfinch, song thrush, (skylark, turtle dove – occasional visitors)
Amber List Species: Snipe, grasshopper warbler (spring visitor), blackbird, redwing (winter), kingfisher, dunnock (breeding), fieldfare (winter), goldfinch (winter), green woodpecker (visitor), jack snipe (winter), starling, water rail (1-2 in winter), woodcock (1-2 in winter)

TYPICAL NEUTRAL AND WET GRASSLAND SPECIES RECORDED
Early marsh orchid, pepper saxifrage, ragged robin, meadowsweet, fen bedstraw, marsh St John's wort, marsh marigold, water figwort, water forget-me-not, brooklime, parsley water dropwort, cuckooflower.

Oxfordshire Wildlife Sites Citation

SITE NAME: Shipton-on-Cherwell Quarry (Bunkers Hill) SITE CODE: 41T06

AREA: 62.6 ha GRID REF: SP 475175

DISTRICT: Cherwell

SITE DESCRIPTION:
This huge limestone quarry adjacent to the River Cherwell and Oxford Canal carries extensive open water, wetland, calcareous grassland and open-ground habitats. The bird interest is significant for over wintering, migrating and breeding birds, as reported by John Brucker of the Oxford Ornithological Society.

The wetlands are quite rich with extensive areas of hard rush, lesser pond sedge and some branched bur-reed and a little common reed. Interesting plants include brookweed, early marsh-orchid, mare's-tail and a stonewort (*Chara*, species unknown). The limestone grassland is most established on the northern side where there is the rare wild liquorice and also mouse-ear hawkweed, wild basil, carline thistle, yellow-wort, stemless thistle and bird's-foot trefoil. Open areas are extensive and carry abundant fairy flax, common centaury, autumn hawkbit, rough hawkbit and lesser hawkbit, squirrel-tail fescue and stork's bill, as well as the rarer fern-grass and rat's-tail fescue. Areas with hard core have abundant ploughman's spikenard, blue fleabane and willowherbs including square-stemmed, broad-leaved and American willowherbs.

Butterflies include marbled white, small heath and ringlet. Nationally scarce insects recorded in 1990 include the scarce blue-tailed damselfly and the white-legged damselfly and a leafhopper *Macrosteles frontalis*. Grass snake was recorded in 1990 and common lizard in 1987.

UK PRIORITY BAP HABITATS: Lowland Calcareous Grassland, Fen

UK PRIORITY BAP SPECIES: *To be added.*

RED DATA BOOK SPECIES:

NATIONALLY SCARCE SPECIES:
Scarce blue-tailed damselfly 1990
White-legged damselfly 1990
a leafhopper *Macrosteles frontalis* 1990.

OXFORDSHIRE BIODIVERSITY CHALLENGE SPECIES: Cowslip

BIRDS OF CONSERVATION CONCERN: Red list: *To be added* Amber list: *To be added*

TYPICAL (habitat type) SPECIES:

Oxfordshire Wildlife Sites Citation

SITE NAME: Bletchingdon Quarry

SITE CODE: 41Y03

AREA : 7 ha

GRID REF: SP 484178

DISTRICT: Cherwell

SITE DESCRIPTION:
This site is an abandoned limestone quarry which has been used informally for motorbike scrambling for the last 40 years. Much of the ground has been levelled for the scrambling tracks and has annual plants of neutral soils. The remaining steep areas with rocky outcrops carry some scrub and a more interesting flora with the unusual fern grass and occasional stemless thistle, salad burnet and mouse-ear hawkweed. An area to the south west is scrubbing over but has a patch of common restharrow with pyramidal orchid and hairy violet. Invertebrates were recorded in 1998 and include a Notable b woodlouse, 4 local snails, 2 local woodlice and 1 local spider.

Divided from the main site by a bank with ash, hazel and field maple, and enclosed by a bend of the River Cherwell is a swampy area dominated by reed sweet-grass and sedges. Common meadow-rue, marsh bedstraw, lesser spearwort, celery-leaved buttercup and reed canary-grass are also present. This area is important for birds which in 2001 included sedge warbler (3 pairs), reed warbler (2 pairs), grasshopper warbler (1) whitethroat (4 pairs), garden warbler (2 pairs), blackcap (4 pairs), chiffchaff (3 pairs), greenfinch (2), goldfinch (6) and yellowhammer (2).

UK PRIORITY BAP HABITATS: Lowland Calcareous Grassland

UK PRIORITY BAP SPECIES: none recorded

RED DATA BOOK SPECIES: none recorded

NATIONALLY SCARCE SPECIES: *Trichoniscoides albidus* a woodlouse, 1998 Notable b.

OXFORDSHIRE BIODIVERSITY CHALLENGE SPECIES:
Common meadow-rue
Sedge warbler (3 pairs in 2001)

BIRDS OF CONSERVATION CONCERN:
Red list: none recorded
Amber list: **Grasshopper warbler** (1 pair)

TYPICAL WETLAND SPECIES:
Reed sweet-grass, floating sweet-grass, plicate sweet-grass, reed canary grass, greater pond sedge, lesser pond sedge, false fox sedge, common reed, marsh bedstraw, lesser spearwort, celery-leaved buttercup, creeping jenny, common meadow-rue, water mint, water forget-me-not, meadowsweet, brooklime, jointed rush, soft rush, hard rush, toad rush, greater club-rush.

OXFORDSHIRE WILDLIFE SITES PROJECT CITATION

NAME: Enslow Marsh Sedgebed (Southern section) GRID REF: SP 486184

DISTRICT: Cherwell ALERT MAP CODE: 42X07/2

TOTAL AREA OF SITE: ...ha

SITE DESCRIPTION:
This site is one of the largest sedgebeds in Oxfordshire. Greater pond sedge dominates much of the area while lesser pond sedge is abundant towards the northern edge of the site. Slender tufted sedge and bottle sedge (a species which is rare in Oxfordshire) are also found at Enslow Marsh Sedgebed. The site has typical marshland species including common meadow-rue (a large patch near the River Cherwell at the southern end of the site), hemlock water-dropwort, skullcap, water horsetail, yellow iris, marsh marigold, great willowherb, common valerian and purple loosestrife. Reed sweet-grass dominates wetter areas of the marsh near the northern edge and a strip at the southern end near the canal towpath.

Wet willow woodland has become established beside the hedgerow that marks the northern boundary of the site and at the southern end of the marsh. Wet woodland is a priority for conservation in Britain. Willows are invading the marsh and two large groups have become established at the northen end around a small area of open water, and extending into the marsh from the southern end. Unless controlled, willows will eventually dominate the sedgebed.

Enslow Marsh Sedgebed provides important breeding habitat for birds including reed bunting (4-5 pairs breeding) and sedge warbler. Reed warbler use Enslow Marsh for feeding, but breed in the reeds off the site at the edge of the canal. The woodland and scrub at Enslow Marsh provides habitat for song thrush (3-4 pairs breeding), bullfinch, and a variety of warblers. In the past snipe bred at Enslow Marsh however the vegetation has now become too tall for them. Water rail probably breeds at Enslow Marsh and is sometimes seen around the small area of open water. Reed bunting, song thrush and bullfinch are on the Red List of birds of conservation concern and are a high priority for conservation in Britain.

The banks of the adjacent Oxford Canal have a thriving population of water vole, a Red Data Book species which is threatened with extinction in Britain. Enslow Marsh Sedgebed could provide important additional undisturbed habitat for water voles.

PRIORITY UK BAP HABITAT(s): Fen

PRIORITY UK BAP SPECIES RECORDED:
Reed bunting (4-5 pairs breeding)
Song thrush (3-4 pairs breeding)
Water vole (on Oxford Canal, adjacent to Enslow Marsh)

OXFORDSHIRE BIODIVERSITY CHALLENGE SPECIES RECORDED:
Common meadow-rue
Meadow crane's-bill
Reed bunting
Song thrush
Water vole

RED DATA BOOK (RDB) SPECIES RECORDED:
Water vole (on Oxford Canal, adjacent to Enslow Marsh)

NATIONALLY SCARCE (NSC) SPECIES RECORDED: none recorded

BIRDS OF CONSERVATION CONCERN (BoCC) RECORDED:
Red List Species: **Reed bunting, song thrush**
Amber List Species: **Water rail** (probably breeding), **green woodpecker, blackbird, fieldfare** (winter visitor), **redwing** (winter visitor), **grasshopper warbler** (frequent spring visitor), **tawny owl** (resident in willows)

TYPICAL WETLAND/WET GRASSLAND SPECIES RECORDED
Marsh marigold, slender tufted sedge, lesser pond sedge, greater pond sedge, bottle sedge, great willowherb, water horsetail, marsh horsetail, hemp agrimony, meadowsweet, common marsh bedstraw, reed sweet-grass, yellow iris, soft rush, gipsywort, purple loosestrife, water forget-me-not, water chickweed, hemlock water-dropwort, reed canary-grass, water dock, skullcap, marsh woundwort, common meadow-rue, bulrush, common valerian, blue water-speedwell.

OXFORDSHIRE WILDLIFE SITES CITATION

NAME: Enslow Marsh – northern two fields

GRID REF: SP 487185

DISTRICT: Cherwell

SITE CODE: 42X07/2

TOTAL AREA OF SITE : 6.3 ha

SITE DESCRIPTION:
These two wet fields between the River Cherwell and the Oxford Canal north of Kirtlington have a dense growth of meadowsweet and reed sweet-grass with other tall plants including great willowherb, wild angelica, water figwort, common valerian and yellow flag. These fields were formerly grazed by cattle but there has been no grazing since the 1950s.

The area is rich in birds including breeding reed bunting and sedge warbler, and over-wintering snipe. Reed bunting are on the Red List of birds of high conservation concern because their population has declined by over 50% over the last 35 years. A ditch divides the two fields into two halves. The crack willows in the boundary hedges and along the ditch have grown massive and are starting to fall over into the marsh. Shading by crack willows affects about one third of the site. Woodcock are sometimes flushed from this wet woodland. The banks of the adjacent Oxford Canal have a thriving population of water voles, a Red Data Book species which is threatened with extinction in Britain. There is an old record of water shrew for the marsh. A thick hedge forms the boundary between the canal towpath and the fields.

PRIORITY UK BAP HABITAT(s): Fen

PRIORITY UK BAP SPECIES RECORDED:
Reed bunting
Water vole (in adjacent Oxford Canal banks)

OXFORDSHIRE BIODIVERSITY CHALLENGE SPECIES RECORDED:
Meadow crane's-bill
Reed bunting
Sedge warbler
Water vole (in adjacent Oxford Canal banks)

RED DATA BOOK (RDB) SPECIES RECORDED:
Water vole (in adjacent Oxford Canal banks)

NATIONALLY SCARCE (NSC) SPECIES RECORDED:
White-legged damselfly in 1983 Notable b
***Bembidion gilvipes* – a ground beetle in 1986 and 1988** Notable b

BIRDS OF CONSERVATION CONCERN (BoCC) RECORDED:
Red List Species: **Reed bunting**
Amber List Species:

TYPICAL WETLAND/WET GRASSLAND SPECIES RECORDED
Reed sweet-grass, meadowsweet, great willowherb, wild angelica, water figwort, common valerian, woody nightshade, river horsetail, yellow flag.

Site details for Bletchingdon Road Verge (East)

Site Number: 97 File Code(s): 51D06

Name(s): Bletchingdon Road Verge (East)

Parish(es): Cherwell in the county of Oxfordshire

Grid Reference: SP509172

Total Area: .00 (hectares)

Site Description

This site consists of the verges and hedges on both sides of the B4027. The hedges are dominated by blackthorn and support a good colony of the nationally rare black hairstreak butterfly.

There is no information about the habitats on this site.

Status of Site

Wildlife Sites

Shipton on Cherwell Quarry Data Search: Designated Sites within 2km

Produced by TVERC

Shipton-on-Cherwell Quarry Data Search. Bat records within 4 km

Common Name	Scientific Name	Date	Grid Reference	Site	Subsite/Locality
Noctule	Nyctalus noctula	13 NOV 1986	SP430170	BLENHEIM PARK	
Brown Long-eared Bat	Plecotus auritus	02 NOV 1988	SP435155	BLENHEIM PARK	BLENHEIM PARK SSSI
Pipistrelle	Pipistrellus pipistrellus	15 JUN 1976	SP435155	BLENHEIM PARK	BLENHEIM PARK SSSI
Noctule	Nyctalus noctula	21 MAY 1980	SP444167	COUNTY MUSEUM, WOODSTOCK	
Serotine	Eptesicus serotinus	21 MAY 1980	SP444167	COUNTY MUSEUM, WOODSTOCK	
Pipistrelle	Pipistrellus pipistrellus	28 JUN 1988	SP479156	OXFORD CANAL	TETRAD 4814 Oxford Canal
Noctule	Nyctalus noctula	21 MAY 1980	SP4317	oxon tetrad 4216	museum, oxon tetrad 4216
Pipistrelle	Pipistrellus pipistrellus	15 JUN 1976	SP4317	oxon tetrad 4216	oxon tetrad 4216
Brown Long-eared Bat	Plecotus auritus	04 MAR 1996	SP450152	oxon tetrad 4414	Bladon, oxon tetrad 4414
Pipistrelle	Pipistrellus pipistrellus	12 AUG 1991	SP446145	oxon tetrad 4414	Bladon, oxon tetrad 4414
Brown Long-eared Bat	Plecotus auritus	30 SEP 1997	SP4517	oxon tetrad 4416	marlborough arms, oxon tetrad 4416
Barbastelle	Barbastella barbastellus	1988	SP4517	oxon tetrad 4416	oxon tetrad 4416
Pipistrelle	Pipistrellus pipistrellus	01 AUG 1986	SP4517	oxon tetrad 4416	Woodstock, oxon tetrad 4416
Brown Long-eared Bat	Plecotus auritus	25 AUG 1977	SP4519	oxon tetrad 4418	Wootton, oxon tetrad 4418
Brown Long-eared Bat	Plecotus auritus	25 AUG 1977	SP4519	oxon tetrad 4418	Wootton, oxon tetrad 4418
Pipistrelle	Pipistrellus pipistrellus	05 JUN 1981	SP4519	oxon tetrad 4418	Wootton, oxon tetrad 4418
Pipistrelle	Pipistrellus pipistrellus	05 JUN 1981	SP4519	oxon tetrad 4418	Wootton, oxon tetrad 4418
Pipistrelle	Pipistrellus pipistrellus	06 JUL 1994	SP475140	oxon tetrad 4614	Begbroke, Oxon Tetrad 4614
Brown Long-eared Bat	Plecotus auritus	01 NOV 1994	SP479166	oxon tetrad 4616	Shipton on Cherwell, oxon tetrad 4616
Pipistrelle	Pipistrellus pipistrellus	14 AUG 1995	SP486147	oxon tetrad 4814	Kidlington, oxon tetrad 4814
Pipistrelle	Pipistrellus pipistrellus	08 AUG 1983	SP4915	oxon tetrad 4814	Kidlington, oxon tetrad 4814
Pipistrelle	Pipistrellus pipistrellus	1977	SP4915	oxon tetrad 4814	Park Farm,Kidlington, oxon tetrad 4814
Pipistrelle	Pipistrellus pipistrellus	28 JUL 1995	SP481168	oxon tetrad 4816	Shipton-on-Cherwell, oxon tetrad 4816
Pipistrelle	Pipistrellus pipistrellus	12 JUL 1995	SP504178	oxon tetrad 5016	Bletchingdon, oxon tetrad 5016
Pipistrelle	Pipistrellus pipistrellus	07 AUG 1995	SP508179	oxon tetrad 5016	Bletchingdon, oxon tetrad 5016
Pipistrelle	Pipistrellus pipistrellus	24 JUL 1994	SP5017	oxon tetrad 5016	Bletchingdon, oxon tetrad 5016
Brown Long-eared Bat	Plecotus auritus	02 DEC 1993	SP506181	oxon tetrad 5018	Bletchingdon, oxon tetrad 5018
Brown Long-eared Bat	Plecotus auritus	08 MAY 1988	SP5317	oxon tetrad 5216	Heathfield, oxon tetrad 5216

Shipton-on-Cherwell Quarry Rare and Protected Species

Common Name	Scientific Name	Date	Grid Ref.	Site	Subsite/Locality	IUCN Red List Status	Legislation	UKBAP Status	Notable Invertebrates	BOCC List	Nationally Scarce Plants
Bluebell	Hyacinthoides non-scripta	1975	SP505160	Bletchingdon Churchyard			W & C Act 1981 Schedule 8				
Bluebell	Hyacinthoides non-scripta	04 JUL 1979	SP504160	Springwell copse and ponds	Springwell copse and ponds		W & C Act 1981 Schedule 8				
Swallow	Hirundo rustica	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Amber List	
House Martin	Delichon urbica	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Amber List	
Dunnock	Prunella modularis	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Amber List	
Song Thrush	Turdus philomelos	21 MAY 2001	SP484178	BLETCHINGDON QUARRY				Priority Species		Red List	
Grasshopper Warbler	Locustella naevia	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Red List	
Starling	Sturnus vulgaris	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Red List	
House Sparrow	Passer domesticus	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Red List	
Yellowhammer	Emberiza citrinella	21 MAY 2001	SP484178	BLETCHINGDON QUARRY						Red List	
Black Hairstreak	Satyrium pruni	17 JUL 1999	SP502167	BLETCHINGDON SOUTH VERGE					Notable		Vascular Plant
Sharp Rush	Juncus acutus	1976	SP475175	BUNKERS HILL QUARRY					Notable		
Scarce Blue-tailed Damselfly	Ischnura pumilio	12 JUL 1990	SP477175	BUNKERS HILL QUARRY					Notable		
a leafhopper	Macrosteles frontalis	12 JUL 1990	SP477175	BUNKERS HILL QUARRY					Nb		
Loosestrife Flea Beetle	Lythraria salicariae	10 JUL 2001	SP475175	BUNKERS HILL QUARRY			W & C Act 1981 Schedule 5				
Viviparous Lizard	Lacerta vivipara	06 AUG 1987	SP482174	BUNKERS HILL QUARRY						Amber List	
Mute Swan	Cygnus olor	1979 -1983	SP475175	BUNKERS HILL QUARRY						Amber List	
Wigeon	Anas penelope	1982, 17 DEC 1983	SP475175	BUNKERS HILL QUARRY						Amber List	
Teal	Anas crecca	1979 - 1984	SP475176	BUNKERS HILL QUARRY						Amber List	
Garganey	Anas querquedula	1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Shoveler	Anas clypeata	1981	SP476175	BUNKERS HILL QUARRY						Amber List	
Pochard	Aythya ferina	1979 - 1984	SP476175	BUNKERS HILL QUARRY						Amber List	
Kestrel	Falco tinnunculus	1979 - 1981	SP476175	BUNKERS HILL QUARRY				Priority Species		Red List	
Grey Partridge	Perdix perdix	1976	SP476175	BUNKERS HILL QUARRY						Amber List	
Ringed Plover	Charadrius hiaticula	1978 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Lapwing	Vanellus vanellus	1975 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Temminck's Stint	Calidris temminckii	1979 - 1980	SP476175	BUNKERS HILL QUARRY						Amber List	
Dunlin	Calidris alpina	1976 -1981	SP475175	BUNKERS HILL QUARRY						Amber List	
Ruff	Philomachus pugnax	1981	SP475175	BUNKERS HILL QUARRY						Amber List	
Snipe	Gallinago gallinago	1976 -1982	SP477175	BUNKERS HILL QUARRY						Amber List	
Woodcock	Scolopax rusticola	1978	SP475175	BUNKERS HILL QUARRY						Amber List	
Whimbrel	Numenius phaeopus	1979 - 1980	SP475175	BUNKERS HILL QUARRY						Amber List	
Spotted Redshank	Tringa erythropus	1979 - 1980	SP475175	BUNKERS HILL QUARRY						Amber List	
Redshank	Tringa totanus	1975 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Green Sandpiper	Tringa ochropus	1975 -1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Green Sandpiper	Tringa ochropus	05 AUG 1987	SP477175	BUNKERS HILL QUARRY						Amber List	
Green Sandpiper	Tringa ochropus	12 JUL 1990	SP477175	BUNKERS HILL QUARRY						Amber List	
Wood Sandpiper	Tringa glareola	06 AUG 1975	SP475175	BUNKERS HILL QUARRY						Amber List	
Wood Sandpiper	Tringa glareola	1982	SP476175	BUNKERS HILL QUARRY						Amber List	
Black-headed Gull	Larus ridibundus	1979 -1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Common Gull	Larus canus	1976 & 1979	SP475176	BUNKERS HILL QUARRY						Amber List	
Stock Dove	Columba oenas	1975 -1976 and 1979 - 198	SP475175	BUNKERS HILL QUARRY				Priority Species		Red List	
Turtle Dove	Streptopelia turtur	1975 -1976 and 1979 - 198	SP475175	BUNKERS HILL QUARRY						Amber List	
Cuckoo	Cuculus canorus	1979 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Kingfisher	Alcedo atthis	06 AUG 1975	SP475176	BUNKERS HILL QUARRY				Priority Species		Red List	
Skylark	Alauda arvensis	1975 - 1976, 1981 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Sand Martin	Riparia riparia	1976, 1979, 1981	SP477175	BUNKERS HILL QUARRY						Amber List	
Sand Martin	Riparia riparia	05 AUG 1987	SP477175	BUNKERS HILL QUARRY						Amber List	
Swallow	Hirundo rustica	1975 - 1976, 1979 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
House Martin	Delichon urbica	1975 - 1976, 1979 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Meadow Pipit	Anthus pratensis	1979 - 1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Yellow Wagtail	Motacilla flava	1979 -1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Grey Wagtail	Motacilla cinerea	1979 -1982	SP475175	BUNKERS HILL QUARRY						Amber List	
Dunnock	Prunella modularis	1976, 1979 -1981	SP475175	BUNKERS HILL QUARRY						Amber List	
Fieldfare	Turdus pilaris	1981	SP475175	BUNKERS HILL QUARRY				Priority Species		Red List	
Song Thrush	Turdus philomelos	1979	SP475175	BUNKERS HILL QUARRY						Amber List	
Willow Warbler	Phylloscopus trochilus	1976, 1979 -1981	SP475175	BUNKERS HILL QUARRY						Red List	
Willow Tit	Parus montanus	1976	SP475176	BUNKERS HILL QUARRY						Red List	
Starling	Sturnus vulgaris	1975 -1976, 1979 -1982	SP475175	BUNKERS HILL QUARRY						Red List	
House Sparrow	Passer domesticus	1975 - 1976, 1979 - 1982	SP475175	BUNKERS HILL QUARRY				Priority Species		Red List	
Tree Sparrow	Passer montanus	1979	SP475175	BUNKERS HILL QUARRY				Priority Species		Red List	
Linnet	Carduelis cannabina	1975 - 1976, 1979 - 1982	SP475175	BUNKERS HILL QUARRY				Priority Species		Red List	
Bullfinch	Pyrrhula pyrrhula	1976, 1981 - 1982	SP475175	BUNKERS HILL QUARRY						Red List	
Yellowhammer	Emberiza citrinella	1982	SP476175	BUNKERS HILL QUARRY				Priority Species		Red List	
Reed Bunting	Emberiza schoeniclus	1975 - 1976, 1979 - 1982	SP475175	BUNKERS HILL QUARRY					Nb		
Loosestrife Flea Beetle	Lythraria salicariae	17 JUN 2000	SP498149	behind St Mary's Church							

a ground beetle	Bembidion gilvipes	04 APR 1986	SP487186	ENSLOW MARSH					Nb		
a ground beetle	Bembidion gilvipes	09 JUN 1988	SP487186	ENSLOW MARSH					Nb		
Kingfisher	Alcedo atthis	25 AUG 1983	SP487186	ENSLOW MARSH						Amber List	
Reed Bunting	Emberiza schoeniclus	Unknown - recent	SP487186	ENSLOW MARSH				Priority Species		Red List	
Song Thrush	Turdus philomelos	Unknown - recent	SP487186	ENSLOW MARSH				Priority Species		Red List	
Long-winged Conehead	Conocephalus discolor	23 JUL 2003	SP486149	Kidlington Parish Meadow		IUCN (pre 1994) - Rare					
a leafhopper	Macrosteles quadripunctulat	09 JUL 2001	SP486149	Kidlington Parish Meadow					Na		
Green Woodpecker	Picus viridis	23 JUL 2003	SP486149	Kidlington Parish Meadow						Amber List	
Water Vole	Arvicola terrestris	pre 1987	SP488155	Meadow, East of Thrupp			W & C Act 1981 Schedule 5	Priority Species			
Cuckoo	Cuculus canorus	27 APR 1993	SP485188	PINSEY BRIDGE MEADOW (Cherwell Mdws)						Amber List	
Great Water-parsnip	Sium latifolium	05 AUG 1987	SP484175	Riverside Meadow							Vascular Plant
Skylark	Alauda arvensis	12 APR 1988	SP485195	Cowslip patch, Akeman Street				Priority Species		Red List	
a ground beetle	Bembidion gilvipes	02 AUG 1998	SP488197	Flights Mill Meadow					Nb		
a ground beetle	Pterostichus anthracinus	02 AUG 1998	SP488197	Flights Mill Meadow					Nb		
a ground beetle	Acupalpus exiguus	02 AUG 1998	SP488197	Flights Mill Meadow					Nb		
a ground beetle	Oodes helopioides	02 AUG 1998	SP488197	Flights Mill Meadow					Nb		
Curlew	Numenius arquata	Unknown	SP447182	Glyme Meadows North of Woodstock						Amber List	
Dunnock	Prunella modularis	10 MAR 1976	SP445185	Glyme Meadows North of Woodstock						Amber List	
Grey Wagtail	Motacilla cinerea	10 MAR 1976	SP445185	Glyme Meadows North of Woodstock						Amber List	
Hawfinch	Coccothraustes coccothraust	Unknown	SP447182	Glyme Meadows North of Woodstock						Amber List	
Kingfisher	Alcedo atthis	Unknown	SP447182	Glyme Meadows North of Woodstock						Amber List	
Mistle Thrush	Turdus viscivorus	10 MAR 1976	SP445185	Glyme Meadows North of Woodstock						Amber List	
Reed Bunting	Emberiza schoeniclus	10 MAR 1976	SP445185	Glyme Meadows North of Woodstock				Priority Species		Red List	
Skylark	Alauda arvensis	10 MAR 1976	SP445185	Glyme Meadows North of Woodstock				Priority Species		Red List	
Snipe	Gallinago gallinago	Unknown	SP447182	Glyme Meadows North of Woodstock						Amber List	
Song Thrush	Turdus philomelos	10 MAR 1976	SP445185	Glyme Meadows North of Woodstock				Priority Species		Red List	
Teal	Anas crecca	Unknown	SP447182	Glyme Meadows North of Woodstock						Amber List	
Willow Tit	Parus montanus	Unknown	SP447182	Glyme Meadows North of Woodstock						Red List	
Woodcock	Scolopax rusticola	Unknown	SP447182	Glyme Meadows North of Woodstock						Amber List	
a ground beetle	Chlaenius nigricornis	10 AUG 1993	SP448175	Glyme Meadows North of Woodstock	POPLAR PLANTATION NORTH OF WOODSTOCK				Nb		
Common Frog	Rana temporaria	08 OCT 1976	SP448171	Glyme Meadows North of Woodstock	Woodstock Meadow		W & C Act 1981 Schedule 5				
Gadwall	Anas strepera	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Quail	Coturnix coturnix	1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Red List	
Snipe	Gallinago gallinago	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Blackheaded Gull	Larus ridibundus	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Stock Dove	Columba oenas	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Stock Dove	Columba oenas	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Kingfisher	Alcedo atthis	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Lesser Spotted Woodpecker	Dendrocopos minor	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Red List	
Swallow	Hirundo rustica	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
House Martin	Delichon urbica	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Grey Wagtail	Motacilla cinerea	05 AUG 1981	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Dunnock	Prunella modularis	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Dunnock	Prunella modularis	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Stonechat	Saxicola torquata	1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Fieldfare	Turdus pilaris	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Song Thrush	Turdus philomelos	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow			Priority Species		Red List	
Redwing	Turdus iliacus	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Redwing	Turdus iliacus	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Mistle Thrush	Turdus viscivorus	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Mistle Thrush	Turdus viscivorus	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Amber List	
Starling	Sturnus vulgaris	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Red List	
Starling	Sturnus vulgaris	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Red List	
House Sparrow	Passer domesticus	1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow					Red List	
Reed Bunting	Emberiza schoeniclus	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow			Priority Species		Red List	
Water Vole	Arvicola terrestris	09 MAR 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow		W & C Act 1981 Schedule 5	Priority Species			
Water Vole	Arvicola terrestris	25 MAY 1976	SP444170	Glyme Meadows North of Woodstock	Woodstock Meadow		W & C Act 1981 Schedule 5	Priority Species			
Green Hound's-tongue	Cynoglossum germanicum	24 APR 1979	SP446185	Hedgebank overlooking River Glyme		IUCN (1994) - Vulnerable	W & C Act 1981 Schedule 8				
Bluebell	Hyacinthoides non-scripta	1975	SP497148	Kidlington St Marys Churchyard			W & C Act 1981 Schedule 6				
Fringed Water-lily	Nymphoides peltata	1983	SP4919	Kirtlington	pond, Kirtlington						Vascular Plant
Galingale	Cyperus longus	1983	SP4919	Kirtlington	pond, Kirtlington						Vascular Plant
Bluebell	Hyacinthoides non-scripta	- 1986	SP486183	LINCE LANE COPSE (Cherwell Mdws)	LINCE LANE COPSE (Cherwell Mdws)		W & C Act 1981 Schedule 6				
Reed Bunting	Emberiza schoeniclus	09 JUN 1998	SP486184	Meadow between canal & river	Meadow between canal & river			Priority Species		Red List	

Badger	Meles meles	- 1998	SP475196	Woodland Alongside Akeman Street			Badger Act 1991				Vascular Plant
Spreading Hedge-parsley	Torilis arvensis	22 AUG 1962	SP468181	Woodstock				Priority Species			Vascular Plant
Red Hemp-nettle	Galeopsis angustifolia	22 SEP 1962	SP468181	Woodstock							

Tetrad Records: Those with four figure grid references do not have precise locations but should be from the search area.

Slow-worm	Anguis fragilis	28 MAY 1999	SP4617	oxon tetrad 4416	Manor Road, Woodstock, oxon tetrad 4416		W & C Act 1981 Schedule 5				
Brown Long-eared Bat	Plecotus auritus	30 SEP 1997	SP4517	oxon tetrad 4416	marlborough arms, oxon tetrad 4416		W & C Act 1981 Schedule 5				
Bluebell	Hyacinthoides non-scripta	1988	SP4517	oxon tetrad 4416	oxon tetrad 4416		W & C Act 1981 Schedule 8				
Barbastelle	Barbastella barbastellus	1988	SP4517	oxon tetrad 4416	oxon tetrad 4416	IUCN (1994) - Vulnerable	W & C Act 1981 Schedule 5				
Brown Hare	Lepus capensis	17 MAR 1976	SP4517	oxon tetrad 4416	oxon tetrad 4416			Priority Species			
Brown Hare	Lepus capensis	SEP 1978	SP4517	oxon tetrad 4416	oxon tetrad 4416			Priority Species			
Scarce Tissue	Rheumaptera cervinalis	1971	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416				Nb		
Scarce Tissue	Rheumaptera cervinalis	1979	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416				Nb		
Pale Shining Brown	Polia bombycina	1975	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416			Priority Species			
Pale Shining Brown	Polia bombycina	1976	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416			Priority Species			
Pale Shining Brown	Polia bombycina	1977	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416			Priority Species			
Pale Shining Brown	Polia bombycina	1979	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416			Priority Species			
Lead-coloured Drab	Orthosia populeti	1979	SP455169	oxon tetrad 4416	Woodstock, oxon tetrad 4416				Nb		
Pipistrelle	Pipistrellus pipistrellus	01 AUG 1986	SP4517	oxon tetrad 4416	Woodstock, oxon tetrad 4416		W & C Act 1981 Schedule 5	Priority Species			
Badger	Meles meles	27 FEB 1994	SP444168	oxon tetrad 4416	Hardley Farm		Badger Act 1991				
Orange-fruited Elm-lichen	Caloplaca luteoalba	1970 - 1971	SP4519	oxon tetrad 4416	oxon tetrad 4416	IUCN (1994) - Vulnerable	W & C Act 1981 Schedule 8	Priority Species			Vascular Plant
Whorled Water-milfoil	Myriophyllum verticillatum	1969	SP4519	oxon tetrad 4416	oxon tetrad 4416						
Bluebell	Hyacinthoides non-scripta	1969	SP4519	oxon tetrad 4416	oxon tetrad 4416		W & C Act 1981 Schedule 8				
Common Toad	Bufo bufo	MAR 1988	SP4519	oxon tetrad 4416	oxon tetrad 4416		W & C Act 1981 Schedule 5				
Common Frog	Rana temporaria	MAR 1988	SP4519	oxon tetrad 4416	oxon tetrad 4416		W & C Act 1981 Schedule 5				
Brown Hare	Lepus capensis	13 MAY 1998	SP442185	oxon tetrad 4416	oxon tetrad 4416			Priority Species			
Badger	Meles meles	23 SEP 1993	SP447180	oxon tetrad 4416	oxon tetrad 4416		Badger Act 1991				
Pipistrelle	Pipistrellus pipistrellus	05 JUN 1981	SP4519	oxon tetrad 4416	Wootton, oxon tetrad 4416		W & C Act 1981 Schedule 5	Priority Species			
Brown Long-eared Bat	Plecotus auritus	25 AUG 1977	SP4519	oxon tetrad 4416	Wootton, oxon tetrad 4416		W & C Act 1981 Schedule 5				
Brown Hare	Lepus capensis	12 NOV 1997	SP457202	oxon tetrad 4420	Wootton, oxon tetrad 4420			Priority Species			
Badger	Meles meles	08 APR 1997	SP467157	Oxon Tetrad 4614	A4260, Oxon Tetrad 4614		Badger Act 1991				
Brown Hare	Lepus capensis	10 MAR 1989	SP4715	Oxon Tetrad 4614	Bladon, Oxon Tetrad 4614			Priority Species			
Badger	Meles meles	18 AUG 2000	SP479158	Oxon Tetrad 4614	Thrupp turn, Oxon Tetrad 4614		Badger Act 1991				
Badger	Meles meles	10 JAN 1996	SP472172	oxon tetrad 4616	A4260, oxon tetrad 4616		Badger Act 1991				
Water Vole	Arvicola terrestris	07 JUL 1976	SP4616	oxon tetrad 4616	canal, oxon tetrad 4616		W & C Act 1981 Schedule 5	Priority Species			
Water Vole	Arvicola terrestris	26 DEC 1976	SP460160	oxon tetrad 4616	Oxford canal, oxon tetrad 4616		W & C Act 1981 Schedule 5	Priority Species			
Cabbage	Brassica oleracea	21 OCT 1970	SP4717	oxon tetrad 4616	oxon tetrad 4616						Vascular Plant
Brown Hare	Lepus capensis	APR 1985	SP4717	oxon tetrad 4616	oxon tetrad 4616			Priority Species			
Water Vole	Arvicola terrestris	26 DEC 1977	SP4717	oxon tetrad 4616	oxon tetrad 4616		W & C Act 1981 Schedule 5	Priority Species			
Brown Long-eared Bat	Plecotus auritus	01 NOV 1994	SP479166	oxon tetrad 4616	Shipton on Cherwell, oxon tetrad 4616		W & C Act 1981 Schedule 5				
Badger	Meles meles	17 JUL 1996	SP469180	Oxon tetrad 4618	A4620, Oxon tetrad 4618		Badger Act 1991				
Black Hairstreak	Satyrium pruni	09 JUL 1997	SP469189	Oxon tetrad 4618	Bunkers Hill Copse, Oxon tetrad 4618				Notable		
a lichen	Backia incompta	1966 - 1972	SP4718	Oxon tetrad 4618	Oxon tetrad 4618	IUCN (1994) - Vulnerable		Priority Species			
Orange-fruited Elm-lichen	Caloplaca luteoalba	1966 - 1972	SP4718	Oxon tetrad 4618	Oxon tetrad 4618	IUCN (1994) - Vulnerable	W & C Act 1981 Schedule 8	Priority Species			
Purple Ramping-fumitory	Fumaria purpurea	1970 - 1971	SP469189	Oxon tetrad 4618	Oxon tetrad 4618			Priority Species			Vascular Plant
Purple Ramping-fumitory	Fumaria purpurea	1970	SP4618	Oxon tetrad 4618	Oxon tetrad 4618			Priority Species			Vascular Plant
Red Hemp-nettle	Galeopsis angustifolia	1970	SP469189	Oxon tetrad 4618	Oxon tetrad 4618			Priority Species			Vascular Plant
Adder	Vipera berus	APR 1980	SP469189	Oxon tetrad 4618	Oxon tetrad 4618		W & C Act 1981 Schedule 5				
Badger	Meles meles	28 FEB 1993	SP479194	Oxon tetrad 4618	Pond Hill, Oxon tetrad 4618		Badger Act 1991				
Badger	Meles meles	05 JUL 1995	SP477194	Oxon tetrad 4618	Pound Hill, Oxon tetrad 4618		Badger Act 1991				
Adder	Vipera berus	APR 1980	SP469189	Oxon tetrad 4618	Quarry View, Oxon tetrad 4618		W & C Act 1981 Schedule 5				
a ground beetle	Harpalus azureus	02 AUG 1998	SP477185	Oxon tetrad 4618	set aside field, Oxon tetrad 4618				Nb		
Adder	Vipera berus	24 APR 1979	SP469189	Oxon tetrad 4618	south edge of Tackley Park, Oxon tetrad 4618		W & C Act 1981 Schedule 5	Priority Species			
Brown Hare	Lepus capensis	02 JAN 1995	SP463184	Oxon tetrad 4618	Tackley, Oxon tetrad 4618						
Badger	Meles meles	02 MAR 1996	SP464191	Oxon tetrad 4618	Tackley, Oxon tetrad 4618		Badger Act 1991				
Brown Hare	Lepus capensis	04 SEP 1996	SP467184	Oxon tetrad 4618	Weavely Farm			Priority Species			
Brown Hare	Lepus capensis	22 APR 1997	SP462203	oxon tetrad 4620	nr.Tackley, oxon tetrad 4620			Priority Species			
a ground beetle	Bembidion gilvipes	13 MAR 1988	SP492152	oxon tetrad 4814	field edge, oxon tetrad 4814				Nb		
a ground beetle	Bembidion gilvipes	22 DEC 1989	SP492155	oxon tetrad 4814	Hampton Poyle				Nb		
Four-spotted	Tyta luctuosa	1977	SP466144	oxon tetrad 4814	Kidlington, oxon tetrad 4814	IUCN (pre 1994) - Vulnerable		Priority Species			

Fringed Water-lily	Nymphoides peltata	30 JUL 1998	SP481166	Oxford Canal	TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 8					Vascular Plant
Bluebell	Hyacinthoides non-scripta	04 JUN 1991	SP488190	Oxford Canal	TETRAD 4816 Oxford Canal							
a freshwater mussel	Pseudanodonta complanata	17 APR 1980	SP4816	Oxford Canal	Oxford Canal north of Thrupp, TETRAD 4816 Oxford Canal	IUCN (1994) - Lower risk - least concern		Priority Species				
a freshwater mussel	Pseudanodonta complanata	17 APR 1980	SP478181	Oxford Canal	TETRAD 4816 Oxford Canal	IUCN (1994) - Lower risk - least concern		Priority Species				
a planthug or grassbug	Halticus saltator	30 JUL 1998	SP481166	Oxford Canal	TETRAD 4816 Oxford Canal				Nb			
a ground beetle	Pterostichus anthracinus	05 JUL 1992	SP485190	Oxford Canal	TETRAD 4816 Oxford Canal				Nb			
Flax Flea Beetle	Longitarsus parvulus	30 JUL 1998	SP482158	Oxford Canal	TETRAD 4814 Oxford Canal				Na			
Freshwater Crayfish	Austropotamobius pallipes	07 JUL 1976	SP481166	Oxford Canal	TETRAD 4816 Oxford Canal	IUCN (1994) - Vulnerable	W & C Act 1981 Schedule 5	Priority Species				
Freshwater Crayfish	Austropotamobius pallipes	07 JUL 1976	SP485190	Oxford Canal	TETRAD 4816 Oxford Canal	IUCN (1994) - Vulnerable	W & C Act 1981 Schedule 5	Priority Species				
Pipistrelle	Pipistrellus pipistrellus	28 JUN 1988	SP478156	Oxford Canal	TETRAD 4814 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	03 AUG 1976	SP485190	Oxford Canal	Pigeon Lock, TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	18 JAN 1976	SP485190	Oxford Canal	Pigeon Lock, TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	17 APR 1980	SP478181	Oxford Canal	TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Summer 1983	SP482158	Oxford Canal	TETRAD 4814 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	07 JUL 1976	SP481166	Oxford Canal	TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	03 AUG 1976	SP485190	Oxford Canal	TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	03 APR 1977	SP485190	Oxford Canal	TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	07 JUL 1979	SP485190	Oxford Canal	TETRAD 4816 Oxford Canal		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	05-Sep-89	SP411634	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	1989	SP481148	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	May-99	SP481148	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Dec-99	SP482153	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Aug-00	SP4771?9	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	May-00	SP478182	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Jun-00	SP480147	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Mar-00	SP481147	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Jan-01	SP481147	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Mar-00	SP481149	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Apr-01	SP481148	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Jun-00	SP481149	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	2000	SP484191	Oxford Canal			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	May-00	SP484191	Oxford Canal				Priority Species				
Brown Hare	Lepus capensis	24 MAY 1996	SP485183	Oxfordshire Way	Oxfordshire way sp4818				Nb			
a ground beetle	Bembidion glMpes	15 APR 1998	SP487196	River Cherwell	Pigeons Lock R.Cherwell				Nb			
a ground beetle	Acupalpus exiguus	15 APR 1998	SP487196	River Cherwell	Pigeons Lock R.Cherwell		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	07 JUL 1976	SP477178	River Cherwell	TETRAD 4816 R.Cherwell					Amber List		
Grey Wagtail	Motacilla cinerea	30 JUL 1998	SP478183	River Cherwell	TETRAD 4816 R.Cherwell		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	JUL 1976 - AUG 1976	SP492155	River Cherwell	TETRAD 4814 R.Cherwell		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	25 MAY 2000	SP492155	River Cherwell	TETRAD 4814 R.Cherwell		W & C Act 1981 Schedule 5	Priority Species				
Freshwater Crayfish	Austropotamobius pallipes	06 JUL 1977	SP486165	River Cherwell	TETRAD 4816 R.Cherwell	IUCN (1994) - Vulnerable				Amber List		
Grey Wagtail	Motacilla cinerea	07 SEP 1999	SP486165	River Cherwell	TETRAD 4816 R.Cherwell		W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Apr-00	SP484175	River Cherwell			W & C Act 1981 Schedule 6	Priority Species				
Water Vole	Arvicola terrestris	May-00	SP484175	River Cherwell			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Mar-00	SP485174	River Cherwell			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	1993	SP471485	River Cherwell			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Aug-97	SP480147	River Cherwell			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	Aug-97	SP487124	River Cherwell			W & C Act 1981 Schedule 5	Priority Species				
Water Vole	Arvicola terrestris	30 JAN 1975	SP443187	RIVER GLYME	RIVER GLYME Tetrad 4416		W & C Act 1981 Schedule 8					
Bluebell	Hyacinthoides non-scripta	09 APR 2002	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry				Nb			
a ground beetle	Harpalus anfosiacus	07 APR 2000	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry				Nb			
a ground beetle	Harpalus azureus	07 APR 2000	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry				Nb			
a ground beetle	Harpalus schaubergerianus	12 SEP 1996	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry				Nb			
a ground beetle	Harpalus schaubergerianus	07 APR 2000	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry		W & C Act 1981 Schedule 5					
Viviparous Lizard	Lacerta vivipara	03 MAY 1999	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry		W & C Act 1981 Schedule 5					
Viviparous Lizard	Lacerta vivipara	22 JUL 2000	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry		W & C Act 1981 Schedule 5					
Viviparous Lizard	Lacerta vivipara	04 JUN 2002	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry		W & C Act 1981 Schedule 5					
Adder	Vipera berus	APR 1983	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry					Amber List		
Kestrel	Falco tinnunculus	22 JUL 2000	SP478186	Shipton on Cherwell Quarries	Whitehill Farm Quarry					Red List		
Yellowhammer	Emberiza citrinella	1988	SP444188	Stratford Bridge Verge				Priority Species				Vascular Plant
Purple Ramping-fumitory	Fumaria purpurea	1971	SP4718	Sturdys Castle		IUCN (1994) - Endangered	W & C Act 1981 Schedule 8					
Downy Woundwort	Stachys germanica	29 JUL 1983	SP4619	Sturdys Castle		IUCN (1994) - Endangered	W & C Act 1981 Schedule 8					
Downy Woundwort	Stachys germanica	1988	SP474184	Sturdys Castle				Priority Species				Vascular Plant
Red Hemp-nettle	Galeopsis angustifolia	22 SEP 1962	SP462194	Sturdys Castle								Vascular Plant
Stinking Hellebore	Helleborus foetidus	- 1990	SP478202	Tackley Churchyard			W & C Act 1981 Schedule 8					
Bluebell	Hyacinthoides non-scripta	- 1990	SP476202	Tackley Churchyard		IUCN (1994) - Lower risk - least concern						
Harvest Mouse	Micromys minutus	13 OCT 1998	SP475202	Tackley Churchyard								Vascular Plant
Large-leaved Lime	Tilia platyphyllos	09 APR 2002	SP476196	Woodland Alongside Akeman Street								

Warty Newt	Triturus cristatus	1976	SP493143	oxon tetrad 4814	Kidlington, oxon tetrad 4814	IUCN (1994) - Lower risk - conservation dependent	W & C Act 1981 Schedule 5	Priority Species			
Warty Newt	Triturus cristatus	1977	SP493146	oxon tetrad 4814	Kidlington, oxon tetrad 4814	IUCN (1994) - Lower risk - conservation dependent	W & C Act 1981 Schedule 5	Priority Species			
Pipistrelle	Pipistrellus pipistrellus	14 AUG 1995	SP466147	oxon tetrad 4814	Kidlington		W & C Act 1981 Schedule 5	Priority Species			
Viviparous Lizard	Lacerta vivipara	APR 2001	SP483149	oxon tetrad 4814	oxon tetrad 4814		W & C Act 1981 Schedule 5				
Water Vole	Arvicola terrestris	07 JUL 1976	SP4816	oxon tetrad 4816	canal, oxon tetrad 4816		W & C Act 1981 Schedule 5	Priority Species			
a ground beetle	Trechus discus	09 AUG 1985	SP4817	oxon tetrad 4816	Hampton Poyle				Nb		
Fine-leaved Sandwort	Minuartia hybrida	1989	SP4917	oxon tetrad 4816	oxon tetrad 4816						Vascular Plant
Bluebell	Hyacinthoides non-scripta	1969	SP4917	oxon tetrad 4816	oxon tetrad 4816		W & C Act 1981 Schedule 6				
Water Vole	Arvicola terrestris	08 FEB 1977	SP4917	oxon tetrad 4816	oxon tetrad 4816		W & C Act 1981 Schedule 5	Priority Species			
Water Vole	Arvicola terrestris	08 FEB 1977	SP480160	oxon tetrad 4816	oxon tetrad 4816		W & C Act 1981 Schedule 5	Priority Species			
Pipistrelle	Pipistrellus pipistrellus	28 JUL 1995	SP481168	oxon tetrad 4816	Shipton-on-Cherwell		W & C Act 1981 Schedule 5	Priority Species			
a liverwort	Marchantia polymorpha ssp.	04 SEP 1985	SP4919	oxon tetrad 4818	garden of Dr E W Jones at Kirtlington, oxon tetrad 4818						Liverwort or Hornwort
a moss	Pterygoneurum ovatum	1985	SP4919	oxon tetrad 4818	garden of Dr E W Jones, oxon tetrad 4818						Moss
Small Blue	Cupido minimus	23 MAY 1991	SP4618	oxon tetrad 4818	Kirtlington (Unknown), oxon tetrad 4818		W & C Act 1981 Schedule 5				
Adder	Vipera berus	08 AUG 1982	SP4919	oxon tetrad 4818	Kirtlington, oxon tetrad 4818		W & C Act 1981 Schedule 5				
Water Vole	Arvicola terrestris	07 JUL 1979	SP480180	oxon tetrad 4818	Oxford canal		W & C Act 1981 Schedule 5	Priority Species			
Badger	Meles meles	1995	SP4919	oxon tetrad 4818	oxon tetrad 4818		Badger Act 1991				
Badger	Meles meles	14 MAR 1996	SP492186	oxon tetrad 4818	oxon tetrad 4818		Badger Act 1991				
Water Vole	Arvicola terrestris	03 AUG 1976	SP4618	oxon tetrad 4818	Pigeon Lock		W & C Act 1981 Schedule 5	Priority Species			
Water Vole	Arvicola terrestris	16 JAN 1978	SP4818	oxon tetrad 4818	Pigeon Lock		W & C Act 1981 Schedule 5	Priority Species			
Kingfisher	Alcedo atthis	03 JUL 2002	SP4919	oxon tetrad 4818	pond, oxon tetrad 4818					Amber List	
Badger	Meles meles	01 FEB 1997	SP496192	oxon tetrad 4818	road, oxon tetrad 4818		Badger Act 1991				
Water Vole	Arvicola terrestris	03 APR 1977	SP480180	oxon tetrad 4818	Woodstock canal, oxon tetrad 4818		W & C Act 1981 Schedule 5	Priority Species			

Status Key

Legislation W & C Act 1981 - Wildlife and Countryside Act 1981

- Schedule 5 Animals
- Schedule 8 Plants

IUCN Red List Categories

- IUCN (1994) – Extinct (EX) A taxon is Extinct when there is no reasonable doubt that the last individual has died.
- IUCN (1994) – Extinct in the Wild (EW) A taxon is Extinct in the Wild when it is known to survive only in cultivation, in captivity or as a naturalised population (or populations) well outside the past ranges.
- IUCN (1994) – Critically Endangered (CR) A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
- IUCN (1994) – Endangered: A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
- IUCN (1994) – Vulnerable: A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future
- IUCN (1994) – Lower risk: A taxon is Lower Risk when it has been evaluated, but does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable.

Old Red Data Book categories included if up to date information is incomplete.

- IUCN (pre 1994) – Endangered (RDB1) - Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating.
- IUCN (pre 1994) – Vulnerable (RDB2) - Taxa believed likely to move into the 'Endangered' category in the near future if the causal factors continue operating.
- IUCN (pre 1994) – Rare (RDB3) Species estimated to exist in only <15 10km sq.

United Kingdom Biodiversity Action Plan (UKBAP) Priority Species:

They are species which are (a) globally threatened and (b) rapidly declining in the UK (i.e. by an estimated >50% in the last 25 years)

BOCC Lists - Birds of Conservation Concern Lists

These lists were drawn up by the RSPB

Red List - species are those that are globally threatened, whose population or range has declined rapidly in recent years (ie by more than 50% in 25 years), or which have declined historically and not recovered.

Amber List - Amber list species are those whose population or range has declined moderately in recent years (by more than 25% but less than 50% in 25 years), those whose population has declined historically but recovered recently, rare breeders (fewer than 300 pairs), those with internationally important populations in the UK, those with localised populations, and those with an unfavourable conservation status in Europe.

Notable Invertebrates

Na - Nationally Scarce (Notable) A: Taxa which don't fall within IUCN categories but are uncommon in Britain and occur in <30 10 km sq or for less well recorded groups within <7 vice counties

Nb - Nationally Scarce (Notable) B: Taxa which don't fall within IUCN categories but are uncommon in Britain and occur in 31-100 10 km sq or for less well recorded groups between 8 and 20 vice counties

N – Notable: Taxa which are known to be scarce(occurring in between 16 and 100 10km squares). Often there is insufficient information to assign them to Na or Nb categories.

Designation come from the NBN species dictionary.

Nationally Scare Plants

Species estimated to occur in 16-100 10km sq in Britain. Identified as vascular plant, moss, liverwort or hornwort. or lichen

APPENDIX V

TARGET NOTES

APPENDIX V: TARGET NOTES

QUARRY (**Figure 3** refers)

Woodland and Scrub

1)

English Name	Scientific Name	Frequency		
		Canopy	Under-storey	Ground flora
Tree and shrub species				
Ash	*Fraxinus excelsior*	F		LO
Blackthorn	*Prunus spinosa*		R/O	
Bramble	*Rubus fruticosus agg.*		LF	
Crack willow	*Salix fragilis*	LO		
Dog rose	*Rosa canina*		R/O	
Elder	*Sambucus nigra*		O/F	
Field maple	*Acer campestre*		LO	R
Gooseberry	*Ribes uva-crispum*		LO	
Grey willow	*Salix cinerea*		R	
Hawthorn	*Crataegus monogyna*		O	
Osier	*Salix viminalis*		R?	
Silver birch	*Betula pendula*	LO		
Spindle	*Euonymus europaeus*		R	
Sycamore	*Acer pseudoplatanus*	O		
Climbers				
False brome	*Brachypodium sylvaticum*			LF
Grasses				
Honeysuckle	*Lonicera periclymenum*		LO/F	
Rough meadow-grass	*Poa trivialis*			R
Traveller's joy	*Clematis vitalba*			R
White bryony	*Bryonia dioica*		LO	
Other species				
Bracken	*Pteridium aquilinum*			LO
Broad-leaved willowherb	*Epilobium montanum*			LO
Cleavers	*Galium aparine*			LF
Common nettle	*Urtica dioica*			LF
Common ragwort	*Senecio jacobaea*			LO
Common valerian	*Valeriana officinalis*			LO
Enchanter's nightshade	*Circaea lutetiana*			LF/A
Forget-me-not	*Myosotis sp.*			LO
Garlic mustard	*Alliaria petiolata*			LO
Greater burdock	*Arctium lappa*			R/O
Ground ivy	*Glechoma hederacea*			LF
Hairy violet	*Viola hirta*			R/LO
Hart's tongue fern	*Phyllitis scolopendrium*			R
Herb robert	*Geranium robertianum*			LO
Hoary willowherb	*Epilobium parviflorum*			R
Ivy	*Hedera helix*			LF
Lord's-and-ladies	*Arum maculatum*			R/O

English Name	Scientific Name	Frequency		
		Canopy	Under-storey	Ground flora
Male fern	*Dryopteris filix-mas*			O/LF
Nipplewort	*Lapsana communis*			R/O
Ploughman's spikenard?	*Inula conyza?*			R/O
Self-heal	*Prunella vulgaris*			R
Spear thistle	*Cirsium vulgare*			R/O
Square-stalked St. John's-wort	*Hypericum tetrapterum*			R
Wild basil	*Clinopodium vulgare*			R/O
Wood avens	*Geum urbanum*			LO/F
Wood dock	*Rumex sanguineus*			R/O
Wood speedwell	*Veronica montana*			LO

Local swamp area with sedge sp., Himalayan balsam, yellow iris, reed canary-grass, great willowherb, hedge bindweed, common nettle, bounded by species-rich, defunct hedge comprising ash, hawthorn, field maple, blackthorn, elder, crack willow and hop.

2) Scrub / developing woodland: field maple, hawthorn, blackthorn, traveller's-joy. Ground flora sparse: ivy, ground-ivy, common nettle, dog-rose (all marginal). Continuing north: English elm (some dying), ash, elder, privet (garden?), dogwood (marginal), hazel, spindle, apple (crab?), black bryony and lords-and-ladies.
3) Wooded bank with ash, sycamore, hawthorn.
4) Areas of dense scrub along cliff-top to east predominantly blackthorn, hawthorn and bramble with some dog rose and elder.
5) Line of poplars / scrub: hawthorn, laurel, bramble, privet, teasel, blackthorn, field rose, grey willow.
6) Cliff scrub to east comprises willow, hawthorn, sycamore, blackthorn.
7) Conifer and poplar windbreak.
8) Mounds of earth towards central lake predominantly with scattered scrub (silver birch, willows, elder, butterfly-bush). Some tall herb (some herbicided): teasel, perforate St. John's-wort.

Grassland and Marsh

9) See species list (northern margin).

English Name	Scientific Name	Area A
Grasses:		
Common bent	*Agrostis capillaris*	R
Creeping bent	*Agrostis stolonifera*	O/LF
Crested hair-grass	*Koeleria macrantha*	LO
False oat grass	*Arrhenatherum elatius*	R/LO
Red fescue	*Festuca rubra*	O
Wood false brome	*Brachypodium sylvaticum*	O/LF
Yorkshire fog	*Holcus lanatus*	R/O
Herbaceous species:		
Agrimony	*Agrimonia eupatoria*	O/LF
Ash	*Fraxinus excelsior*	R
Autumn hawkbit	*Leontodon autumnalis*	R/O
Bee orchid	*Ophrys apifera*	LO

English Name	Scientific Name	Area A
Biting stonecrop	*Sedum acre*	R
Bladder campion	*Silene vulgaris*	R
Blue fleabane	*Erigeron acer*	O
Bramble	*Rubus fruticosus agg.*	R/O
Broad-leaved willowherb	*Epilobium montanum*	O
Broomrape	*Orobanche sp.*	R
Cleavers	*Galium aparine*	R
Common bird's-foot trefoil	*Lotus corniculatus*	O/F
Common centaury	*Centaurium erythraea*	O/LF
Common figwort	*Scrophularia nodosa*	LO
Common knapweed	*Centaurea nigra*	F
Common mouse-ear	*Cerastium fontanum*	O
Common nettle	*Urtica dioica*	R
Common ragwort	*Senecio jacobaea*	O
Common restharrow	*Ononis repens*	LO
Common spotted orchid	*Dactylorhiza fuchsii*	LF
Common stork's-bill	*Erodium cicutarium*	R
Common toadflax	*Linaria vulgaris*	R
Cowslip	*Primula veris*	LO
Creeping cinquefoil	*Potentilla reptans*	F
Creeping thistle	*Cirsium arvense*	R/O
Dogwood	*Cornus sanguinea*	R/O
Fairy flax	*Linum catharticum*	LF
Field bindweed	*Convolvulus arvense*	R
Field forget-me-not	*Myosotis arvensis*	LO
Germander speedwell	*Veronica chamaedrys*	LF
Great mullein	*Verbascum thapsus*	R
Greater knapweed	*Centaurea scabiosa*	LO
Ground-ivy	*Glechoma hederacea*	F
Hairy violet	*Viola hirta*	LF
Hawthorn	*Crataegus monogyna*	R
Hedge bedstraw	*Galium mollugo*	O
Hoary plantain	*Plantago media*	LO/F
Hoary willowherb	*Epilobium parviflorum*	R
Hogweed	*Heracleum sphondylium*	R
Lady's bedstraw	*Galium verum*	R
Lesser trefoil	*Trifolium dubium*	O
Mouse-ear hawkweed	*Pilosella officinarum*	LO
Musk mallow	*Malva moschata*	LO
Nipplewort	*Lapsana communis*	R/O
Oxeye daisy	*Leucanthemum vulgare*	LO/F
Oxford ragwort	*Senecio squalidus*	R
Perforate St. John's wort	*Hypericum perforatum*	F
Ploughman's spikenard	*Inula conyza*	O
Pyramidal orchid	*Anacamptis pyramidalis*	R/O
Ribwort plantain	*Plantago lanceolata*	LO
Rosebay willowherb	*Chamerion angustifolium*	LO
Rough hawkbit	*Leontodon hispidus*	O/F

English Name	Scientific Name	Area A
Scabious	*Knautia arvensis/Scabiosa columbaria*	R
Scarlet pimpernel	*Anagallis arvensis*	R/O
Scentless mayweed	*Tripleurospermum inodorum*	R/O
Sedge	*Carex sp.*	LO
Self-heal	*Prunella vulgaris*	O/F
Spear thistle	*Cirsium vulgare*	R
Spotted medick	*Medicago arabica*	R
Square-stalked St. John's wort	*Hypericum tetrapterum*	O(LO/F)
Teasel	*Dipsacus fullonum*	LO
Thyme-leaved sandwort	*Arenaria serpyllifolia*	R/O(LF)
Travellers'-joy	*Clematis vitalba*	R/O
Violet	*Viola sp.*	LO
White clover	*Trifolium repens*	O
Wild basil	*Clinopodium vulgare*	LF/A
Wild carrot	*Daucus carota*	R
Wild liquorice	*Astragalus glyptostroboides*	LD
Wild parsnip	*Pastinaca sativa*	LO
Wild privet	*Ligustrum vulgare*	R
Wild strawberry	*Fragaria vesca*	LO/F
Willow	*Salix sp.*	R
Wood avens	*Geum urbanum*	R
Yarrow	*Achillea millefolium*	O
Yellow-wort	*Blackstonia perfoliata*	R/O

In addition to the above, cock's-foot, daisy, woolly thistle, cut-leaved crane's-bill, dove's-foot crane's-bill, greater bird's-foot trefoil, black medick, water mint, red bartsia and common vetch were also recorded in 2003.

10) Similar flora to rest woodland corridor, less developed, more weedy: creeping buttercup, traveller's-joy, woolly thistle, hoary ragwort. Locally fine grass sward with perforate St. John's-wort, creeping thistle, creeping thistle, common ragwort, creeping cinquefoil, ox-eye daisy, fairy flax, ribwort plantain, self-heal, white clover, hawkbit, wild carrot, meadow crane's-bill, common centaury, common restharrow (LD), agrimony.

11) Had recently been herbicided. Surviving vegetation supporting common bird's-foot trefoil, agrimony, ploughman's spikenard, germander speedwell, ground-ivy, bramble, wild parsnip, smooth hawk's-beard, fairy flax, common ragwort, hairy violet, wild strawberry, field forget-me-not, rosebay willowherb, travellers'-joy, black medick, self-heal, blue fleabane, creeping cinquefoil, dove's-foot crane's-bill, willowherb species, common centaury, wild basil.

12) Grassy clearing: perforate St. John's-wort, common nettle, water figwort, self-heal, scentless mayweed, common centaury, spear thistle, travellers'-joy, enchanters' nightshade, ground-ivy, creeping buttercup, fleabane, creeping cinquefoil, gypsywort, scarlet pimpernel, blue fleabane, yarrow, hawthorn, fairy flax, ribwort plantain, white clover, creeping bent, ox-eye daisy, great willowherb, hard rush, germander speedwell, common knapweed, water mint.

13)

English Name	Scientific Name	
Grasses:		
Common bent	*Agrostis capillaris*	F
Red fescue	*Festuca rubra*	O/F
Herbaceous species:		
Agrimony	*Agrimonia eupatoria*	O
Biting stonecrop	*Sedum acre*	LF/A
Black medick	*Medicago lupulina*	R/O
Blue fleabane	*Erigeron acer*	O/LF
Bramble	*Rubus fruticosus agg.*	O
Bristly ox-tongue	*Picris echioides*	R
Buckthorn	*Rhamnus catharticus*	R
Common centaury	*Centaurium erythraea*	LO
Common mouse-ear	*Cerastium fontanum*	R/O
Common nettle	*Urtica dioica*	LF/A
Common ragwort	*Senecio jacobaea*	F/A
Creeping buttercup	*Ranunculus repens*	O/F
Creeping cinquefoil	*Potentilla reptans*	O/F
Creeping thistle	*Cirsium arvense*	R/O
Cut-leaved crane's-bill	*Geranium dissectum*	R
Elder	*Sambucus nigra*	LO
Field bindweed	*Convolvulus arvensis*	R
Field forget-me-not	*Myosotis arvensis*	LO
Ground-ivy	*Glechoma hederacea*	F/LA
Hedge bedstraw	*Galium mollugo*	R/O
Hemlock	*Conium maculatum*	LF
Hoary willowherb	*Epilobium parviflorum*	LO
Lady's bedstraw	*Galium verum*	R/O
Lords-and ladies	*Arum maculatum*	R
Musk thistle	*Carduus nutans*	R
Nipplewort	*Lapsana communis*	O
Perforate St. John's wort	*Hypericum perforatum*	F
Ploughman's spikenard	*Inula conyza*	✓
Red bartsia	*Odontites vernus*	R/O
Ribwort plantain	*Plantago lanceolata*	O
Rosebay willowherb	*Chamerion angustifolium*	LO
Scarlet pimpernel	*Anagallis arvensis*	R
Scentless mayweed	*Tripleurospermum inodorum*	O
Self-heal	*Prunella vulgaris*	O
Spear thistle	*Cirsium vulgare*	LF
Teasel	*Dipsacus fullonum*	LO
White clover	*Trifolium repens*	R/O
Wild carrot	*Daucus carota*	R/O
Willowherb	*Epilobium sp.*	O/LF
Woolly thistle	*Cirsium eriophorum*	R
Yarrow	*Achillea millefolium*	R/O
Yellow-wort	*Blackstonia perfoliata*	R

14) Scrub-bordered track (blackthorn, hawthorn, dog rose, elder): teasel (O), ground-ivy (O/LF), perforate St. John's-wort (F), field forget-me-not (O), common ragwort (O), hairy violet (LF/A), common knapweed (R), thyme-leaved speedwell (R/O), self-heal (LO), yarrow (R/O), hawkbit (R), blue fleabane (R/O), ladies bedstraw (R), cowslip (R), ploughman's spikenard (LO), scarlet pimpernel (R/O), suckering blackthorn (LF), common mouse-ear (O), creeping cinquefoil (LF).

15)

English Name	Scientific Name	Frequency
Grasses		
Cock's-foot	*Dactylis glomerata*	O
Common bent	*Agrostis capillaris*	F
False oat-grass	*Arrhenatherum elatius*	LA
Fern grass	*Catapodium rigidum*	R
Meadow foxtail	*Alopecurus pratensis*	R
Red fescue	*Festuca rubra*	O/F
Sweet vernal grass	*Anthoxanthum odoratum*	R/O
Herbaceous species		
Black medick	*Medicago lupulina*	LF
Bulbous buttercup?	*Ranunculus bulbosus?*	R
Comfrey	*Symphytum sp.*	R
Common bird's-foot trefoil	*Lotus corniculatus*	O
Common figwort	*Scrophularia nodosa*	R
Common knapweed	*Centaurea nigra*	LO
Common nettle	*Urtica dioica*	F/LA
Common ragwort	*Senecio jacobaea*	F/LA
Common sorrel	*Rumex acetosa*	R
Common spotted orchid	*Dactylorhiza fuchsii*	R
Common vetch	*Vicia sativa*	R
Cow parsley	*Anthriscus sylvestris*	R
Creeping cinquefoil	*Potentilla reptans*	O
Creeping thistle	*Cirsium arvense*	O
Curled dock	*Rumex crispus*	R
Cut-leaved crane's-bill	*Geranium dissectum*	R/O
Field forget-me-not	*Myosotis arvensis*	O/F
Germander speedwell	*Veronica chamaedrys*	O
Ground-ivy	*Glechoma hederacea*	O/LF
Hairy violet?	*Viola hirta?*	R/O(LF)
Hemlock	*Conium maculatum*	O
Hoary willowherb	*Epilobium parviflorum*	R/O
Hogweed	*Heracleum sphondylium*	R/O
Hop	*Humulus lupulus*	R
Ladies bedstraw	*Galium verum*	O/F
Perforate St. John's-wort	*Hypericum perforatum*	O
Smooth hawk's-beard	*Crepis capillaris*	LF
Spear thistle	*Cirsium vulgare*	R
Teasel	*Dipsacus fullonum*	O
Toadflax	*Linaria vulgaris*	R/O
Travellers'-joy	*Clematis vitalba*	LO
Weld / Migonette	*Reseda sp.*	R
White bryony	*Bryonia dioica*	R
White campion	*Silene alba*	R/O
White clover	*Trifolium repens*	O/LF
White dead-nettle	*Lamium album*	R/O
Wild carrot	*Daucus carota*	R

16) Track side

English Name	Scientific Name	Frequency
Biting stonecrop	*Sedum acre*	LO
Bulbous buttercup	*Ranunculus bulbosus*	R
Common bent	*Agrostis capillaris*	O
Common centaury	*Centaurium erythraea*	O
Common ragwort	*Senecio jacobaea*	O
Common stork's-bill	*Erodium cicutarium*	R/LO
Creeping cinquefoil	*Potentilla reptans*	R
Cut-leaved crane's-bill	*Geranium dissectum*	R
Dove's-foot crane's-bill	*Geranium molle*	R/O
Fern-grass	*Catapodium rigidum*	LO
Field forget-me-not	*Myosotis arvensis*	O
Greater plantain	*Plantago major*	R
Ground-ivy	*Glechoma hederacea*	LO/F
Lesser trefoil	*Trifolium dubium*	R
Moss		LF
Sea mouse-ear	*Cerastium diffusum*	LO
Parsley piert	*Aphanes arvensis*	LO
Procumbent pearlwort	*Sagina procumbens*	LO
Perforate St. John's-wort	*Hypericum perforatum*	O
Ploughman's spikenard	*Inula conyza*	R
Red fescue	*Festuca rubra*	LO/F
Sand-spurrey?	*Spergularia sp.*	LO
Scentless mayweed	*Tripleurospermum inodorum*	O
Self-heal	*Prunella vulgaris*	R/O
Teasel	*Dipsacus fullonum*	O
Thyme-leaved speedwell	*Veronica serpyllifolia*	R
Yorkshire fog	*Holcus lanatus*	R

Verges

English Name	Scientific Name	W. bank	E.bank
Agrimony	*Agrimonia eupatorium*	R	
Beaked hawk's-beard	*Crepis vesicaria*	R	
Black medick	*Medicago lupulina*	O	
Black mustard	*Brassica nigra*	LF	
Bramble	*Rubus fruticosus agg.*	O	
Cleavers	*Galium aparine*	LO	
Cock's-foot	*Dactylis glomerata*	R/O	R/O
Colt's-foot	*Tussilago farfara*		R/O
Columbine	*Aquilegia sp.*		LO
Comfrey	*Symphytum sp.*	R	
Common bent	*Agrostis capillaries*	F	F
Common bird's-foot trefoil	*Lotus corniculatus*	O	O/F
Common knapweed	*Centaurea nigra*	R	LO
Common mouse-ear	*Cerastium fontanum*		O
Common nettle	*Urtica dioica*	✓	
Common poppy	*Papaver rhoeas*	R	
Common ragwort	*Senecio jacobaea*	O	
Common sorrel	*Rumex acetosa*	R	
Cow parsley	*Anthriscus sylvestris*	R	
Creeping bent	*Agrostis stolonifera*	R	R
Creeping cinquefoil	*Potentilla reptans*		R/O
Cut-leaved crane's-bill	*Geranium dissectum*	R/LO	R
Dove's-foot crane's-bill	*Geranium molle*		R

English Name	Scientific Name	W. bank	E.bank
Fairy flax	*Linum catharticum*	R	
False oat-grass	*Arrhenatherum elatius*	LF	R/O
Fern grass	*Catapodium rigidum*		LO
Field forget-me-not	*Myosotis arvensis*	O	R
Garlic mustard	*Alliaria petiolata*	O/LF	
Goat's-beard	*Tragopogon pratensis*		R
Hairy violet	*Viola hirta*	LF	
Hoary ragwort	*Senecio erucifolius*	LO	R/O
Hogweed	*Heracleum sphondylium*	R/O	
Ladies bedstraw	*Galium verum*	R/O	
Melilot / Lucerne	*Melilotus sp. / Medicago sp.*	R	R/LO
Ox-eye daisy	*Leucanthemum vulgare*	R/LO	
Perennial rye grass	*Lolium perenne*		R
Ploughman's spikenard	*Inula conyza*	R/O	R
Prickly sow-thistle	*Sonchus asper*	R	LO
Red clover	*Trifolium pratense*	R	
Red fescue	*Festuca rubra*	F	F
Ribwort plantain	*Plantago lanceolata*	LO	LO
Smooth hawk's-beard	*Crepis capillaris*	O	
Soft brome	*Bromus hordeaceus*	R	
Spear thistle	*Cirsium vulgare*	R	R
Rat's-tail fescue	*Vulpia myuros*		R
Sterile brome	*Anisantha sterilis*	R	
Teasel	*Dipsacus fullonum*	LA/D	O
Travellers'-joy	*Clematis vitalba*	LD	R
Tufted vetch	*Vicia cracca*	R	
Weld	*Reseda luteola*	LO	
White clover	*Trifolium repens*		R/O
White dead-nettle	*Lamium album*	R	
Wild carrot	*Daucus carota*	R	R/O
Wild parsnip	*Pastinaca sativa*	R/O	LO/F
Yarrow	*Achillea millefolium*	R/O	R/O

W bank supports scattered scrub comprising ash, blackthorn, elder, hawthorn and sycamore.

E face of bank dominated with false oat-grass with common nettle, bramble and occasional hogweed, smooth hawk's-beard and red clover. Becomes more open to S with bare soil / rock.

17) Teasel (LF), ground-ivy (LF), wild parsnip (LO), creeping thistle (O/LF), ploughman's spikenard (LO), self-heal (LO), field forget-me-not (O), common ragwort (LO/F), daisy (R), perforate St. John's-wort (LO), white clover (R/LF), common bird's-foot trefoil (LO), spear thistle (R), Yorkshire fog (R), agrimony (R), colt's-foot (LO), creeping buttercup (LF), great willowherb (LO), willowherb sp. (LO), common vetch (R), creeping cinquefoil (LO), false oat-grass (LO), tufted hair-grass (LF) and yarrow (LO). Some scattered scrub: elder, willow, dog-rose and bramble.

Area below much overgrown with scrub: willow species, bramble, dog-rose, elder, sycamore and blackthorn.

To west: becomes more dominated by tufted hair-grass with occasional creeping thistle and locally frequent colt's-foot. Locally rocky and open with common ragwort, wild parsnip, common bird's-foot trefoil, teasel, colt's-foot and willowherb species. Lower slopes are grassier:

English Name	Scientific Name	Frequency
Bristly ox-tongue	*Picris echioides*	LO
Bulbous buttercup	*Ranunculus bulbosus*	R
Cock's-foot	*Dactylis glomerata*	R
Colt's-foot	*Tussilago farfara*	LO
Common figwort	*Scrophularia nodosa*	R
Common mouse-ear	*Cerastium fontanum*	R
Common ragwort	*Senecio jacobaea*	LO
Common vetch	*Vicia sativa*	R
Creeping bent	*Agrostis stolonifera*	R
Creeping cinquefoil	*Potentilla reptans*	LO
Creeping thistle	*Cirsium arvense*	LO/F
Curled dock	*Rumex crispus*	LO
Cut-leaved crane's-bill	*Geranium dissectum*	LO
Fairy flax	*Linum catharticum*	LF
Field forget-me-not	*Myosotis arvensis*	O
Field horse-tail	*Equisetum arvense*	LF
Glaucous sedge	*Carex flacca*	LO
Great willowherb	*Epilobium hirsutum*	LO
Hairy sedge	*Carex hirta*	LO/F
Hard rush	*Juncus inflexus*	R
Ploughman's spikenard	*Inula conyza*	R
Ribwort plantain	*Plantago lanceolata*	R
Rosebay willowherb	*Chamerion angustifolium*	LO
Spear thistle	*Cirsium vulgare*	R
Teasel	*Dipsacus fullonum*	LO
Tufted hair-grass	*Deschampsia cespitosa*	LF/A
Water mint	*Mentha aquatica*	LO
Wood false-brome	*Brachypodium sylvaticum*	R
Yorkshire fog	*Holcus lanatus*	R/O

Scattered scrub comprising willow, bramble, sycamore and hawthorn.

18) Marshy grassland: hard rush (F), brookweed, common centaury, gypsywort, water mint, fleabane, sedge.

Tall Herb

19) Large tall ruderal area, subsequently herbicided:

English Name	Scientific Name	Frequency
Barley/rye	*Hordeum/Secale*	R
Beaked hawk's-beard	*Crepis vesicaria*	R
Bittersweet	*Solanum dulcamara*	R/O
Black medick	*Medicago lupulina*	O
Black-grass	*Alopecurus myosuroides*	LO
Bladder campion	*Silene alba*	R/O
Bramble	*Rubus fruticosus agg.*	LO
Bristly ox-tongue	*Picris echioides*	O/LF
Broad-leaved dock	*Rumex obtusifolius*	O/LF
Bulbous buttercup	*Ranunculus bulbosus*	R/O
Burdock	*Arctium sp.*	LO
Butterfly bush	*Buddleja davidii*	LO
Cleavers	*Galium aparine*	R

English Name	Scientific Name	Frequency
Cock's-foot	*Dactylis glomerata*	R/O
Colt's-foot	*Tussilago farfara*	LF
Columbine	*Aquilegia sp.*	R
Comfrey	*Symphytum sp.*	R
Common bird's-foot trefoil	*Lotus corniculatus*	O
Common centaury	*Centaurium erythraea*	R
Common figwort	*Scrophularia nodosa*	R
Common knapweed	*Centaurea nigra*	R
Common mouse-ear	*Cerastium fontanum*	R/O
Common nettle	*Urtica dioica*	LO
Common ragwort	*Senecio jacobaea*	O
Common toadflax	*Linaria vulgaris*	R
Common vetch	*Vicia sativa*	LO
Creeping bent	*Agrostis stolonifera*	R/O
Creeping buttercup	*Ranunculus repens*	O
Creeping cinquefoil	*Potentilla reptans*	R/O
Creeping thistle	*Cirsium arvense*	O/F
Crested dog's-tail	*Cynosurus cristatus*	R
Curled dock	*Rumex crispus*	R
Cut-leaved crane's-bill	*Geranium dissectum*	O
Daisy	*Bellis perennis*	LO
Dove's-foot crane's-bill	*Geranium molle*	R
False oat grass	*Arrhenatherum elatius*	O/F
Fennel (garden)	*Foeniculum vulgare*	R
Fern grass	*Catapodium rigidum*	R
Feverfew	*Tanacetum parthenium*	R
Field forget-me-not	*Myosotis arvensis*	O
Field horse-tail	*Equisetum arvense*	LO
Field madder	*Sherardia arvensis*	R
Field speedwell	*Veronica arvensis*	O
Foxglove	*Digitalis purpurea*	R
Garlic mustard	*Alliaria petiolata*	R/O
Germander speedwell	*Veronica chamaedrys*	R
Great mullein	*Verbascum thapsus*	R
Great willowherb	*Epilobium hirsutum*	LF
Greater celandine	*Chelidonium majus*	R
Greater plantain	*Plantago major*	LO
Green alkanet	*Pentaglottis sempervirens*	R
Ground ivy	*Glechoma hederacea*	R
Gypsywort	*Lycopus europaeus*	LO
Hairy tare	*Vicia hirsuta*	R/LO
Hard rush	*Juncus inflexus*	R
Hedge bindweed	*Calystegia sepium*	R
Hedge woundwort	*Stachys sylvatica*	LO
Hedgerow crane's-bill	*Geranium pyrenaicum*	LO/F
Herb Robert	*Geranium robertianum*	R/O
Hoary willowherb	*Epilobium parviflorum*	O
Hogweed	*Heracleum sphondylium*	R

English Name	Scientific Name	Frequency
Hop trefoil	*Trifolium campestre*	R
Iris	*Iris sp.*	R
Lesser trefoil	*Trifolium dubium*	O/LF
Love-in-a-mist	*Nigella damascena*	LO
Meadow vetchling	*Lathyrus pratensis*	R
Meadow-grass	*Poa sp.*	O
Medick	*Medicago sp.*	R/O
Mugwort	*Artemisia vulgaris*	O
Ox-eye daisy	*Leucanthemum vulgare*	O/F
Perennial rye-grass	*Lolium perenne*	LO
Perforate St. John's-wort	*Hypericum perforatum*	O
Ploughman's spikenard	*Inula conyza*	O
Prickly sow-thistle	*Sonchus asper*	LO
Procumbent pearlwort	*Sagina procumbens*	R
Rat's-tail fescue	*Vulpia myuros*	R/LF
Red clover	*Trifolium pratense*	R/O
Red fescue	*Festuca rubra*	R/O
Ribwort plantain	*Plantago lanceolata*	O
Rosebay willowherb	*Chamerion angustifolium*	LF
Scarlet pimpernel	*Anagallis arvensis*	R/O
Scentless mayweed	*Tripleurospermum inodorum*	O/F
Sisyrinchium sp.	*Sisyrinchium sp.*	R
Smooth hawk's-beard	*Crepis capillaries*	R/O
Soft brome	*Bromus hordeaceus*	LO
Spear thistle	*Cirsium vulgare*	O
Spotted medick	*Medicago arabica*	R
St. John's-wort	*Hypericum sp.*	R
Sterile brome	*Anisantha sterilis*	LO
Teasel	*Dipsacus fullonum*	O/F
Timothy	*Phleum pratense*	R
Tufted hair-grass	*Deschampsia cespitosa*	LO
White clover	*Trifolium repens*	O
Wild carrot	*Daucus carota*	R
Wild strawberry	*Fragaria vesca*	R
Willow sp.	*Salix sp.*	LO/F
Willowherb sp.	*Epilobium sp.*	LO/F
Yarrow	*Achillea millefolium*	LO
Yorkshire fog	*Holcus lanatus*	R/O

20) Sparser area than (17) - c. 60% cover: ribwort plantain (F), mugwort (O), ox-eye daisy (F), lesser trefoil (O/F), lucerne? (R), silverweed (LF), white clover (F), bristly ox-tongue (F), tufted hair-grass (R), red clover (R/O), wild carrot (R/O), common mallow (R), scarlet pimpernel (R/O), Yorkshire fog (R/O), weld (O), prickly sow-thistle (LF), herb Robert (R), self-heal (R), common figwort (R), feverfew (R), creeping cinquefoil (LF), willow spp. (LF), common vetch (LO), spotted medick (R), soft rush (R), hard rush (R), brookweed (R), pendulous sedge (LO), cornflower (R), beaked hawk's-beard (R), hoary willowherb (R/O), evening primrose (R), creeping buttercup (LO/F), common vetch (LO).

21) Area herbicided. Probably supported similar flora to (17).

22)

English Name	Scientific Name	Frequency
Bent	*Agrostis sp.*	LO
Bramble	*Rubus fruticosus agg.*	F
Bristly ox-tongue	*Picris echioides*	LO
Burdock	*Arctium sp.*	LO
Butterfly bush	*Buddleja davidii*	O
Cock's-foot	*Dactylis glomerata*	R
Colt's-foot	*Tussilago farfara*	LF
Columbine	*Aquilegia sp.*	LO
Common bird's-foot trefoil	*Lotus corniculatus*	LF/A
Common mouse-ear	*Cerastium fontanum*	R
Common nettle	*Urtica dioica*	LF
Common ragwort	*Senecio jacobaea*	F
Keeled-fruited cornsalad	*Valerianella carinata*	R
Creeping buttercup	*Ranunculus repens*	LF
Creeping cinquefoil	*Potentilla reptans*	LF/A
Creeping thistle	*Cirsium arvense*	LF
Cut-leaved crane's-bill	*Geranium dissectum*	O/F
Dog rose	*Rosa canina*	R/O
False oat-grass	*Arrhenatherum elatius*	F
Field bindweed	*Convolvulus arvensis*	R
Germander speedwell	*Veronica chamaedrys*	LO
Great willowherb	*Epilobium hirsutum*	LO
Hard rush	*Juncus inflexus*	LO
Ladies bedstraw	*Galium verum*	LO
Lemon balm?	*Melissa officinalis?*	R
Lucerne	*Medicago sativa*	LD
Ox-eye daisy	*Leucanthemum vulgare*	LO
Pendulous sedge	*Carex pendula*	R/O
Perforate St. John's-wort	*Hypericum perforatum*	O/F
Ploughman's spikenard	*Inula conyza*	LO
Rat's-tail fescue	*Vulpia myuros*	LF
Red fescue	*Festuca rubra*	R/O
Rosebay willowherb	*Chamerion angustifolium*	LF/A
Scarlet pimpernel	*Anagallis arvensis*	R
Scentless mayweed	*Tripleurospermum inodorum*	LO
Self-heal	*Prunella vulgaris*	LO
Silverweed	*Potentilla anserina*	LF
Sterile brome	*Anisantha sterilis*	LO
Teasel	*Dipsacus fullonum*	A
Wall speedwell	*Veronica arvensis*	R/O
Tufted hair-grass	*Deschampsia cespitosa*	R
Wild carrot	*Daucus carota*	LO
Willow sp.	*Salix sp.*	R/O
Wood false-brome	*Brachypodium sylvaticum*	R/O
Yorkshire fog	*Holcus lanatus*	R

23)

English Name	Scientific Name	Frequency
Bittersweet	*Solanum dulcamara*	R
Bristly ox-tongue	*Picris echioides*	✓
Burdock	*Arctium sp.*	R
Butterfly bush	*Buddleja davidii*	R/O
Canadian fleabane	*Conyza canadensis*	LO
Celery-leaved buttercup	*Ranunculus sceleratus*	LO
Colt's-foot	*Tussilago farfara*	LO
Common bird's-foot trefoil	*Lotus corniculatus*	R
Common evening-primrose	*Oenothera biennis*	R
Common mallow	*Malva sylvestris*	R
Common nettle	*Urtica dioica*	LO
Common poppy	*Papaver rhoeas*	R
Common ragwort	*Senecio jacobaea*	LO
Creeping buttercup	*Ranunculus repens*	O
Docks	*Rumex spp.*	LA
Dove's-foot crane's-bill	*Geranium molle*	R/O
Feverfew	*Tanacetum parthenium*	R
Field forget-me-not	*Myosotis arvensis*	✓
Field pansy	*Viola arvensis*	LO
Field penny-cress	*Thlaspi arvense*	R
Great mullein	*Verbascum thapsus*	R/O
Hedgerow crane's-bill	*Geranium pyrenaicum*	R
Hemlock	*Conium maculatum*	R
Hoary willowherb	*Epilobium parviflorum*	O
Lady's-mantle (garden escape)	*Alchemilla sp.*	R
Large-flowered evening-primrose	*Oenothera glazioviana*	R/O
Mullein (garden escape?)	*Verbascum sp.*	R
Musk mallow	*Malva moschata*	R
Ox-eye daisy	*Leucanthemum vulgare*	R
Perennial rye-grass	*Lolium perenne*	✓
Ribwort plantain	*Plantago lanceolata*	O
Scarlet pimpernel	*Anagallis arvensis*	R/O
Scentless mayweed	*Tripleurospermum inodorum*	O/F
Silverweed	*Potentilla anserina*	R
Small balsam	*Impatiens parviflora*	LO
Spear thistle	*Cirsium vulgare*	R/O
Sun spurge	*Euphorbia helioscopia*	LO
Wall speedwell	*Veronica arvensis*	R
Weld	*Reseda luteola*	✓
Willowherb spp.	*Epilobium spp.*	O/F
Yorkshire fog	*Holcus lanatus*	✓

24) Spoil mounds, some treated: locally scattered bushes of butterfly bush. Hemlock, broad-leaved dock, scentless mayweed, white campion, common nettle, wild parsnip, rosebay willowherb, teasel, large-flowered evening-primrose, weld, perforate St. John's-wort, creeping thistle, spear thistle, common fumitory (Fumaria officinalis), ornamental poppies, garlic mustard, redshank, common mallow, knotgrass, black mustard.

25) Base of quarry: random mounds of spoil with common nettle, common fumitory, scentless mayweed, weld, ornamental poppies, wall speedwell, field forget-me-not, sticky groundsel (Senecio viscosus), garlic mustard, colt's-foot, Oxford ragwort, fool's-parsley (Aethusa cynapium), teasel.

26) Tall herb with scattered butterfly bush where building demolished. Common fumitory, hoary willowherb, willowherb sp., scentless mayweed, ploughman's spikenard, blue fleabane, field forget-me-not, perforate St. John's-wort, great willowherb, creeping thistle, travellers'-joy, common ragwort, common centaury.

27) Banks of small cut-off lake: spear thistle, common ragwort, bristly ox-tongue, great willowherb, prickly sow-thistle, broad-leaved dock, common nettle, large-flowered evening-primrose, teasel, rosebay willowherb, ornamental spurge, cat-mint? (Nepeta cataria), feverfew, common mallow, creeping thistle, yarrow.

28) Rocky mounds with bristly ox-tongue (F), bulbous buttercup (R/O), ploughman's spikenard (O), lesser trefoil (O), field forget-me-not (O/F), ox-eye daisy (LF), common bird's-foot trefoil (O), rat's-tail fescue (LF), Yorkshire fog (R/O), bramble (O), fern grass (R), common mouse-ear (O), red fescue (R/O), cock's-foot (R/O), creeping thistle (O), common centaury (R), wall speedwell (O), perforate St. John's-wort (R/O), tufted hair-grass (LO), hoary willowherb (LO), figwort sp. (LO/F).

29) Rosebay willowherb, great willowherb, ground-ivy, common ragwort, common centaury, germander speedwell, bramble, agrimony, blue fleabane, wild carrot, ploughman's spikenard, hairy violet, self-heal, hoary willowherb, creeping thistle, teasel.

30) At eastern end below TN 16 cliff and foot of cliff support common nettle, bramble, false oat-grass, hogweed, great willowherb, black mustard, traveller's-joy, field bindweed, beaked hawk's-beard, smooth hawk's-beard, common ragwort, hemlock, garlic mustard, weld, spear thistle, teasel, prickly sow-thistle, field madder (R), field pennycress (LO). Tall herb bordering wide track at base (recently treated): broad-leaved dock, spear thistle, scentless mayweed, scarlet pimpernel (LO), great mullein, wood avens.

31) Slopes with teasel, common nettle, great horsetail, burdock, spear thistle, dog rose, agrimony, wild basil, ground-ivy, great mullein (R), creeping thistle, common ragwort, hemlock, pellitory-of-the-wall (R), English elm (R), blackthorn. Much scattered scrub: butterfly bush, ash, hawthorn and bramble.

Swamp, Marginal, Inundation and Aquatic Vegetation

Inundation

32) Drained lake bed: toad rush (F), blue water-speedwell (Veronica anagallis-aquatica, O), redshank (R/O), spear-leaved orache (Atriplex prostrata, R/O), water mint (O/LF), brooklime (F), fleabane (LO), hoary willowherb (R/O), scentless mayweed (O), scarlet pimpernel (R/O), self-heal (R/O), square-stalked willowherb (Epilobium tetragonum, R/O), bramble (R/O), creeping bent (LO/F), common centaury (R), gypsywort (R/O), silverweed (LO), Michaelmas daisy (R). Very little marginal vegetation: forget-me-not sp., jointed rush, pond sedge, common club-rush, hairy hawk-bit.

33) Lake bed: scattered brookweed, scentless mayweed, hard rush, teasel, water mint, hoary willowherb, common centaury, an alien grass, common spike-rush (*Eleocharis palustris*), self-heal, black medick, yellow-wort.

34) Damp plateau beyond channel at base of cliffs: hairy hawkbit, common centaury, a sedge, fleabane.

35) Former lake bed: brookweed (F), common figwort (LO), hoary willowherb.

Swamp/marginal

36) Marshy area: large stand common spike-rush with bulrush, hard rush, common figwort, water-plantain, brookweed, great willowherb, jointed rush, water horse-tail, water mint, water figwort, great horsetail, common water-starwort (LA).

37) Damp area with water-starwort, blue water-speedwell, floating sweet-grass, celery-leaved buttercup, hard-rush.

38) Wet flush area with floating sweet-grass, hard rush, branched bur-reed?, fool's water-cress, creeping buttercup, blue water-speedwell, celery-leaved buttercup.

39) Small cut-off lake: water-plantain, flowering rush, small pondweed, branched bur-reed, water-crowfoot, gypsywort.

40) Small channel: willows, bulrush, water mint, brookweed, jointed rush, common figwort, hemp agrimony, hard rush, gypsywort, common club-rush, water-plantain (LO), common spike-rush (LF), fool's water-cress, great willowherb.

41) Stream / flush: water mint, hard rush, common spike-rush, bulrush, brookweed, great willowherb, hemp agrimony, common club-rush, small pond-weed.

Central Lake

42) Area dominated by lesser bulrush with water mint, gypsywort, bittersweet, water horsetail and lesser / greater pond sedge (both recorded from lake). Scattered marginal scrub: dog-rose, bramble, grey willow, traveller's-joy, hawthorn, sycamore. Common club-rush and common reed locally dominant.

43) Area dominated by lesser bulrush with large water-lily (ornamental?), common spike-rush (local), hemp agrimony and purple loosestrife (local).

44) Island covered with willow.

45) Aquatic / marginal flora: water-crowfoot, Nuttall's waterweed (*Elodea nuttallii*), hard rush, mare's-tail (*Hippuris vulgaris*), water forget-me-not, fennel-leaved pondweed and water-crowfoot. Southern end of lake (overspills into partially drained lake to south: grey willow scrub, great horsetail, gypsywort, bramble, great willowherb, false fox sedge, water mint, bittersweet, fleabane. Western bank / causeway: marginal goat willow scrub, osier, great willowherb and lesser pond sedge, causeway with much great horsetail, wood avens, docks (herbicided), teasel, hoary willowherb, creeping thistle, bristly ox-tongue, creeping cinquefoil. A single bee orchid was recorded on the eastern margin of the lake in 2003.

46) Area dominated with common reed, some purple loosestrife, lesser pond-sedge, hemp agrimony.

47) Sedge dominated area: water mint, great willowherb, gypsywort, mare's-tail, fleabane, hemp agrimony, jointed rush (where sedge less vigorous), bulrush (local). 2003: also recorded hard rush, brookweed, common reed, toad rush, sweet-flag, common spike-rush, fool's water-cress and common club-rush.

48) Northern bank dominated by willow scrub with ash, traveller's-joy, dog rose, bramble.

Cultivated / Disturbed Land, Boundaries, Built-Up Areas and Bare Ground

Ephemeral / short perennial

49)

English Name	Scientific Name	Frequency
Blue fleabane	*Erigeron acer*	R/LO
Bramble	*Rubus fruticosus agg.*	O
Bristly ox-tongue	*Picris echioides*	LO
Bulbous buttercup	*Ranunculus bulbosus*	LO
Cat's-ear	*Hypochaeris radicata*	R
Cock's-foot	*Dactylis glomerata*	R
Colt's-foot	*Tussilago farfara*	R/LO
Comfrey	*Symphytum sp.*	R
Common bird's-foot trefoil	*Lotus corniculatus*	O(LF/A)
Common centaury	*Centaurium erythraea*	R/O
Common mouse-ear	*Cerastium fontanum*	O
Common ragwort	*Senecio jacobaea*	R/LO
Common toadflax	*Linaria vulgaris*	R
Common vetch	*Vicia sativa*	LO
Keeled-fruited cornsalad	*Valerianella carinata*	LO

English Name	Scientific Name	Frequency
Creeping bent	*Agrostis stolonifera*	LO/F
Creeping cinquefoil	*Potentilla reptans*	LO
Creeping thistle	*Cirsium arvense*	LO
Curled dock	*Rumex crispus*	LF
Cut-leaved crane's-bill	*Geranium dissectum*	LO
Dove's-foot crane-s-bill	*Geranium molle*	LO
Fairy flax	*Linum catharticum*	R
False oat-grass	*Arrhenatherum elatius*	LO
Fern grass	*Catapodium rigidum*	LO
Field forget-me-not	*Myosotis arvensis*	O
Great willowherb	*Epilobium hirsutum*	F
Ground-ivy	*Glechoma hederacea*	LF
Hard rush	*Juncus inflexus*	R
Hemlock	*Conium maculatum*	R
Hoary ragwort	*Senecio erucifolius*	LO
Hoary willowherb	*Epilobium parviflorum*	LO
Hop	*Humulus lupulus*	R
Lesser trefoil	*Trifolium dubium*	LA
Lucerne	*Medicago sativa*	LO
Common mouse-ear	*Cerastium fontanum*	LO
Mugwort	*Artemisia vulgaris*	LO
Ox-eye daisy	*Leucanthemum vulgare*	O/LF
Parsley piert	*Aphanes arvensis*	R/O
Pearlwort	*Sagina sp.*	LF
Perforate St. John's-wort	*Hypericum perforatum*	O
Ploughman's spikenard	*Inula conyza*	LF
Rat's-tail fescue	*Vulpia myuros*	F
Red clover	*Trifolium pratense*	LO
Ribwort plantain	*Plantago lanceolata*	LO
Rosebay willowherb	*Chamerion angustifolium*	LF
Scentless mayweed	*Tripleurospermum inodorum*	O
Grey sedge?	*Carex divulsa?*	R
False fox-sedge	*Carex otrubae*	R
Self-heal	*Prunella vulgaris*	O
Silverweed	*Potentilla anserina*	R
Smooth hawk's-beard	*Crepis capillaris*	LO
Soft brome	*Bromus hordeaceus*	R
Sterile brome	*Anisantha sterilis*	R
Teasel	*Dipsacus fullonum*	O/LF
Thyme-leaved speedwell	*Veronica serpyllifolia*	LO
Tufted hair-grass	*Deschampsia cespitosa*	R/LO
Wall speedwell	*Veronica arvensis*	LO
White clover	*Trifolium repens*	R/O
Wild carrot	*Daucus carota*	R
Wild parsnip	*Pastinaca sativa*	LO
Willowherb sp.	*Epilobium sp.*	LO
Yorkshire fog	*Holcus lanatus*	R

50)

English Name	Scientific Name	Frequency
Bearberry (cultivar)	*Cotoneaster sp.*	R
Bramble	*Rubus fruticosus agg.*	O/LA
Broad-leaved dock	*Rumex obtusifolius*	R
Cleavers	*Galium aparine*	LO
Colt's-foot	*Tussilago farfara*	LF
Columbine (garden escape)	*Aquilegia sp.*	LO
Common nettle	*Urtica dioica*	LF
Common ragwort	*Senecio jacobaea*	R/O
Creeping buttercup	*Ranunculus repens*	VLF
Dog rose	*Rosa canina*	R
Elder	*Sambucus nigra*	R/O
False oat-grass	*Arrhenatherum elatius*	F
Fern grass	*Catapodium rigidum*	VLF
Field forget-me-not	*Myosotis arvensis*	O
Germander speedwell	*Veronica chamaedrys*	VLO
Great willowherb	*Epilobium hirsutum*	LO/F
Hawthorn	*Crataegus monogyna*	O
Hedge bindweed	*Calystegia sepium*	LO
Hoary cress	*Lepidium draba*	LF
Hoary ragwort	*Senecio erucifolius*	R
Hoary willowherb	*Epilobium parviflorum*	R
Montbretia	*Crocosmia sp.*	R
Sea mouse-ear	*Cerastium diffusum*	LF
Pendulous sedge	*Carex pendula*	R
Ploughman's spikenard	*Inula conyza*	LO
Rat's-tail fescue	*Vulpia myuros*	LF
Rosebay willowherb	*Chamerion angustifolium*	LF
Self heal	*Prunella vulgaris*	LO
Teasel	*Dipsacus fullonum*	O
Travellers'-joy	*Clematis vitalba*	R/O
Tufted hair-grass	*Deschampsia cespitosa*	R
Wall speedwell	*Veronica arvensis*	R/O
Willowherb	*Epilobium sp.*	LO/F
Wood avens	*Geum urbanum*	LO
Yorkshire fog	*Holcus lanatus*	LO

51)

English Name	Scientific Name	Frequency
Bristly ox-tongue	*Picris echioides*	LO
Broad-leaved dock	*Rumex obtusifolius*	LO
Common mouse-ear	*Cerastium fontanum*	LO
Creeping bent	*Agrostis stolonifera*	LO
Creeping thistle	*Cirsium arvense*	O
Evening-primrose	*Oenothera sp. (NIF)*	LA
Field forget-me-not	*Myosotis arvensis*	O
Hop trefoil	*Trifolium campestre*	R/LO
Lesser trefoil	*Trifolium dubium*	LO
Meadow-grass	*Poa sp.*	LO
Sea mouse-ear	*Cerastium diffusum*	LF
Ox-eye daisy	*Leucanthemum vulgare*	R/O
Perforate St. John's-wort	*Hypericum perforatum*	LO
Ploughman's spikenard	*Inula conyza*	LO
Rat's-tail fescue	*Vulpia myuros*	F/A