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PHASE 2 ECOLOGICAL SURVEYS OF LAND OFF WITHIES PARK, MIDSOMER NORTON, SOMERSET

DRAFT INTERIM REPORT

CLIENT: DAVID WILSON HOMES

OUR REF: DAVWIL-CAUCLO-2728

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DAVWIL-CAUCLO-2728

PHASE 2 ECOLOGICAL SURVEYS OF LAND OFF WITHIES PARK, MIDSOMER NORTON, SOMERSET

NON-TECHNICAL SUMMARY

Site location and size	Land off Withies Park (including 100 Withes Park), Midsomer Norton; 3.67ha
Scope of Works	Phase 2 surveys including hedgerows, bats, water vole, otter, dormouse, kingfisher, great crested newt (Habitat Suitability Index assessment), reptile and white-clawed crayfish
Purpose of Works	To inform proposed development of the site, including the construction of residential properties and associated infrastructure
Dates of site visits	To date - April to July 2010 (surveys anticipated to be completed in September 2010)
Overview	*Hedgerows* One hedgerow on the northern boundary of the site is considered ecologically important under the hedgerow regulations, six are considered UKBAP priority habitats and one species rich LBAP habitat *Bats* The building on site is considered to have negligible suitability to support rooting bats. One tree on site is considered to offer low suitability to support roosting bats. Eight species of bats were recorded utilising the site for foraging and commuting during the activity surveys undertaken between May and July. No greater or lesser horseshoe bats have been recorded to date *Dormouse* No evidence of dormouse has been recorded to date *Otter* Otter spraints were recorded up-river to the south of the site. No evidence of otter was recorded on site. The site is likely to be used by otter for commuting and foraging *Water Vole* No evidence of water vole was recorded on site. The site provides limited suitability for this species *Kingfisher* No evidence of kingfisher was recorded on site. Branches overhanging the River Somer along a short section of the banks provide suitable perches for kingfisher *Great crested newt* The ditch on site was dry at the time of survey and considered to have poor suitability to support great

	crested newts, with a HSI score of 0.36. The pond off site is considered to have poor suitability with a HSI score of 0.33 *Reptiles* A peak count of 25 slow worms was recorded. The site provides suitable foraging habitat for reptiles, and is likely to be used in combination with adjacent residential gardens *White-clawed crayfish* No evidence of white-clawed crayfish was recorded with River Somer, but records within 1km of the site exist
Recommendations	A Mitigation Strategy for the site should be developed to identify and mitigate for the impacts of the proposals during both the construction and operational phases of the development. Based on the results of the surveys, ecological receptors include: River Somer SNCI, hedgerows, foraging badger, foraging and commuting bats, including horseshoe bats (until completion of the surveys it is assumed that these species are using the site), otter, dormouse (until completion of the surveys it is assumed this species is present), birds, common reptile and amphibian species, and Bullhead fish

CONTENTS

1 INTRODUCTION

1.1 In April 2010, ecosulis ltd was commissioned by David Wilson Homes to undertake Phase 2 surveys of land off Withies Park, including 100 Withies Park, Midsomer Norton, Somerset. Current proposals include the demolition of 100 Withies Park to make way for an access road, and the development of residential housing within land off Withies Park. This report should be read in conjunction with the extended Phase 1 habitat survey report (ecosulis ltd, 2010; report reference DAVWIL-CAUCLO-2693) and Ecological Strategy report (ecosulis ltd, 2010, report reference: DAVWIL-CAUCLO-2728-ES).

1.2 Members of staff from ecosulis ltd visited the site in April, May, June and July 2010 to undertake the surveys, which included a hedgerow survey, daytime bat assessment and survey, bat activity surveys, dormouse surveys, otter survey, water vole survey, kingfisher survey, reptile survey, great crested newt Habitat suitability Index (HSI) assessment and white-clawed crayfish survey. The bat activity surveys and dormouse surveys will continue into August and September 2010. Access was provided by the landowner.

Objectives of Study

1.3 The objectives of this study are: To identify the importance of hedgerows on site; to determine the suitability and/or presence and extent of use of the site by protected/notable species, including bats, dormouse, otter, water vole, kingfisher, reptiles, great crested newts and white-clawed crayfish; and to identify mitigation and opportunities for enhancement to ensure that ecology is fully considered within the proposals.

General Description of Site

1.4 The development site is located in Midsomer Norton, and covers approximately 3.67ha (centred on OS grid reference ST 659 535). The site comprises land off Withies Park and includes 100 Withies Park (for site boundary see Figure 1).

1.5 The site covers 3.6ha and is dominated by arable land with woodland, scrub, hedgerows and the River Somer, a Site of Nature Conservation Interest (SNIC), on the north-western boundary of the site. The field had been recently ploughed at the commencement of the phase 2 surveys. Urban environments lie to the south and west of the site. Amenity grassland and hedgerows lie to the north and east of the site.

1.6 100 Withes Park is included within the site boundary and comprises occupied residential buildings and gardens and includes the River Somer running through the site. This area covers approximately 0.07ha and forms part of the surrounding residential area. The main development site lies to the south.

2 NOMENCLATURE

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

3 METHODS

Hedgerows

3.1 All hedges on site were mapped and surveyed by an experienced ecologist of ecosulis ltd, Lisa Peirce, on 4 May 2010. In order to qualify as a hedge as defined by the Hedgerow Regulations 1997, hedges must have existed for 30 years or more and lie adjacent to either common land, protected land, agricultural land, forestry, land where horses, donkeys or ponies are kept or by a footpath or byway. In addition, they must not lie on the boundary of a dwelling and must be over 20m in length or, if not, must meet another hedge at both ends.

3.2 Hedgerows were surveyed for woody species, ground flora, isolated trees, length and connectivity with other hedgerows, woodlands and ponds according to the Hedgerow Survey Handbook, 2007. Woody species were surveyed within a central 30m section of each hedgerow. Where the hedgerow exceeded 100m in length, two 30m sections were surveyed and the average number of woody species was calculated for the purposes of the assessment.

Assessment

3.3 The field survey information was used to identify those hedgerows that are ecologically important under the Hedgerow Regulations 1997, those qualifying under the UK Biodiversity Action Plan (UK BAP) and included within the BAP for Bath and North East Somerset, and those that are species rich or species poor. Ecologically important hedgerows as defined by the Hedgerow Regulations 1997 are those with an average of four or more native woody species within the 30m surveyed sections and sufficient additional features of value according to the Hedgerow Regulations, 1997. The UK BAP website has recently published (2007) an updated list of Priority Habitat descriptions, and the previous description of ancient and/or species rich hedgerows has now been amended to cover all hedgerows with predominant (80% or more) cover of at least one native woody species. In order to provide a further clarification of ecological value a distinction has been made between species rich and species poor hedgerows within this report, with a species rich hedgerow as defined by the previous UK BAP classification as those with an average of five or more native woody species within the 30m surveyed sections.

Bats

3.4 Assessment and survey methods followed current best practice guidance including those outlined within the Bat Mitigation Guidelines (English Nature, 2004), the Bat Workers' Manual (JNCC, 2004) and the Bat Surveys Good Practice Guidelines (Bat Conservation Trust, 2007). The surveys were led by Lisa Peirce and Jo Clarke and assisted by Sara King and Pete Etheridge of ecosulis ltd.

Daytime Assessment and Survey

A daytime bat assessment and survey was undertaken of the building (residential dwelling forming 100 Withies Park) and trees on site on 22 April 2010 and 4 May 2010.

Building

3.5 The building was assessed externally and internally where possible for its suitability to offer roost sites for bats. This was undertaken by determining the style and construction of the buildings/structures and presence of features such as roof voids and cracks, holes in brickwork/tiling and internal conditions. The building was then rated as having negligible, low, medium or high suitability as roost sites (refer to Appendix II for guidance on the criteria used in this assessment).

3.6 Following the initial assessment, the building was searched internally and externally for signs of bat use. External evidence of bat use may include droppings and/or staining on walls, window ledges, in cobwebs and on the ground under suitable roost entry and exit points (e.g. around soffits, fascias, eaves, flashing etc). Internal evidence of bat use may include droppings (floors, walls, window ledges and other structural elements), staining, scratch marks, feeding remains, or bats themselves. The surveyors used high powered torches to search for bat evidence.

Trees

3.7 Mature trees on site were visually assessed for their suitability to support bats. This was determined by the presence of features such as crevices, holes, fissures and arboreal ivy. The trees were then rated as having negligible, low, medium or high suitability as roost sites (refer to Appendix II for guidance on the criteria used in this assessment; this method aims to provide an indication of the potential value of the tree to bats; however, it cannot definitely state whether bats are using the trees as roost sites). The tree bases were then searched for signs of bat droppings.

Ecological Context

3.8 An assessment of the ecological context of the site was undertaken with notes made with respect to the suitability of the site habitats and surrounding habitats to support foraging and commuting bats. The ecological context of a structure, such as a building or tree, can significantly influence the likelihood of it supporting roosting bats. For example, a structure of low suitability is more likely to be used if it is set within an area of high quality habitat with few alternative roosting opportunities. Likewise, a highly suitable structure is less likely to be used by roosting bats if it is isolated within an area providing no suitable foraging or commuting habitat.

Activity Surveys

3.9 To date, six horseshoe activity surveys have been carried out at the site, one on each of the following dates: 10 May, 18 May, 23 June, 30 June, 6 July and 21 July 2010; a further four surveys will be undertaken, two in August and two in September. Each survey commenced at dusk and continued for three hours. During each survey two surveyors walked a predetermined transect stopping at ten predetermined recording points for ten minutes each.

3.10 Frequency division 'duet' bat detectors were used together with visual observations on flight patterns and feeding behaviour to aid identification to species level. One surveyor had their detector set to 80kHz for the duration of the survey and the other had their detector set at 110kHz, the peak frequency for greater horseshoe bats and lesser horseshoe bats, respectively. Notes were recorded on times, locations, species and behaviour. Recordings of bat echolocation calls were made and later analysed using dedicated computer software 'BatScan' where required. Whilst the focus of the surveys was to detect horseshoe bats (BRERC hold records of lesser horseshoe bats 3km north-east of the site), incidental records of other bat species were also noted.

Dormouse

3.11 Survey methods followed those given in the Dormouse Conservation Handbook (English Nature, 2006). This guidance defines a minimum search score of 20 to determine absence of dormouse. The survey methods applied to the site, including nest tube/box monitoring and nut searches (detailed below), give a search score of 23. The surveys were led by Joel Green, a dormouse licence holder.

Nest Tubes/Boxes Survey

3.12 A total of 45 nest tubes and ten nest boxes were set up in April 2010 within the woodland and hedgerows on site, determined during the Phase 1 habitat survey as providing suitable habitat for dormouse. The nest tubes/boxes were set up at distances of approximately (no less than) 20m from one another. These were then visited monthly, between April and July, and inspected for signs of dormouse activity. A further two months of monitoring will be undertaken in August and September 2010.

Hazel Nut Search

3.13 A hazel nut search will be undertaken in September 2010. This will consist of a search of any hedgerows or areas with fruiting hazel on and adjacent to the site (where there is suitable connecting habitat to the site). Seven suitable habitat patches will be identified during the survey, each measuring approximately 10m by 10m, which will be searched for 20 minutes each for characteristically gnawed hazel nuts.

Otter

3.14 Survey method followed guidance in Strachan and Moorhouse (2006) and The New Rivers and Wildlife Handbook. The survey was carried out on 4 May 2010, led by Lisa Peirce and assisted by Sara King of **e**co*sulis* ltd.

3.15 The survey area consisted of the 250m section of the River Somer adjacent to the site. This 250m stretch of the river was divided into two sub-sections for the purpose of the survey. The sub-sections were 75m and 148m in length. The river could not be accessed further north of the site due to the river entering residential properties. Evidence of otter activity was searched for, including potential holts/lay-up sites, spraint sites and slides.

3.16 Both sub-sections were accessible from the river and both banks for the most part, but deep water prevented access in a few places. However, there was good visibility from the opposite banks and therefore there were no restrictions to survey.

Water Vole

3.17 Methodology followed Strachan and Moorhouse (2006). The survey was undertaken on 4 May 2010 and was led by Lisa Peirce and assisted by Sara King of **e**co*sulis* ltd.

3.18 The survey was carried out along the River Somer within the 250m section adjacent to the site. This 250m stretch of the river was divided into two sub-sections for the purpose of the survey. The sub-sections were 75m and 148m in length. Field signs such as burrows, runs, latrines and foraging signs, including chewed stems and feeding stations (piles of cut grass), were recorded.

3.19 Both sub-sections were accessible from the river and both banks for the most part, but deep water prevented access in a few places. However, there was good visibility from the opposite banks and therefore there were no restrictions to survey.

Kingfisher

3.20 A check for kingfisher burrows was carried out in combination with the water vole and otter surveys on 4 May 2010, led by Lisa Peirce and assisted by Sara King of **e**co*sulis* ltd. The survey was carried out along the River Somer within the 250m section adjacent to the site.

3.21 The banks of the river were methodically searched for evidence of kingfisher, namely in the form of burrows.

Reptiles

3.22 The survey was undertaken between 27 April and 9 June 2010 by members of staff of **e**co*sulis* ltd and followed methods in Froglife (1999) and Gent and Gibson (2003).

3.23 On 27 April 2010, a total of 50 artificial reptile refuges were laid out across the site in areas of suitable habitats such as around rubble piles and in long grass on the edges of hedgerows and scrub (a density of 13.5 refuges per hectare). The refuges comprised roofing felt cut into mats approximately 1m x 0.5m in size, which were left in place for a period of ten days to allow time for the refuges to settle.

3.24 The survey method states that a minimum of seven site visits should be undertaken in suitable weather to check beneath the refuges for reptiles and signs of reptile presence. A total of eight site visits was carried out between 8 May and 9 June 2010 (an additional visit was required to replace a number of mats which had been damaged due to the ploughing of the field).

3.25 Following each reptile check, the site was systematically walked to check for reptile presence. Care was taken to avoid disturbance prior to sightings. The ground was carefully checked between 2m to 3m in front of the recorder with the sun behind

for reptiles basking in the open. Any sightings or evidence of reptile presence, such as sloughed skins, was recorded.

3.26 The survey was undertaken during optimum weather conditions, i.e. when the temperature was neither too hot nor too cold, usually between 08.30 and 11.00 hours or between 16.00 and 18.30 hours and during periods of cloud with sunny spells and little wind.

Great Crested Newt

Habitat Suitability Index Survey and Assessment

3.27 The HSI survey and assessment was undertaken on 22 April 2010 by Lisa Peirce and Sara King of **e**co*sulis* ltd and was applied to one ditch on site and a nearby off site pond.

3.28 The HSI for the great crested newt was developed by Oldham *et al.* (2000) and was applied according to guidance set out by the National Amphibian and Reptile Recording Scheme (NARRS 2007). The HSI is a numerical index, for which scores between 0 and 1.0 indicate the suitability of the habitat. The scoring system is shown in Table 1 below.

Table 1: HSI scores summary

HSI score	Pond suitability
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

3.29 The final HSI score gained for each accessible water body can be used to predict the suitability of the habitat to support great crested newt. The HSI for the great crested newt incorporates ten suitability indices, all of which are factors thought to affect great crested newts and these were recorded for the ditch on site and a nearby pond, including the location of the water bodies, water body area, water body drying, water quality, shade, presence of water fowl, presence of fish, presence of nearby water bodies, adjacent terrestrial habitat and the presence of macrophytes.

3.30 The HSI for great crested newts is not a substitute for newt surveys. In general, water bodies with high HSI scores are more likely to support great crested newts than those with low scores; however, the calculation is not precise enough to allow the conclusion that any water body with a high score will support newts, or that any pond with a low score will not.

White-Clawed Crayfish

3.31 A white-clawed crayfish survey was undertaken of the 250m section of the River Somer adjacent to the site on 12 July 2010. The survey was led by Matt Smith, a licensed white-clawed crayfish surveyor. Survey method followed Peay (2000).

3.32 The stream was surveyed in an upstream direction from south-west to north-east. The survey employed a standard method for actively hand-searching the bed and banks in which ten patches were surveyed (chosen for their suitability to support crayfish) per 100m stretch, with stones being turned over to allow a visual assessment. This method was deemed suitable as the water depth was >30cm and the water was clear. The presence and numbers of adults and juveniles were recorded, along with adult gender were possible. An assessment of the suitability of the watercourse to support this species was also undertaken, noting the structure and vegetation of the banks and river bed.

4 RESULTS

Hedgerows

Survey

4.1 Table 2 provides a summary description of each hedgerow on site. All of the hedgerows are mapped on Figure 2.

Table 2: Description of Hedgerows

Hedgerow Number (refer to Figure 2)	Woody species as listed under the hedgerow regulations 1997	Ground Flora	Standard trees	Length	Connectivity	Other observations
1	Hazel, field maple, hawthorn, holly, elm and buckthorn Total woody species = 6	Bluebell, dog's mercury, lord-and-ladies, garlic mustard and brome species	One ash and two coppiced hazel	230m	Connected to two adjacent hedgerows. One further parallel hedge within 15m	The hedge includes an bank along the length of the hedge and gaps less than 105 of the overall length of the hedge
2 – Curtilage hedge therefore not surveyed under the H/row Regs 1997	Hazel, field maple beech Total woody species = 3	Tall herbs including dog's mercury and wild garlic	None	164m	Connected to two adjacent hedgerows	Dense hedgerow
3 – Curtilage hedge therefore not surveyed under the H/row Regs 1997	Hazel Total woody species = 1	None	None	50m	Connected to woodland on site	Sparse gappy hedge

Hedgerow Number (refer to Figure 2)	Woody species as listed under the hedgerow regulations 1997	Ground Flora	Standard trees	Length	Connectivity	Other observations
4 – Curtilage hedge therefore not surveyed under the H/row Regs 1997	Bramble, blackthorn, hawthorn (none of these are included on the woody species list under the H/row Regulations)	None	None	73m	Forms a boundary between the arable field and the woodland. Hedgerow also forms part of the boundary of a residential dwelling	Dense hedgerow
5 – Curtilage hedge therefore not surveyed under the H/row Regs 1997	Bramble, blackthorn, hawthorn (none of these are included on the woody species list under the H/row Regulations)	None	None	75m	Connected to one adjacent hedgerow and scrub habitats	
6 – Curtilage hedge therefore not surveyed under the H/row Regs 1997	None	None	Non-native conifers	60m	Connected to one adjacent hedgerow	
7 – Curtilage hedge therefore not surveyed under the H/row Regs 1997	Elm, field maple, hawthorn, elder and hazel	Lord-and-ladies	One horse-chestnut	80m	Connected to two adjacent hedgerows	

Assessment

4.2 Table 3 below provides the assessment of the status of each of the hedges 1-7 on site, with respect to the Hedgerow Regulations 1997, the UK and local BAPs, and whether species rich.

Table 3: Classification of Hedgerows

Hedgerow Number	Important under Hedgerow Regulations 1997	UK BAP Hedgerow	Species rich LBAP hedgerow
1	Yes - Hedgerow contains six woody species, a bank, gaps of less than 10% of the hedgerow, four woodland species, and a parallel hedge within 15m	Yes	Yes
2	No - Curtilage hedge	Yes	No
3	No - Curtilage hedge	Yes	No
4	No - Curtilage hedge	Yes	No
5	No - Curtilage hedge	Yes	No
6	No - Curtilage hedge	No	No
7	No - Curtilage hedge	Yes	No

4.3 Referring to Table 3, hedgerow 1 is considered important under the Hedgerow Regulations 1997. The remaining six hedgerows are not considered to be hedges as defined by the Regulations. Six hedgerows (hedgerows 1-5 and 7) are considered UK BAP priority habitat as they comprise more than 80% native species, but hedgerows 2-7 are not considered LBAP habitat due to their lack of woody and herbaceous species diversity.

4.4 Ancient and/or species-rich hedgerows are a LBAP habitat and as such the one important hedgerow (defined by the Hedgerow Regulations) is considered to be LBAP habitat.

Bats

Daytime Bat Assessment and Survey

Buildings

4.5 The location of the building at 100 Withes Park is shown in Figure 3. The results of the assessment and survey of the building is given in Table 4 below.

Table 4: Results of the Daytime Assessment and Survey of Building, 4 May 2010

Building Description	Suitability for roosting bats	Evidence of bats recorded	Constraints to survey
Building 1: Residential house. 1970s two-storey building constructed from brick with a pitched clay tiled roof. The building is currently occupied and appears to be well sealed. Loft ventilation runs the length of the roof; however the gaps in the vents appear to be too small to allow access into the loft space by roosting bats The ground and first floors of the building are currently occupied and subject to extensive light levels, fluctuating temperatures and disturbance. The loft space is dark and draughty with exposed wooden beams and fibreglass insulation. The loft space is approximately 10m by 10m	Negligible	None	The loft space could not be extensively surveyed due to health and safety constraints

4.6 The building appears to be in good condition, with no obvious access opportunities for bats noted. The building has been assessed as having negligible suitability to support roosting bats due to a lack of access opportunities.

Trees

4.7 The trees on site have been assessed as having between negligible to low suitability to support roosting bats. Table 5 below gives a summary of the assessment of mature trees on site, which considers their potential to support species of bat (refer to Figure 3 for locations).

Table 5: Results of the Daytime Assessment and Survey of Trees, 22 April 2010

Tree Number	Description	Potential value to bats
1	Mature hazel coppice with rot holes, split limbs and potential gaps underneath the ivy	Low
2	Mature hazel coppice with a shallow split limb that does not appear to lead into a cavity	Negligible
3 (off site)	Semi-mature oak with dense thin-stemmed ivy coverage	Low
4 (off site)	Semi-mature sycamore with dense ivy, some of which is thick-stemmed	Low
5 (off site)	Mature sweet chestnut with a split limb potentially leading to a small cavity	Low
6	Dead tree on the eastern boundary of the site. Dense thin stemmed ivy with no features to support roosting bats	Negligible
7 (off site)	Semi-mature ash with moderate ivy cover	Low
8	Semi-mature ash with no features to support roosting bats	Negligible
9 (off site)	Mature oak with three split limbs potentially leading to cavities	Low
10 (off site)	Semi-mature oak with no features to support roosting bats	Negligible
11 (off site)	Mature twin-stemmed alder with thick stemmed ivy cover	Low
12 (off site)	Mature twin-stemmed alder with thick stemmed ivy cover	Low
13 (off site)	Dead tree within woodland west of the site boundary. The tree supports fissured bark, some of which has potential to support roosting bats	Low
14 (off site)	Mature alder with two rot holes, thick stemmed ivy and a large, exposed cavity	Low

4.8 Referring to Table 5 above, ten trees have been assessed as low suitability to roosting bats (one on site and nine off site trees) and four trees (three on site and one off site) have been assessed as negligible suitability to roosting bats. A further 23 trees alongside the river channel on-site, 16 trees off-site and the conifers on the northern boundary of the site have been assessed as having negligible potential to support roosting bats due to their size, age and lack of suitable features. These trees include alder, ash, silver birch, hazel and oak.

4.9 Evidence of nesting birds was recorded in trees within the woodland alongside the river on site.

Ecological Context

4.10 Urban environments comprising residential properties with associated gardens and infrastructure lie to the west and south of the site. The River Somer flows through 100 Withes Park site and forms part of the boundary of the main site. A well lit footpath lies adjacent to this boundary, which acts to reduce the suitability of the river corridor to foraging bats. Grassland playing fields and hedgerows lie immediately to the east and north, providing suitable foraging and commuting habitats for bats. The assessment of the suitability of features (buildings and trees) provided in Table 5 above, takes into account the ecological context of features.

Activity Surveys

4.11 The full results of the activity surveys are presented in Appendix III. The surveys were undertaken during optimal weather conditions; warm with light wind and no rain. No lesser horseshoe or greater horseshoe bats have been recorded to date. The surveys have recorded low numbers (usually one individual recorded at any one time, but on occasion two or three individuals have been recorded) of eight species of bat, including common and soprano pipistrelles, *Myotis* species, Daubenton's, brown long-eared, noctule, serotine and leisler's bats, foraging and commuting around the site.

Dormouse

4.12 No signs of dormouse have been found on site during the nest tube/box monitoring survey to date. The location of the nest tubes and boxes are shown in Figure 4.

Otter

4.13 The otter survey results from the 250m section of the River Somer adjacent to the site are provided in Table 6. Key features are shown in Figure 5. A habitat description of each of the sub-sections is also provided.

Table 6: Results of the Otter Survey, 4 May 2010

Section (refer to Figure 5) and length	Habitat description	Suitability for otter	Field signs	Assessment of use by otter
1 - 75m. Off-site	This section is located upstream of the bridge, beyond the south-west boundary of the site. The channel is meandering with riffles and pools. The water is clear. The channel is approximately 2m-3m wide. The left bank comprises a stone wall, whereas the right bank comprises earth. Overhanging trees shade the channel throughout this section, including ash and sycamore. The ground flora includes wild garlic, cow parsley, water drop-wort, garlic mustard, lesser celandine, ivy, common nettle, pendulous sedge and honeysuckle The water level within the channel was 10cm-40cm deep at the time of the survey, with very little in-channel vegetation To the south of the river lies farmland and to the north lies a well-lit footpath and residential housing	Suitable commuting and foraging habitat for otter is present throughout this section and suitable lay-up sites, including gravel bars, overhanging trees and the bridge	Two old otter spraints were recorded under the bridge and on a gravel side bar, off-site	Otter use this river. Their usage is likely to be infrequent owing to the low number of spraints found, which appear to be old. Two areas (under the bridge and gravel bar) are likely to have been used as lay-up sites
2 - 148m	This section is located downstream of the bridge and flows adjacent to the western boundary of the site. The channel is approximately 2m to 3m wide and 10cm-40cm deep. Steep banks up to 2m high are present throughout this section. The channel is largely shaded with overhanging alder trees. Ground flora species include pendulous sedge,	Suitable commuting and foraging habitat for otter was noted throughout this section. Occasional overhanging trees and gravel bars provide suitable lay-up sites	No evidence of otter were identified along this section	Owing to the presence of field signs upriver (Section 1) and suitability of this section for otter, it is likely that otter use this section for foraging and commuting. Given the lack of field signs and

Section (refer to Figure 5) and length	Habitat description	Suitability for otter	Field signs	Assessment of use by otter
	water drop-wort and bramble The right bank of the channel is dominated by a stone wall and scrub. The left bank is an earth bank, partly shaded with occasional pendulous sedge and water drop-wort To the south of the river lies a narrow strip of woodland that is likely to be informally used for recreation (bike trails are present), beyond which is an arable field (forming the main part of the site). To the north lies a well-lit footpath and residential properties	although recreational disturbance through the woodland along this section reduces its suitability		likely disturbance, this section is unlikely to be used by otter for laying-up

4.14 Referring to Table 6, two old otter spraints were recorded within Section 1 during the survey. One spraint was recorded beneath a well-lit bridge that crosses the river, and a second was noted on a gravel bar upriver of the site. Section 1 provides suitable lay-up sites for otter in the form of gravel bars, over-hanging trees and a bridge.

4.15 Evidence indicates that Section 2 is likely to be more disturbed by recreation than Section 1 owing to the presence of informal bike trails within adjacent woodland along this river section. A minor road crosses the river immediately upstream of the site (Cautlett's Close), which lies between Sections 1 and 2. It is lit and carries a low volume of traffic and therefore is likely to provide some disturbance to otter along this river section. A well-lit path lies along the left bank of the river, which also provides some level of disturbance.

Water Vole

4.16 The survey results from the 223m section of the River Somer are described in Table 7 below and shown in Figure 5. A section of river downstream of the site could not be surveyed due to access restrictions. For a description of the habitats refer to Table 6 of the previous section.

Table 7: Results of the Water Vole Survey, 4 May 2010

Section	Suitability for water vole	Field signs	Assessment of Population
1	The channel is mostly shaded with little suitable burrowing habitat on its banks for water vole. Very limited suitable foraging habitat was noted in the form of occasional water drop-wort and water parsley	No signs of water vole were identified during the survey	Water vole presence is considered unlikely due to low quality habitat and lack of field signs
2	The left bank of this section is mostly shaded and provides limited suitable burrowing and foraging habitat for water vole in the form of earth banks (some sections are comprised of stone revetment and are unsuitable). Very limited suitable foraging habitat was noted at the upriver end of this section, by the bridge in the form of occasional water drop-wort and water parsley	No signs of water vole were identified during the survey	Water vole presence is considered unlikely due to low quality habitat and lack of field signs

4.17 No evidence of water vole was recorded during the survey. Limited suitable habitats for water vole were recorded along the survey sections of the river, including occasional steep earth banks and very small areas of marginal vegetation.

Kingfisher

4.18 No evidence of kingfisher was recorded during the survey. Suitable habitat for kingfisher was noted during the survey in the form of a short section of steep earth bank and numerous overhanging trees that provide suitable perches, particularly within Section 2 (refer to Figure 5 for survey sections and location of suitable kingfisher bank). The River Somer also provides suitable feeding habitat (bullhead are known to be present and were recorded within the river during the white-clawed crayfish survey (refer to the section on Field Observations)). No kingfishers themselves were recorded during the survey.

Reptiles

4.19 The site provides limited suitable foraging habitat for reptiles, particularly slow worm, in the form of narrow (up to 1m wide) arable field margins supporting tall grassland. Suitable basking habitat is present within the arable field at certain times of the year when the crop is not shading the ground, such as early spring and early autumn. Hedgerows and the woodland along the river corridor provide suitable refuge habitat. The woodland and small area of marginal vegetation along the river also provide suitable habitat for grass snake. Adjacent gardens are also likely to provide suitable reptile habitat. The results of the reptile survey are provided in Table 8 below.

Table 8: Reptile Survey Results, 8 May to 9 June 2010

Visit No.	Date	Time	Temperature (˚C)	Total Reptiles Found	Total Other Species
1	8 May 2010	17:30	13.2	Slow worm: 2 female, 1 male	1 common toad
2	18 May 2010	16:05	13.0	Slow worm: 3 female, 2 male and 4 of unknown gender	None recorded
3	25 May 2010	09:00	16.9	Slow worm: 3 female, 5 male, 1 juvenile	1 common toad, 1 juvenile common toad

Visit No.	Date	Time	Temperature (˚C)	Total Reptiles Found	Total Other Species
4	26 May 2010	08:15	13	Slow worm: 2 female, 1 male (mating observed)	None recorded
5	27 May 2010	09:00	17.4	Slow worm: 5 female, 7 male, 1 juvenile	None recorded
6	2 Jun 2010	10:30	14	Slow worm: 19 female, 6 male	None recorded
7	4 Jun 2010	07:01	13.1	Slow worm: 3 female, 1 male	2 common toads
8	9 Jun 2010	08:30	16	Slow worm: 8 female, 7 male	6 common toads

4.20 Referring to Table 8, a peak count of 25 slow worms, consisting of 19 females and six males, was recorded on 2 June (the sixth visit). Mating slow worms were noted during the fourth visit on 26 May 2010. A peak count of six common toads were also recorded during the visits.

Great Crested Newt

Habitat Suitability Index and Assessment

4.21 The location of the ditch and pond are shown on Figure 5 and HSI calculations, scores and suitability are provided in Appendix IV.

4.22 The ditch is located on the southern boundary of the site, and is approximately 175m in length, 1m wide and surrounded by tall herbs and scrub banks. The ditch was dry at the time of survey and is therefore considered likely to dry annually. Tall herbs and scrub dominate the channel of the ditch, with no macrophytes noted during the survey. The ditch has an HSI score of 0.36, indicating that it has 'poor' suitability to support great crested newt. The ditch was dry at the time of survey, which was undertaken in April 2010, during the breeding season, therefore its suitability to act as a breeding ditch for great crested newts is further lowered.

4.23 A pond is located within woodland 230m north-east of the site. The pond is approximately 5m by 12m, appears to be artificial and has very poor water quality with high levels of debris and litter. The pond is surrounded by low density

woodland next to a public footpath. No macrophytes were present within the pond and waterfowl were noted at the time of survey. The pond has an HSI score of 0.33, indicating that it has 'poor' suitability to support great crested newt.

White-clawed Crayfish

4.24 The river section surveyed is shown on Figure 6 (the survey sections are the same as for the otter and water vole surveys). The banks and gravel/cobble bed, over-hanging trees and underwater tree roots and clear moderately fast flowing water all contribute to provide suitable habitat for white-clawed crayfish. Debris, such as discarded bricks, which are present, provide refuges as well as larger cobbles and tree roots within the channel. The moderate to fast flowing water provides suitable hydrological conditions and suitable gravel/cobble substrates by maintaining low levels of silt deposition. Invertebrates on aquatic plants, gravel/cobble substrates and over-hanging trees provide suitable prey.

4.25 No signs of presence of white-clawed crayfish were recorded, such as bank excavation signs or white-clawed crayfish themselves.

Field Observations

4.26 Two small patches of Himalayan balsam were recorded on site (for location see Figure 5). One patch was noted on the right bank of the river, approximately 1m by 0.5m in extent within ground flora adjacent to a gravel bar. A second patch of Himalayan balsam was noted on the boundaries of the arable field. This area of balsam had been recently disturbed by ploughing works.

4.27 Badger snuffle holes were recorded within river sections 1 and 2 during the water vole, otter and kingfisher surveys on 4 May 2010. An orange-tip butterfly was also noted during these surveys.

4.28 A tawny owl was noted flying across the site and foraging within the river corridor during the bat activity survey undertaken on 23 June 2010.

4.29 Bullhead (adults and juveniles) was recorded within the River Somer during the white-clawed crayfish survey. The river was also noted to support a good diversity of aquatic invertebrates, including species of mayfly and caddisfly larvae, riffle beetle, pea mussel and pond snail.

5 SUMMARY OF RESULTS AND ASSESSMENT

5.1 Table 9 below provides a summary the results of the surveys undertaken at the site. It also summarises the results of local record searches undertaken as part of the Phase 1 habitat survey (**e**co*sulis* 2010). Full records received from BRERC are included within Appendix V. The assessment column considers the status of the species recorded on site, taking into account the results of the surveys and desktop study undertaken.

Table 9: Summary of Results and Assessment

Feature	Summary of Results	Summary of Local Records (2010; NBN and BRERC)	Assessment
Hedgerows	Seven hedgerows surveyed, only one of which can be defined as a hedge under the Hedgerow Regulations 1997	n/a	One hedge is 'important' as defined by the Hedgerow Regulations 1997; six hedges can be considered UK BAP priority habitat; and one is species-rich LBAP (hedgerow 1)
Bats	Building – negligible suitability as bat roosting habitat Trees – One tree with low potential and three with negligible potential on site. Nine trees with low potential and one with negligible potential off site Eight species of bats recorded foraging and commuting across the site. No horseshoe bats recorded to date	NBN - Three species of bats within 4km of the site, including lesser horseshoe, noctule and soprano pipistrelle	The hedgerows and river corridor provided the majority of bat records during the activity surveys. The site is considered to be used transiently by bats as part of the wider area
Dormouse	Nest tubes/boxes survey did not record presence on site Nut search to be undertaken in autumn	No records of dormouse within 2km of the site	Based on the results of the surveys to date and absence of local records, it is considered unlikely that dormouse are currently using the site
Otter	Two old otter spraints noted within sub-section 1 upstream of the site	Record provided within 1km of the site	The presence of spraint confirms that Section 1 is used by otter and owing to the close proximity of

Feature	Summary of Results	Summary of Local Records (2010; NBN and BRERC)	Assessment
			Section 2 and its suitability for otter it is likely to be used for foraging and commuting Lack of field signs and high levels of disturbance within Section 2 indicate that this section is not currently used by otter for laying-up. Otter using this river are likely to be habituated to a moderate level of disturbance
Water vole	No evidence of water vole was noted during the survey. The river provides limited suitable habitat for water vole	No records within 2km of the site	Sections 1 and 2 are considered unlikely to support water vole based on the lack of field signs, the limited suitable habitats recorded on site and absence of records of water vole within the data search
Kingfisher	No evidence of kingfisher was recorded during the survey. Suitable habitat for kingfisher was noted in the form of a short section of steep earth bank and numerous overhanging trees that provide suitable perches, particularly within Section 2	Record provided 0.5km north-east of the site	Sections 1 and 2 provide suitable perches for kingfisher and therefore it is considered possibly that kingfisher occasionally use the river
Reptiles	A regular count of slow worms, including males and females, was recorded on site during the survey visits. A minimum count of minimum adult slow worms and a peak count of 25 slow	Record of slow worm provided 1km west of the site	A peak count of 25 slow worms indicates an exceptional population size on site (referring to guidance in Froglife, 1999; it is noted that

Feature	Summary of Results	Summary of Local Records (2010; NBN and BRERC)	Assessment
	worms was recorded. Mating slow worms and juvenile slow worms were noted on site during three of the visits, which confirms that breeding is occurring		refuge density used for this survey was slightly higher (13.5/ha) than the guidance of up to ten/hectare). Higher quality reptile habitat is located within adjacent habitats, including residential gardens
Great crested newt	The ditch on site and the pond within adjacent habitats both have poor suitability to support great crested newt. The ditch was dry at the time of survey	Record of common toad (UKBAP) 2km from the site	The site and adjacent habitats are considered very unlikely to support great crested newt. The site provides suitable foraging habitat for common amphibian species in the form of hedgerows, tall herbs, scrub and tree roots
White-clawed crayfish	The River Somer provides good quality habitat for white-clawed crayfish; however there is no evidence that this species is currently using this river section	Record provided within 1km of the site	The site provides good quality habitat for white-clawed crayfish and there is a record of this species within 1km of the site. Owing to the close proximity of the record to the site, it is considered that this species is present in the River Somer

5.2 Referring to the above summary based on the results of these surveys, the following features require further consideration within future development proposals: River Somer SNCI, hedgerows, foraging badger, foraging and commuting bats, including horseshoe bats (until completion of the surveys it is assumed that these species are using the site), otter, dormouse (until completion of the surveys it is assumed this species is present), birds, common reptile and amphibian species, and Bullhead fish.

5.3 A Mitigation Strategy for the site should be developed to identify and mitigate for the impacts of the proposals during both the construction and operational phases of the development with respect to the habitats/species (ecological receptors) identified.

6 LIMITATIONS OF SURVEYS

6.1 This report records wildlife found during the survey and anecdotal evidence of sightings. It does not record any plants or animals that may appear at other times of the year and were therefore not evident at the time of visit. Some species that might use the site or be apparent at other times of year, or only in certain years, would not have been detected.

6.2 The River Somer could not be accessed downstream of the site as the river passes into residential properties.

6.3 This report provides provisional ecological baseline for the site and should not be considered to be conclusive until the ecological considerations have been undertaken and all necessary further surveys completed. Likewise the ecological considerations at this stage are not necessarily final and may be subject to change or additional proposals made following the results of detailed development plans.

6.4 A national standard has not been adopted for minimum survey effort for bats since the extent of surveys required is dependent upon species present and site specific factors. Natural England will not comment on survey effort and they expect this decision to be made by the ecological consultant. There is also some difference in opinion from local authorities across the UK as to what constitutes sufficient survey effort. The recommended level of survey within this report is based upon extensive experience of surveying and assessment for similar sites.

6.5 The behaviour of animals can be unpredictable and may not conform to standard patterns recorded in current scientific literature. This report therefore cannot predict with absolute certainty that animal species will occur in apparently suitable locations or habitats or that they will not occur in locations or habitats that appear unsuitable.

6.6 The advice contained in this report relate primarily to factual survey results and general guidance only. On all legal matters you are advised to take legal advice.

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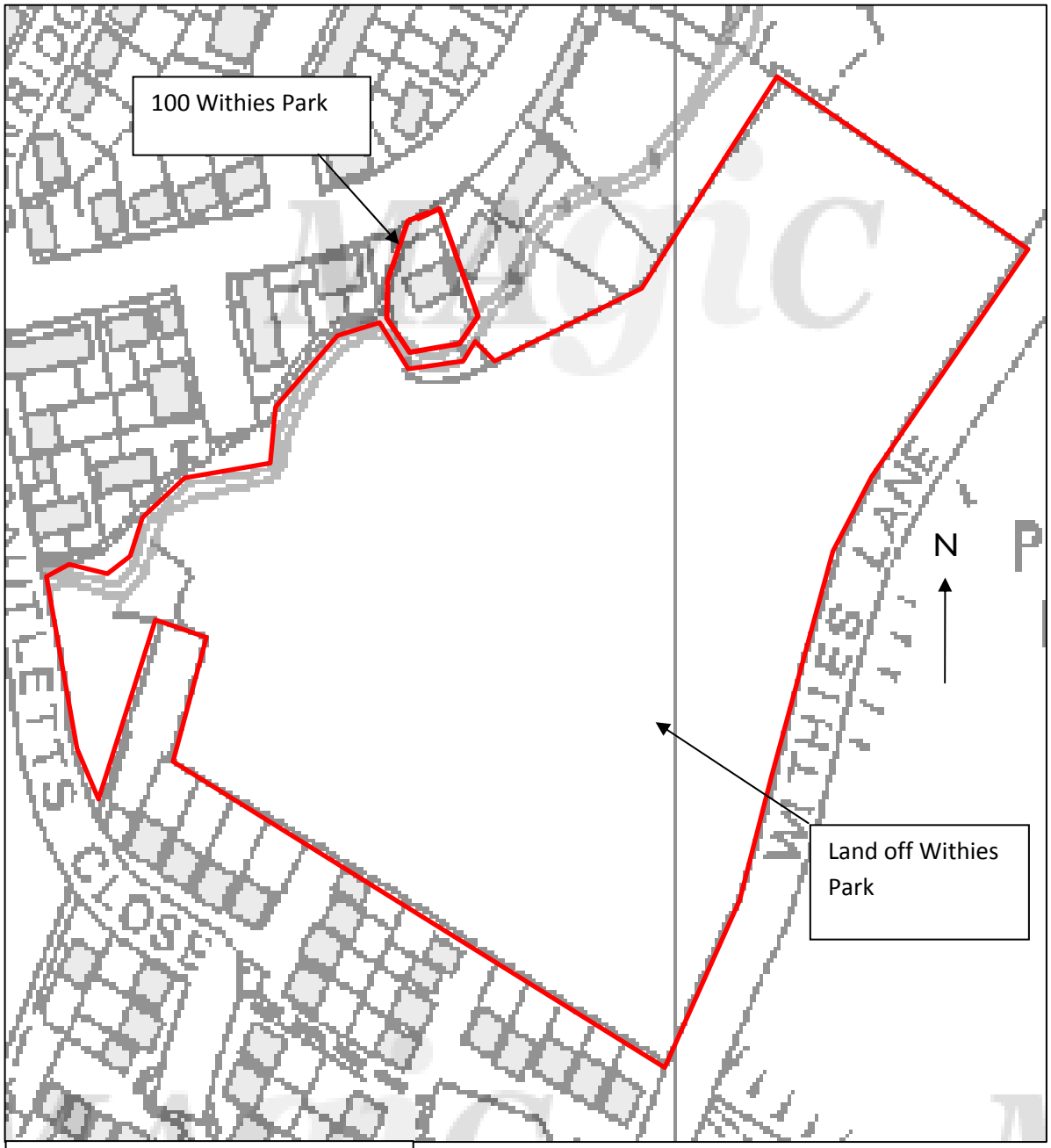
Client	David Wilson Homes	
Project	Land off Withies Park	
Title	Development Site Boundary	
Date April 2010	Scale SCHEMATIC ONLY	Figure 1

Key

Site boundary (Land off Withies Park including 100 Withies Park)



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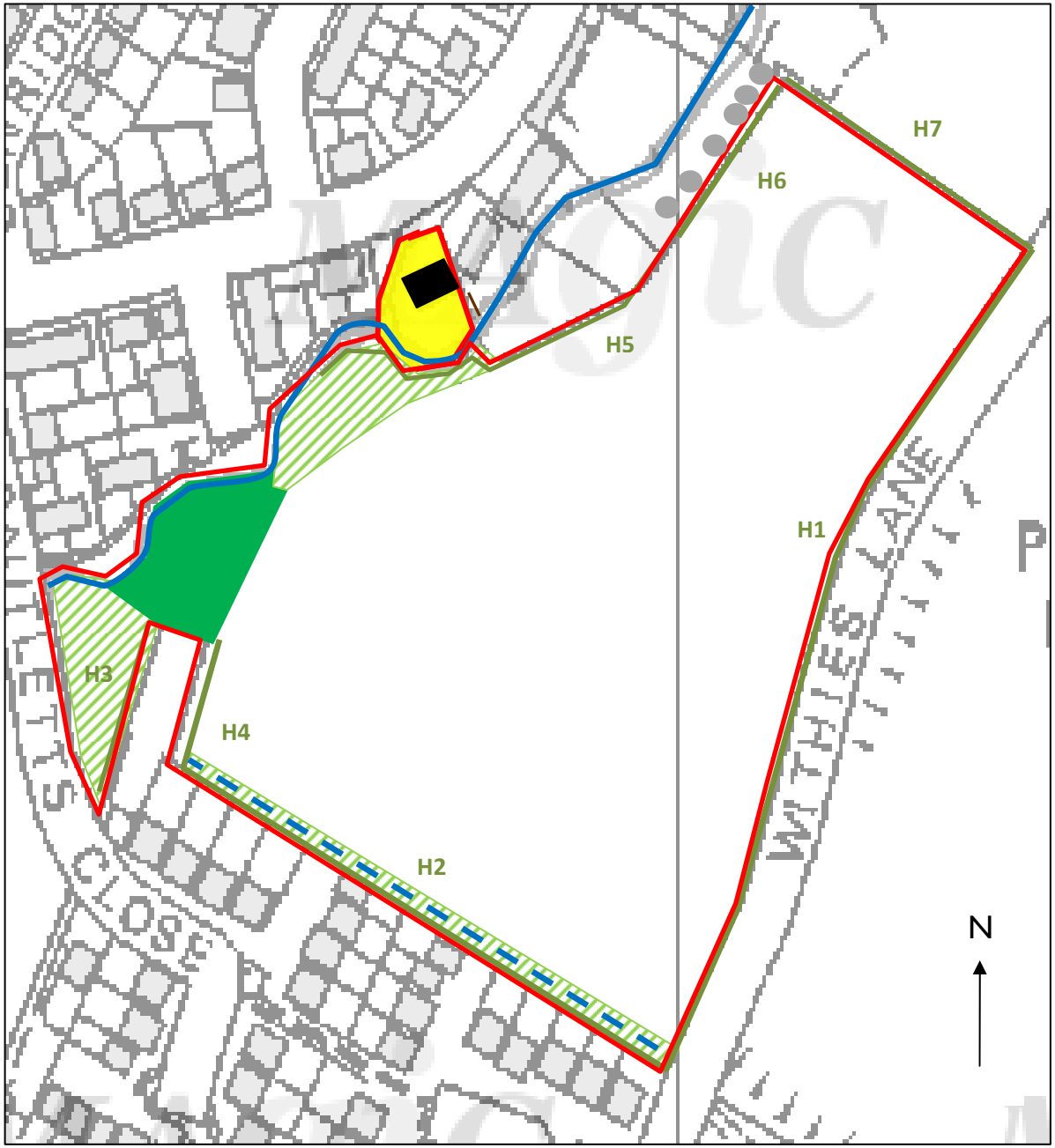
Client	David Wilson Homes	
Project	Land off Withies Park	
Title	Phase 1 Plan	
Date April 2010	Scale SCHEMATIC ONLY	Figure 2

Key

- Building
- Woodland
- Amenity grassland
- Tall herb and scrub
- Hedgerow
- River Somer
- Ditch
- Site boundary



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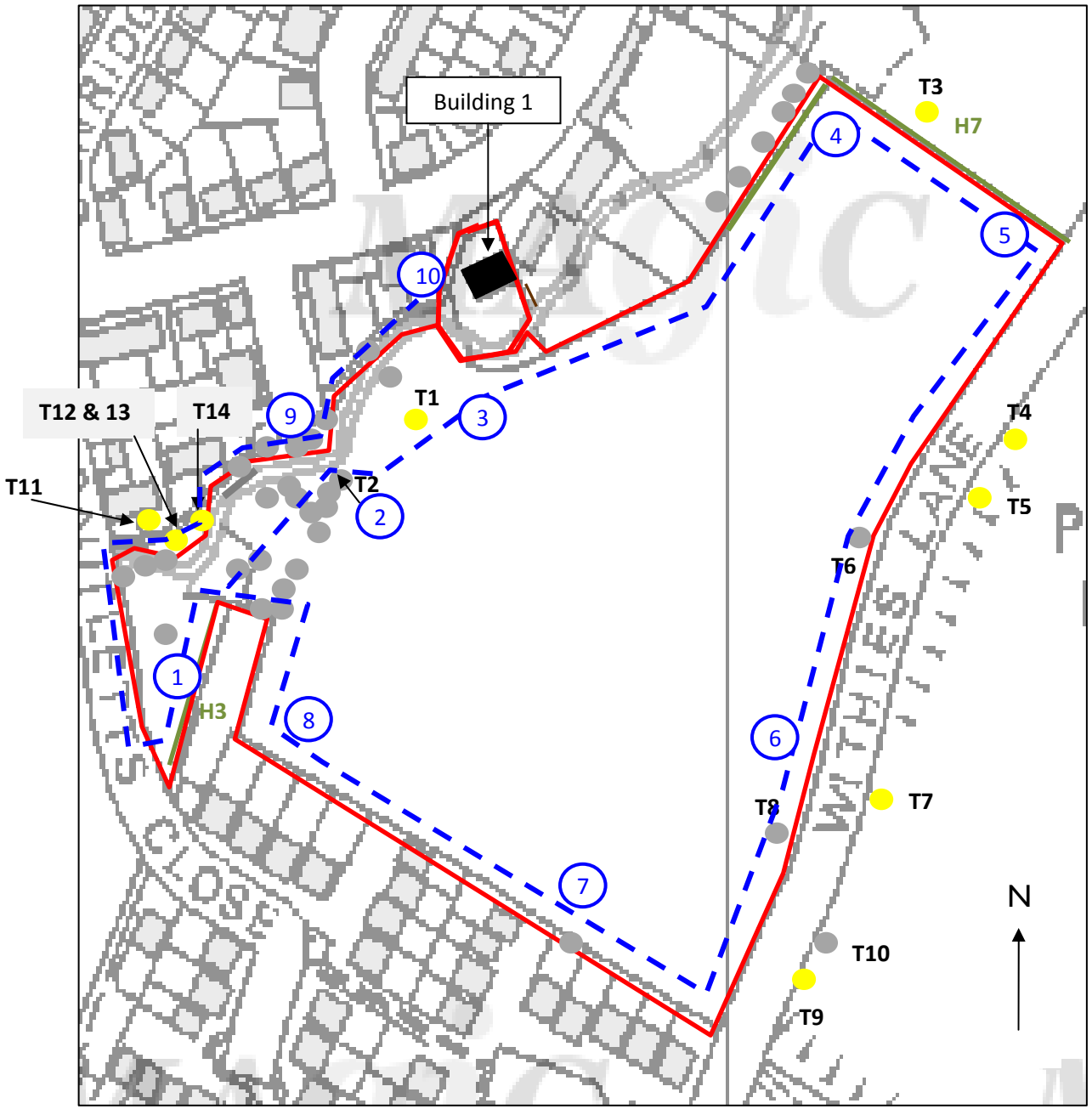
Client	David Wilson Homes	
Project	Land off Withies Park	
Title	Bat Survey Plan	
Date April 2010	Scale SCHEMATIC ONLY	Figure 3

Key

- Building
- Trees with negligible potential to support roosting bats
- Trees with low potential to support roosting bats
- Bat activity transect
- Bat Activity stations
- Site boundary



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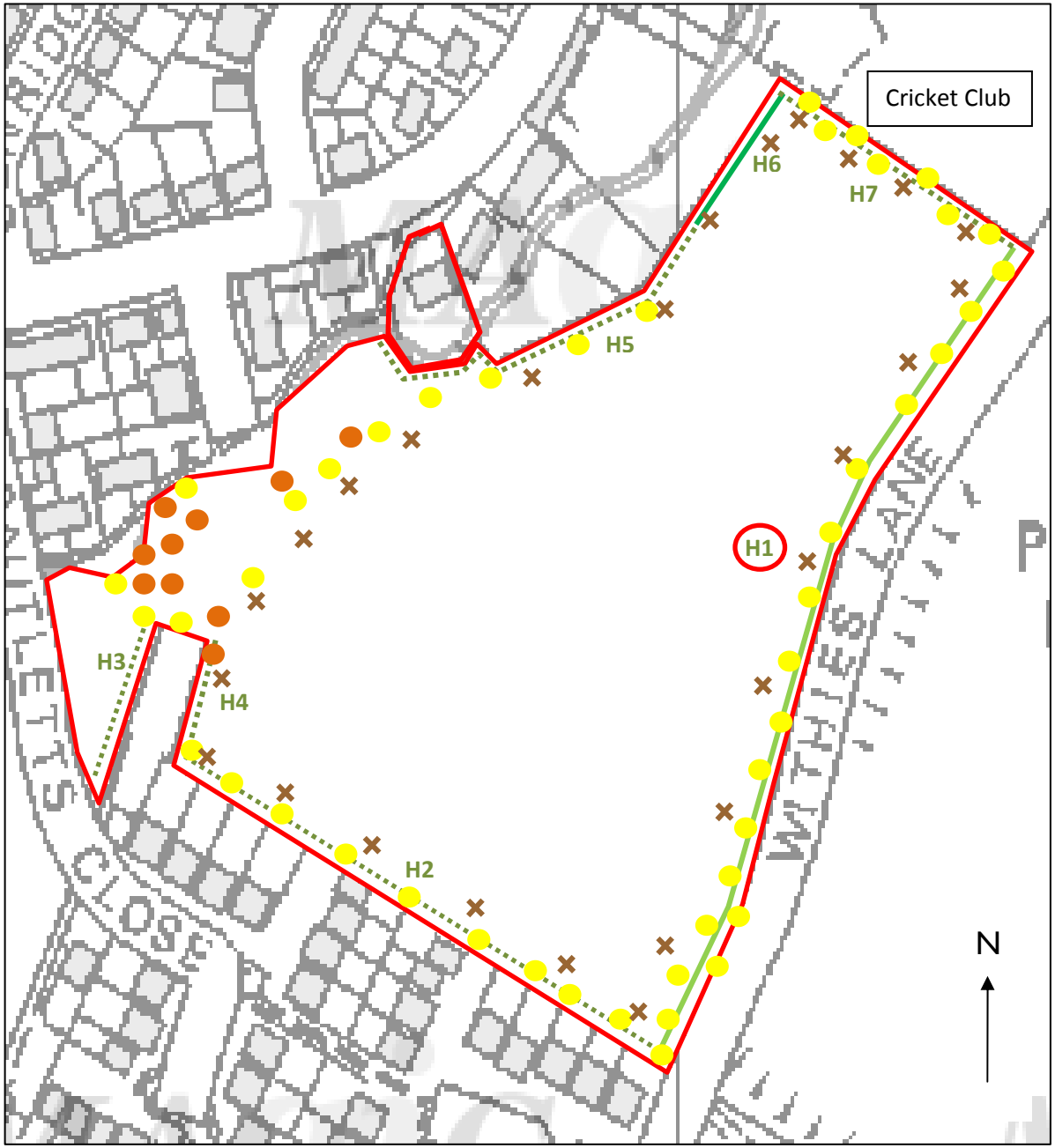
Client	David Wilson Homes	
Project	Land off Withies Park	
Title	Hedgerow, Dormouse and Reptile Plan	
Date April 2010	Scale SCHEMATIC ONLY	Figure 4

Key

- Native hedgerow (intact)
- Non-native hedgerow (intact)
- Curtilage hedge
- Important hedgerow
- Dormouse nest tube
- Dormouse nest box
- Reptile mat
- Site boundary



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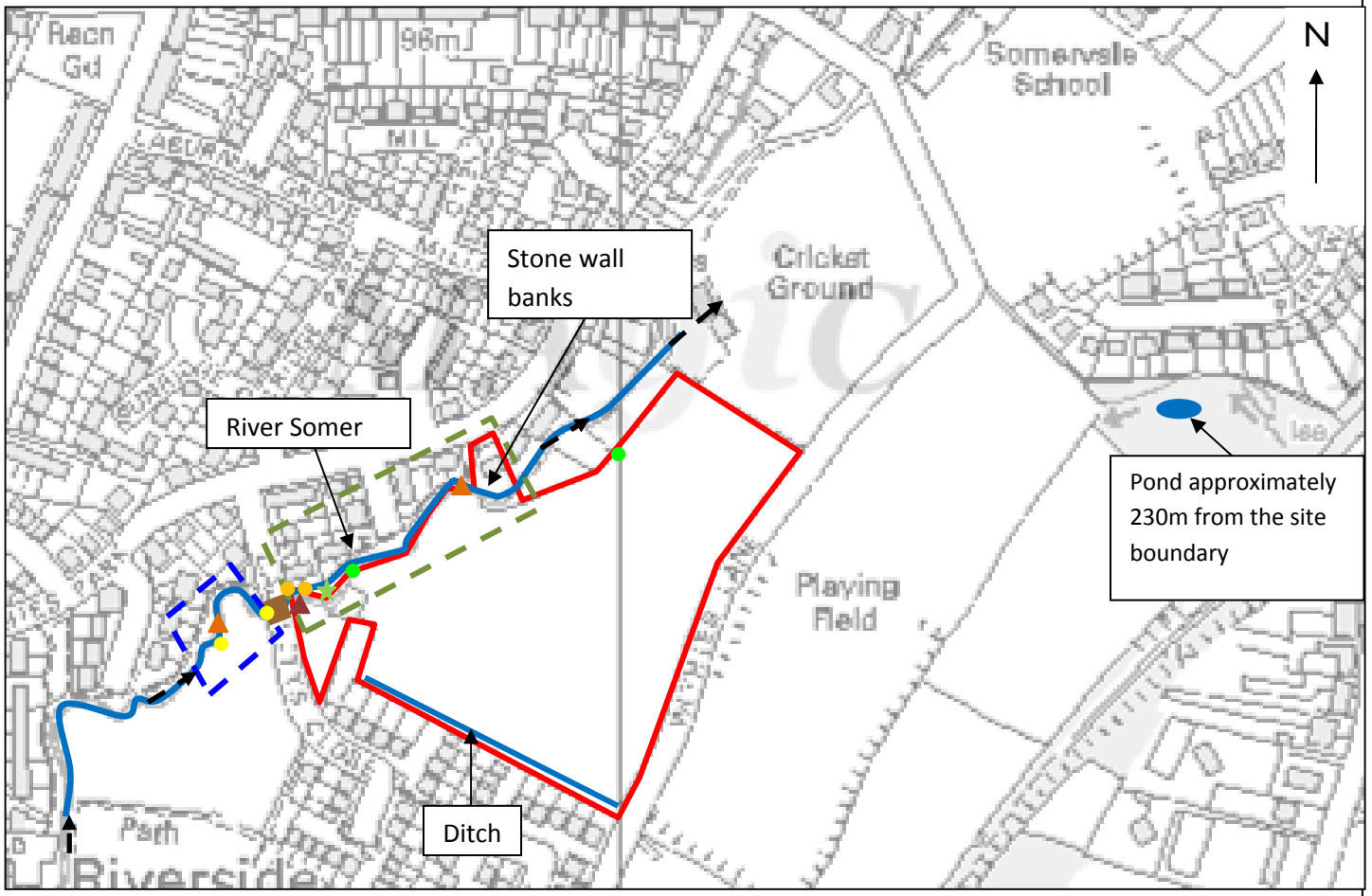
Client	David Wilson Homes	
Project	Land off Withies Park	
Title	Great crested Newt, Water Vole, Otter and Kingfisher Plan	
Date April 2010	Scale SCHEMATIC ONLY	Figure 5

Key

- Survey Section 1
- Survey Section 2
- Water body
- Bridge
- Direction of Flow
- Otter spraint
- Potential otter print
- Burrow
- Potential otter lay-up
- Suitable bank/perches for kingfisher
- Himalayan balsam
- Site Boundary



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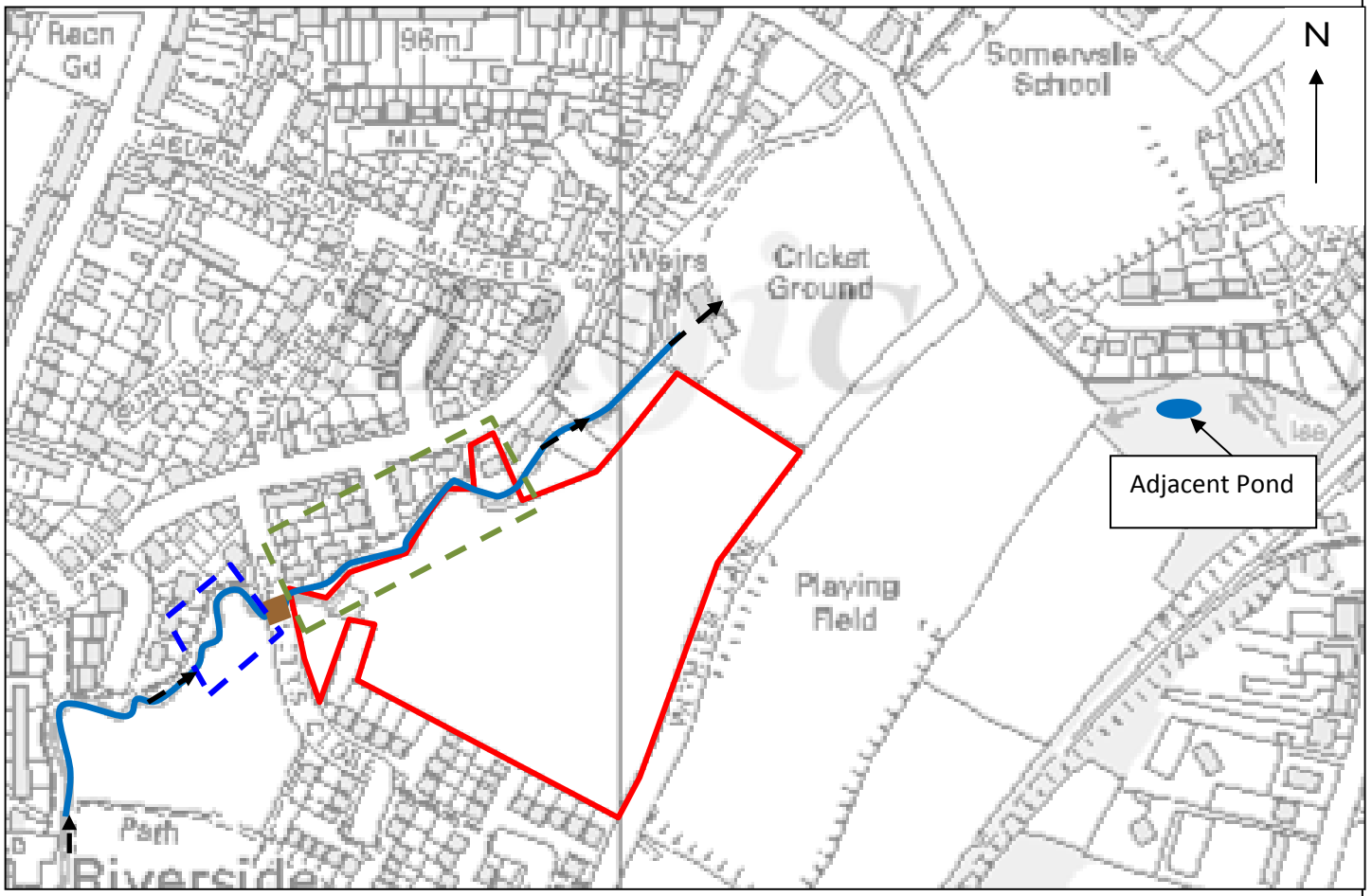
Client	David Wilson Homes	
Project	Land off Withies Park	
Title	White-clawed crayfish	
Date July 2010	Scale SCHEMATIC ONLY	Figure 6

Key

- Survey Section 1
- Survey Section 2
- River
- Bridge
- Site Boundary



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Appendix I: SPECIES LIST

Flora	
Common Name	**Latin Name**
Alder	*Alnus glutinosa*
Ash	*Fraxinus excelsior*
Beech	*Fagus sylvatica*
Blackthorn	*Prunus spinosa*
Bramble	*Rubus fruticosus agg.*
Buckthorn	*Rhamnus cathartica*
Common nettle	*Urtica dioica*
Cow parsley	*Anthriscus sylvestris*
Dog-rose	*Rosa canina*
Dog's mercury	*Mercurialis perennis*
Elm	*Ulmus procera*
Field maple	*Acer campestre*
Garlic mustard	*Alliaria petiolata*
Hawthorn	*Crataegus monogyna*
Hazel	*Corylus avellana*
Himalayan balsam	*Impatiens glandulifera*
Holly	*Ilex aquifolium*
Honeysuckle	*Lonicera periclymenum*
Horse-chestnut	*Aesculus hippocastanum*
Ivy	*Hedera helix*
Lesser celandine	*Ranunculus ficaria*
Lords-and-ladies	*Arum maculatum*
Oak	*Quercus robur*
Pendulous sedge	*Carex pendula*

Flora	
Common Name	**Latin Name**
Silver birch	*Betula pendula*
Sycamore	*Acer pseudoplatanus*
Water drop-wort	*Oenanthe fistulosa*
Wild garlic	*Allium sativum*
Fauna	
Common Name	**Latin Name**
Badger	*Meles meles*
Brown long-eared	*Plecotus auritus*
Bullhead	*Cottus gobio*
Common pipistrelle	*Pipistrellus pipistrellus*
Common toad	*Bufo bufo*
Leisler's bat	*Nyctalus leisleri*
Long-eared species	*Plecotus* sp
Myotis species	*Myotis sp*
Noctule	*Nyctalus noctula*
Orange-tip butterfly	*Anthocharis cardamines*
Otter	*Lutra lutra*
Serotine	*Eptesicus serotinus*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Tawny owl	*Strix aluco*

Appendix II: BAT ASSESSMENT CRITERIA - GUIDANCE

Roost Suitability Category	Criteria
Negligible	No features or locations presenting roosting opportunities apparent. Building, structure or tree considered unlikely to be used by roosting bats, although occasional or transient use can rarely be entirely ruled out
Low	Few features or locations within building, structure or tree with the potential to support roosting bats, although quality of these features limited by size, aspect or internal micro-climate. Although not directly assessed by these criteria, the chances of significant roost types (maternity or hibernation) is not considered likely
Medium	Some features/locations within building, structure or tree with the potential to be used by roosting bats. Although not directly assessed by these criteria, the chances of significant roost types (maternity or hibernation) is considered possible
High	Several features/locations within building, structure or tree with the potential to support roosting bats. Combination of size, aspect and internal micro-climate within these locations make them very suitable for roosting bats. Although not directly assessed by these criteria, the chance of significant roost types (maternity or hibernation) is considered possible

Appendix III: BAT ACTIVITY SURVEY RESULTS

Table 1: Results of Horseshoe Activity Survey, 10/05/10

DATE: 10/05/10	**START TIME**: 20:47	**WEATHER**: 12°C, NO WIND, NO CLOUD
	END TIME: 22:47	**WEATHER**: 9°C, NO WIND, NO CLOUD

STATIONARY RECORDING POINTS (FIGURE 3)	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
4	21:06	Common pipistrelle	2	Foraging
7	21:23	Common pipistrelle	1	Commuting
7-8	21:27	Common pipistrelle	1	Foraging
2	21:34	Common pipistrelle	1	Foraging
1	21:39	Common pipistrelle	1	Foraging
1	21:48	Common pipistrelle	1	Foraging
2	21:50	Myotis	1	Foraging
2	21:52	Long-eared	1	Commuting
4	22:01	Common pipistrelle	1	Foraging
4-5	22:03	Common pipistrelle	2	Foraging
4-5	22:07	Common pipistrelle	1	Commuting
2	22:20	Myotis	1	Commuting
1-2	22:34	Common pipistrelle	1	Foraging

Table 2: Results of Horseshoe Activity Survey, 20/05/10

DATE: 20/05/10	**START TIME**: 21:00	**WEATHER**: 18°C, LIGHT WIND, OVERCAST		
	END TIME: 00:00	**WEATHER**: 13°C, LIGHT WIND, OVERCAST		
GENERAL WEATHER NOTES: STILL AND WARM				
STATIONARY RECORDING POINTS	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
1	21:00	Common pipistrelle	1	Foraging
2	21:15	Common pipistrelle	1	Foraging
3	21:21	Common pipistrelle	1	Foraging
4	21:21	Noctule	1	Commuting
7	21:38	Common pipistrelle	1	Foraging
8	21:43	Common pipistrelle	1	Commuting
2	21:47	Common pipistrelle	1	Foraging
2	21:50	Noctule	1	Commuting
1-2	21:51	Myotis species	1	Commuting
1-2	21:55	Noctule	1	Foraging
1-2	21:56	Myotis species	1	Foraging
9-10	22:08	Myotis species	1	Commuting
3	22:19	Serotine	1	Foraging
3	22:31	Noctule	1	Commuting
3	22:43	Common pipistrelle	1	Foraging
1	22:47	Common pipistrelle	1	Foraging

Table 3: Results of Horseshoe Activity Survey, 23/06/10

DATE: 23/06/10	**START TIME**: 21:30	**WEATHER**: 17.2°C, LIGHT WIND, 10% CLOUD		
	END TIME: 00:30	**WEATHER**: 12°C, LIGHT WIND, 10% CLOUD		
GENERAL WEATHER NOTES: CLEAR AND WARM				
STATIONARY RECORDING POINTS	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
3	22:10	Common pipistrelle	1	Foraging along boundary
4	22:16	Common pipistrelle	1	Commuting
4	22:19	Common pipistrelle	1	Foraging
4	22:54	Common pipistrelle	1	Foraging
8	23:02	Common pipistrelle	1	Foraging and commuting
9	23:11	Common pipistrelle	1	Foraging close to river
2	23:40	Common pipistrelle	1	Foraging close to river
4	23:57	Common pipistrelle	1	Foraging

Table 4: Results of Horseshoe Activity Survey, 30/06/10

DATE: 23/06/10	**START TIME**: 21:30	**WEATHER**: 19.2°C, NO WIND, 10% CLOUD		
	END TIME: 00:30	**WEATHER**: 17°C, NO WIND, 10% CLOUD		
GENERAL WEATHER NOTES: DRY, CLEAR AND DRY UNDERFOOT				
STATIONARY RECORDING POINTS	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
1	21:50	Soprano pipistrelle, common pipistrelle and Myotis species	3	Foraging by stream
1	21:54	Common pipistrelle	1	Foraging by stream
2	22:08	Soprano pipistrelle and common pipistrelle	2	Commuting by stream
3	22:26	Common pipistrelle	3	Commuting along hedgerow
3	22:30	Brown long-eared	3	Commuting across field
4	22:37	Soprano pipistrelle	1	Commuting along hedgerow
4	22:40	Common pipistrelle	1	Commuting along hedgerow
4	22:43	Serotine	1	Commuting along hedgerow
5	22:58	Leisler's	1	Commuting along hedgerow
5	23:02	Leisler's	1	Foraging over arable field
5	23:03	Leisler's	1	Commuting along hedgerow
5	23:10	Leisler's	1	Commuting along

DATE: 23/06/10	**START TIME**: 21:30	**WEATHER**: 19.2°C, NO WIND, 10% CLOUD
	END TIME: 00:30	**WEATHER**: 17°C, NO WIND, 10% CLOUD
GENERAL WEATHER NOTES: DRY, CLEAR AND DRY UNDERFOOT		

STATIONARY RECORDING POINTS	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
				hedgerow
6	23:23	Common pipistrelle	1	Commuting along hedgerow
6	23:31	Common pipistrelle	1	Commuting along hedgerow
6	23:47	Common pipistrelle	1	Foraging along hedgerow
8	00:15	Common pipistrelle	1	Brief pass

Table 5: Results of Horseshoe Activity Survey, 06/07/10

DATE: 06/07/10	**START TIME**: 21:25	**WEATHER**: 19°C, NO WIND, 100% CLOUD		
	END TIME: 00:25	**WEATHER**: 17°C, NO WIND,, 50% CLOUD		
GENERAL WEATHER NOTES: WARM AND DRY				
STATIONARY RECORDING POINTS	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
4	22:03	Common pipistrelle	2	Foraging along northern hedgerow
8	22:34	Pipistrelle	1	Brief forage before commuting south
1	22:39	Pipistrelle	2	Foraging along stream
10	22:45	Daubenton's	1	Very brief call
3	23:12	Serotine	1	Very briefly commuted pass
8	00:01	pipistrelle	1	Briefly commuted past
10	00:19	Common pipistrelle	2	Foraging

Table 6: Results of Horseshoe Activity Survey, 22/07/10

DATE: 21/07/10	**START TIME**: 21:20	**WEATHER**: 17°C, LIGHT WIND, 20% CLOUD		
	END TIME: 00:20	**WEATHER**: 13°C, MODERATE WIND, 80% CLOUD		
GENERAL WEATHER NOTES:				
STATIONARY RECORDING POINTS	**TIME**	**SPECIES**	**NUMBER**	**BEHAVIOUR**
4	21:47	Pipistrelle	2	Commuting across the site
5	21:53	Common pipistrelle	1	Commuting across the site
5	21:50	Common pipistrelle	2	Brief commute
6	22:01	Common pipistrelle	2	Commuting
7	22:14	Common pipistrelle	2	Commuting
7	22:19	Common pipistrelle	1	Brief pass
9	22:39	*Myotis* species	1	Foraging
9	22:43	*Myotis* species	1	Foraging along river
9	22:50	Common pipistrelle	1	Passing
10	22:58	Common pipistrelle	1	Briefly foraging
9	23:05	*Myotis* species	1	Intense foraging along river
2	23:12	Common pipistrelle	1	Constant foraging along river corridor
8	23:56	*Myotis* species	1	Brief commute
2	00:00	*Myotis* species	1	Faint foraging along river
2	00:11	Common pipistrelle	1	Foraging
9 & 10	00:13	Common pipistrelle	1	Foraging along river

Appendix IV: Habitat Suitability Index Calculations

Table 1: Summary of HSI Results

Habitat suitability criteria	Ditch on site	Pond off site
Location	1.00	1.00
Pond area	0.34	0.12
Drought	0.10	0.90
Water quality	0.01	0.01
Shade	1.00	0.20
Waterfowl	1.00	0.67
Fish	1.00	0.67
Pond Count	0.55	0.55
Terrestrial Map	0.67	1.00
Macrophyte Score	0.30	0.30
HSI Scores	**0.36**	**0.33**
Pond suitability	**Poor**	**Poor**