

Appendix B

Fish Report

FISHERY ASSESSMENT OF THE OAKINGTON BROOK AS PART OF THE NORTHSTOWE DEVELOPMENT

**Undertaken by Windrush AEC Ltd on behalf of
ARUP**

March 2014



**Windrush Aquatic
Environmental Consultancy**

Windrush AEC Limited
Registered Office: The Cottage
Fordwells, Witney,
Oxon. OX29 9PP

Telephone: 01993 878573
Email: vaughan@windrushaec.co.uk

1.0 Introduction

On 11th March 2014, a fish survey was carried out along Oakington Brook, Cambridgeshire. The purpose of this survey was to assess the importance of fish populations in the brook, which could be impacted as a result of works associated with Phase 2 of the proposed development of Northstowe new town, located to the northwest of Cambridge. A new road is proposed between Longstanton Road and Dry Drayton Road, which would cross Oakington Brook to the south of Oakington Business Park.

This survey updates the results of a previous survey conducted by Windrush AEC Ltd in February 2007 at Ordnance Survey (OS) grid reference TL395635. Four species of fish were captured during this survey, comprising 65 stone loach *Barbatula barbatula*, which was dominant. The other species were 3-spined stickleback *Gasterosteus aculeatus* which was assessed as frequent, 14 roach *Rutilus rutilus* and a single gudgeon *Gobio gobio*. No fish of conservation importance were recorded. The same location (OB1) was surveyed in 2014, as well as a new location further north (OB2).

2.0 Methodology

All sites were electrofished using generator powered Electracatch pulsed DC electrofishing equipment. A standard catch removal methodology was used between upstream and downstream stop nets at all sites, with electrofishing undertaken in an upstream direction unless specified otherwise in the report. All fish of major species caught were enumerated by species, their fork length being recorded to the nearest millimetre and their weight recorded to the nearest gram.

Minor species including 3-spined stickleback and stone loach were recorded on a D(dominant)A(abundant) F(frequent)O(occasional)R(rare) scale. Other relevant site data and physical river characteristics were recorded on a proforma sheet.

Data were analysed to provide a minimum estimate of fish number, density and biomass. Results were presented in both numerical and graphical format.

Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

3.0 Results

WATERCOURSE: Oakington Brook

SITE CODE: OB1

SITE NAME: Slate Hall Farm

LOCATION: D/S of access bridge to Slate Hall Farm

NGR: TL39765 63501

DATE FISHED: 11 March 2014

WEATHER: Overcast, cool

METHOD: Upstream electrofishing, wading with single anode. 240v pulsed DC drawing 1.5A

HABITAT FEATURES

LENGTH: 100m **MEAN WIDTH (RANGE):** 1.8m (1.5m-2.1m)

AREA: 180 m² **MEAN DEPTH (RANGE):** 0.25m (0.05-0.5m)

WATER TEMPERATURE: 8⁰ C

WATER LEVEL: Low

WATER FLOW: Low/Moderate

WATER CLARITY: Good

SUBSTRATE COMPOSITION (%)

BARE CLAY: **MUD & SILT:** 20 **SAND:** 50 **GRAVEL:** 29

COBBLE: 1

VEGETATION (% COVER)

SUBMERGED: <5 **FLOATING:** 0 **EMERGENT:** <1 **SHADE:** 70

DOMINANT PLANTS SPECIES (AQUATIC): Filamentous algae

DOMINANT PLANT SPECIES (RIPARIAN): Fool's cress *Apium nodiflorum*

ADJACENT LAND USE LB: Improved grass field with deciduous planting

ADJACENT LAND USE RB: Arable with a <2m width buffer strip

REMARKS:

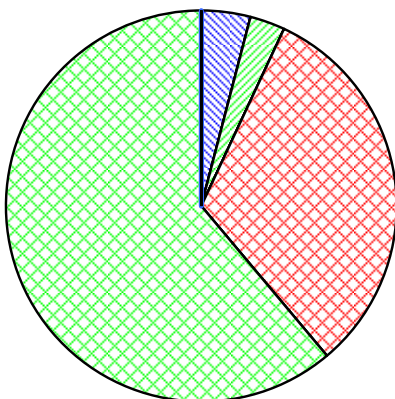
PHYSICAL STRUCTURE OF SITE: A well incised (>3m) length of river with a relatively meandering planform. The site had a well-defined pool-riffle sequence. There was evidence of some channel re-adjustment, with the creation of a low level 2-stage shelf evident in places, and significant areas of bank slippage obvious in others. The substrate was dominated by gravel, although over much of the site this was overlaid by a thick layer of sand and silt. There were some Coarse Woody Debris (CWD) dams across the channel, with a few pieces of Large Woody Debris (LWD) present. The RB had a section of failed coir fibre rolls revetment. Failure was probably due to the over-shaded nature of the channel, with a dense belt of deciduous trees including oak *Quercus robur*, willow *Salix* Spp. and elder *Sambucus nigra* present on the LB

CATCH: A total of 5 species were caught at the site. The dominant species by density was 3-spined stickleback. These were assessed as 'frequent'. Of the other species captured, only stone loach was present in large numbers, with a single pike *Esox lucius* and chub *Leuciscus cephalus* caught, along with two roach *Rutilus rutilus*. A single common frog *Rana temporaria* was seen.

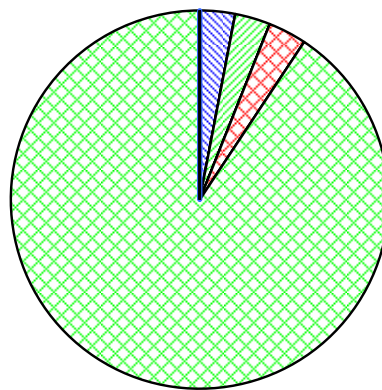


Site OB1: Oakington Brook

	Species	Biomass (g m ⁻²)	Density (n m ⁻²)
	Barbel		
	Chub	0.1	0.006
	Dace		
	Bleak		
	Gudgeon		
	Roach	0.1	0.006
	Perch		
	Pike	0.6	0.006
	Common bream		
	Stone loach	1.2	0.167
	Silver bream		
	Tench		
	European eel		
	Roach x Bream hybrid		
	Common carp		
	Rudd		
	Atlantic salmon		
	Brown trout		
	Rainbow trout		
	Grayling		
	Total	1.9	0.184

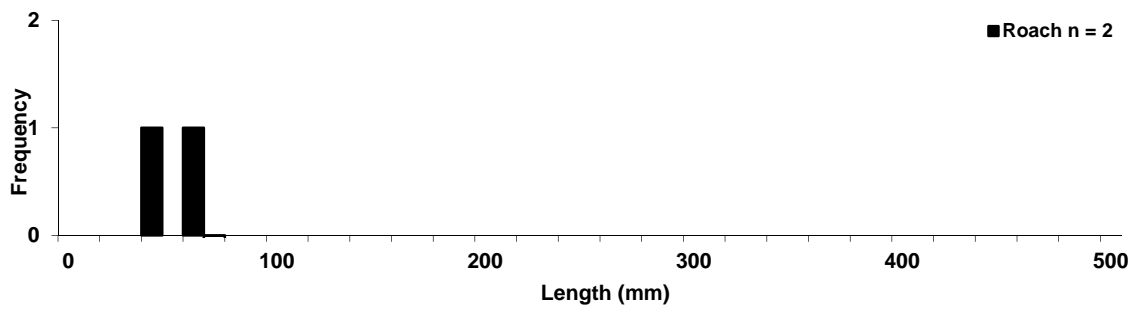
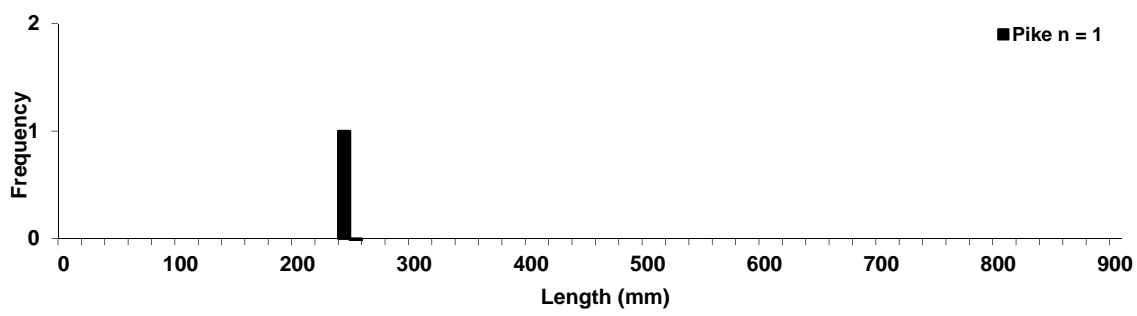
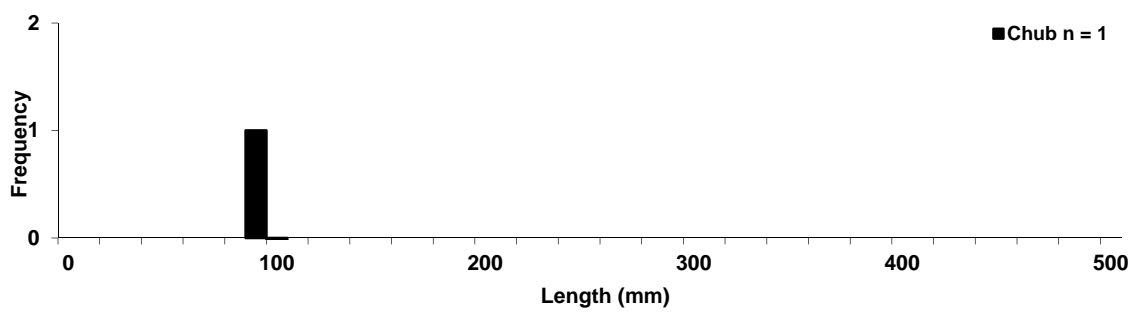
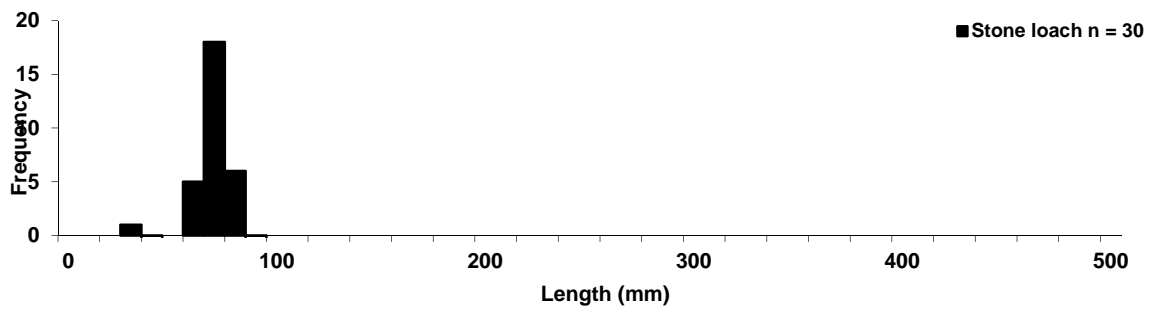


Biomass (g m⁻²)



Density (n m⁻²)

Length frequency:



WATERCOURSE: Oakington Brook

SITE NAME: Phyper's Farm

SITE CODE: OB2

LOCATION: Between concrete road bridge and green bridleway bridge

NGR: TL40198 63712

DATE FISHED: 11 March 2014

WEATHER: Overcast, cold

METHOD: Upstream electrofishing, wading with single anode. 240v pulsed DC drawing 1.5A

HABITAT FEATURES

LENGTH: 100m **MEAN WIDTH (RANGE):** 1.9m (1.5-2.1m)

AREA: 190m² **MEAN DEPTH (RANGE):** 0.1m (0.05-0.25m)

WATER TEMPERATURE: 8⁰C

WATER LEVEL: Low

WATER FLOW: Low/moderate

WATER CLARITY: Good

SUBSTRATE COMPOSITION (%):

BARE CLAY: **MUD & SILT:** 10 **SAND:** 80 **GRAVEL:** 10
COBBLE:

VEGETATION (% COVER):

SUBMERGED: 30 **FLOATING:** 0 **EMERGENT:** 0 **SHADE:** 70

DOMINANT PLANTS SPECIES (AQUATIC): Starwort *Callitriche* Spp.

DOMINANT PLANT SPECIES (RIPARIAN): Ruderal species

ADJACENT LAND USE LB: Arable with >10m width grass margin

ADJACENT LAND USE RB: Arable with <2m width grass margin

REMARKS:

PHYSICAL STRUCTURE OF SITE: A heavily incised (>3m) site, with a relatively straight planform. The channel was generally shallow, with a uniform substrate dominated by up to 20cm of sand overlaying gravel and anoxic silt. There were short sections of exposed gravel visible above the water. There was very little instream cover, with the overhanging bushes on the RB and short sections of undercut bank the only exceptions. The upper 10m of the LB was reveted with posts and wooden boarding.

CATCH: Only two species of fish were caught; 3-spined stickleback that were assessed as occasional; and stone loach.

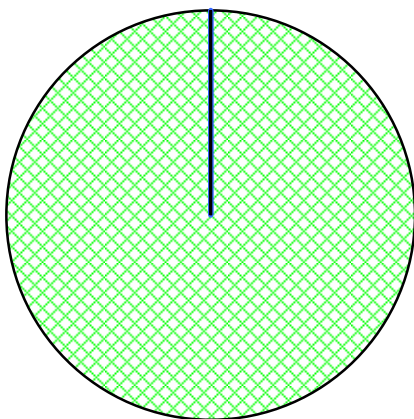


Site OB2: Oakington Brook

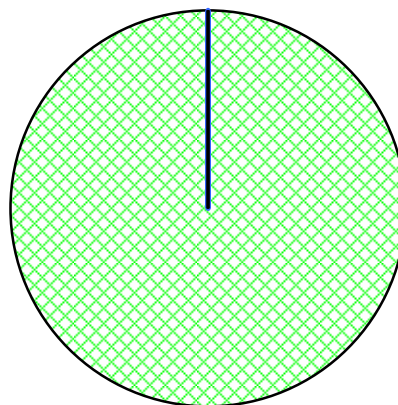


Stone loach on the measuring board

	Species	Biomass (g m ⁻²)	Density (n m ⁻²)
■	Barbel		
▨	Chub		
▩	Dace		
▧	Bleak		
▦	Gudgeon		
▥	Roach		
□	Perch		
▤	Pike		
▣	Common bream		
▢	Stone loach	0.8	0.105
□	Silver bream		
■	Tench		
▟	European eel		
▞	Roach x Bream hybrid		
▝	Common carp		
▜	Rudd		
▛	Atlantic salmon		
▚	Brown trout		
▙	Rainbow trout		
▘	Grayling		
	Total	0.8	0.105

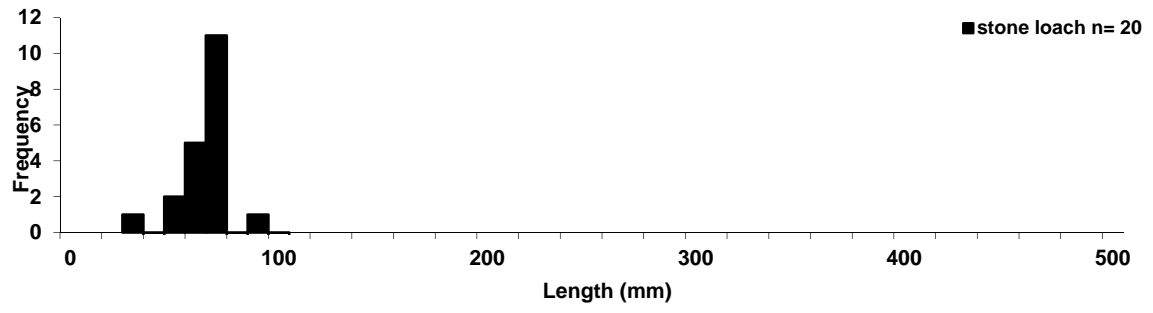


Biomass (g m⁻²)



Density (n m⁻²)

Length frequency:



3.0 Discussion

The Oakington Brook was last surveyed in February 2007, with a catch of 65 stone loach, 14 roach and a single gudgeon at Site OB1, plus 3-spined stickleback assessed as 'frequent'. The results from the 2014 survey showed a reduction in the numbers of both stone loach and roach, with no gudgeon recorded. The lack of the large numbers of roach fry seen in 2007 may be an indication of the damaging impacts of high summer flows during the 2012 and 2013 spawning seasons. However, two additional species, chub and pike were captured in 2014.

A second site, OB2 was surveyed in 2014, further downstream in the brook. The results here were poor with only two species, stone loach and 3-spined stickleback captured.

Habitat quality in the Oakington Brook remained generally poor, with a preponderance of sand and fine sediment overlying the gravel substrate. The reinstatement works to the banks downstream of Slate Farm Bridge had largely failed, probably due to overshadowing of the coir fibre rolls. Cover at both sites was limited with some CWD and LWD providing instream shelter. It is likely that water quality, particularly water temperature, has a significant impact on fish populations during periods of low flow.

None of the species recorded in either the 2007 or 2014 survey has any specific or special conservation status. They do however receive general protection under the Salmon and Freshwater Fisheries Act 1975. The species captured all occur commonly throughout lowland England and are representative of the habitat found within the Oakington Brook.

The impact of the proposed road crossing is expected to be limited and local, provided that:

- The bridge is clear spanning with its footprint not impacting on the river bed or banks immediately adjacent to the channel; and
- Good environmental practice is followed during construction and the Environment Agency pollution prevention guidelines adhered to, particularly with respect to protection from the spillage of fuel/oil, and the mobilisation of excessive fine silt.

A number of simple but effective enhancement measures could be employed in the reach adjacent to the new bridge. These include:

- The installation of brushwood faggots along the margins of the river to encourage the accumulation of fine sediment and the subsequent growth of emergent vegetation. 'Soft' edging of this type is vital habitat for fish, particularly at an early lifestage. Young fry are unable to withstand the high water velocity associated with summer storm flows, and rely on low velocity areas in the marginal zone to provide refuge;
- A reduction in channel shading to allow for the growth of marginal and instream vegetation. Rotational coppicing of the riparian hedge at Phyper's Farm (OB2) would allow more incident light to fall on the channel, increasing channel vegetation growth; and
- The introduction of additional gravel substrate. Subject to a suitable flood risk assessment and consent from the Environment Agency, the introduction of gravel (diameter range 20-50mm) would increase opportunities for the spawning of rheophilic fish species and add to available habitat for invertebrates. The bed elevation resulting from gravel introduction would also increase the effective gradient and help to decrease the shading due to the heavily incised channel profile.

Appendix C

Bat Tree Climbing Survey Report

Northstowe, Cambridgeshire
Bat survey of 50 Scattered Trees

May 2014

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Issuing office

3 Brunel House | Hathersage Park | Station Approach | Hathersage | Derbyshire | S32 1DP
 T: 01433 651869 | W: www.bsg-ecology.com | E: info@bsg-ecology.com

Client	Arup
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1 Introduction

- 1.1 The site, Northstowe, is an area of land between the villages on Longstanton and Oakington, Cambridgeshire, located approximately 5-6km to the north of Cambridge. The majority of the site is situated within a disused former military airfield which is surrounded by security fencing. This area formerly contained numerous buildings, now demolished; surfaced roads and parts of the former runway are still present within the site. This part of the site includes large areas of pasture (grazed by sheep and cattle), a wide range of scattered trees and small plantation woodland blocks. A lake, surrounded by scrub, woodland blocks and pasture with scattered trees is present in the south part of the former airfield.
- 1.2 The north part of the site, to the north of Rampton Lane, includes privately owned farmland: grazed pasture with hedgerow field boundaries. The south part of the site, to the north of Dry Drayton Road, supports arable fields and areas of recent woodland planting.
- 1.3 This report presents the results of aerial surveys of 50 trees within the areas described above. The survey work has been carried out to assess the trees' suitability for roosting bats and to identify any evidence of roosting bats.
- 1.4 The site boundary and areas surveyed are shown on the plan in Appendix 1.

Proposed development

- 1.5 A large residential development is proposed within the site. The proposed site layout is not currently known but for the purposes of the report it is assumed that some of the trees surveyed may be affected by the development, for example, through either removal, remedial pruning, subject to increased levels of lighting or a change in immediate landscape context (e.g. from open pasture/parkland to residential development).

Background

- 1.6 Bats and their roosts receive legal protection under the Conservation of Habitats and Species Regulations 2010 (as amended) and Wildlife & Countryside Act 1981 (as amended). See Appendix 4 for further information.
- 1.7 Several bat species, including (soprano pipistrelle *Pipistrellus pygmaeus*, brown-long eared bat *Plecotus auritus*, noctule *Nyctalus noctula*, barbastelle *Barbastellus barbastella*), are priority species. Planning authorities have a duty under Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 to have regard to priority species in exercising their functions including development control and planning.
- 1.8 The National Planning Policy Framework (NPPF) (paragraph 117) states that local authorities should take measures to “*promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species*” linking to national and local targets through local planning policies.
- 1.9 Since bats use cavities in trees as roosts survey work for bats is required where trees which have potential for bats could be affected by development proposals.
- 1.10 Ground level tree surveys were carried out by Arup in 2013. These surveys involved searching for features such as rot holes, woodpecker holes, splits and other cavities with potential to support roosting bats within trees within the site. Following these surveys 60 trees were identified as having potential to support roosting bats in woodland blocks (the “woodland trees”), and 50 trees were identified in open habitats (pasture fields, landscaping around the former military buildings, and hedgerow trees) within the site (the “scattered trees”).

Aims and Objectives

- 1.11 BSG-Ecology was commissioned by Arup on behalf of the Homes and Communities Agency (HCA) in April 2014 to undertake detailed aerial surveys of the 50 scattered trees.

- 1.12 The aim of the survey work was to search for evidence of bat roosts and to carry out a close inspection of potentially suitable roost features to corroborate the previous ground based assessment. This work will be used to determine where further activity survey work (i.e. dawn/dusk surveys) is required and should be targeted. The results of this survey work will also be used to inform the baseline ecological assessment for the proposed development.
- 1.13 The woodland trees were not included in the survey by BSG Ecology. Similarly a ground-based reassessment of other trees within the site was not carried out.

2 Methods

Survey

- 2.1 All trees identified were subject to a detailed aerial inspection where safe access was possible. Trees were climbed using a combination of ropes and ladders. Cavities within the trees, including woodpecker holes, rot holes, splits, hollow limbs and loose bark, were subject to a close detailed inspection using a torch and where necessary deeper cavities were surveyed with an endoscope.
- 2.2 Evidence of bat activity such as droppings, staining, worn and polished access holes, feeding remains, dead and live bats was searched for.
- 2.3 A description of each tree and its features were recorded on a form. This data is set out in Appendix 2.
- 2.4 The surveys were carried out on the 14, 15 and 16 April 2014 during a period of fine weather. The survey was led by Principal Ecologist Guy Miller MIEEM who holds a Natural England Class 2 scientific survey licence for bats. Two other consultant Ecologists Grant Bramall MIEEM (Natural England Class 2 Scientific Survey licence) and Chris Morrell MIEEM (Natural England Class 1 Scientific Survey licence) assisted with the survey. Tree climbing assistance was provided by arborist Rob Greaves.
- 2.5 All surveyors are qualified tree climbers and all survey work was carried out under the supervision of the lead surveyor.

Assessment

- 2.6 Each feature was assessed for its potential to support bats – consideration was given to exposure to weather (rain and wind), the depth and degree of shelter provided by each cavity, the position of the cavity in the tree, competition for hole use by other species (including grey squirrel *Sciurus carolinensis* which is abundant within the site).
- 2.7 Following this check individual features were assigned with a category of high, moderate, or low in terms of the potential to support roosting bats:
 - High: Features which provide deeper sheltered cavities suitable for roosting bats;
 - Moderate: Smaller, shallow or partially exposed features which have more limited potential to support bats, but may be occasionally used by individual bats;
 - Low: Features considered to have negligible potential to support roosting bats, for example, on close inspection found to be too shallow or too exposed to weather to provide a suitable roosting opportunity.
- 2.8 This assessment of individual features was used to assign an overall suitability assessment for each tree in terms of its potential to support roosting bats. Categories are based on Hundt *et al.* (2012) and are summarised as follows:
 - Roost present - bats or droppings identified which allow presence of bats to be confirmed.
 - 1* - Multiple highly suitable roost features are present within the tree (for the purposes of this survey report a tree with more than one high potential feature is assigned to this category).
 - 1 - Suitable roost features present, but fewer than a 1* tree (for the purposes of this report a tree with only one high potential feature is assigned a 1 category. Occasionally trees with multiple moderate potential features are also assigned in this category).
 - 2 - Limited potential (only few moderate potential (and low potential) features present).
 - 3 - Negligible potential (all features present are assessed to have low potential)

3 Results and Interpretation

- 3.1 The survey results are summarised in Table 1 below. Full details are provided on tree survey forms in Appendix 2.
- 3.2 No bats or bat roosts were found within any of the trees surveyed.
- 3.3 Twenty-seven trees are considered to have potential to support roosting bats, of these four support multiple high potential roosting features (1* trees), and 21 support at least one high potential roosting feature (1). Two trees could not be safely surveyed and these are assigned a precautionary category - 1/1*).
- 3.4 Following close inspection, 15 trees are considered to have only moderate potential to support roosting bats. The remaining 8 trees previously considered to have potential to support roosting bats could now be discounted because the features present have low suitability for bats (e.g. too shallow, superficial or very exposed to wind/rain).
- 3.5 Woodpeckers are present within the site; green woodpecker *Picus viridis* appears to be abundant, great spotted woodpecker *Dendrocopos major* is also present. Many of the cavities within trees are woodpecker holes. These holes broadly fall into three categories:
- Shallow feeding holes, currently of insufficient depth to provide opportunities for roosting bats. A large number of the woodpecker holes identified during the ground level survey fall into this category.
 - Deeper cavities which may be used by woodpeckers and other birds as nesting sites – these are considered to have the highest potential to support roosting bats.
 - Deeper cavities which have been enlarged by grey squirrel. Grey squirrel is abundant within the site and individuals were found in cavities in several trees. The majority of deeper woodpecker holes in trees within the site have been enlarged by and are frequently occupied by squirrel. Tooth marks and staining from fur is evident around the majority of deeper woodpecker holes. The abundant presence of squirrels is considered likely to reduce the suitability of many of these holes for roosting bats.
- 3.6 Two trees could not be safely accessed: Tree 175 supported woodpecker holes and rot holes in a dead limb which could not be safely accessed with either ropes or a ladder. Tree 52 was safe to climb in terms of secure rope anchor points but supported an active bees nest in a cavity directly below two woodpecker holes; due to the risk of disturbing and aggravating the bee colony this tree was not surveyed.
- 3.7 Nesting material was present in several tree holes although not all nests appeared to be active during the survey. The following active nests were confirmed:
- Tree 17 supports a blackbird *Turdus merula* nest
 - Tree 60 supports a green woodpecker nest.
 - Tree 122 supports a little owl *Athene noctua* nest

Table 1 – Summary of features and revised bat potential for each tree following aerial inspection.

Tree	Species	Grid Reference		Summary of features	Bat potential	Evidence of bats
4	Cherry	540555	266499	Two north-west facing rot holes/woodpecker holes. The lower hole is partially sheltered but damp. The upper hole has been enlarged by a squirrel; a squirrel was present during the survey. The cavity leads up to a large exposed upward facing hole at 4m.	2	No
17	Cherry	540737	266379	East facing woodpecker hole 2m above the ground leading down into a small cavity – bird nesting material is present in the hole. A blackbird was seen emerging from the hole.	1	No
23	Silver birch	540624	266332	South-east facing hole at 2m - shallow, exposed cavity.	2	No
34	Rowan	540488	266654	Three sheltered cavities are present leading into the trunk between 0.3 and 1.5m. The small cavity higher in the tree (2m) is exposed to rain.	1	No
36	Ash	540468	266636	Woodpecker hole at 2m – the hole is shallow and exposed.	2	No
37	Ash	540459	266633	Cavity at 3m has an open, exposed entrance hole but narrows to provide a small sheltered cavity.	1	No
40	Almond	540474	266739	A single large cavity at 2m is present with two large entrances. The cavity is generally exposed although it contains some more sheltered areas.	1	No
41	Swedish whitebeam	540478	266742	Two rot holes are present. The hole at 2m is partially exposed. The other rot hole provides a sheltered cavity.	1	No
42	Poplar	540495	266780	Tree stump with a little live material remaining. Some superficial flaking bark is present. A large exposed cavity is present near the base of the tree. Two woodpecker holes are present in dead wood higher in the tree. The deepest is occupied by grey squirrel. The other features are small and shallow.	1	No
46	Walnut	540498	266748	Several small holes are present at various heights within the tree which have low potential for bats. Two small but slightly more sheltered cavities have moderate potential.	2	No
47	Apple	540707	266236	Two woodpecker holes low in the tree. The lower cavity (at 1m) supports a birds nest, the cavity is deep but is partially exposed and does not offer a suitable roost. The higher hole (at 2m) is shallow.	2	No
48	Apple	540666	266282	A small hole at 1.5m leads into a small, only partially sheltered bowl-shaped cavity.	2	No
49	Apple	540673	266257	Two adjacent holes at 1.5m lead into the same sheltered cavity. An unused bird nest is present.	1	No

Tree	Species	Grid Reference		Summary of features	Bat potential	Evidence of bats
52	Poplar	540754	266155	An active bee nest is present in a large cavity at 4.5m. As a result this tree was <u>not subject to a detailed aerial survey</u> . Two woodpecker holes are present higher in the tree above the bee's nest.	1/1* TBC	No
54	Poplar	540699	266137	Very shallow woodpecker hole at 10m.	3	No
60	Poplar	540805	265836	Woodpecker holes at 3m and 5m lead into two separate cavities; both contain bird nests, one is being used by green woodpecker. The loose bark provides, at best, a partially sheltered cavity.	1	No
64	Lime	540744	266855	Shallow woodpecker feeding hole at 3m.	3	No
65	White poplar	540723	266872	Three features with moderate potential including a lateral split, and two holes leading into cavities within split limbs.	1	No
66	White poplar	540717	266876	Three connected woodpecker holes at 11m lead into a cavity.	1	No
68	White poplar	540723	266913	A woodpecker hole leads into a small/shallow cavity at 4m.	2	No
70	Poplar	541096	266586	A small rot hole leading into a small cavity.	2	No
71	Poplar	541095	266586	A shallow woodpecker feeding hole.	3	No
113	Apple	540864	266222	Woodpecker and rot holes on branches between 1 and 3m lead into the same central cavity in a hollow limb on west side of tree.	1	No
116	Cherry	540881	266255	Woodpecker hole at 2m leading into a large sheltered cavity. Squirrel use. Flaking bark present but is exposed.	1	No
119	Cherry plum	540890	266145	Two woodpecker holes lead into sheltered cavities.	1*	No
120	Cherry plum	540894	266133	Woodpecker hole leading into sheltered cavity at 1.3m.	1	No
121	Apple	540910	266151	Exposed branch stub does not support cavities	3	No
122	Apple	540909	266152	Sheltered cavity in trunk and hollow branch on west side of tree; both have potential to support bats. The cavity in trunk supported an active little owl nest.	1*	No
123	Cherry	540921	266157	Woodpecker hole leading into small cavity which leads into a more exposed rot hole.	1	No
125	Poplar	540922	266473	Split in upper half of main trunk with multiple small cavities/rot holes. High potential. Other features present are small holes with only moderate potential.	1	No
126	Poplar	540917	266502	Dead wood on main trunk between 8-11m supports four woodpecker holes leading into a sheltered cavity within the hollow trunk.	1*	No
127	Lime	540706	266571	Shallow woodpecker holes; insufficient depth to support bats.	3	No

Tree	Species	Grid Reference		Summary of features	Bat potential	Evidence of bats
129	Lime	540757	266631	Shallow woodpecker hole; insufficient depth to support bats.	3	No
172	Ash	540442	267101	Six woodpecker holes are present within the tree. The lower three (5-7m) are interlinked and occupied by grey squirrel. Another at 8m also leads into a cavity with evidence of squirrel use. The cavities higher in the tree are smaller, the highest at 15m is blind.	1	No
173	Ash	540463	267177	Small cavity at 10m; partially sheltered.	2	No
174	Ash	540463	267176	Shallow woodpecker holes are present; one deeper hole is present although the large entrance hole means that the cavity may be partially exposed.	1	No
175	Ash	540492	267195	Several woodpecker holes possibly leading into cavities within a central dead limb, and some loose bark. Safe access was not possible; the tree was <u>not subject to a detailed aerial survey</u> .	1/1* TBC	No
242	Poplar	540505	265514	Woodpecker hole leading into shallow cavity.	2	No
246	Horse chestnut	540443	266612	Several small/shallow holes are present where limbs have been removed. One of these at 4.5m leads into a slightly more sheltered cavity. Bird nesting material is present.	2	No
247	Horse chestnut	540516	266530	Three small, shallow rot holes are present.	2	No
248	Lime	540520	266526	Three superficial, shallow rot holes are present.	3	No
249	Cherry	540545	266497	See Tree 4	See Tree 4	No
255*	Norway maple	540400	266754	Small superficial cavities between 1-3m, a slightly larger cavity is present but this is low on the tree and may be of low suitability due to predation risk.	2	No
257	Horse chestnut	540461	266809	Sheltered rot hole at 3m – high potential. Smaller sheltered rot hole at 5m has moderate potential. Other features of low potential.	1	No
260	Lime	540442	266787	Two shallow woodpecker feeding holes at 4m and 5.5m.	3	No
332	Poplar	539960	263583	Deep crack between 3-6m provides a sheltered cavity. Crack may lead into further cavities.	1	No
333	Poplar	539966	263570	Partially sheltered cavity at 2m where old stem has broken off. Another cavity a 1m leads into the stem but suffers from damp.	2	No
335	Poplar	540064	263637	Several woodpecker holes/cavities high in the tree (9-11m) are generally shallow or exposed and are assessed to have moderate potential to support roosting bats. Several splits and cracks around the base of this large veteran tree which provide cavities, but are close to ground level.	1	No

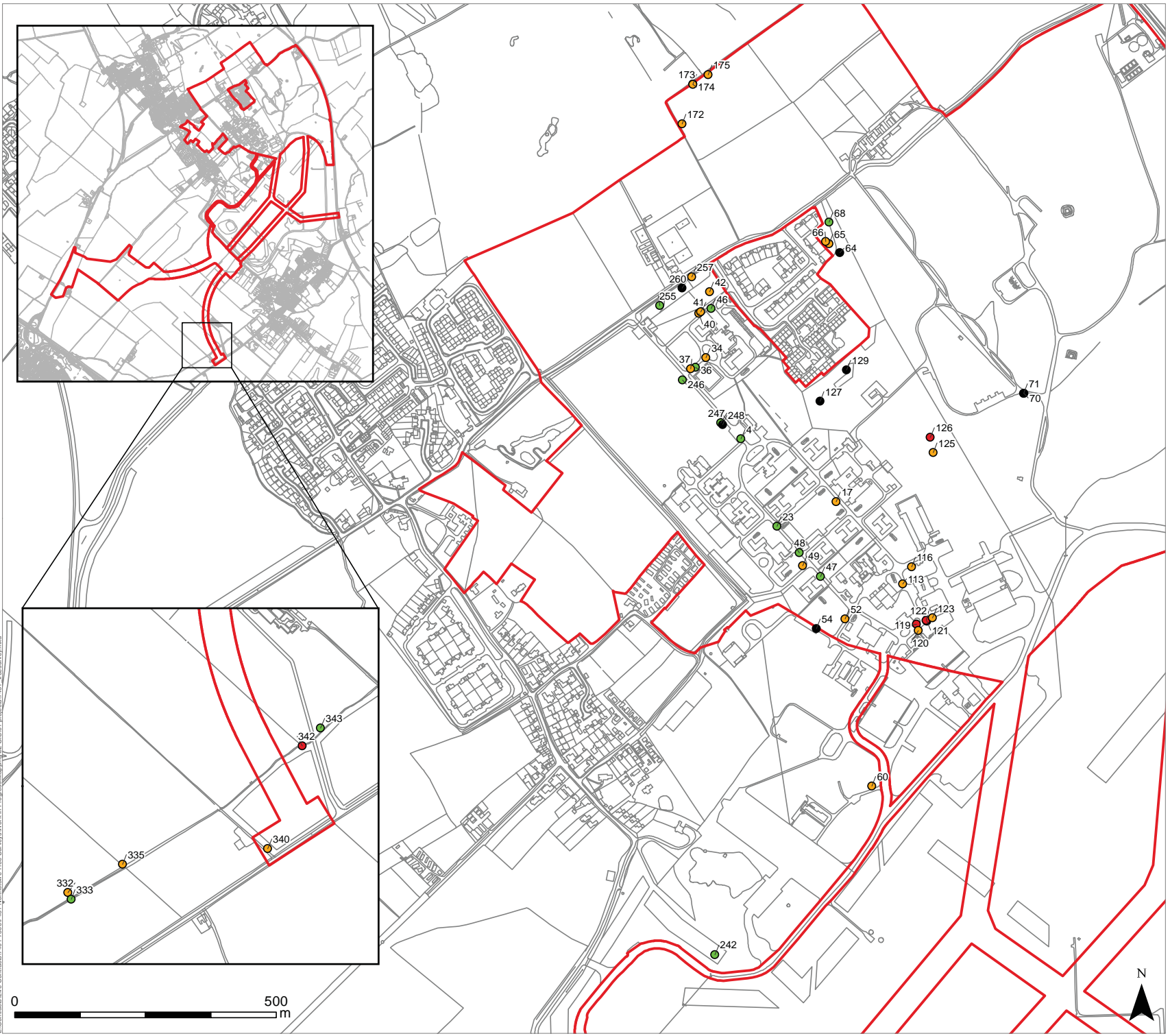
Tree	Species	Grid Reference		Summary of features	Bat potential	Evidence of bats
340	Ash	540342	263667	This tree supports dead wood and loose bark. In particular, a deep sheltered cavity is present in the central dead stem which could not be fully examined due to its length.	1	No
342	Willow	540408	263863	This tree supports numerous features with potential to support roosting bats including rot holes, woodpecker holes and splits.	1*	No
343	Willow	540443	263897	Woodpecker hole on the northwest side at 6m, leads into a small cavity. Bird nesting material is present within the hole.	2	No

Notes on Table 1: Tree species identification is based on previous survey. *The Grid Reference for Tree 255 has been revised to more closely identify this tree's location.

4 Potential Impacts and Recommendations

- 4.1 Given the habitats present, scattered trees in parkland, grazed pasture, woodland blocks, hedgerows and a lake, the site has potential to support foraging bats; it is possible several species use the site, some of which are likely to use tree roosts.
- 4.2 The survey has not identified any bat roosts within the trees surveyed although numerous trees within the site are considered to have potential to support roosting bats.
- 4.3 Bats use tree roosts unpredictably often moving between roosts at different times or year or using roosts for short periods. Tree roosts can therefore be hard to identify, particularly where they are used infrequently.
- 4.4 Bat droppings, one of the more reliable signs of use, are not always visible particularly in smaller, less frequently occupied roosts. Droppings from previously occupied roosts may break down (by invertebrates and decay processes) over winter months to such an extent that they become unrecognisable several months later.
- 4.5 These factors mean that a tree climbing survey in April alone is insufficient to give a conclusive assessment of roost absence. The results of this survey do however inform and increase confidence in the baseline assessment and will be crucial to inform approach to additional survey.
- 4.6 Further survey is recommended for trees with potential to support roosting bats. This survey should be targeted toward trees with the highest potential to support roosting bats (i.e. trees assigned 1 or 1* categories).
- 4.7 Further survey work could include a combination of dawn/dusk roost surveys of individual trees, or groups of nearby trees. Additional survey could also potentially involve further targeted aerial tree survey later on during the year (i.e. June-August).
- 4.8 The results of more general activity survey (e.g. walked transect survey or remote detector survey) within the site would be useful to identify areas of higher levels of use and to determine the species assemblage present. Given the number of trees within the site, such general activity survey may be valuable to assist with the approach for targeting for individual tree survey, to ensure a reasonable, proportionate approach to tree survey for bats work can be devised for the site.
- 4.9 As a general guide, it is recommended that, where possible, trees with potential to support roosting bats are retained within the development, particularly where they can be incorporated into areas of naturalistic landscaping and open space, and where connections can be maintained between tree and suitable foraging habitats. It is also recommended that any lighting required within the development is designed to avoid illuminating trees with potential to support roosting bats, and suitable flight paths (e.g. hedgerows or corridors of vegetation) between the trees and suitable foraging habitats (e.g. woodland, scrub, hedgerows, waterbodies etc.).

Appendix 1: Tree Location Plan



LEGEND

- Site boundary
- Category 1*
- Category 1
- Category 2
- Category 3



OFFICE: Derbyshire
 T: 01433 651869
 JOB REF: 7451.00

PROJECT TITLE
 NORTHSTOWE, CAMBRIDGESHIRE.
 BAT SURVEY OF 50 TREES.

DRAWING TITLE
 Tree Location Plan

DATE: 20.05.2014	CHECKED: GM	SCALE: 1:7,000
DRAWN: COH	APPROVED: GM	STATUS: FINAL

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