Little Crow
Solar Park

Little Crow Solar Park, Scunthorpe

ENVIRONMENTAL STATEMENT: TECHNICAL APPENDICES

APPENDIX 7.1

EXTENDED PHASE 1, ARABLE PLANTS, GREAT CRESTED NEWTS & WATER VOLE

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BASELINE CONDITIONS REPORT:

EXTENDED PHASE 1, ARABLE PLANTS, GREAT CRESTED NEWTS & WATER VOLE

LITTLE CROW SOLAR PARK, SCUNTHORPE, LINCOLNSHIRE

CONTENTS

Project title	Little Crow Solar Park, Scunthorpe, Lincolnshire			
Project number	5642			
Document title	Baseline Conditions Report: Extended Phase 1, Arable Plants, Great Crested Newts & Water Vole			
Client	INRG Solar (Little Crow) Ltd			
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1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by INRG Solar (Little Crow) Ltd to carry out an ecological survey of land of land proposed to accommodate Little Crow Solar Park near Scunthorpe in Lincolnshire.

1.1.2 This report presents the findings of the extended phase 1 habitat survey, a rare arable plants survey, a great crested newt survey and a water vole survey.

1.1.3 The Phase 1 Habitat survey was carried out over several dates on 26th & 27th July, 2nd August and 15th September 2017. The results of the survey have been augmented from additional site visits undertaken during 2017-2018 associated with detailed surveys for a number of target ecological features. An update Phase 1 Habitat survey was conducted on 5-7th November 2019 in order to update the findings of the 2017 survey, and ascertain any differences in habitat or potential for the site to support protected and/or priority species which could alter the Ecological Impact Assessment.

1.1.4 The arable plants survey was conducted on the 12th and 13th of June 2018.

1.1.5 The great crested newt surveys were conducted on 24th April, 19th June 2018 and 22nd May 2019.

1.1.6 The water vole surveys were conducted on 14th and 15th September 2017, and 23rd April 2018.

1.1.7 Unless the client indicates to the contrary, information on the presence of species will be passed to the county biological records centre in order to augment their records for the area.

1.2 Survey Area Description Summary

1.2.1 The survey area is located to the east of the town of Scunthorpe and consists of 17 (predominantly arable) fields bordered by a network of hedgerows and extensive woodland plantations. The land gradually slopes down to the west of the site, where a number of ditches and ponds are

present. Grassland, scrub and ruderal habitat are also present in discrete areas around the site.

1.2.2 The wider landscape is characterised by the industrial steel workings to the west of the Order Limits, and further arable farmland and plantation woodland to the north and east. Beyond the woodland to the south lies a recently constructed solar array. The town of Broughton is located approximately 0.9km to the east of the site.

1.2.3 The survey area is approximately 225 hectares (ha) in size, and the approximate centre was at OS Grid Ref. SE 941 099. The location of the survey area is shown in Figures 1 and 2.

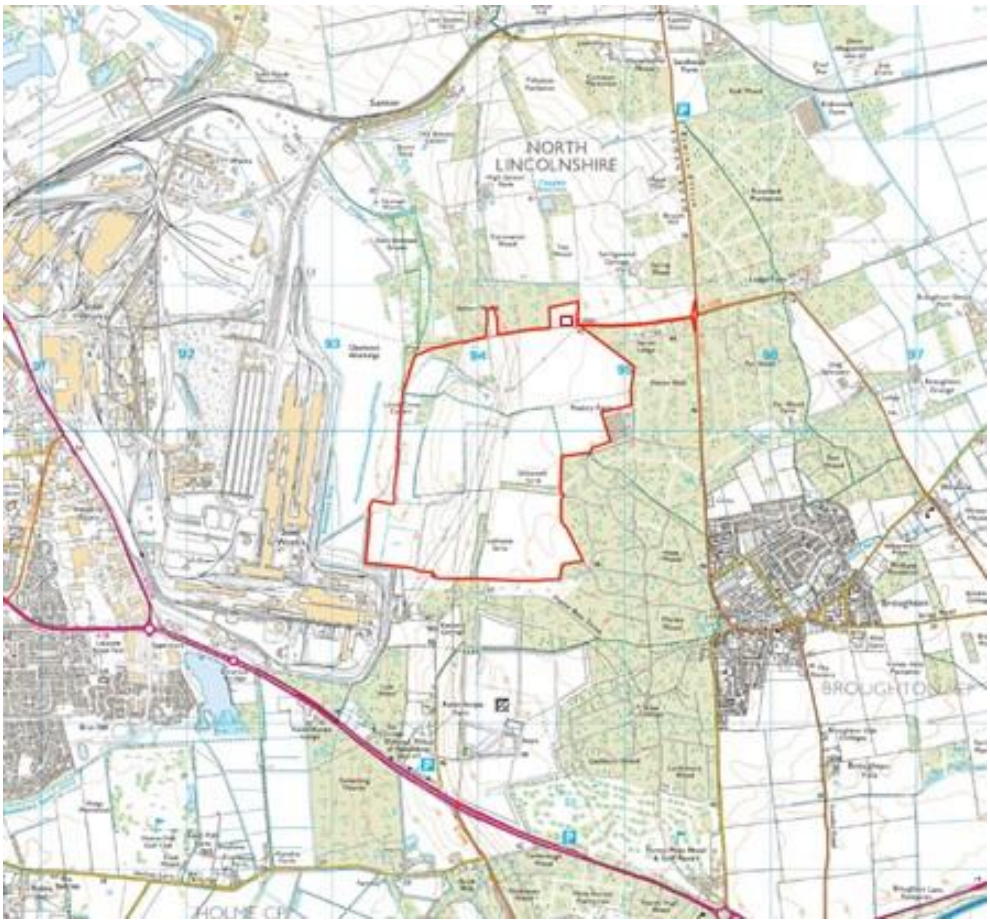


Figure 1: Ordnance Survey Map Showing Location of Order Limits (OS Licence 100050456)

Figure 2: Aerial photograph of Order Limits

2 SURVEY AND ASSESSMENT METHODOLOGY

2.1 Data Search

2.1.1 Statutory designated sites within proximity of the Order Limits were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).

2.1.2 Ordnance Survey maps (1:25,000) and aerial images of the Order Limits were examined online (bing.com/maps and maps.google.co.uk).

2.1.3 The Lincolnshire Environmental Records Centre (LERC) was consulted for records of protected and notable species within 2km of the Order Limits. The records centre was also asked to provide details of designated sites within 1km of the Order Limits.

2.2 Field Survey

Personnel

2.2.1 The extended Phase 1 Habitat Survey was undertaken by Peter Timms MCIEEM. Peter has 8 years' experience undertaking ecological surveys and has a BSc and MSc in relevant subjects. Peter holds a Natural England class licence (Level 1) for the survey of great crested newts (Registration Number: 2015-19739-CLS-CLS). Peter also undertook the update Phase 1 Habitat Survey in November 2019.

2.2.2 A survey for arable plant species was undertaken by Mark Baker MCIEEM. Mark has over 14 years' experience undertaking botanical and ecological surveys and has a BSc in a relevant subject.

2.2.3 The following staff members also assisted with the water vole surveys and the collection of water samples for eDNA analysis:

- *Phil Bowater BSc Grad CIEEM*
- *Patrick Ellison BSc Grad CIEEM*
- *Chris Poole BSc Grad CIEEM*

2.2.4 All above staff have been assessed under the Clarkson and Woods QA processes as competent to complete the survey.

Habitats

2.2.5 A habitat survey was carried out based on standard field methodology set out in the *Handbook for Phase 1 Habitat Survey* (2003 edition)[1].

2.2.6 Botanical names follow Stace (1997)[2] for higher plants and Edwards (1999)[3] for bryophytes.

2.2.7 Habitats are mapped following the codes and conventions described within the Phase 1 Habitat Survey Handbook and Target Notes (Table 3) are used to describe habitats not readily conforming to recognised types and

[1] Nature Conservancy Council. (1990 - 2003 edition). *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*, Joint Nature Conservation Committee
[2] Stace, C. (1997). *New Flora of the British Isles Second Edition*. Cambridge University Press
[3] Edwards, S.R. (1999). *English Names for British Bryophytes*. BBS, Cardiff

evidence of or suitability for protected species and species of conservation concern.

Arable Plants

2.2.8 A targeted survey for arable plant species (sometimes called arable weed species) was undertaken during the 12th and 13th June 2018. The margins of all arable fields were initially walked over by an experienced ecologist in order to rapidly assess the distribution of arable plants across the Order Limits. Areas noted to be of interest in terms of abundance and diversity of arable plants were then subject to more detailed survey. The location of these arable plant survey target zones are provided in Figure 6.

2.2.9 The survey used a modified version of the Plantlife Arable Plants Survey Form and adopted a methodology whereby areas noted to be of interest in the rapid assessment were then subject to a detailed inspection with all arable plant species being recorded. Each area was subjected to an extended and detailed search with all species within the area (other than crops) being recorded. Where threatened species were recorded these were ascribed a score according to the Plantlife Important Arable Plant Areas Methodology[4]

2.2.10 Arable plant species encountered and their relative abundance within each target survey zone were recorded and described using the DAFOR scale shown below:

- *D – Dominant*
- *A – Abundant*
- *F – Frequent*
- *O – Occasional*
- *R – Rare*

2.2.11 The quality of each arable area was assessed against the three criteria identified by Plantlife in identifying important arable plant areas[4].

[4] Byfield,A.J. & Wilson, P. J. (2005). Important Arable Plant Areas: identifying priority sites for arable plant conservation in the United Kingdom. Plantlife International, Salisbury, UK

2.3 Protected and Notable Species

Badgers

2.3.1 A search was made for badger *Meles meles* setts, and sett entrances were checked for signs of use by badgers or other mammals. Setts were classified into the following categories; Main, Subsidiary, Annexe or Outlying. Main setts are typically large structures which constitute the principal shelter and breeding location for a single social group. Subsidiary setts are significant setts which receive regular or sporadic usage but are not the focal sett for a social group. Annexe setts are smaller structures closely associated with Main setts but are not connected by underground tunnels. Outlying setts are located away from other setts and usually comprise no more than two, infrequently used sett entrances.

2.3.2 Sett entrances were counted and mapped to record tunnel direction and their relative level of usage.

2.3.3 Field signs such as 'snuffle holes' (holes dug by badgers when searching for invertebrates), pathways through vegetation, 'latrines' (small pits in which badgers deposit their faeces) and 'day nests' (nests of bedding material made by badgers for sleeping above ground) were also mapped.

2.3.4 All details within this report relating to badgers have been redacted and are presented in a separate Appendix (7.5 - Document Ref: 8.1 LC TA7.5).

Bats

2.3.5 The assessment of the suitability of the survey area for foraging and roosting bats was based on current guidance set out by the Bat Conservation Trust[5].

2.3.6 *Trees:* an inspection of trees within the Order Limits was carried out from the ground, using binoculars, to record any signs of use of the tree by bat species. A ladder, powerful torch and a video fibrescope were available. Features such as frost cracks, rot cavities, flush cuts, split or decaying limbs (including hazard beams), loose bark and dense plates of ivy were

[5] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.

inspected and recorded. Any signs of staining (from urine or fur rubbing) and scratch marks below potential access points were noted, and a search was made for droppings underneath these features.

2.3.7 *Habitat:* the habitats within the Order Limits were appraised for their suitability for use by foraging and commuting bats. In particular, the connectivity of the habitats on site to those lying beyond was taken into account. Vegetated linear features are typically important for many species to navigate around the landscape, while the presence of woodland, scrub, gardens, grassland and wetland features increases a site's foraging resource value to bats. The potential for noise or lighting disturbance which may affect commuting links was also recorded.

2.3.8 Detailed bat activity surveys have been conducted within the Order Limits. The details of outlined in a separate Appendix (7.4 - Document Ref: 7.25 LC TA7.4)

Otter

2.3.9 A search was made along the banks of water courses and water bodies and their adjacent habitats for otter *Lutra lutra* signs including spraints, tracks, castling, and rolling. The banks of any water courses were searched for the presence or potential for holts or other sheltering areas.

Water Vole

2.3.10 A water vole survey was carried out following guidance in the Water Vole Conservation Handbook – 3rd Edition[6] and the Mammal Society's Water Vole Mitigation Handbook[7].

2.3.11 Given that habitat suitability for water voles can change significantly throughout the course of the breeding season, the Mitigation Handbook recommends that two survey visits for the species are necessary to confirm presence or likely absence in most cases. One of these surveys should be completed in the first half of the water vole breeding season

[6] Rob Strachan, Tom Moorhouse and Merryl Gelling (2011), Water Vole Conservation Handbook (3rd ed.), Wildlife Conservation Research Unit (WildCRU)
[7] Dean, M., Strachan, R., Gow, D. & Andrews, R. (2016). *The Water Vole Mitigation Handbook (Mammal Society Mitigation Guidance Series)*. Eds Fiona Matthews & Paul Chanin. Mammal Society, London.

(mid-April to the end of June) and the other in the second half of the season (July to September inclusive) and the surveys should be two months apart.

2.3.12 The first water vole survey was undertaken on the 14th and 15th September 2017 by Peter Timms, with a second survey undertaken on 23rd April 2018 by Peter Timms, Patrick Ellison and Phil Bowater.

2.3.13 The surveys were carried out along the length of the ditch network at the survey area, which is primarily within the western part of the site. Both banks of the river were surveyed where possible and safe to do so. Where access was permitted, the survey area extend 100m up and downstream of the ditch network off-site. Where the ditch network extended into the steelworkings off-site to the west of the Order Limits, no permissible access was available to extend the survey into this area. It is nevertheless considered that adequate survey effort has been made so that water voles would have been detected if they had been present within the Order Limits. The area covered by the surveys is shown in Figure 7.

2.3.14 The ditch banks within the survey area were systematically searched, extending to at least 1m from the water's edge, for signs of water vole including: latrines (showing discrete piles of droppings); feeding remains with characteristically cut vegetation; burrow entrances above and below the water line; runways and footprints; sightings and sounds, particularly listening for the characteristic 'plop' of a water vole entering the water as a result of having been disturbed

Amphibians

2.3.15 All waterbodies within 500m of the Order Limits were identified using Ordnance Survey maps and aerial imagery. Waterbodies within the Order Limits ownership and on publically accessible land were assessed during the field survey for their suitability to support amphibian species.

2.3.16 Where suitable water bodies were identified on accessible land a Habitat Suitability Index (HSI) score was calculated for each one following the

methodology described by Oldham et al[8]. HSI scores give a relative indication of the likelihood that a water body would support breeding great crested newts. Factors which increase these scores include the presence of other ponds nearby, water quality, pond size, absence of fish/waterfowl, vegetation cover and shading.

2.3.17 Terrestrial habitats were also assessed for their suitability for foraging and sheltering amphibians. Amphibians require habitats such as grassland, scrub, woodland and hedgerows for dispersal and hibernation. Further hibernation features include buried rubble and logs, or mammal burrows.

eDNA Survey

2.3.18 Five ponds pond within the Order Limits were subject to eDNA survey on 24th April 2018. This was carried out within the optimal survey window (15th April and 30th June) to determine presence/likely absence. Surveys were carried out following best practice as outlined in the Defra Project WC1067[9].

2.3.19 The surveyed ponds contained >10cm water with full surveyor access to collect samples around the pond perimeter where possible. Care was taken to ensure that the water was not contaminated from other sources and that any sediment present was not stirred up to contaminate the samples. There were no constraints to sampling of the ponds that may have resulted in provision of false positive or negative results.

2.3.20 The eDNA kit was provided and water samples analysed by ADAS UK.

2.3.21 Two of the ponds, which initially returned indeterminate results, were subsequently resampled on 19th June 2018. On this occasion, the eDNA kits were provided and water samples analysed by SureScreen Scientifics.

[8] Oldham. R.S., Keeble L., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.
[9] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

2.3.22 Further eDNA samples were taken of a water body 330m south of the application area on the 22nd May 2019. A HSI assessment of the pond was undertaken at the same time.

2.3.23 A pond which lies approximately 100m west of the application area within a former quarry working, currently owned and managed by British Steel was not accessed. British Steel refused access to this pond as they advised that there is no safe method of accessing the pond and the pH of the water within the pond make it extremely hazardous.

Reptiles

2.3.24 Features on Order Limits were assessed for their potential to provide suitable habitats for use by reptile species. These include rough, tussocky grassland, scrub, disturbed land or refugia such as wood piles, rubble or compost heaps. Where present, suitable existing refugia were inspected for sheltering reptiles, and the ground was scanned whilst walking to look for basking species.

Birds

2.3.25 Breeding and wintering bird surveys have been conducted at the site, the details of which are outlined in Appendix 7.2 (Document Ref: 7.23 LC TA7.2) and 7.3 (Document Ref: 7.24 LC TA7.3)

Invasive Species

2.3.26 Invasive species, such as Japanese knotweed *Fallopia japonica* and Himalayan Balsam *Impatiens glandulifera* were searched for and recorded.

Other Notable Species and Species of Conservation Concern

2.3.27 Field signs indicating the presence of other species of conservation concern, such as hares *Lepus europaeus,* harvest mice *Micromys minutus* and hedgehogs *Erinaceus europaeus* (Species of Principal Importance under the NERC Act (2006)) were recorded. Habitats were also assessed for their potential to support such species.

2.4 Quality Assurance

2.4.1 All ecologists employed by Clarkson and Woods are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow the Institute's Code of Professional Conduct[10] when undertaking ecological work.

2.4.2 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS)[11].

2.4.3 This report has been prepared in accordance with the relevant British Standard: *BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*[12].

3 SURVEY LIMITATIONS

3.1 Desk Study

3.1.1 The data presented within the report should not be seen as exhaustive. Data obtained from within the search area is highly unlikely to constitute a complete record of habitats and species present within the search area. It is therefore possible that protected species may occur within the vicinity of the proposed Order Limits that have not been identified within the desk study.

3.1.2 The data presented within the desk study section of this report constitutes a summary of the data obtained from the local records centre. Should additional detail be required on any of the records described within this report Clarkson and Woods Ltd. should be contacted.

3.2 Arable Plants

3.2.1 The majority of arable plant species are annuals and require suitable conditions in order to perform their life cycle in a given year. As such there

[10] CIEEM (2013). *Code of Professional Conduct*. www.cieem.net/professional-conduct.
[11] CIEEM (2013). *Competencies for Species Survey (CSS). www.cieem.net/competencies-for-species-survey-css-*
[12] The British Standards Institution (2013*). BS42020: 2013 – Biodiversity: Code of Practice for Planning and Development*. BSI Standards Ltd.

may be arable plant species present in the seed bank that were not recorded during the surveys but that may appear in another year.

3.2.2 The arable plant survey was generally focused on the field margins at the with the survey area and it was not possible to survey the entire ground within the circa 211ha of arable land. Arable plants growing amongst crops are likely to have been missed if present with the centre of fields. However, arable plants do not generally flourish within the centre of conventionally managed arable crop fields, due to herbicide use and being outcompeted by crops, and it is therefore unlikely that or highly-diverse areas or abundant weed growth would have been missed. The survey approach taken is therefore considered likely to have identified the key areas of arable plants present within the Order Limits.

3.3 Water Voles and Otters

3.3.1 Otters have no defined breeding season and the breeding holt is kept deliberately obscure by the female so locating one can be difficult and time consuming.

3.3.2 Where water voles live at low densities or a site is at the edge of their range, field signs can be very limited.

3.4 Badgers

3.4.1 Areas with dense ground cover (hedges, scrub, woodland etc. were examined closely. If impenetrable vegetation prevented entry then the perimeter was examined in order to detect badger paths suggesting a hidden sett within the area. It cannot be guaranteed that all the entrances have been located, especially if a small sett is currently inactive or used seasonally and concealed in an area of thick scrub. Badgers may dig new holes and create new setts in a very short space of time.

3.5 Great Crested Newt

3.5.1 The pond to the west of the application area was not sampled and therefore it remains possible that newts may be present within this pond. However, after discussions with British Steel it is understood that the pH of the pond is approximately ph14 and therefore extremely alkaline and hostile to

supporting wildlife. Examination of detailed aerial photography of the water body shows an extremely vivid cobalt blue with no associated vegetation. As such the presence of great crested newt from within the water body is considered highly unlikely and the lack of eDNA sample of this water body is not considered to be a significant constraint.

3.6 General

3.6.1 This survey offers only a series of 'snapshots' of the land within the Order Limits and takes no account of seasonal differences, or of any species which might choose to take up residence subsequently. At the same time a lack of signs of any particular species does not confirm its absence, merely that there was no indication of its presence during this survey.

3.6.2 If no action or development of this land takes place within twelve months of the date of this report, then the findings of this survey should be reviewed and may need to be updated. After three years the findings will be out of date and the full survey should be repeated.

4 DESK STUDY

4.1 Data Search – Designated Sites

International Designations within 10km of the Order Limits

4.1.1 The Humber Estuary is designated a Special Protection Area (SPA), Special Conservation Area (SAC) and Ramsar site. The area encompassing the SPA is situated approximately 11km north of the Order Limits at the closest point, whilst the SAC and Ramsar site is located 9km west at the closest point. It primarily receives its designation for its estuarine habitats, which support a range of associated species including internationally important assemblages of wintering and migratory birds.

National Designations within 5km of the Order Limits

4.1.2 Five Sites of Special Scientific Interest (SSSIs) are located within 5km of the Order Limits, and are described below:

Broughton Far Wood SSSI

4.1.3 This is an extensive block of commercial woodland located approximately 820m east of the proposed solar array, although is 350m from the access (which will utilise an existing farm track). This is designated for its rich woodland canopy and ground flora, as well as its areas of herb-rich limestone grassland in the north east corner.

4.1.4 The SSSI is separated from the Order Limits by further woodland plantation, arable fields and the B1207 road.

Broughton Alder Wood SSSI

4.1.5 Situated approximately 1km east of the Order Limits, and is designated for its wet, alder *Alnus glutinosa* woodland and associated fen and spring habitats and flora. It is separated from the Order Limits by extensive plantation woodland, the B1207 road, and a poultry farm.

Risby Warren SSSI

4.1.6 This is a remnant area of heathland which supports a variety of associated plant communities, include dune, heathland, acid and calcareous grassland which are affected by airborne pollution from the nearby industrial sites.

Tree cover on the SSSI comprises coniferous shelter belt planting and as well as scattered birch *Betula sp*. and gorse *Ulex europaeus*. This is located approximately 2.65km north west of the Order Limits and is separated from the Order Limits by plantation woodland, agricultural farmland, heavy industry and quarry workings.

Manton and Twigmoor SSSI

4.1.7 This comprises a complex of three separate sites, which are located approximately 3.1km south of the Order Limits at the closest point. Important habitats supported by the SSSI include heathland, acid grassland and wetland features, with wet woodland also present. Together the site components support a diverse range of associated floral species. The intervening landscape comprises woodland plantations, an existing solar array, a golf course and the busy A18 and M180 roads.

Castlethorpe Tufas SSSI

4.1.8 This is situated approximately 3.4km and is designated for its' geological interest.

Local Designations within 1km of the Order Limits

4.1.9 Eleven locally designated sites for nature conservation are located within 1km of the Order Limits, which are described in Table 1. Of these, eight are Local Wildlife Sites (LWSs) selected by the Greater Lincolnshire Nature Partnership due to their importance for wildlife at a local level. Three sites are Sites of Nature Conservation Interest (SNCIs), the status of which has been superseded by the LWSs, but these sites retain SNCI status until they have been assessed against the LWS criteria.

Table 1: Non-statutorily designated sites within 1km of the application site

Site	Designation	Description	Size (ha)	Distance and bearing from Order Limits
Manby Wood	LWS	Botanically diverse wooded area, primarily consisting of broadleaved plantation with small areas of young coniferous plantation. Supports a variety of associated ground flora.	80.1	Adjacent to south-eastern boundary of Order Limits
Heron Holt	LWS	Woodland with parts containing diverse range of deciduous species and structural variety, with other parts consisting of dense pine and sycamore plantation. Supports a variety of woodland ground flora.	33.3	Adjacent to eastern boundary of Order Limits

Site	Designation	Description	Size (ha)	Distance and bearing from Order Limits
Broughton West Wood	LWS	Mostly mature deciduous plantation, representative of re-planted ancient woodland, with substantial areas of younger growth and some coniferous elements. Very rich in woodland botany.	83.8	Adjacent to eastern boundary of Order Limits
Santon Wood East	LWS	A strip of field edge woodland connecting two planted woodland blocks of varying age and structure, which contains some ancient woodland indicator species.	6,77ha	Adjacent to north eastern boundary of Order Limits
Broughton Far Wood	LWS	Botanically diverse plantation woodland containing mature or maturing broadleaved trees with some pine in places.	50.8	440m east
Gadbury and Lundimore Woods	LWS	Mixed plantation woodland considered to represent re-planted ancient woodland, supporting diverse ground flora. Known to support common pipistrelle *Pipistrellus pipistrellus* bat roosts.	81.5	450m south
Rowland Planation	LWS	Dominated by botanically-poor woodland plantation, although supports some areas with richer ground flora, and also contains diverse grassland rides and a small area of wetland	121	560m east
Far Wood Farm Meadow	LWS	An area of marsh, drier grassland and coarse vegetation formally cropped for hay. Supports diverse range of flush and grassland botany.	1.9	800m east
Broughton West Wood	SNCI	Two strips of woodland shelter belts, predominantly consisting of deciduous plantation woodland with a small element of coniferous growth. Occasionally diverse woodland ground flora found in some areas. Support a wide range of typical woodland bird species.	6	Adjacent to south eastern boundary of Order Limits
Santon Wood	SNCI	Deciduous plantation woodland managed for forestry. Contains some good woodland ground flora.	101	Adjacent to north western boundary, contains part of the Order Limits
Spring Wood Boughton	SNCI	Dense coniferous plantation woodland with very little ground flora	9.2	230m north of site access

4.1.10 Parts of Manby Wood LWS and Broughton West Wood are considered to represent Plantations on Ancient Woodland Sites (PAWS) due to notable presence of mature ancient woodland indicator species.

Priority Habitats

4.1.11 Much of the woodland habitat within and surrounding the Order Limits are listed on Natural England's Priority Habitat Inventory[13] as 'Deciduous Woodland' habitat type. In addition, an area of approximately 3.3ha of grassland present in the east of the survey area is also listed as 'Lowland Meadows' on the Inventory. A map of the habitats listed on the Priority

[13] https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england

Habitats Inventory, as obtained from the MAGIC website, is provided in Figure 4.

4.2 Data Search – Protected and Notable Species

Data obtained from Lincolnshire Environmental Records Centre

4.2.1 Data was obtained from Lincolnshire Environmental Records Centre (LERC) on all notable species within 2km of the Order Limits.

Badger

[redacted]

Bats

4.2.3 A number of existing records of at least six species of bats were obtained from the records centre, the closest of which were field recordings of unidentified bat species within woodland adjacent to the south east of the Order Limits.

4.2.4 A number of field records of common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* exist from areas of woodland approximately 1km east of the Order Limits. Field records of this species, as well as Daubenton's bat *Myotis daubentonii* exist from Ashbyville Lake, approximately 1.3km south west of the Order Limits. Single records of Nathusius' pipistrelle *Pipistrellus nathusii* and Whiskered bat *Myotis mystacinus* occur within Scunthorpe and approximately 1.5km west of the Order Limits.

4.2.5 Unspecified common pipistrelle and brown long-eared *Plecotus auritus* roosts are also known to be present within the town of Broughton, approximately 1km east of the Order Limits.

Otter and Water Vole

4.2.6 A record of an otter spraint from 1996 exists, located approximately 200m north of the Order Limits.

4.2.7 Water voles have been recorded on Bottesford Beck, approximately 1.95km south west of the Order Limits, most recently in 2013.

Amphibians

4.2.8 Great crested newt *Triturus cristatus* records exist from 2006. The exact location these records were taken from is unclear but is believed to be from close to the south west boundary of the Order Limits. A small number of records of common toad *Bufo bufo* are also present within the search area.

Reptiles

4.2.9 Records of reptiles from within the search area are limited to a record of grass snake from 1977, from an unspecified location.

Birds

4.2.10 A number of records of notable bird species were obtained from the records centre. These are documented within the wintering bird survey and breeding bird survey report in separate Appendices (7.2 & 7.3).

Invertebrates

4.2.11 Several moth and butterfly species which are listed as Species of Principal Importance[14] have been recorded within 2km of the Order Limits since 2000. These include grey dagger *Acronicta psi*, mouse moth *Amphipyra tragopoginis*, dusky brocade *Apamea remissa*, garden tiger *Arctia caja*, sprawler *Asteroscopus sphinx*, mottled rustic Caradrina morpheus, latticed heath Chiasmia clathrata, sallow Cirrhia icteritia, small heath Coenonympha pamphilus, small square-spot *Diarsia rubi*, small phoenix *Ecliptopera silaceata*, august thorn *Ennomos quercinaria*, autumnal rustic *Eugnorisma glareosa*, white-line dart *Euxoa tritici*, ghost moth *Hepialus humuli*, grayling *Hipparchia semele*, rustic *Hoplodrina blanda*, wall *Lasiommata megera*, shoulder-striped wainscot *Leucania comma*, rosy minor *Litoligia literosa*, lackey *Malacosoma neustria*, dot moth *Melanchra persicariae*, pretty chalk carpet *Melanthia procellata*, dark spinach *Pelurga*

[14] Species of Principal Importance (SPI) are listed in Schedule 41 of the Natural Environment and Rural Communities (NERC) Act as requiring action under the UK Biodiversity Action Plan

comitata, large wainscot *Rhizedra* lutosa, white-letter hairstreak *Satyrium w-album*, shaded broad-bar *Scotopteryx chenopodiata*, white ermine *Spilosoma lubricipeda*, buff ermine *Spilosoma lutea*, hedge rustic *Tholera cespitis*, feathered gothic *Tholera decimalis*, blood-vein *Timandra comae*, cinnabar *Tyria jacobaeae* and dark-barred twin-sport carpet *Xanthorhoe ferrugata*.

4.2.12 The majority of small heath, grayling, and wall records were from Yarborough Quarry, approximately 350m north west of the Order Limits. The records of all other species were primarily located at either Ashbyville Lake (1.5km south west of the Order Limits) or at woodland areas approximately 1km east.

Plants

4.2.13 A number of records of notable plant species have been recorded within 2km of the Order Limits. These include two Species of Principal Importance; Purple milk vetch, of which records exist from within the Order Limits, and yellow bird's nest, which has been recorded approximately 950m north of the Order Limits

MAGIC search for EPS Licences

4.2.14 Records of previously issued European Protected Species Licences from within 5km of the Order Limits were obtained using the MAGIC website. Details of these licences are provided in Table 2 below.

Table 2: MAGIC records of EPS mitigation licences issued within a 2km radius of the Order Limits

Licence Ref No.	Species Covered	Dates of Licence	Distance and bearing from Order Limits of Licence Record
2015-7054-EPS-MIT	**Bats** – Common pipistrelle	2015-2025	1.37km Southeast
EPSM2009-1229	**Bats –** Soprano pipistrelle	2009-2010	2.35km Northeast
EPSM2010-2663	**Bats** – Common pipistrelle	2011	4km Northwest
2015-16065-EPS-MIT	**Bats** – Common pipistrelle	2015-2020	5km Northwest
2015-16065-EPS-MIT-1	**Bats** – Common pipistrelle	2016-2020	5km Northwest
2015-16065-EPS-MIT-2	**Bats** – Common pipistrelle	2016-2020	5km Northwest

5 EXTENDED PHASE 1 SURVEY

5.1.1 The survey area consisted of 17 (predominantly arable) fields bordered by a network of hedgerows and extensive woodland plantations. The land gradually slopes down to the west of the Order Limits, where a number of ditches and ponds are present. The results of the ecological survey are shown on Figure 3 at the end of this section

5.2 Habitats

Arable

Arable fields

5.2.1 This was the most frequently encountered habitat within the Order Limits, accounting for approximately 211ha of the land within the survey area. Over the course of the surveys, the arable fields were under cultivation using a mix of spring-sown cereals and rapeseed, as well as game cover crops within discrete areas at the edges of some of the fields. During the update survey in November 2019, Fields F8, F16 and F17 were left fallow and vegetated with course grasses and herbs associated with disturbed ground, particularly docks *Rumex sp.*, Canadian fleabane *Conyza canadensis*, colt's foot *Tussilago farfara* wild mignonette *Reseda lutea* and a variety of common ruderal species

Arable Field Margins

5.2.2 The margins of the arable fields were generally narrow (0.5m to 2m wide), although extended to 6m in places, and comprised typical coarse grasses and herbaceous species, including: false-oat grass *Arrhenatherum elatius*; cock's foot *Dactylis glomerata*; black grass *Alopecurus myosuroides;* perennial ryegrass *Lolium perenne*; nettle *Urtica dioica*; hogweed *Heracleum sphondylium*; common poppy *Papaver rhoeas*; fat hen *Chenopodium album*; greater knapweed *Centaurea scabiosa*; common knapweed *Centaurea nigra*; prickly sow-thistle *Sonchus asper*; groundsel *Senecio vulgaris;* red campion *Silene dioica*; white campion *Silene latifolia*; redshank *Persicaria maculosa*; mugwort *Artemisia vulgaris*; ragwort *Jacobaea vulgaris*; soft brome *Bromus hordeaceus*; scentless mayweed

Tripleurospermum inodorum; wall barley *Hordeum murinum*; common fumitory *Fumaria officinalis*; borage *Borago officinalis;* and bracken *Pteridium aquilinum* in some parts.

5.2.3 Additional species recorded during the arable plants survey included fool's parsley *Aethusa cynapium*, bugloss *Anchusa officinalis*, goat's beard *Tragopogon pratensis*, henbane *Hyoscyamus niger,* wild pansy *Viola tricolor,* shepherd's purse *Capsella bursa-pastoris*, cut-leaved cranesbill *Geranium dissectum*, wild mignonette and annual nettle *Urtica urens* (see Section 6 for detailed results of the arable plants survey).

Photograph 1: Typical arable field and margin habitat encountered across much of the Order Limits. Photo taken form Field F4, looking east (July 2017).

Photograph 2: Field margin with arable plants. Photo taken from Field F6, looking south (July 2017).

5.2.4 Uncultivated strips of grassland 2-6m wide were present on either side of farm tracks running though the Order Limits and at some headlands around arable fields, particularly in the north east of the survey area. The

vegetation within these habitats was similar in composition to the rest of the arable field margins described above, although evidence that this habitat was subject to less frequent disturbance was noted; a layer of thatch was present and a higher abundance of floral species was present, such as field speedwell *Veronica persica*; black horehound *Ballota nigra*; vipers' bugloss *Echium vulgare*; doves-foot cranebill *Geranium molle*; hairy vetch *Vicia hirsute*; burdock *Arctium lappa;* and teasel *Dipsacus fullonum* in addition to that recorded elsewhere within arable fields. For the purposes of this assessment, these grassland strips were considered to represent semi-improved grassland although they have been included under the broad habitat type of Arable Field Margins.

5.2.5 Although the arable fields were cultivated up to the field boundaries with generally only narrow margins present, the total extent of this habitat type with the Order Limits is approximately 3ha, and arable field margins are a priority habitat identified as a conservation target both locally and nationally.

5.2.6 Of the arable plant species recorded within the survey area, henbane, which was recorded in Field F8 in the north western corner, is classified as Vulnerable on the vascular plant Red Data Book for Great Britain[15]. A species is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future. See Section 6 for further details of the findings of the arable plant survey.

Semi-improved Grassland

5.2.7 Areas of agricultural land in the south west of the Order Limits were dominated by rank grasses and herbs, particularly false-oat grass and cock's foot, as well as hogweed; nettle; marsh thistle *Cirsium palustre*; creeping thistle *Cirsium arvense*; great willowherb *Epilobium hirsutum*; and hairy vetch. In damper areas, rush species soft rush *Juncus effusis* and toad rush *Juncus bufonius* were noted. This habitat is readily-

[15] Cheffings, C.M. & Farrell, L. (2005) *Species Status Report No 7: The Vascular plant red data list for Great Britain*. Joint Nature Conservation Committee, Peterborough.

establishing and was not considered to offer elevated ecological compared to habitats within the wider landscape.

5.2.8 An area of semi-improved grassland containing abundant orchids was present in the north of Field F11 (Target Note 15), around the edges of the raised circular mound at Target Note 11 and extending east of this feature. Common spotted orchid *Dactylorhiza fuchsia* was frequently encountered as was northern or southern marsh orchid *Dactylorhiza praetermissa* / *Dactylorhiza purpurella*, as well as occasional bee orchid *Ophrys apifera*. Although these orchid species are widespread in the UK and can be found in a range of habitats, the presence of these signifies this area as likely to have been subject to less improvement than the other grassland habitat present at the site.

Photograph 3: Typical poor semi-improved grassland habitat at the south west of the Order Limits. This photo shows Field F12 (September 2017).

Photograph 4: Grassland with abundant orchid species at Target Note 15, in the north of Field F11 (June 2018).

5.2.9 A square block of mown, semi-improved grassland measuring approximately 3.5ha and dominated by cock's foot was present in the north west of Field F2. Other grasses, including false oat grass, Yorkshire fog, red fescue and perennial ryegrass were occasionally present in the sward, as well as several herbaceous species including smooth sow-thistle *Sonchus oleraceus*, ragwort, smooth hawk's-beard *Crepis capillaris*, yarrow *Achillea millefolium*, greater plantain *Plantago major*, hogweed and common knapweed. This area is currently under Higher Tier Countryside Stewardship Agreement Option 'Management of grassland for target features'.

5.2.10 This

Semi-natural Broad-leaved Woodland

5.2.11 Much of the survey area was bordered by woodland, although the majority of woodland habitat comprised planted mixed/broadleaved woodland (see below). However, just beyond the western boundary of Fields F10 and F9 lay a strip of semi-natural riparian woodland on the banks of a stream, sloping down some 5-10m to the stream below and covering an area of approximately 1.5ha. This habitat comprised semi-mature oak *Quercus robur*; silver birch *Betula pendula*; hawthorn *Crataegus monogyna*; goat willow *Salix caprea*; alder *Alnus glutinosa;* and elder *Sambucus nigra*.

5.2.12 An area of this habitat measuring 0.25ha was also present at the junction of three hedgerows in the south west of the Order Limits, which comprised mature oak, lime *Tilia sp;* hawthorn; elder; silver birch; and grey willow, and an understorey of enchanter's nightshade *Circaea lutetiana* and wood avens *Geum urbanum*. This was damp and held standing water over the winter months.

Plantation Broad-leaved Woodland

5.2.13 Much of the woodland beyond the northern and south eastern boundary of the Order Limits comprised planted broadleaved trees as well as a roughly

rectangular area of 1.75 ha in between arable land within the western area of the site.

5.2.14 Although this varied in age and species composition between different areas of the site, generally speaking this comprised abundant semi-mature to mature ash *Fraxinus excelsior*; oak; Norway maple *Acer platanoides*; poplar *Populu*s sp.; silver birch; and sycamore *Acer pseudoplanatu*s. Hawthorn; blackthorn Prunus spinosa; sweet chestnut *Castanea sativa*; hazel *Corylus avellana* were also frequently encountered with an associated ground flora noted at the edges of the woodlands close to the Order Limits, including species such as bramble *Rubus fruticosu*s; ivy *Hedera helix*; wood avens; lords-and-ladies *Arum maculatum*; and nettle.

5.2.15 Much of this habitat at the Order Limits are locally designated Sites of Nature Conservation Interest (see above). This habitat also represents Lowland Mixed Deciduous Woodland, which is a local and national priority habitat.

Plantation Mixed Woodland

5.2.16 Although predominantly consisting of broad-leaved species, parts of the woodland bordering the southern and western parts of the site contained an element of coniferous plantation. Species such as larch *Larix decidua*, scot's pine *Pinus sylvestris* and Corscian pine *Pinus nigra* were recorded in these areas amongst the broadleaved species described above. The woodland beyond the south east corner of the Order Limits, within Broughton Far Wood LWS and Manby Wood LWS) is classed as 'plantation on an ancient woodland site' (PAWS), and the understorey in this area was noted to be more representative of mature woodland, with species such as enchanter's nightshade, green alkanet *Pentaglottis sempervirens* and dog's mercury *Mercurialis perennis* noted.

5.2.17 A small area of this habitat (approx. 0.1 ha) was present within the north western part of the site, alongside a stream, and comprised planted larch, poplar *Populus sp*. and cypress trees with young hawthorn and elder.

5.2.18 This habitat is likely to support a wide range of associated wildlife, and is representative of the priority habitat Lowland Mixed Deciduous Woodland. Much of this habitat also forms part of designated Local Wildlife Sites.

Plantation Coniferous Woodland

5.2.19 An area of woodland comprising entirely of planted larch was present beyond the southern boundary of the Order Limits. This habitat was relatively small in extent (approx. 1.1ha) and low in both species composition and structural diversity, and provided fewer opportunities for wildlife compared to the other types of woodland within the survey area.

Scrub

5.2.20 Areas of dense, unmanaged scrub were occasionally encountered in the centre of the site, as well as more frequently along the western Order Limits. In most places, this habitat usually comprised semi-mature hawthorn; bramble; blackthorn; elder; and young willow. Scattered stands of scrub were occasionally encountered elsewhere at the site, such as at field margins and along ditch banks. Although this habitat is likely to support a range of protected and notable wildlife species, it is readily establishing and frequently found in the wider landscape.

Photograph 5: Area of scrub habitat at Target Note 3, parallel to Hedgerow H2

Hedgerows

5.2.21 The agricultural fields were bordered in parts by a network of eighteen hedgerows. These are labelled in Figure 5 and are description of each hedgerow is provided in Table 4.

5.2.22 The majority were poor in terms of species diversity, although species-rich hedgerows are present at the site. The hedgerows also varied in structural diversity; some were relatively intact whereas frequent gaps were noted in others, and trees were present in some, with others being managed at a uniform height. In total, the hedgerow habitat at the site measured approximately 4.55km in length.

5.2.23 The hedgerows are likely to be of importance for a wide range of associated wildlife, and provide connective links to between valuable habitat within and adjacent to the site. Hedgerows in general are a priority habitat for Lincolnshire as well as on a national scale.

Ponds

5.2.24 Five ponds were present within the survey area. These are labelled in Figure 5 and a description of each is provided in Table 5. Two of the ponds appeared to be ephemeral and dried up during spring and early summer (Ponds 4 & 5). A small field pond present at the northern edge of the site (Pond 3) was shallow, heavily silted and overshaded by an adjacent tree, with very little aquatic vegetation present. The remaining two ponds were larger, more open and likely to hold water year-round, and were seen to support a range of marginal and aquatic vegetation.

5.2.25 Two further ponds were noted off-site but within 500m, situated approximately 100m west and 330m south of the Order Limits respectively. The pond to the 100m west has not been surveyed due to access restrictions. The pond 330m south was surveyed in May 2019.

5.2.26 Two liquid discharge lagoons were also present at the Poultry farm, to the east of the Order Limits. These comprised pools containing semi-liquid animal waste arising from the poultry sheds, with no emergent or marginal vegetation present.

Scattered Broadleaved Trees

5.2.27 A small number (5) of semi-mature to mature trees were present at the site which were not associated with adjacent woodland or field boundaries. These generally comprised ash trees, with an oak, a horse chestnut *Aesculus hippocastanum* and a weeping willow *Salix babylonica* also present. None of the trees were considered to represent good examples of veteran trees, as they were generally similar in age and size to the trees at the nearby woodland and hedgerows, and did not occupy prominent positions in the landscape.

5.2.28 Furthermore, a number of self-seeded young sycamore and ash trees were scattered around the edge of the area of bare ground containing the former oil well in the north east of the survey area (not within the Order Limits.

Tall Ruderal

5.2.29 Discrete parts of the survey area outside of the cultivated fields were dominated by tall ruderal species, particularly nettle, great willowherb, meadowsweet *Filipendula ulmaria*, mugwort, burdock marsh thistle, ragwort and hogweed.

Photograph 6: Tall ruderal habitat at Target Note 1

Ditches

5.2.30 A network of drainage ditches were present at some of the field boundaries. At the time of survey, nearly all of the ditches were dry or

held very little water over the summer months, although aquatic/marginal vegetation could be seen which indicated seasonal inundation with water.

Photograph 7: Dry Ditch between Fields F9 and F7 (September 2017)

5.2.31 A ditch running along the western Order Limits was deeper and wider than most of the other ditches and was considered to hold water permanently. Two of the other ditches held running water which flowed east-west towards lower land beyond the western Order Limits, eventually into a former opencast workings to the west of the Order Limits.

5.2.32 The ditches have the potential to support a range of protected species and species of conservation concern.

5.3 Protected Species and Species of Conservation Concern

Badgers

[redacted]

Bats

5.3.4 The data search revealed a number of existing records of at least six species of bat from the surrounding 2km.

5.3.5 Four trees at the site were identified as having potential to support roosting bats. These were generally mature oak trees which either had 'Low' or 'Moderate' potential (Target Note 2 and 5 respectively) to support roosting bats, in accordance with the Bat Conservation Trust Guidelines[16]. These are all expected to be retained within the development. The woodland, hedgerow and scrub habitat is likely to be used by local populations of bats for foraging and commuting. The large expanses of agricultural fields are generally sub-optimal for foraging and commuting however.

5.3.6 Further surveys for foraging/commuting bats have been undertaken at the site, the results of which are given in a separate Appendix (Appendix 7.4 - Document Ref: 7.25 LC TA7.4)

Otter

5.3.7 The data search did not reveal any recent (post-2000) records of otter within 2km. The ditches within the Order Limits are unlikely to be used by otters if present in the locality, being either dry or holding shallow water, which would not provide the sources of prey needed to sustain a population of this species at the site. It is considered that otters are highly unlikely to occur within the Order Limits.

Water Vole

5.3.8 The data search returned 7 records of water vole from within 2km, the most recent of which was from 2013. The ditches and ponds within the western part of the survey area have potential to be used by water voles, with suitable foraging and burrowing habitat present, although the fact that most of the ditches appear to dry regularly reduces the value of the site somewhat for water voles, as they generally favour features which

[16] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1.

hold water permanently. See Section 8 for further details of the findings of the detailed water vole survey.

Amphibians

5.3.9 Water samples were collected from the all five ponds within the Order Limits on 23rd April 2018 and sent for testing for great crested newt eDNA. The samples collected from P3, P4 and P5 returned a negative result indicating the likely absence of great crested newts from this pond. Water samples from two of the Ponds (P1 & P2) returned 'Indeterminate' results, which means that although no newt eDNA was identified, the water samples were of insufficient quality to ensure an accurate analysis. Water samples were re-collected from both of these ponds on 19th June 2018 and tested again, and returned negative results for great crested newt eDNA.

5.3.10 Details of the eDNA analysis are provided in Section 6. The results of the eDNA survey indicate that great crested newts are likely absent from the site.

5.3.11 The ponds provides suitable breeding and foraging habitat for more widespread species of amphibian, such as common frog *Rana temporaria* and common toad *Bufo bufo* which are expected to be use the features for present at the site. The field boundaries also provide suitable sheltering habitat for these species.

5.3.12 Pond P6, which is located 330m south of the Order Limits was sampled on the 22nd May 2019 and returned a positive result indicating the likely presence of great crested newts from this pond.

5.3.13 The two liquid discharge lagoons at the poultry farm were considered highly unsuitable for amphibians due to the lack of marginal/emergent vegetation, high levels of pollution/poor water quality and likely anaerobic conditions,

Reptiles

5.3.14 No recent records of reptiles within the locality of the Order Limits were revealed by the data search.

5.3.15 Nevertheless, the hedgerows, scrub, woodland edges, ditches and grassland areas offer some value for foraging and sheltering widespread reptile species, such as slow worm *Anguis fragilis* and grass snake *Natrix helvetica*. However, the large agricultural fields were considered to offer poor suitability for reptiles.

Birds

5.3.16 The site was considered to be suitable for both wintering and breeding birds, some of which may be notable species. Further surveys have been carried out, the results of which are given in separate Appendices (7.2 & 7.3).

Invertebrates

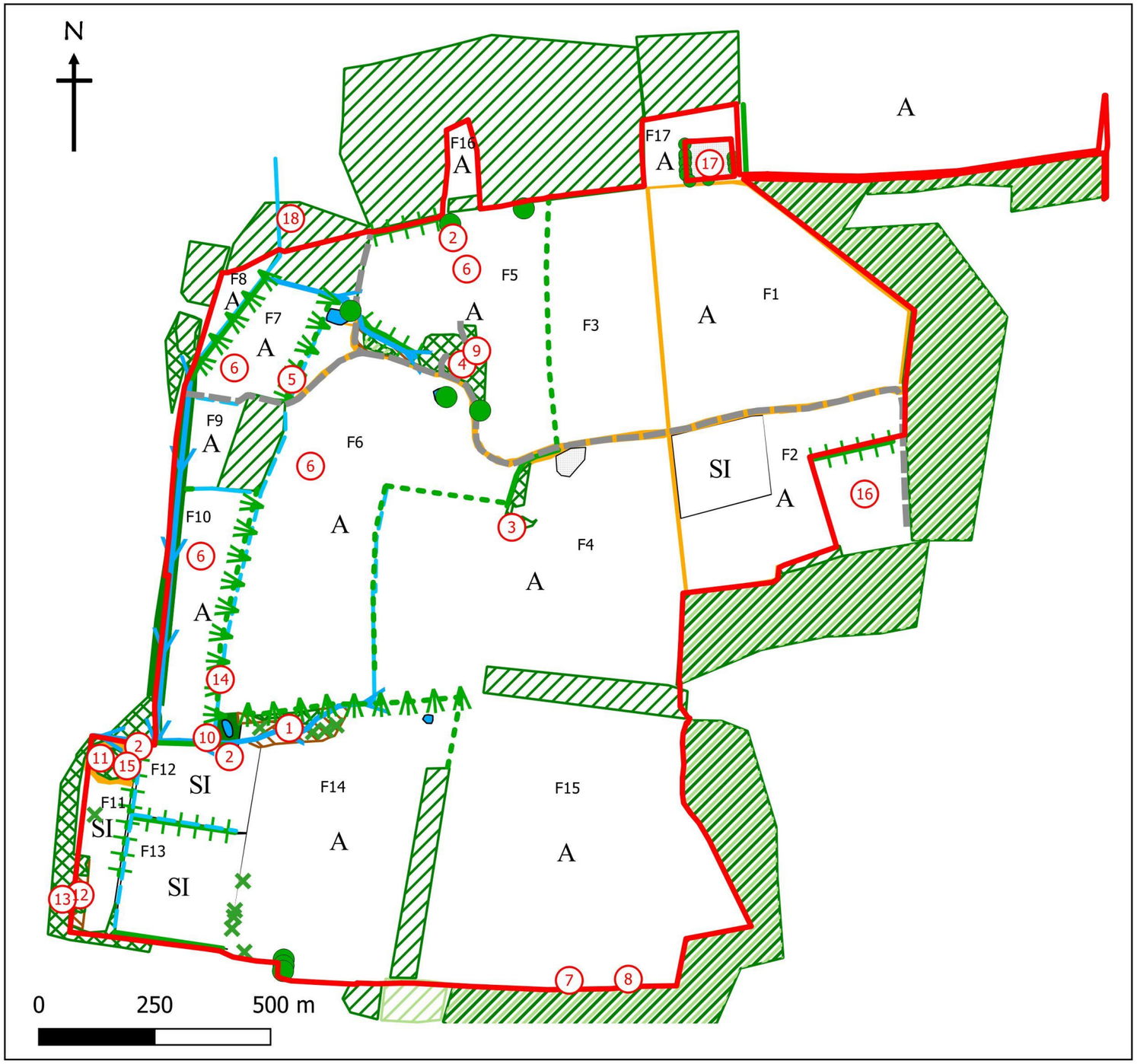
5.3.17 The data search revealed a number of existing records of notable butterfly and moth species from within the surrounding 2km.

5.3.18 Habitats at the margins and boundaries of the field are likely to be of value for a range of invertebrate species typical of woodland edge and hedgerows. During the surveys, several common and widespread species belonging to the order Lepidoptera were recorded, including cinnabar moth *Tyria jacobaeae*, a Species of Principal Importance. The ponds and ditches within the Order Limits are also likely to support a range of aquatic invertebrates. However, assemblages of invertebrates supported by the arable fields comprising the majority of the survey area are likely to be poor, particularly for pollinating species.

Other Protected Species, Species of Conservation Concern and Invasive Species

5.3.19 A number of brown hares *Lepus europaeus* (up to 8 individuals) were seen on regular occasions during the survey visits, particularly in the western part of the site (Target Note 6). The mosaic of open fields, woodland and hedgerow provides optimal habitat for this species. Brown hare is a Species of Principle Importance targeted for conservation nationally.

5.3.20 No Japanese knotweed or Himalayan balsam was noted within the site during the survey.



Key:

- A — Arable
- SI — Poor Semi-impro -ved Grassland
- Semi-natural Broad -leaved Woodland
- Plantation Broad -leaved Woodland
- Plantation Mixed Woodland
- Plantation Conifer -ous Woodland
- Bare Ground
- Ponds
- Dense Scrub
- Tall Ruderals
- Semi-improved Grassland
- Species-rich Intact Hedgerow w Trees
- Species-rich Defunct Hedgerow w Trees
- Species-poor Defunct Hedgerow w Trees
- Species-poor Intact Hedgerow w Trees
- Species-poor Defunct Hedgerow
- Species-poor Intact Hedgerow
- Scattered BL tree
- Scattered Scrub
- Running Water
- Wet Ditch
- Dry Ditch
- Track
- Order Limits
- Target Note
- F — Field No.

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

Project **Little Crow Solar Park**	
Title **Extended Phase 1 Habitat Map**	
Project Number **5642**	
Scale **See Scale Bar**	Date **26/11/19**

Figure 3: Extended Phase 1 Habitat Map

Table 3: Target Notes

No.	Description
TN1	Shallow valley area sloping down to a small stream. Covered with tall ruderal species with scattered young willow, hawthorn and bramble scrub
TN2	Mature oak tree with small number of Potential Roost Features (PRFs) such as loose, peeling bark, vertical frost cracks, rot holes and woodpecker holes. Considered to hold Moderate Potential for roosting bats
TN3	Dilapidated brick structure within dense hawthorn scrub
TN4	Mosaic of scrub, tall ruderals and poor SI grassland with farm track running through the middle. Occasional semi-mature ash tree scattered amongst scrub.
TN5	Mature oak tree with no obvious PRFs seen from the ground, but is of an age and size that PRFs may be present further up. Considered to hold Low Potential for roosting bats
TN6	Brown hares seen frequently
TN7	[redacted]
TN8	[redacted]
TN9	Brick structure in disrepair within scrub area.
TN10	[redacted]
TN11	Raised circular mound approximately 2m tall. Vegetated by course grasses and ruderal/herbaceous species, including false oat grass, cock's foot, hogweed, autumn hawkbit *Leontodon autumnalis*, creeping thistle and ragwort
TN12	[redacted]
TN13	Raised bund reaching approximately 15m tall in far south west corner of the site. Vegetated with a mix of dense bramble scrub, course grasses and ruderal species.
TN14	[redacted]
TN15	Area in north edge of Field F11 around the edge of circular mound (TN11) containing frequent northern marsh orchid, and occasional bee orchid.
TN16	Poultry Farm

TN17	Fenced area of bare ground at a former oil well, used for storing hay bales at the time of survey. Outside of Order Limits. Several self-seeded sycamore, ash and blackthorn trees scattered around the edges
TN18	[redacted]

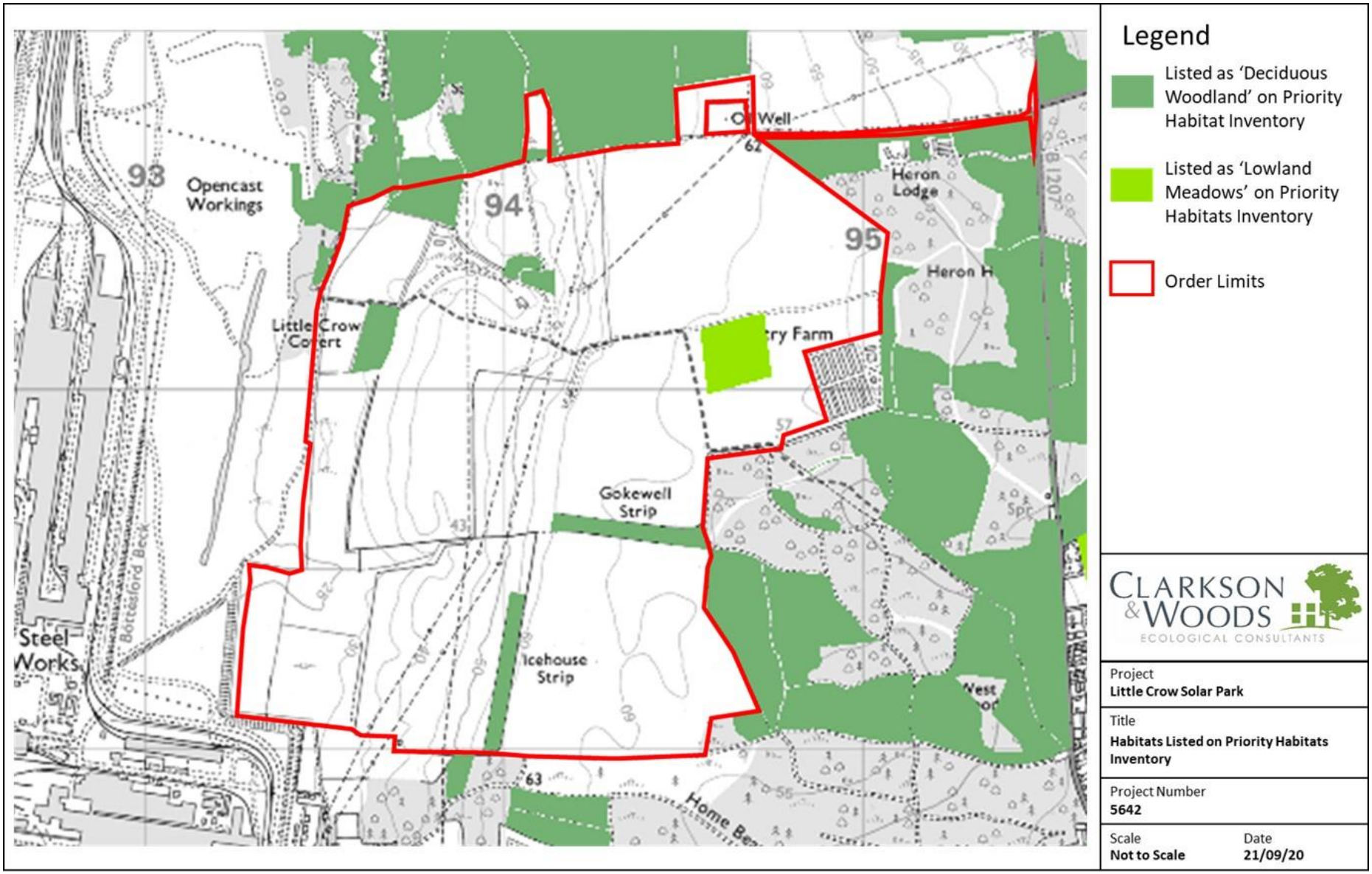


Figure 4: Map of Habitats Listed on Natural England Priority Habitats Inventory

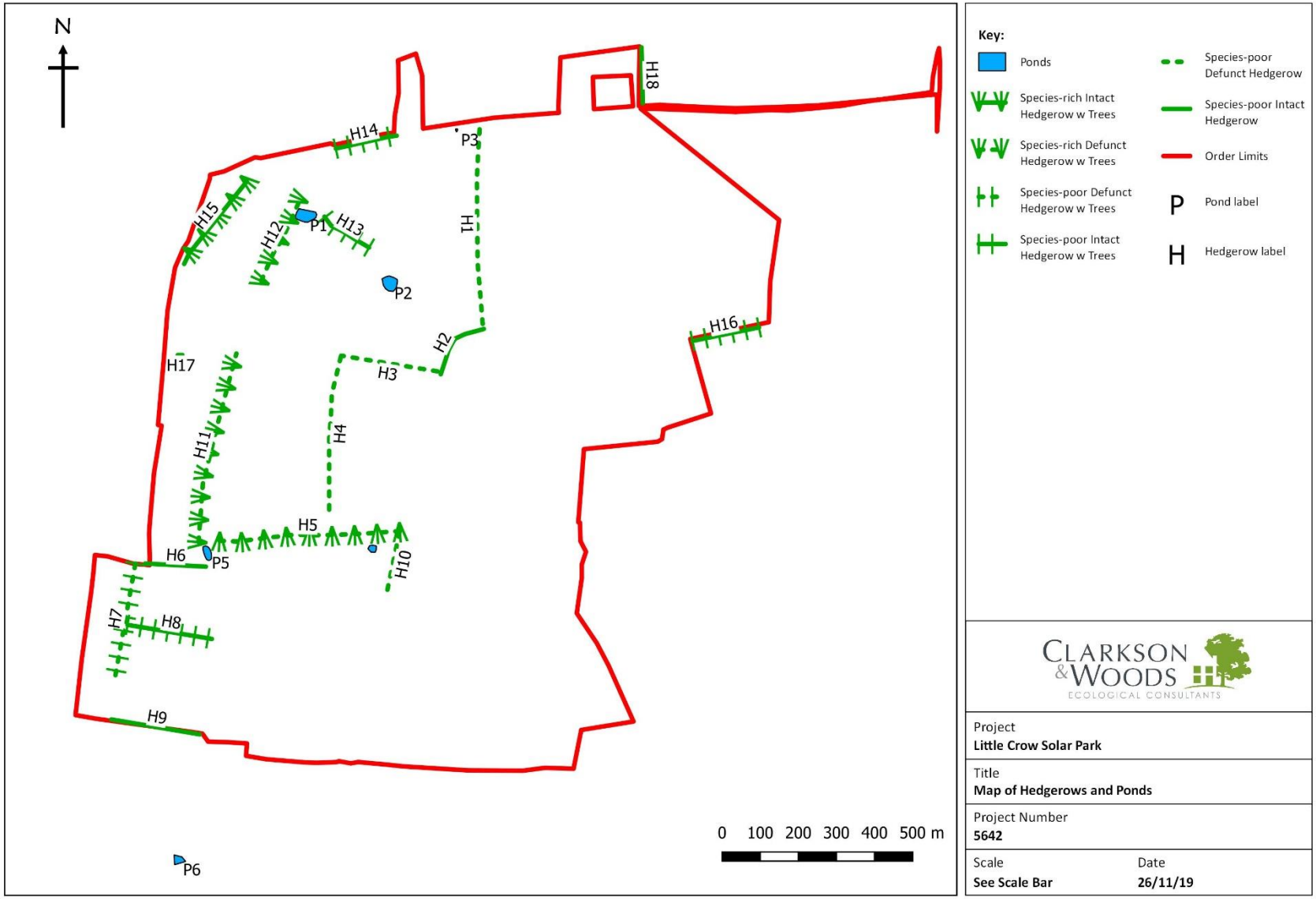


Figure 5: Map of Hedgerows and Ponds within Survey Area

Table 4: Descriptions of Hedgerows

Hedgerow No.	Description
H1	This hedgerow was approximately 525m in length and consisted primarily of hawthorn *Cretaegus monogyna*, and elder *Sambucus nigra* with occasional sycamore *Acer pseudoplanatus*. The hedgerow was approximately 2m tall on top of an earth bank, with no sign of recent management. Frequent gaps were noted, particularly at the northern end. This hedgerow was species-poor. Ground flora present included nettle, hogweed, red campion, bramble and burdock. Not classified as 'Important' under the Hedgerow Regulations (1997)
H2	A line of unmanaged shrub, approximately 3-6m tall and between 1 and 5m wide, with the wider and taller shrubs at the southern end. Dominated by hawthorn, with elder and ash also present and considered to be species-poor. Approximately 180m in length, partially forming a 'green lane' with scrub on the opposite side of a farm track. Ground flora present included white campion, red campion, mugwort, common poppy, nettle, red dead nettle, white dead nettle, field bindweed *Convolvulus arvensis* and hedge woundwort *Stachys sylvatica*. Not classified as 'Important' under the Hedgerow Regulations (1997)
H3	A species-poor, gappy hedgerow measuring 250m in length showing no sign of recent management, and as a result was quite leggy as opposed to showing bushy, lateral growth. Up to 3m in height and 1.5m wide, dominated by hawthorn with occasional elder and white bryony *Bryonia alba* present. Ground flora included nettle, marsh thistle, hogweed and cow parsley. Not classified as 'Important' under the Hedgerow Regulations (1997)
H4	A 240m length of gappy, defunct hedgerow approximately 3m tall with no recent management evident. Species-poor, consisting of hawthorn, blackthorn, hazel and white bryony. A dry, shallow ditch (<0.5m deep and wide) was present at the base of the hedgerow on its eastern side, which was choked with mugwort and nettles. A deeper ditch was present on the western side, which looks to hold water for most of the year. Ground flora included nettle, mugwort, hogweed, cleavers, soft brome and bracken. Not classified as 'Important' under the Hedgerow Regulations (1997)
H5	A species-rich hedgerow, 530m in length and approximately 4-5m tall with taller standards. Held some gaps of more than 5m in length. No sign of recent management. Species present included hawthorn, blackthorn, hazel, elder, oak, ash, willow, sycamore, and wild privet *Ligustrum vulgare*. Ground flora included hogweed, great willowherb, bramble, meadowsweet, mugwort and nettle. Classified as 'Important' under the Hedgerow Regulations (1997)
H6	A hedgerow measuring approximately 175m in length, and 4-5m in height. Leggy, with no sign of recent management, with some small gaps although no gaps wider than 5m. A stream was present along the northern base. Dominated by hawthorn, with elder, bramble and willow. Not classified as 'Important' under the Hedgerow Regulations (1997)
H7	A 4m tall, species poor unmanaged hedgerow with taller oak and ash standards. Frequent gaps present. Species present included hawthorn, elder, bramble and white bryony. A ditch with common reed, nettles and hogweed was present along the base. Not classified as 'Important' under the Hedgerow Regulations (1997)
H8	Approximately 200m long running east-west. This is approximately 4m tall with one tall oak standard. Species present included hawthorn, elder, grey willow and white bryony. A dry ditch is present at the base of the hedgerow. Not classified as 'Important' under the Hedgerow Regulations (1997)
H9	A length of species-poor hedgerow approximately 140m long at the south western Order Limits. Comprising hawthorn, blackthorn, willow and elder with frequent gaps (although none were greater than 5m) and no sign of recent management. Several self-seeded shrubs present and a ditch at the base of the hedgerow. Not classified as 'Important' under the Hedgerow Regulations (1997)
H10	A 3-4m tall, overgrown, unmanaged and gappy hedgerow, approximately 160m in length and merging into the woodland at its southern base. Comprising hawthorn, elder, oak and field maple. A species-poor hedgerow. Ground flora present included nettle, hogweed, red campion, bramble and burdock Not classified as 'Important' under the Hedgerow Regulations (1997)
H11	An approximately 500m long species-rich hedgerow, overgrown and unmanaged with occasional gaps. Approximately 4-5m tall with taller oak and ash standards. Species present included oak, ash, hawthorn, elder and hazel. A mostly dry ditch was present along the western base, vegetated with nettles and bramble. Ground flora included nettle, common poppy, white campion, hogweed, bramble and burdock Classified as 'Important' under the Hedgerow Regulations (1997)

Hedgerow No.	Description
H12	A species-rich, unmanaged and gappy hedgerow. Approximately 4m-5m tall with one taller oak standard. Consisted of hazel, oak, elder, hawthorn, dog rose, larch, cypress and white bryony. Connected to woodland at the northern and southern base. A dry ditch is present at the eastern base of the hedgerow. Ground flora included nettle, hogweed, bramble and burdock Classified as 'Important' under the Hedgerow Regulations (1997)
H13	A 110m section of unmanaged, bushy hedgerow, dominated by 4m high hawthorn but also containing elder, hazel, and 4 taller poplar trees. A ditch fringed with tall ruderal species was present along the southern base of the hedgerow. Not classified as 'Important' under the Hedgerow Regulations (1997)
H14	A line of unmanaged, leggy trees and shrubs separated from the adjacent woodland to the north by a farm track. 5-15m tall, comprising ash, blackthorn and hawthorn. Not classified as 'Important' under the Hedgerow Regulations (1997)
H15	A tall line of species-rich trees either side of a ditch. Approximately 8-12m tall, comprising semi-mature alder *Alnus glutinosa*, grey willow, silver birch, sycamore, blackthorn, dog rose, elder, and hawthorn. Classified as 'Important' under the Hedgerow Regulations (1997)
H16	A row of planted sycamore around 10m tall, situated on top of an earth bank, with a dense bramble understorey. Not classified as 'Important' under the Hedgerow Regulations (1997)
H17	Remnant line of 2m high unmanaged hawthorn shrubs, approximately 20m long. Not classified as 'Important' under the Hedgerow Regulations (1997)
H18	A managed field boundary hedgerow topped at 1.5m.Dominated by hawthorn with occasional elder, blackthorn, ash and bramble. A farm track ran alongside the western edge of the hedgerow. Ground flora present included nettle, hogweed, red campion, and burdock. Not classified as 'Important' under the Hedgerow Regulations (1997)

Table 5: Description of Ponds

Pond No.	Description	Photographs (where available)
P1	Moderately large (900m^2) pond in the north west of the site, surrounded by marginal and emergent vegetation such as reed mace *Typha latifolia*, rushes, water lily *Nymphaea sp*, fool's-water-cress *Apium nodiflorum* and willowherb. A large, overhanging weeping willow was present on the eastern bankside. Small fish were observed, as were mallard *Anas platyrhynchos*, moorhen *Gallinula chloropus* and mute swan *Cygnus olor*.	 **Photograph 8: Pond P1 (June 2018)**
P2	Permanent pond in the north east of field F6, south of the existing farm track and surrounded by tilled arable land. A large overhanging horse chestnut tree on the northern bankside. Pond covered in duck weed *Lemna sp* and surrounded by willowherb and soft rush. Nesting moorhen present.	 **Photograph 9: Pond P2 (November 2019)**

Pond No.	Description	Photographs (where available)
P3	A relatively small pond (approximately 25m^2) at the northern edge of the Order Limits. Surface covered in duckweed, and banksides shaded by overhanging ash tree, hawthorn and elder bushes. Lacking in aquatic of marginal vegetation, and quite with dead and decaying matter. Almost dry in July 2017.	 **Photograph 10: Pond P3 (April 2018)**
P4	An ephemeral field pond in the north east of field F14, surrounded by tilled arable land. Covered in rush species and tall ruderals with a hawthorn shrub on the north eat bankside. Highly seasonal – the pond was dry in July 2017 although held shallow water (<20cm deep) in April 2018.	 **Photograph 11: Pond P4 (April 2018)**
P5	A pond with a shallow depression amongst an area of secondary woodland. Highly seasonal – this pond was dry in July 2017 but held shallow (~20cm deep) water in April 2018 and November 2019. Completely overshaded by surrounding woodland and lacking in aquatic vegetation. Heavily silted with dead leaves.	 **Photograph 12: Pond P5 (November 2019)**

Pond No.	Description	Photographs (where available)
P6	A large pond on the edge of arable fields and woodland was located 330m south of the application area. Water quality within the pond was noted to be good and a fringe of marginal and emergent vegetation was noted along edges of the pond which were not overshaded by trees.	 **Photograph 11: Pond P6 (May 2019)**

7 ARABLE PLANTS SURVEY

7.1.1 Table 6 below provides a summary description of the habit within each of the arable plant survey target zones, shown in Figure 6. Table 7 demonstrates the relative abundance of plant species (excluding crops) in each zone using the DAFOR criteria.

Table 6: General Description of Arable Plants Survey Target Zones

Arable Plant Zone	General description
Zone AW1	Dead maize uncropped from last year. 60 – 120cm high in rows. Sparsely vegetated by crop, in typical rows. A very sandy soil.
Zone AW2	Dense oil seed rape 70cm. A thin 2-5m band of weed species, dominated by common poppy.
Zone AW3	Dense oil seed rape 70cm. A thin 2-5m band of weed species, dominated by common poppy.
Zone AW4	Dense oil seed rape 70cm. A 4-6m band of weed species, dominated by common poppy.
Zone AW5	Dense oil seed rape 70cm. Both the West and East sides of track. Dominated by borage.. Further less-dense patches of borage spreading to the west.
Zone AW6	Dense oil seed rape 70cm. A thin 2-5m band of weed species, dominated by borage.
Zone AW7	Dense oil seed rape 70cm. A thin 2-5m band of weed species, dominated by common poppy.

Table 7: Relative Abundance (DAFOR*) of Arable Plant Species in Each Target Zone

Common Name	Latin Name	Zone AW1	Zone AW2	Zone AW3	Zone AW4	Zone AW5	Zone AW6	Zone AW7
Common poppy	*Papaver rhoeas*		D	A	O	O	F	
Fool's parsley	*Aethusa cynapium*		O	O		R	O	
Borage	*Borago officinalis*			R		D	O	
Black grass	*Alopecurus myosuroides*			R		D	A	
Bugloss	*Anchusa officinalis*		F	A		R	R	
White campion	*Silene latifolia*	O	O	R	O		R	O
Stinging nettle	*Urtica dioica*			R	R		R	
Scentless mayweed	*Tripleurospermum inodorum*		R					R
Goats-beard	*Tragopogon pratensis*		R		R			
Wall barley	*Hordeum murinum*		F					
Wild pansy	*Viola tricolor*		R	A	O			
Cut-leaved geranium	*Geranium dissectum*	R	F					
Rayless mayweed	*Matricaria matricarioides*		O	O	R			R
Shepherd's-purse	*Capsella bursa-pastoris*		O				O	R

Fat hen	*Chenopodium album*		R		O		R	R
Henbane	*Hyoscyamus niger*	O						
Groundsel	*Senecio vulgaris*	O						R
Vipers bugloss (margin only)	*Echium vulgare*	R						
Wild mignonette	*Reseda lutea*	O						
Prickly sow-thistle	*Sonchus asper*	R						
Creeping thistle	*Cirsium arvense*	R						
Toad rush	*Juncus bufonius*	R						
Annual nettle	*Urtica urens*	O			R			R

***DAFOR scale = D – Dominant, A – Abundant, F – Frequent, O – Occasional, R – Rare**

7.2 Important Arable Plant Area Assessment

7.2.1 Of the above arable plant species recorded only two species are listed by plantlife in the Important Plant Areas guide. These are Henbane which is recorded as being Threatened (and therefore a score of 7) and Wild Pansy which is recorded as being Near Threatened (and therefore a score of 6). None of the other species recorded in the survey area are included within the plantlife listing which is drawn up from PLANTATT: Attributes of British and Irish Plants[17].

7.2.2 This gives a total score for the overall Order Limits of 13. The provisional criteria for threshold scores for assessing the conservation importance of arable plant sites indicates that for sands and freely draining acidic soils, such as are found on site the threshold, is 20-34 points for a site of County Importance; 35-69 points for a site of National Importance and 70+ for a site of European importance. Therefore based upon this scoring method the Order Limits should not be considered of County importance or above. The threshold scores defined by Plantlife do not ascribe scores for levels of importance below County.

7.2.3 Nevertheless, the presence of one nationally threatened species and one near threatened species means the site does support some important

[17] Hill, M.O., Preston, C.D. & Roy, D.B. (2004). PLANTATT:Attributes of British and Irish Plants. NERC Centre for Ecology and Hydrology, Monks Wood

arable weed species and therefore should be treated as important within the impact assessment.

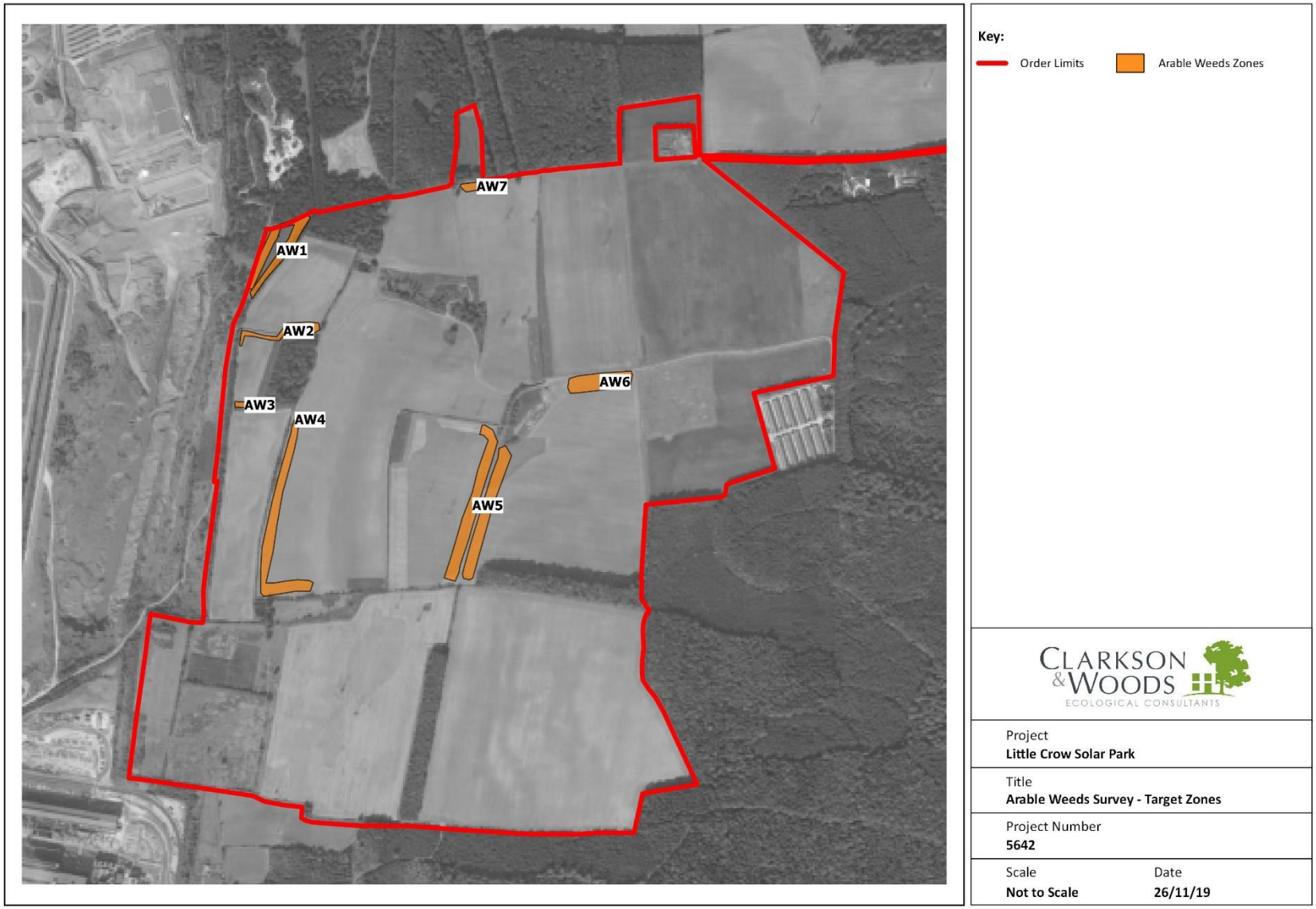


Figure 6: Arable Plants Target Survey Zones

8 GREAT CRESTED NEWT SURVEY

8.1 Habitat Suitability Index

8.1.1 The calculation for HSI scores for each Pond is provided in Table 8:

Table 8: HSI Scoring Calculations for Each Pond

Habitat Suitability Index Criteria (for full details, see Oldham et al. 2000)	Score					
	P1	P2	P3	P4	P5	P6
1. Location (Zone A, 1; Zone B, 0.5; Zone C, 0.01	1	1	1	1	1	1
2. Pond Area (Estimated, and score extrapolated from graph	0.95	0.5	0.1	0.25	0.6	0.9
3. Pond Drying (Never, 0.9; Rarely, 1.0; Sometimes, 0.5; Annually, 0.1;	0.9	1	0.5	0.1	0.1	0.9
4. Water Quality (Good, 1.0; Moderate, 0.67; Poor, 0.33; Bad, 0.01)	0.67	0.33	0.33	0.33	0.33	1
5. Shading (Estimated % perimeter shaded, score extrapolated from Graph	1	0.8	0.4	1	0.2	1
6. Fowl (Absent, 1; Minor 0.67, Major 0.01)	0.67	0.67	1	1	1	0.67
7. Fish (Absent, 1; Possible 0.67, Minor 0.33, Major 0.01)	0.33	1	1	1	1	1
8. Ponds Number of ponds within 1km score extrapolated from Graph	0.8	0.8	0.75	0.75	0.75	0.9
9. Terrestrial Habitat (Good, 1; Moderate, 0.67; Poor, 0.33; None, 0.01)	1	0.33	0.67	0.33	0.67	1
10. Macrophytes (Estimated % of pond with macrophytes,) score extrapolated from Graph	0.6	0.8	0.5	0.3	0.6	0.65
Totals (S1xS2xS3xS4xS5xS6xS7xS8xS9xS10)1/10	0.76	0.67	0.53	0.48	0.51	0.89
Categorisation of HSI Score	**Good**	**Average**	**Below Average**	**Poor**	**Below Average**	**Excellent**

8.2 eDNA Survey Results

8.2.1 The results of the eDNA Analysis lab report for the water samples taken from the ponds on 23rd April 2018 are replicated in Table 9 below:

Table 9: Lab Report for pond samples collected on 23/04/18 and Analysed by ADAS UK.

Pond Number	Sample Ref.	Determinant	Result	Method	Date of Analysis
P1	2018-0728	Inhibition Control	2 of 2	Real Time PCR	08/05/18
		Degradation Control	Evidence of degradation or residual inhibition		
		Great Crested Newt	Indeterminate		
		Negative PCR Control (Nuclease Free Water)	0 of 4		
		Positive PCR Control (GCN DNA 10^{-4} ng/µL)	4 of 4		
P2	2018-0730	Inhibition Control	2 of 2	Real Time PCR	08/05/18
		Degradation Control	Evidence of degradation or residual inhibition		
		Great Crested Newt	Indeterminate		
		Negative PCR Control (Nuclease Free Water)	0 of 4		
		Positive PCR Control (GCN DNA 10^{-4} ng/µL)	4 of 4		
P3	2018-0729	Inhibition Control	2 of 2	Real Time PCR	15/05/18
		Degradation Control	Within Limits		
		Great Crested Newt	0 of 12 (GCN Negative)		
		Negative PCR Control (Nuclease Free Water)	0 of 4		
		Positive PCR Control (GCN DNA 10^{-4} ng/µL)	4 of 4		
P4	2018-0189	Inhibition Control	0 of 2	Real Time PCR	08/05/18
		Degradation Control	Within Limits		
		Great Crested Newt	0 of 12 (GCN Negative)		
		Negative PCR Control (Nuclease Free Water)	0 of 4		
		Positive PCR Control (GCN DNA 10^{-4} ng/µL)	4 of 4		
P5	2018-0727	Inhibition Control	2 of 2	Real Time PCR	03/05/18
		Degradation Control	Within Limits		
		Great Crested Newt	0 of 12 (GCN Negative)		
		Negative PCR Control (Nuclease Free Water)	0 of 4		

		Positive PCR Control (GCN DNA 10^{-4} ng/µL)	4 of 4		
P6	2019-0701	Inhibition Control	2 of 2	Real Time PCR	04/06/19
		Degradation Control	Within Limits		
		Great Crested Newt	12 of 12 (GCN Positive)		
		Negative PCR Control (Nuclease Free Water)	0 of 4		
		Positive PCR Control (GCN DNA 10^{-4} ng/µL)	4 of 4		

8.2.2 As Indeterminate results were obtained for Ponds P1 and P2 these were subsequently re-tested, with samples collected on 19th June 2018. The lab results are replicated in Table 10.

Table 10: Lab Report for pond samples collected on 19/06/18 and Analysed by SureScreen Scientifics.

Pond Location (Grid Ref.)	Sample Ref.	Sample Integrity Check	Degradation Check	Inhibition Check	GCN Detection	Positive Replicates
P1	2880	Pass	Pass	Pass	Negative	0
P2	2881	Pass	Pass	Pass	Negative	0

9 WATER VOLE SURVEY

9.1.1 Table 11 below provides a summary description of each of the ditches subject to a detailed water vole survey, together with an overview of the findings. A map showing the location of ditches surveyed is provide in Figure 7.

Table 11: General Description and Findings of Water Vole Survey

Ditch No.	General Description & Findings
Ditch 1	A 4m wide ditch overshaded by tall trees on either bank. Holding shallow (<0.5m deep) standing water. With shallow earth banks, partly covered with dense bramble scrub in areas. Several rat droppings present, as well as a small number of mammal burrows which were attributed to rats. No water voles signs found.
Ditch 2	A stream at the base of a steep, wooded valley. Channel 1-2m wide, holding fast flowing water (<0.5m deep) flowing north-south. Completely overshaded be woodland trees, with very little emergent/marginal vegetation. A small number of rat droppings and mammal burrows (attributed to rats) were scattered along both banksides. A mustelid scat consisted with weasel *Mustela nivalis* was noted on a log half way along the stream. No water voles signs found.
Ditch 3	A watercourse comprising a shallow, wet flush at the eastern end which is 0.5m wide and holds shallow (<0.1m) water flowing east-west. The watercourse then enters a wooded area, where the banks and channel become deeper and steeper towards the western end, where the stream flows into Ditch 2. The eastern part is relatively open with tall ruderals and scattered scrub along the banks, with the western part being overshaded by the tall woodland and hedgerow adjacent. A number of rat droppings and burrows were noted, which were concentrated at the western end of the ditch. No water voles signs found.
Ditch 4	A dry ditch with shallow banksides (1m deep) and narrow channel (<1m wide), vegetated with trees, shrubs and tall ruderals. A small number of rat droppings and prints were noted at the northern end of the ditch. No water voles signs found.
Ditch 5	A dry ditch at the connected to Ditch 4 at its western end. With shallow banksides (1m deep) and narrow channel (<1m wide), vegetated with trees, shrubs and tall ruderals. Overshaded by adjacent vegetation. No water voles signs found.
Ditch 6	A predominantly dry ditch, although some small pools of water occasionally present. Approximately 1m wide with steep banksides 0.5m – 1m deep. Banksides vegetated with trees, shrubs, ruderals and grasses. Rats seen, and rat droppings, burrows and prints noted along the ditch. No water voles signs found.
Ditch 7	The northern section of this ditch comprised a shallow (<0.5m deep), 0.5m wide dry ditch on the eastern side of a hedgerow. The ditch was choked with ruderal vegetation. At the southern end, the ditch lay on the western side of the hedgerows and was deeper (1.5m deep) holding shallow (<5cm deep) water. Rats seen, and rat droppings noted on a foot crossing spanning the ditch. No water voles signs found.
Ditch 8	A dry ditch approximately 1m wide with 2m deep, steep banks. Banksides covered in grasses, with the channel habitat choked by bramble and nettle. No evidence of mammals noted.
Ditch 9	A 1m wide ditch with moderately steep, 2m deep banksides. Vegetated with dense ruderals and stands of bramble. A small number of rat droppings were noted, although much of this ditch was inaccessible. No water voles signs found.
Ditch 10	A 1m wide ditch along the woodland edge, with 2m deep, steep banks. Holding shallow (<10cm deep) water flowing east to west. Largely overshaded by adjacent woodland within very little bankside or in-channel vegetation. A number of rat droppings, burrows and prints were recorded along the length of the ditch. No water voles signs found.

Ditch 11	A watercourse with 1.5m deep shallow banks, 2m wide. Holdings shallow water (~5cm deep) flower quickly east to west. Southern bankside vegetated with tall ruderals, with a hedgerow present along the northern banks. Some submerged weed present (fool's-water-cress). A small number of rat and fox *Vulpes vulpes* prints present at the southern end, with occasional rat burrows noted along the northern bankside. No water voles signs found.

9.1.2 No field signs evidencing the presence of water voles were noted during the surveys. A high density of rat fields signs were noted within the ditch network. Overall, given the absence of evidence encountered during detailed surveys undertaken for water voles, it is considered that this species are likely to be absent from the site.

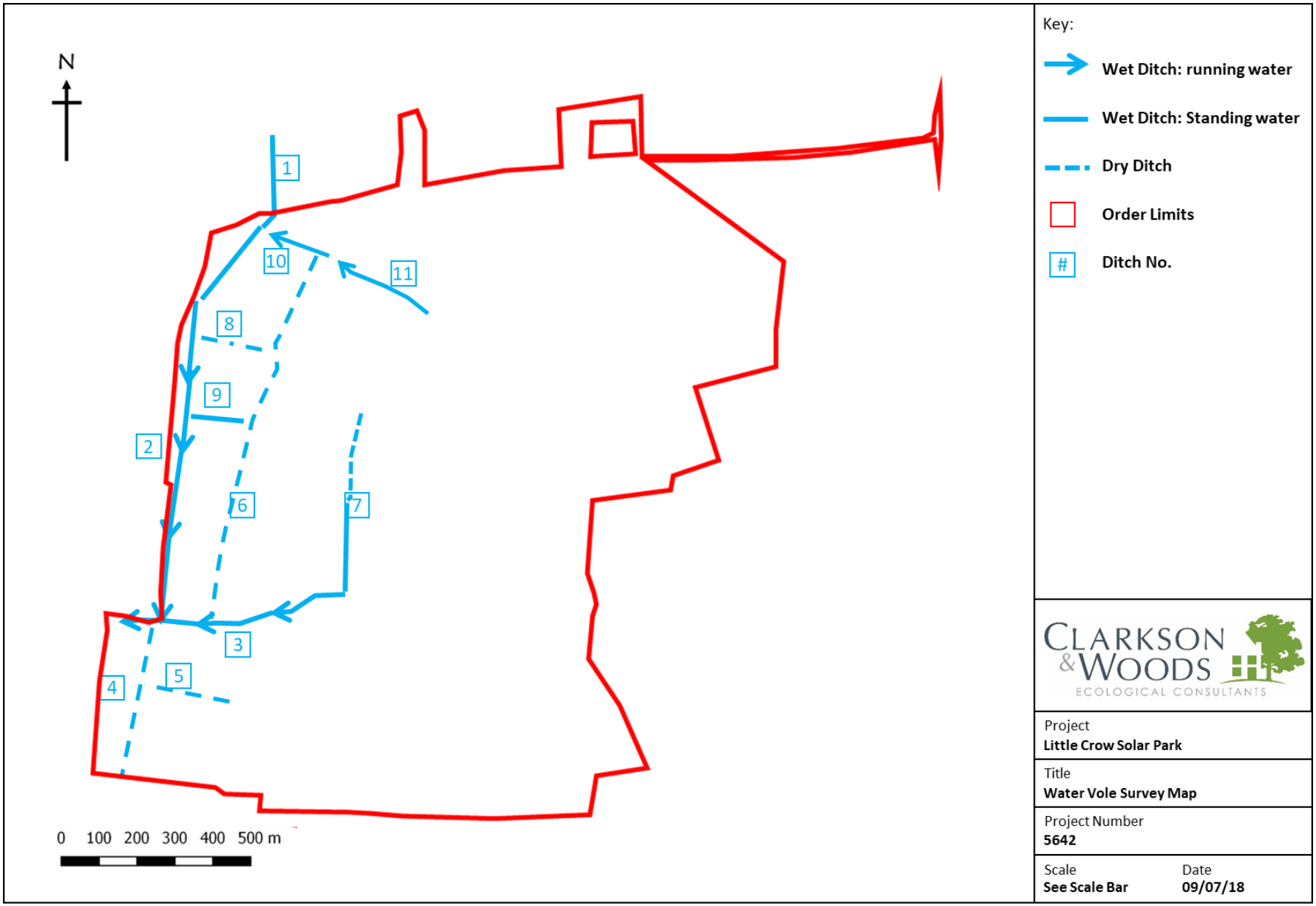


Figure 7: Map of Ditches Subject to Detailed Survey for Water Voles

10 SUMMARY

10.1.1 The survey revealed a mosaic of habitats within the Order Limits:

- Arable
- Semi-improved grassland
- Poor semi-improved grassland
- Plantation woodland – broadleaved, coniferous and mixed
- Semi-natural broadleaved woodland
- Hedgerows
- Tall ruderal
- Scrub
- Ponds
- Ditches

10.1.2 Whilst many of the habitat types present are common within the local landscape, the site is generally considered to be of relatively moderate ecological importance due to the substantial area of land within the Order Limits which support a 'mosaic' of habitat types, as well as the site's connectivity to other features of ecological value in the wider landscape.

10.1.3 The presence of several notable species were also confirmed or assumed:

- Badger (confirmed)
- Bats (see separate report)
- Birds (see separate report)
- Reptiles (assumed)
- Great Crested Newt (confirmed – off-site)
- Common toad (assumed)
- Arable Plant species, most notably henbane (confirmed)

10.1.4 Detailed surveys for water voles have identified these species as likely to be absent from the site. Surveys for great crested newts indicate that the ponds on site do not currently support this species but a population of newts is present approximately 330m to the south of the application boundary.

- **Glossary and Acronyms**

Term / Acronym	Description
Amber Listed (Birds)	Bird species whose population or range has declined moderately in recent years (>25% but <50% in 25 years) declined historically but recovered recently, rare breeders (fewer than 300 pairs), internationally important populations in the UK, localised populations and those with an unfavourable conservation status in Europe.
Annexe Sett	Badger sett that occurs in close association with the main sett, and is linked to the main sett by clear, well-used paths
Assemblage	A group of species found in the same location
BCT	Bat Conservation Trust – British charity dedicated to the conservation of bats and their habitats in the UK
Biodiversity	The variety of life on earth, measurable as the variety within species, and the variety of ecosystems
BS	British Standard - standards produced by British Standards Institution Group
BTO	British Trust for Ornithology – an organisation for the study of birds in the British Isles.
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management – professional body for ecology and environmental practitioners
County Wildlife Site	Non statutory conservation sites for wildlife designated at the county level.
CWS	County Wildlife Site
Defra	Department for Environment, Food and Rural Affairs – Government department responsible for policy and regulations on environmental, food, and rural issues
EA	Environment Agency – An executive non departmental government body working with responsibilities to protect and improve the environment, including flood risk management
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
Ecological Impact Assessment	EcIA is a process of identifying, quantifying and evaluating potential effects of development related or other proposed actions on habitats, species and

Term / Acronym	Description
	ecosystems. The findings of an assessment can help competent authorities understand ecological issues when determining applications for consent. EcIA can be used for the appraisal of projects of any scale including the ecological component of Environmental Impact Assessment (EIA). When undertaken as part of an EIA, EcIA is subject to the relevant EIA Regulations. Unlike EIA, EcIA on its own is not a statutory requirement.
Ecological Feature	Habitats, species or ecosystems
eDNA	Environmental DNA - DNA that is collected from a variety of environmental samples such as soil, water etc. rather than directly sampled from an individual organism.
Environmental Impact Assessment	Process for identifying the likely significance of environmental effects (beneficial or adverse) arising from a Proposed Development, by comparing the existing environmental conditions prior to development (the baseline) with the environmental conditions during/following the construction, operational and decommissioning phases of a development should it proceed.
Environmental Statement	Document setting out the findings of an Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
European Protected Species	Species that are identified by the EU Habitats Directive as the most seriously threatened in Europe, and include bats, great crested newts and otters
Extended Phase 1 Habitat Survey	A more detailed version of the phase 1 survey (see 'Phase 1 Habitat Survey', where additional information is collected, such as more details on hedgerows and the potential for protected species to be present.
Fragmentation	The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function
Greater Lincolnshire Nature Partnership	Government accredited Local Nature Partnership, comprising a broad range of local organisations who

Term / Acronym	Description
	aim to bring about improvements in the natural environment in the Greater Lincolnshire Area.
Habitat Suitability Index	A scoring system for evaluating habitat quality for specific species
Hedgerow Regulations	Government legislation in England and Wales, created to protect hedgerows, in particular those in the countryside aged 30 years or older
HPI	Habitat of Principal Importance – see 'Priority Habitats'
HSI	Habitat Suitability Index
JNCC	Joint Nature Conservation Committee - public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation
LBAP	Local Biodiversity Action Plan - a plan aimed at conserving the fauna, flora and habitats of a defined area, usually along local authority boundary lines
LEMP	Landscape and Ecological Management Plan
LERC	Lincolnshire Environmental Records Centre – Where wildlife and geological information and documents are kept pertaining to the Greater Lincolnshire area.
Local Planning Authority	The Council (County, Borough or District) that is empowered by law to exercise statutory town planning functions for a particular area (administrative boundary) of the UK
Local Wildlife Site	A non statutory designation of local / county importance. In Lincolnshire, these area selected by the Greater Lincolnshire Nature Partnership.
LPA	Local Planning Authority
LWS	Local Wildlife Site
MAGIC	'Multi Agency Geographic Information for the Countryside' website – Government sponsored website containing environmental data from several public bodies including Natural England, the Environment Agency, English Heritage, Forestry Commission, Marine Management Organisation and the Department for Environment, Food and Rural Affairs

Term / Acronym	Description
Main Sett	Typically large structures which constitute the principal shelter and breeding location for a single social group of badgers
Mammal Society	British charity devoted to the research and conservation of British mammals
National Biodiversity Network	Body set up to oversee and facilitate the collection of biological data and information from across the UK into manageable and accessible databases
National Planning Policy Framework	Document setting out the Government's planning policies for England and instruction on how they are expected to be applied
NBN	National Biodiversity Network
NERC Act 2006	Natural Environment and Rural Communities Act 2006 - Act of Parliament to make provision concerned with the natural environment and rural communities (e.g. Natural England)
NPPF	National Planning Policy Framework
OS	Ordnance Survey – Mapping agency
Outlying Sett	Badger sett located away from other setts and usually comprise no more than two, infrequently used sett entrances.
PAWS	Plantation on Ancient Woodland Site
PEA	Preliminary Ecological Appraisal
Phase 1 Habitat Survey	A field survey technique widely used across the UK. Provides a relatively rapid system to record semi-natural vegetation and other wildlife habitats. Each habitat type/feature is defined by way of a brief description and is allocated a specific name, an alpha-numeric code, and unique mapping colour.
Plantation on Ancient Woodland	Woodland sites which contain evidence of former ancient woodland, or for which there is recorded evidence of former ancient woodland, and which have subsequently been planted with coniferous or broadleaved trees
Plantlife	A British wild plant conservation charity
Preliminary Ecological Appraisal	A rapid assessment of the ecological features present, or potentially present, within a site and its surrounding area.

Term / Acronym	Description
Priority Habitats	Habitats that are of principal importance for conservation in the UK (arising from the Section 41 list of the Natural Environment and Rural Communities Act 2006)
Priority Species	Species that are of principal importance for conservation in the UK (arising from the Section 42 list of the Natural Environment and Rural Communities Act 2006)
Red Listed (Birds)	Bird species that are globally threatened, whose population or range has declined rapidly in recent years (i.e. >50% in 25 years), or which have declined historically and not recovered.
RSPB	Royal Society for the Protection of Birds - mote conservation and protection of birds and the wider environment
SAC	Special Area of Conservation
Site of Nature Conservation Interest	A non-statutory designation of local / county importance. In Lincolnshire, the status of SNCIs have been superseded by Local Wildlife Sites but sites retain their SNCI Status until the have been assessed against the LWS criteria by the Greater Lincolnshire Nature Partnership.
Site of Special Scientific Interest	A statutory conservation designation denoting a protected area in the United Kingdom
SNCI	Site of Nature Conservation Interest
SNCO	Statutory Nature Conservation Organisation – in England this is Natural England.
SPA	Special Protection Area
SPI	Species of Principal Importance – see 'Priority Species'
Special Area of Conservation	Sites protected under the European 'Habitats Directive' to protect internationally important natural habitats and species.
Special Protection Area	Sites protected under the European 'Birds Directive' for rare and vulnerable birds and for regularly occurring migratory species
SSSI	Site of Special Scientific Interest - conservation designation denoting a protected area in the United Kingdom

Term / Acronym	Description
Subsidiary Sett	Considerable badger setts which receive regular or sporadic usage but are not the focal sett for a social group
UK BAP	United Kingdom Biodiversity Action Plan –the UK government's response to the Convention on Biological diversity. It brought about a series of created action plans for species and habitats in the UK that were most under threat so as to support their recovery. Succeeded by the 'UK Post-2010 Biodiversity Framework' in 2012
UK Post 2010 Biodiversity Framework	A framework of priorities for UK-level work for the Convention on Biological Diversity