5 EXTENDED PHASE 1 SURVEY

5.1.1 The site 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 site, where a number of ditches and ponds are present. The results of the ecological survey are shown on Figure 4 at the end of this section

5.2 Habitats

Arable

Arable fields

5.2.1 This was the most frequently encountered habitat at the site, 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.

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 *Reseda lutea* 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 site. Photo taken form Field F4, looking east.

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

5.2.4 Uncultivated strips of grassland 2-6m wide were present on either side of farm tracks running though the site and at some headlands around arable fields, particularly in the north east of the site. 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' blugloss *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 at the site 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 on the site, henbane, which was recorded in Field F8 in the north western corner of the site, is classified as Vulnerable on the vascular plant Red Data Book for Great Britain[14]. 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 site were dominated by rank grasses and herbs, particularly false-oat grass, 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-establishing and was not considered to offer elevated ecological compared to habitats within the wider landscape.

[14] 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.

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 site. This photo shows Field F12.

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

Improved Grassland

5.2.9 A block of mown improved grassland measuring approximately 3.5ha and dominated by cock's foot was present in the north west of Field F2.

Semi-natural Broad-leaved Woodland

5.2.10 Much of the site 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*.

5.2.11 An area of this habitat measuring 0.25ha was also present at the junction of three hedgerows in the south west of the site, 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

5.2.12 Much of the woodland beyond the northern and south eastern boundary of the site 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.

5.2.13 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 *Populus* sp.; silver birch; and sycamore *Acer pseudoplanatus*. 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 site boundary, including species such as bramble *Rubus fruticosus*; ivy *Hedera helix*; wood avens; lords-and-ladies *Arum maculatum*; and nettle.

5.2.14 Much of this habitat at the site boundaries 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

5.2.15 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 site, 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.

5.2.16 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.

5.2.17 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

5.2.18 An area of woodland comprising entirely of planted larch was present beyond the southern boundary of the site. 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 at the site.

Scrub

5.2.19 Areas of dense, unmanaged scrub were occasionally encountered in the centre of the site, as well as more frequently along the western site boundary. 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

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

5.2.21 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.

5.2.22 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

5.2.23 Five ponds were present within the survey area. These are labelled in Figure 4 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.

5.2.24 Two further ponds were noted off-site but within 500m, situated approximately 100m west and 330m south respectively. These have not been surveyed at the time of writing due to a lack of permissible access.

Scattered Broadleaved Trees

5.2.25 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.

Tall Ruderal

5.2.26 Discrete parts of the site 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

5.2.27 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

5.2.28 A ditch running along the western site boundary 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 site boundary, eventually into a former opencast workings to the west of the site.

5.2.29 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

5.3.1 The data search revealed several records of badger setts in the local area. A total of four badger setts were discovered within or adjacent to the site as well as field signs such as latrines, snuffle holes, hairs and mammal paths.

5.3.2 The location of setts are provided in Figure 3, and each sett is described within Table 3.

5.3.3 The arable fields, grassland and woodland habitats within the site are likely to represent key foraging grounds for local group(s) of badgers present.

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[15]. 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)

Otter

5.3.7 The data search did not reveal any recent (post-2000) records of otter within 2km. The ditches on site 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 at the site.

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 site 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

[15] 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.

which 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 at the site 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.

Reptiles

5.3.12 No recent records of reptiles within the locality of the site were revealed by the data search.

5.3.13 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

5.3.14 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

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

5.3.16 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 on site are also likely to support a range of aquatic invertebrates. However, assemblages of invertebrates supported by the arable field comprising the majority of the site are likely to be poor, particularly for pollinating species.

Other Protected Species, Species of Conservation Concern and Invasive Species

5.3.17 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.

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

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	Badger latrine pit
TN8	One entrance Outlying badger sett approximately 8m south of woodland edge. Active, with fresh spoil heap, footprints and guard hairs. Tunnel leading north.
TN9	Brick structure in disrepair within scrub area.
TN10	Badger sett within the northern ditch bank amongst hawthorn scrub. One well-used entrance, three partially-used entrances and 2 disused entrances. Considered to represent a Subsidiary sett
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	Badger sett in raised bund. Comprising at least eleven entrances, of which four were well-used, five were partially-used, and two were disused. Fresh latrines, bedding, spoil and guard hairs present. Lots of paths leading into impenetrable bramble scrub. Considered to represent a Main sett
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	Badger sett comprising one disused entrance running underneath hedgerow. Outlying sett.
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, Several self-seeded sycamore, ash and blackthorn trees scattered around the edges

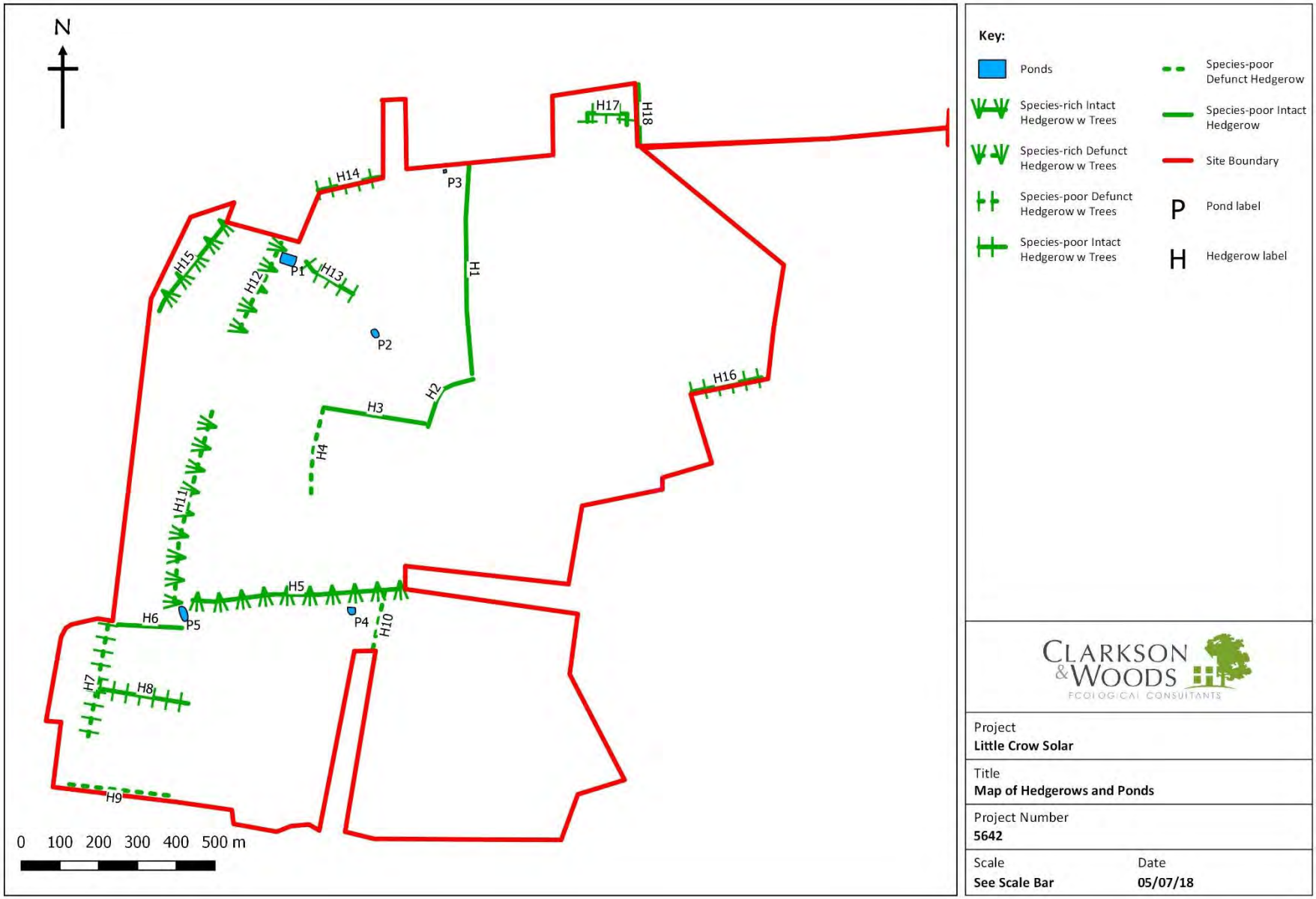

Figure 4: Map of Hedgerows and Ponds within Survey Area

Table 4: Descriptions of Hedgerows

Hedgerow No.	Description
H1	This hedgerow was approximately 525m in length and consisted primarily of hawthorn *Cretaegus monogyna*, with occasional elder *Sambucus nigra* and 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 although no gaps measured more than 5m in length. This hedgerow was species-poor. Ground flora present included nettle, hogweed, red campion, bramble and burdock.
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*.
H3	A species-poor, intact 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.
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. Ground flora included nettle, mugwort, hogweed, cleavers, soft brome and bracken.
H5	A largely intact, species-rich hedgerow, 530m in length and approximately 4-5m tall with taller standards. 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.
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.
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.
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.
H9	A length of species-poor hedgerow approximately 140m long at the south western site boundary. Comprising hawthorn, blackthorn, willow and elder with frequent gaps and no sign of recent management. Several self-seeded shrubs present and a ditch at the base of the hedgerow.
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, sycamore and fleid maple. A species-poor hedgerow. Ground flora present included nettle, hogweed, red campion, bramble and burdock
H11	An approximately 500m long species-rich hedgerow, overgrown and unmanaged with frequent 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
H12	A species-rich, unmanaged and gappy hedgerow. Approximately 4m 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
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.
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.
H15	A tall line of species-rich trees either site of a ditch. Approximately 8-12m tall, comprising semi-mature alder *Alnus glutinosa*, grey willow, silver birch, sycamore, blackthorn, dog rose, and hawthorn,
H16	A row of planted sycamore around 10m tall, situated on top of an earth bank.

Hedgerow No.	Description
H17	Line of unmanaged sycamore trees reaching to 12 screening former oil well, surrounded by self-seeded young sycamore, ash and blackthorn scrub.
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.

Table 5: Description of Ponds

Pond No.	Description	Photographs (where available)
P1	Moderately large (900m²) 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
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.	*None Available*
P3	A relatively small pond (approximately 25m²) at the northern edge of the site. 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 9: Pond P3

Pond No.	Description	Photographs (where available)
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 10: Pond P4
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. Completely overshaded by surrounding woodland and lacking in aquatic vegetation. Heavily silted with dead leaves.	*None Available*

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 5. 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 on site are included within the plantlife listing which is drawn up from PLANTATT: Attributes of British and Irish Plants[16].

7.2.2 This gives a total score for the overall site 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 site 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 arable weed species and therefore should be treated as important within the impact assessment.

[16] 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

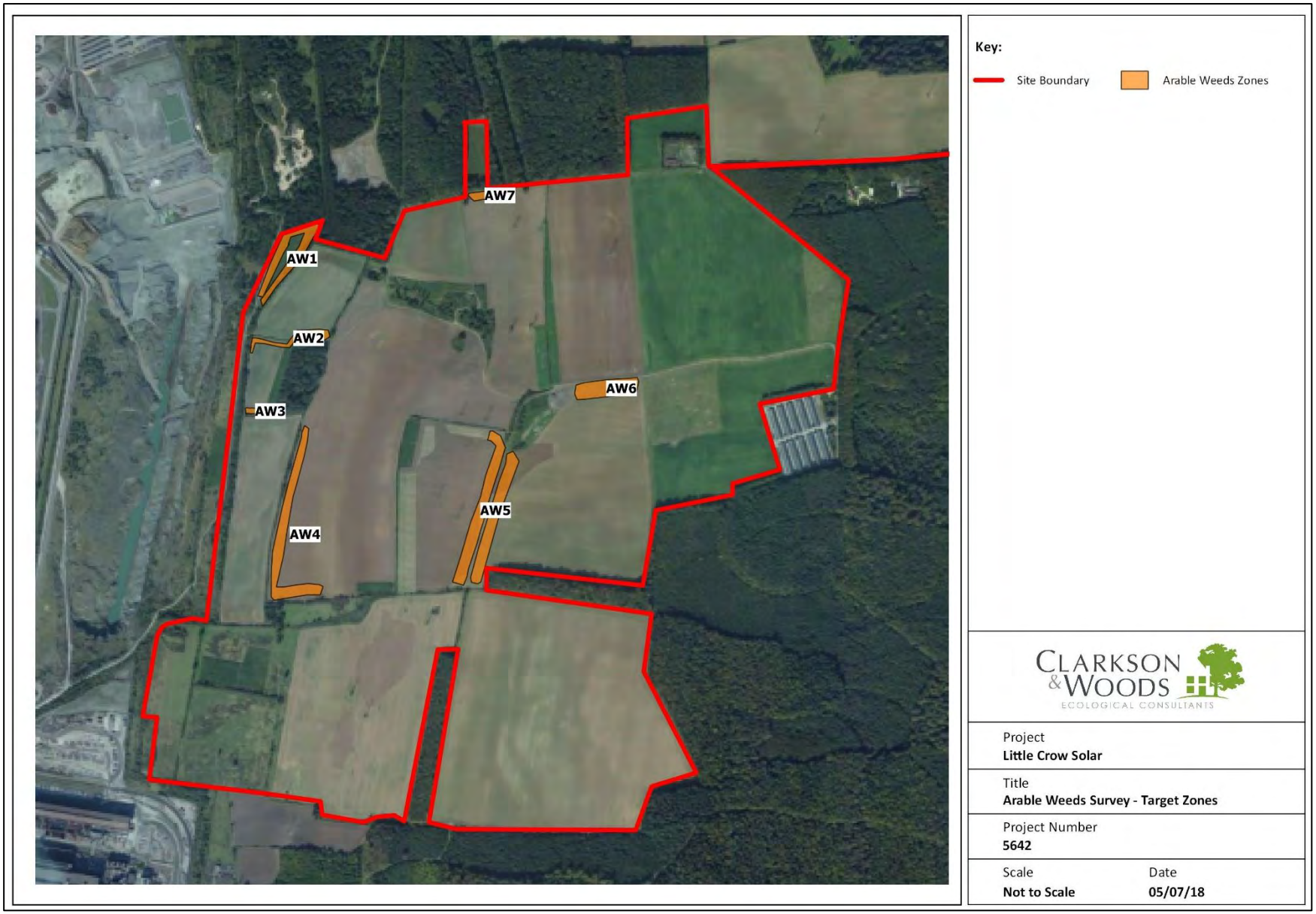

Figure 5: Arable Plants Target Survey Zones

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
1. Location (Zone A, 1; Zone B, 0.5; Zone C, 0.01	1	1	1	1	1
2. Pond Area (Estimated, and score extrapolated from graph	0.95	0.5	0.1	0.25	0.6
3. Pond Drying (Never, 0.9; Rarely, 1.0; Sometimes, 0.5; Annually, 0.1;	0.9	1	0.5	0.1	0.1
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
5. Shading (Estimated % perimeter shaded, score extrapolated from Graph	1	0.8	0.4	1	0.2
6. Fowl (Absent, 1; Minor 0.67, Major 0.01)	0.67	0.67	1	1	1
7. Fish (Absent, 1; Possible 0.67, Minor 0.33, Major 0.01)	0.33	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
9. Terrestrial Habitat (Good, 1; Moderate, 0.67; Poor, 0.33; None, 0.01)	1	0.33	0.67	0.33	0.67
10. Macrophytes (Estimated % of pond with macrophytes,) score extrapolated from Graph	0.6	0.8	0.5	0.3	0.6
Totals (S1xS2xS3xS4xS5xS6xS7xS8xS9xS10)1/10	0.76	0.67	0.53	0.48	0.51
Categorisation of HSI Score	Good	Average	Below Average	Poor	Below Average

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		

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 6.

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.
onDitch 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.

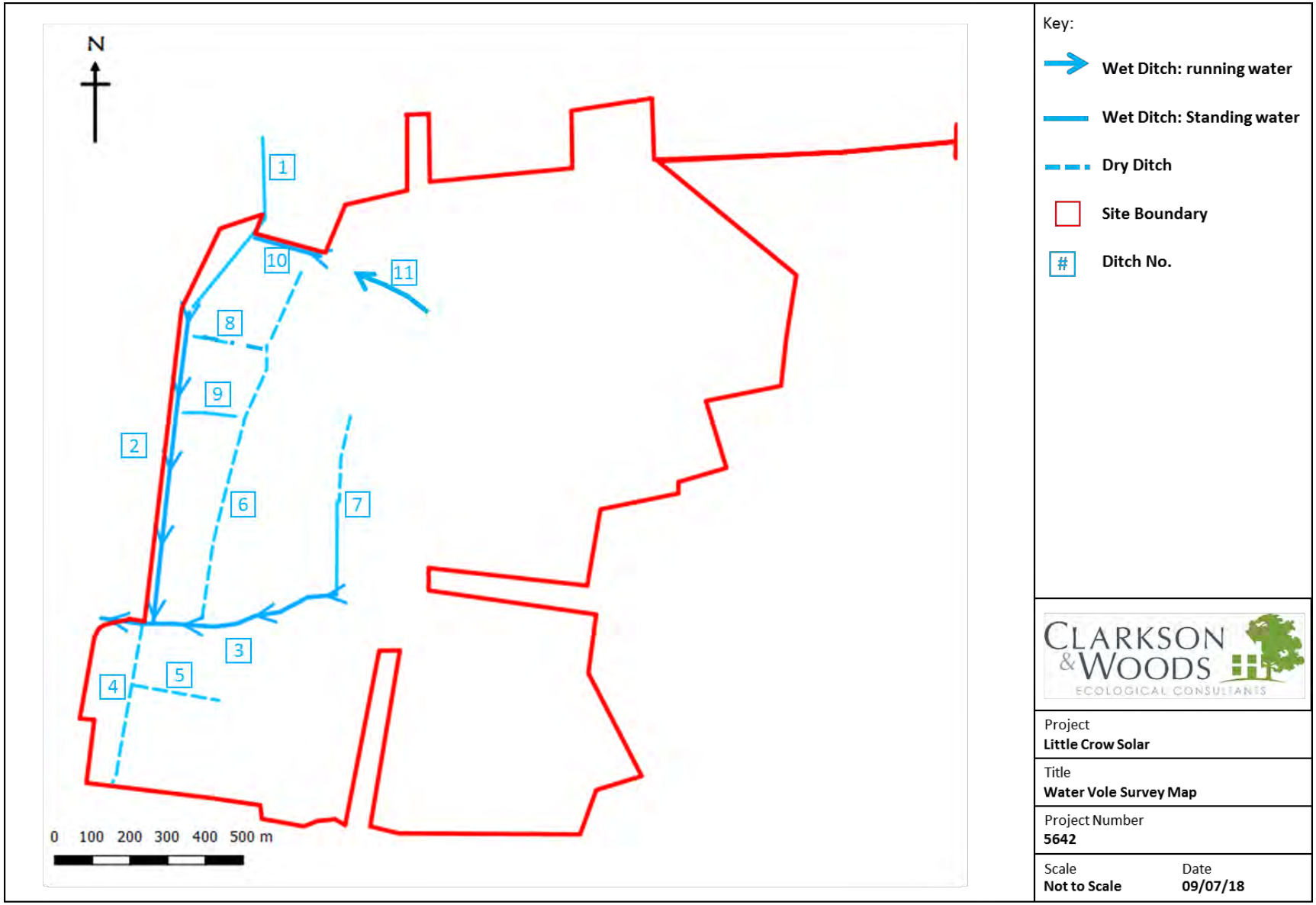

Figure 6: Map of Ditches Subject to Detailed Survey for Water Voles

10 SUMMARY

10.1.1 The survey revealed a mosaic of habitats within the site:

- Arable
- Semi-improved grassland
- Poor semi-improved grassland
- 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 site 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)
- Common toad (assumed)
- Arable Plant species, most notably henbane (confirmed)

10.1.4 Detailed surveys for great crested newts and water voles have identified these species as likely to be absent from the site.

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CLARKSON & WOODS

Technical Appendix 7.2

WINTERING BIRDS SURVEY

Little Crow
Solar Park

National significant infrastructure project in the Energy Sector

Little Crow Solar Park, Scunthorpe

WINTERING BIRD SURVEY

On behalf of INRG Solar (Little Crow) Ltd

November 2018

WINTERING BIRD SURVEY

LITTLE CROW SOLAR FARM, SCUNTHORPE

carried out by

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

commissioned by

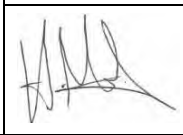
INRG SOLAR (LITTLE CROW) LTD

V2 NOVEMBER 2018

WINTERING BIRD SURVEY

LITTLE CROW SOLAR FARM, SCUNTHORPE

CONTENTS

Project title	Little Crow Solar Farm, Scunthorpe			
Project number	5642			
Document title	Wintering Bird Survey			
Client	INRG Solar (Little Crow) Ltd			
Authors	Michael Hockey Peter Timms			
Status	Checked by	Date	Approved for C&W by	Date
V1	Hannah Montag	24/05/18	Harry Fox	06/06/18
				
V2 *Updated to reflect red line boundary change*	Peter Timms	19/11/18	Harry Fox	20/11/18
				

The information, data and advice which has been prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions. This report and its contents remain the property of Clarkson and Woods Ltd. until payment has been made in full.

1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by INRG Solar (Little Crow) Ltd to carry out wintering bird surveys of land proposed to accommodate Little Crow Solar Farm in Scunthorpe. The surveys were carried out between November 2017 and February 2018 by experienced bird surveyors.

1.1.2 This report aims to inform a planning application for construction of a solar farm within the site. It details the methods and results of the surveys.

1.1.3 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.

2 SITE DESCRIPTION

2.1.1 The site consisted of seventeen (predominantly arable) agricultural fields; with occasional patches of dense scrub, broadleaved woodland and five ponds. Hedgerows, ditches and woodland made up the site boundaries. The wider landscape is characterised by the industrial steelworkings to the west of the site, and further arable farmland and plantation woodland to the north and east. Beyond the woodland to the south lies a recently constructed solar array.

2.1.2 The development site is approximately 226 hectares (ha) in size, and the approximate centre of the site is at OS Grid Ref. SE 941099.

2.1.3 Figure 1 shows the present layout of habitats across the site according to the Phase 1 Habitats Survey carried out in 2017.

2.1.4 The proposals for the site consist of the installation of solar panels on metal frames, which are driven into the ground, and connected by underground cables to a cabin containing a transformer. This is then connected locally to the National Grid network.

Figure 1: Phase 1 Habitat Map of the Survey Area

3 SURVEY AND ASSESSMENT METHODOLOGY

3.1 Data Search

3.1.1 Statutory designated sites relating to birds within proximity of the site were identified using the Natural England/DEFRA web-based MAGIC database (www.MAGIC.gov.uk).

3.1.2 Lincolnshire Environmental Records Centre (LERC) was consulted for records of wintering birds within 2km of the site. The records centre was also asked to provide details of locally designated sites within 1km of the site.

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

3.2 Field Methodology

3.2.1 The site was surveyed for wintering birds on four occasions between 23rd October 2017 and 11th February 2018 to identify species, numbers and locations of wintering birds on site (see Table 1 for dates and weather conditions). Due to the large size of the site, each survey visit was split over two days.

Table 1: Dates and weather conditions of the wintering bird surveys

Survey Number	Date	Description of weather: Precipitation; Cloud (Oktas); Wind (Beaufort Scale)	Temperature (°C)	Timings
1	23/11/2017	Dry, Cloud 2, Wind 6	4	08:30 – 14:30
	24/11/2017	Dry, Cloud 2, Wind 2	6	08:30 – 10:00
2	09/12/2017	Dry, Cloud 0, Wind 3	1	08:30 – 15:00
	10/12/2017	Light snow, Cloud 5, Wind 2	0	08:30 – 11:00
3	26/01/2018	Dry, Cloud 6, Wind 2	5	08:00 – 15:30
	27/01/2018	Mostly dry, Cloud 7, Wind 4	5	08:00 – 10:30
4	11/02/2018	Dry, Cloud 5, Wind 3	5	08:00 – 15:00
	12/02/2018	Light rain, Cloud 8, Wind 1	3	08:00 – 11:00

3.2.2 The surveys followed British Trust for Ornithology (BTO) guidelines, where the observer systematically walked through the site, ensuring that all points on site were visited to within 50m. The location and behaviour of all birds and flocks of birds seen was noted on large-scale survey maps which were later collated for interpretation. Standard BTO Common Birds Census symbology and species codes were used to create a survey map for each individual visit.

3.2.3 Peak counts for all wintering species for the site and across the various survey zones and boundaries were calculated.

Personnel

3.2.4 Surveys were undertaken by Harry Fox BSc MCIEEM and Steve Miller affiliate member of CIEEM. Harry and Steve are highly experienced bird surveyors able to identify all British species by sight and sound.

Mapping

3.2.5 The site was divided up into eight survey "zones" (comprising fields) and twelve "boundaries" (comprising hedgerows, scrub and ditches) according to similar habitat characteristics to assist in the interpretation of data (see Table 2 & Figure 2). This separation of the site's features allowed the relative usage of the site's habitats by notable species or numbers of species to be assessed. It should be noted that these zones and boundaries combine multiple fields and hedgerows and therefore the numbering differs from that used in the Phase 1 survey map.

Table 2: Zones and Boundaries numbering scheme

Zone No.	Description
1	Arable fields to the north-east of the site, sown with winter barley
2	Primarily arable fields sown with a block of improved grassland present
3	Arable field to the south-east of the site sown with early wheat
4	Arable field to the south of the site sown with early wheat
5	Primarily semi-improved grassland fields to the south-west of the site
6	Primarily arable fields to the west of the site sown with harvested oil seed rape
7	Arable field towards the centre of the site with harvested oil seed rape
8	Arable fields towards the north of the site with beet
Boundary No.	**Description**
B1	Mixed plantation woodland to the east of the site and poultry farm
B2	Mixed plantation woodland to the south-east of the site
B3	Broad-leaved plantation woodland towards the centre of the site
B4	Broad-leaved plantation woodland to the south of the site dividing zones 3 and 4
B5	Hedgerow, scrub and woodland habitat to the south of the site
B6	Riparian woodland, hedgerows and scrub to the west of the site

B7	Broad-leaved plantation woodland, as well as an arable field containing a portion of bare ground surrounded by trees, situated to the north of the site
B8	Broad-leaved plantation woodland and hedgerows dividing zones 6 and 7
B9	Dense scrub and hedgerow between zones 7 and 8
B10	Hedgerows and ditch in the centre of the site
B11	Hedgerow with ditch to the north of zone 4
B12	Hedgerows and ditches to the south-west of the site

Figure 2: Map showing Habitat/Boundary Zones

4 SURVEY LIMITATIONS

4.1.1 This survey involved four survey events and thus provided a series of 'snapshots' of bird activity recorded on the site. It takes no account of any species which might occur at other times of the day and on other days. 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.

4.1.2 Nocturnal bird surveys were not undertaken and as such the activity on site of birds such as owls cannot be determined. In lieu of survey data, a judgement has been made based on the results of the data search and the presumed value of the habitats on site to such species.

4.1.3 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.

Site Compound Area

4.1.4 The survey area did not encompass the entire field surrounding the former oil well in the north east of the site, which is expected to be used to house the temporary site compound during construction of the array. This field was added to the application scheme subsequent to the completion of the breeding bird surveys. The red line boundary was amended to include this area after the surveys had been completed. The use of this area by wintering birds was not fully investigated and it is possible that bird species (including those of conservation concern) using this area were not recorded. However the survey route did follow the southern boundary of this field and this area was included within survey boundary zone B7 (figure 2 refers). As such any moderate or larger flocks of wintering birds present would likely have been conspicuous and recorded, and the surveyors also noted any movement of birds within, into and out of this area. The findings of the survey (particularly the results recorded within B7) are therefore considered to depict a reasonably accurate reflection of the bird use of this area during the survey period.

5 RESULTS

5.1 Data Search – Designated Sites of Relevance to Birds

International Designations within 10km of the Site

Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site

5.1.1 The Humber Estuary is designated a Special Protection Area (SPA) and Ramsar site. The area encompassing the SPA is situated approximately 11km north of the site 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.

5.1.2 The application site is situated a considerable distance from the Humber Estuary, and contains markedly different habitats to the estuarine habitats cited within the relevant designations. In addition, the application site is highly unlikely to represent functionally linked habitat for the wildlife supported by the designated sites.

National Designations within 5km of the Site

5.1.3 No nationally designated sites pertaining to birds are located within 5km of the site.

Local Designations within 1km of the Site

5.1.4 No locally designated sites pertaining to birds are located within 1km of the site.

5.2 Data Search – Protected and Notable Species

Data obtained from Lincolnshire Environmental Records Centre (LERC)

5.2.1 The data search identified 65 notable bird species within 2km of the site since 2000 which winter in the UK (or are vagrants) and are considered relevant to this report. These species and their conservation designations are detailed in Section 8 at the end of this report. Additional records beyond the most recent record for each species have been excluded.

5.2.2 A number of birds within Appendix B were recorded within the site. This includes Lapland bunting *Calcarius lapponicus*, merlin *Falco columbarius*, peregrine *Falco peregrinus*, brambling *Fringilla montifringilla*, tree sparrow *Passer montanus*, fieldfare *Turdus pilaris* and hobby *Falco subbuteo*.

5.2.3 Details of the legislation affecting those protected species which have been identified as occurring on the site from the wintering bird surveys, or potentially occurring on the site given their ecological requirements, are detailed in Appendix A.

Data Search – Local Conservation Priorities

5.2.4 Farmland birds as a group are identified as targets for conservation within the Lincolnshire Biodiversity Action Plan (BAP) 2011-2020 (3rd Edition). The species of bird listed within this group are:

- *Grey partridge Perdix perdix*
- *Lapwing Vanellus vanellus*
- *Yellow wagtail Motacilla flava*
- *Skylark Alauda arvensis*
- *Corn bunting Miliaria calandra*
- *Linnet Carduelis cannabina*
- *Yellowhammer Emberiza citronella*
- *Reed bunting Emeriza scheoniclus*
- *Turtle dove Streptopelia turtur*
- *Bullfinch Pyrrhula pyrrhula*
- *Starling Sturnus vulgaris*
- *Tree sparrow Passer montanus*
- *Snipe Gallingo gallinago*
- *Curlew Numernius arquata*
- *Redshank Tringa totanus*
- *Barn owl Tyto alba*

5.2.5 These species have been identified as local conservation priorities and therefore will be given appropriate additional weight within the ES Chapter.

5.1 Field Survey Results

5.1.1 The main habitats within the site that were utilised by the birds recorded are listed below (in order of importance to key species and the overall assemblage of birds):

- Arable fields;
- Hedgerows and woodand;
- Semi-improved grassland; and
- Ditches

5.1.2 In total, 51 bird species were recorded within the site during the survey visits. 24 of the 51 were species of conservation concern, comprising 12 'red listed' birds and 12 'amber listed' birds according to the British Trust for Ornithology's studies into population declines among British birds within the last 30 years[1]. Twelve of these were also Species of Principal Importance (SPI) under Section 41 of the NERC Act 2006 or Schedule 1 species of the Wildlife and Countryside Act 1981 and as such are capable of being material considerations within the planning process. The species recorded are shown in Tables 3 and 4 overleaf. The level of protection each species receives is denoted by styling which is explained in the Key below.

[1] Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. Mark Eaton, Nicholas Aebischer, Andy Brown, Richard Hearn, Leigh Lock, Andy Musgrove, David Noble, David Stroud and Richard Gregory

Key to Colours and symbols used in Tables 3 and 4 below

Style	Denotation
	BTO Amber List – Bird Population Status Amber
	BTO Red List – Bird Population Status Red
Bold text	Listed under Section 41 of the NERC Act 2006 (Species of Principal Importance - SPIs) or UK Biodiversity Action Plan species
Underlined text	Listed on the Wildlife and Countryside Act 1981 Schedule 1 (receives protection from disturbance while nesting)
	Peak Count of survey for each species

5.1.3 The patterns of abundance and distribution of birds are discussed later in this section, with greatest detail given to Birds of Conservation Concern and SPIs.

5.1.4 Table 3 shows the numbers of each species encountered across all the survey visits with the peak count(s) of sightings highlighted. This enables patterns in changing abundance of each species to be observed over the course of the wintering period.

5.1.5 Table 4 shows the peak counts of each species recorded in each survey zone/ boundary. This allows the relative usage of each survey zone and habitat type to be inferred. The information in this table will be discussed in the next section for each notable species in turn.

Table 3: Results of the Wintering Bird Survey – Total Individuals of Each Species by Survey Visit

Common name	Species name	Visit			
		1	2	3	4
Pink-footed goose	*Anser brachyrhynchus*		35		
Mallard	*Anas platyrhynchos*			1	1
Red legged partridge	*Alectoris rufa*		15	17	7
Grey heron	*Ardea cinerea*		2	1	1
Buzzard	*Buteo buteo*	3	2	5	3
Kestrel	*Falco tinnunculus*	2	2	1	1
Sparrowhawk	*Accipiter nisus*	1	1	1	1
Moorhen	*Gallinula chloropus*				1
Lapwing	*Vanellus vanellus*	77	109		
Snipe	*Gallinago gallinago*	1	1		
Woodcock	*Scolopax rusticola*	1	1	2	
Herring gull	*Larus argentatus*		4	7	3
Common gull	*Larus canus*	6	2		
Great black-backed gull	*Larus marinus*		2		
Black headed gull	*Chroicocephalus ridibundus*			10	4
Woodpigeon	*Columba palumbus*		250		
Stock dove	*Columba oenas*	52			
Great spotted woodpecker	*Dendrocopos major*				1
Skylark	*Alauda arvensis*	69	159	77	158
Meadow pipit	*Anthus pratensis*	18	1	6	21
Pied wagtail	*Motacilla alba*	80	84		7
Dunnock	*Prunella modularis*	1	9	9	6
Robin	*Erithacus rubecula*	7	20	23	15
Blackbird	*Turdus merula*	13	34	44	33
Song thrush	*Turdus philomelos*	2	4		
Mistle thrush	*Turdus viscivorus*		3		1
Redwing	*Turdus iliacus*		17	6	13
Fieldfare	*Turdus pilaris*	2			
Whitethroat	*Sylvia communis*			1	
Goldcrest	*Regulus regulus*			2	
Wren	*Troglodytes troglodytes*	5	14	22	11
Great tit	*Parus major*	5	6	14	9
Blue tit	*Cyanistes caeruleus*	7	32	49	24
Long-tailed tit	*Aegithalos caudatus*			7	4
Coal tit	*Periparus ater*	1	1	2	
Carrion crow	*Corvus corone*	126	43		
Rook	*Corvus frugilgues*	8			
Jackdaw	*Corvus monedula*	1	7		
Jay	*Garrulus glandarius*	1	10	8	5
Magpie	*Pica pica*	2	2	4	6

Common name	Species name	Visit			
		1	2	3	4
Raven	*Corvus corax*				2
Starling	*Sturnus vulgaris*	77	60		
House sparrow	*Passer domesticus*			5	
Brambling	*Fringilla montifringilla*			2	
Goldfinch	*Carduelis carduelis*	21	46	16	21
Chaffinch	*Fringilla coelebs*	21	48	60	84
Greenfinch	*Carduelis chloris*	7	12	5	8
Bullfinch	*Pyrrhula pyrrhula*	2	4	7	1
Linnet	*Linaria cannabina*	16	21	22	2
Reed bunting	*Emberiza schoeniclus*	1	1	9	5
Yellowhammer	*Emberiza citrinella*	15	5	8	8
Sum of Individuals		651	1071	454	467
Count of Species		32	38	32	32

Table 4: Results of the Wintering Bird Survey by Survey Zone (See Figure 3 for Map of Zones)

Common name	Peak counts for each species per zone								Peak counts for each species per boundary											
	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
Pink-footed goose		35																		
Mallard														1		1				
Red legged partridge		2		2	1	5		6			2		7	2	2		1	8	1	
Grey heron	1							2						1						
Buzzard	1	1		3	2	2	1	2						1						
Kestrel		1			1			2			1				1					
Sparrowhawk					1					1									1	1
Moorhen																1				
Lapwing		71		9			69													
Snipe	1				1															
Woodcock					1	1			2											
Herring gull			6				8													
Common gull			4	1	3															
Great black-backed gull		2																		
Black headed gull	3		8				1	3												
Woodpigeon											250									
Stock dove	50				1					1										
Great spotted woodpecker															1					
Skylark	121	51	3	3	10	1	12													
Meadow pipit	28	2	5	1	1	3	3	3												
Pied wagtail		8			1	76											4			
Dunnock			1	1	1	2		1	1			1	1	2		1	2	5	3	3
Robin	3		1		2	4		9	6	2	3	1	4	7	8	6		4	2	3
Blackbird	3			3	10	6		13	9	5	6	9	10	8	9	9	2	9	5	8

Common name	Peak counts for each species per zone								Peak counts for each species per boundary											
	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
Song thrush				1				1		1								1	1	1
Mistle thrush												1	1			1			1	
Redwing			6	4			3		3	3	1						1	6	9	
Fieldfare								2												
Whitethroat											1									
Goldcrest	1																		1	
Wren	1			1	4	1		3	5	4	4	3	3	5	2	5		5	5	1
Great tit	1			1				3	4	1	3	1	2	3	4	3	2	1	4	1
Blue tit	3				7	5		9	14	5	4	6	4	11	16	5	4	1	10	8
Long-tailed tit									4						3	4				
Coal tit									1	3										
Carrion crow	33	1	10	10	1		100	3		1				6		4				
Jackdaw	7						1													
Rook	8																			
Jay	1		3			1		1		6	3	1	5		1				2	
Magpie		3	1		2	1			1	1		1		3					1	
Raven	2																			
Starling	110	3					24													
House sparrow																		5		
Brambling																		2		
Goldfinch	6	21		2		13		5						26	5			21		5
Chaffinch		8		3	11	24	1	46	4		2		2	23	6	8	3	46	12	14
Greenfinch	9	6			2	1		7	1								1	2	3	
Bullfinch				1				2								1			7	3
Linnet	20				5		8	12									1	13	1	1

Common name	Peak counts for each species per zone								Peak counts for each species per boundary											
	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
Reed bunting					4	1		1			2			2		2		2		2
Yellowhammer	1			9				6									3	11	3	3
Count of Species	24	15	11	17	22	17	12	23	13	13	13	9	10	15	12	14	11	17	19	14

5.2 Red-listed species

Lapwing

5.2.1 A typical bird of farmland and upland grassland during the winter, but now in severe decline due to habitat loss. These birds were observed twice in fairly large numbers during (peak count during a single visit of 109) within the open habitats of Zone 2 and Zone 7, during the first two visits in November and December. This species was however absent during the latter two visits in January and February. This species is probably present all year round in the surrounding landscape and the site is likely a regular component of the winter foraging habitat for the local population.

Skylark

5.2.2 Skylark are a ground nesting bird, requiring open habitats to maintain long sightlines for predator surveillance. Skylark have suffered dramatic declines in their breeding population in Britain in recent decades: with a halving of numbers in the 1990s, predominantly due to changes in farming practices governing the timing of sowing and harvesting. The arable fields on site provided optimal habitat for these birds. Skylarks were not particularly associated with any of the boundaries.

5.2.3 Skylark numbers site peaked at 159 during the 2nd visit in December, although moderate to large numbers were encountered on each visit. These birds were mainly found foraging in Zone 1 - an arable field on the north-eastern side of the site which is also part of the highest-lying land on site with the widest sightlines and visibility. This field would appear to constitute a valuable foraging resource for this species.

5.2.4 In summary, the site comprised optimal habitat for foraging and sheltering skylark, especially that of Zone 1, which is likely to form an important winter foraging resource for this species. There was an abundance of other, similar habitat in the form of open arable land within the local area.

Redwing and Fieldfare

5.2.5 Redwing and fieldfare are both winter visitors to the UK which have suffered from a decline in abundance of species-rich, and structurally diverse hedgerows and woodland for both shelter and foraging. As a result both species are a red listed.

5.2.6 Flocks of these species were observed in low numbers foraging on the ground and within the adjacent woodland areas. Peak numbers for redwing were 17, and these were associated with both open areas and boundary habitats. Sightings of fieldfare was limited to two individuals recorded during the first visit in November only, foraging within Zone 8.

5.2.7 Given the low numbers of both species on site, the site is unlikely to represent important winter foraging ground for redwing and fieldfare.

Starling

5.2.8 The starling is a familiar species often found in towns, gardens, farmland and woodland. This species is red listed as a Species of Conservation Concern due to recent breeding and wintering

population decline (1981-2010) and reduction in breeding and wintering range (1981-2010)[6]. It is also a Species of Principal Importance under section 41 of the NERC Act (2006).

5.2.9 Starling were observed in moderately-sized flocks predominantly in Zone 1 and 7. Several flocks were observed on multiple occasions flying overhead. The site offers suitable habitat for foraging starling and appears to support modest numbers.

Woodcock

5.2.10 Woodcock are wading birds commonly associated with woodland which is used for cover. Most woodcock are winter visitors from eastern and northern Europe and rely on woodland, scrub and rough grassland for shelter during the day and pasture and arable fields for foraging at night. Woodcock are in decline, possibly due to the reduction in available breeding areas, such as open areas within woodlands. Small numbers (maximum 2 individuals) were encountered on three of the four survey visits. These were observed on site within the more sheltered fields of Zones 5 and 6, and within Boundary 1.

5.2.11 A small population of this species are probably present all year round in the woodland habitats surrounding the site, and the site is likely a component of the winter foraging habitat for low numbers of this species.

Linnet

5.2.12 The linnet is a species mainly associated with farmland and open country. This species is red listed as a Species of Conservation Concern due to recent breeding and wintering population decline (1981-2010) and reduction in breeding and wintering range (1981-2010)[6]. It is also a Species of Principal Importance under section 41 of the NERC Act (2006).

5.2.13 Linnets were present on site during all four survey visits, with a maximum of 21 individuals recorded on site. This species will utilise open fields and hedgerows. The site offers suitable habitat for foraging linnet and appears to support a moderate population.

Yellowhammer

5.2.14 Yellowhammers are mainly associated with open countryside and hedgerows. This species is red listed as a Species of Conservation Concern due to recent population declines. This is likely due to changes in agricultural practices, such as the removal of hedgerows and increased use of pesticides. Yellowhammers were mainly observed within the Boundary habitats around the site, although small numbers were seen in more open areas, such as Zone 4 and Zone 8. The site offers suitable habitat for foraging yellowhammers and appears to support moderate numbers, with a peak count of 15 recorded during Visit 1.

Pink-footed goose

5.2.15 Pink-footed geese are found on coasts, wetlands, grassland and arable habitats over winter in the UK. They are amber listed as a Species of Conservation Concern due to recent breeding and wintering population decline (1981-2007), reduction in breeding and wintering range (1981-2010)[6] and for having an important non-breeding population. A moderate-sized flock of 35 was

observed on Visit 2 only in Zone 2. This species is likely to use the open fields for foraging but it appears that the site forms only a component of the foraging area for a local wintering population.

Stock dove

5.2.16 Stock dove are most characteristic of arable farmland. They are an amber-listed species of conservation concern due to recent breeding and wintering population decline and reduction in both breeding and wintering range. A moderate flock of 50 stock doves were recorded in Zone 1 during Visit 1 only. The site offers suitable habitat but appears not to be a critical wintering area for stock dove given their absence in December, January and February.

Meadow pipit

5.2.17 Like skylarks, meadow pipits are associated with open arable, grassland and heathland habitats and are ground dwelling birds and have undergone declines in recent years, hence their amber status.

5.2.18 Meadow pipit were observed during all survey visits although only as individuals or small loose flocks. These were present across the open habitats at the site. The site offers suitable habitat for foraging meadow pipit and appears to support a modest population.

Dunnock

5.2.19 Dunnock inhabit any well vegetated areas with scrub, brambles and hedges, including field edges, earning their moniker "hedge sparrow". They spend large amounts of time on the ground in amongst grassland but also remain close to shrubby vegetation cover. Dunnock abundance fell substantially between the mid-1970s and mid-1980s, after a period of population stability. Some recovery has occurred throughout the UK since the late 1990s. Dunnock is an amber listed Species of Conservation Concern and a Species of Principal Importance. Dunnock were observed widely across the site on all visits in low to modest numbers, with a peak count of 9 recorded on both the 2nd and 3rd visits. This species is unlikely to utilise the open fields for foraging but will use the field margins.

Reed bunting

5.2.20 The reed bunting is a species mainly associated with reedbeds, riverine scrub and marsh. This species is amber listed as a Species of Conservation Concern due to recent breeding and wintering population decline (1981-2007) and reduction in breeding and wintering range (1981-2010)[6]. It is also a Species of Principal Importance under section 41 of the NERC Act (2006). Reed bunting were observed during all visits with a peak of 9 individuals recorded on visit 3. They were observed in both open fields and boundaries and were mostly associated with the ditches to the west of the site. This species will utilise open fields but is more likely to use the hedgerow and ditch system. The site does offer suitable habitat for foraging reed bunting, however appears to support modest numbers only.

Other Birds of Conservation Concern

5.2.21 Small numbers of bullfinch (peak count of 7), an amber listed species, were consistently recorded throughout the survey visits, and were most strongly associated with the field boundary habitats in the south west of the site.

5.2.22 Individuals or small numbers (maximum 10) of each of mistle thrush, song thrush, herring gull, house sparrow (red-listed species) and kestrel, mallard, common gull, greater blacked gull and snipe (amber-listed species), were recorded on one or two occasions and did not show a persistent association with the site. It is therefore likely that they are not present within the site throughout the winter but may use the site opportunistically.

Other Birds

5.2.23 Other birds recorded were primarily generalist species encountered within a range of habitats including hedgerow and woodland. These included tits, finches, wren, blackbird and various corvids such as jackdaw, carrion crow and magpie. There were also several other species which are more selective of riparian habitat such as moorhen and grey heron; and farmland species such as red legged partridge.

6 SUMMARY

6.1.1 A total of 55 species were identified; of which 12 were red listed birds and 12 were amber listed birds. Of these 24 bird species, 10 are also Species of Principal Importance under the NERC Act (2006) and so are a material consideration for planning.

6.1.2 The notable birds utilising the site can be split into two distinct categories; those which were recorded predominantly within open habitats and those recorded foraging predominantly in boundary habitats such as woodland and hedgerows.

6.1.3 The birds utilising the open field habitats are more likely to be directly impacted installation of a solar array. The peak count of numbers recorded at the site for each of these species is summarised in Table 5 below.

Table 5: Summary of Wintering Birds of Open Farmland

Birds Recorded within Open Habitats	Peak Count
Pink-footed goose	35
Lapwing	109
Herring Gull	7
Common gull	6
Great black-backed gull	2
Black-headed gull	10
Skylark	159
Meadow pipit	21

6.1.4 Table 6 summaries the notable bird species that predominantly use the boundary habitats for sheltering and foraging:

Table 6: Summary of Wintering Birds of Field Boundary Habitats

Birds Associated with Boundary Habitats	Peak Count
Mallard	1
Kestrel	2
Snipe	1
Woodcock	2
Stock dove	52
Dunnock	9
Song thrush	4
Mistle thrush	3
Redwing	17
Fieldfare	2
Starling	77
House sparrow	5
Bullfinch	7
Linnet	22
Reed bunting	9
Yellowhammer	15

7 WILDLIFE LEGISLATION & SPECIES INFORMATION

BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

PLANNING POLICY IN RELATION TO BIODIVERSITY - ENGLAND

The National Planning Policy Framework (NPPF), issued in March 2012, has superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005). Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. Further guidance is also available within the Government Circular ODPM 06/2005 on Biodiversity and Geological conservation although it should be noted that this document is currently being updated by DEFRA. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 109), including:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 115):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 118) by applying principles including:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
- development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;

- opportunities to incorporate biodiversity in and around developments should be encouraged;
- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas and possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".

8 LERC RECORDS OF BIRDS FROM SURROUNDING 2KM

Species Name	Common Name	Date	Abundance	Designations
Acanthis cabaret	Lesser Redpoll	04/03/2015	3 Present (Count: Exact)	BoCC4-Red, Sect.41, Sect.42,
Accipiter gentilis	Goshawk	06/12/2003	1 Present (Count: Exact)	WCA1i,
Alauda arvensis	Skylark	27/06/2015	4 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41
Alcedo atthis	Kingfisher	01/11/2015		BoCC4-Amber, WCA1i,
Anas acuta	Pintail	23/11/2011	3 Present (Count: Exact)	BoCC4-Amber, WCA1ii,
Anas penelope	Wigeon	08/03/2015	1 Total (Count: Exact)	BoCC4-Amber,
Anas strepera	Gadwall	01/01/2013		BoCC4-Amber,
Anser anser	Greylag Goose	23/05/2015	2 Total (Count: Exact)	BoCC4-Amber, WCA1ii
Anser brachyrhynchus	Pink-footed Goose	01/11/2015		BoCC4-Amber,
Anser fabalis subsp. fabalis	Taiga Bean Goose	16/03/2011	8 Present (Count: Exact)	BoCC4-Amber,
Anser fabalis subsp. rossicus	Tundra Bean Goose	23/11/2011-07/12/2011	2 Juvenile (Count: Exact)	BoCC4-Amber,
Aythya ferina	Pochard	13/12/2015	2 Total (Count: Exact)	BoCC4-Red,
Aythya marila	Scaup	23/11/2011	1 1st calendar year male(s) (Count: Exact)	BoCC4-Red, Sect.41, , WCA1i,
Bucephala clangula	Goldeneye	20/12/2000	2 Present (Count: Exact)	BD2.2, BoCC4-Amber, WCA1ii,
Calcarius lapponicus	Lapland Bunting	27/10/2001	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Charadrius morinellus	Dotterel	25/04/2011	1 Present (Count: Exact)	BoCC4-Red, WCA1i,
Circus aeruginosus	Marsh Harrier	11/01/2012-22/02/2012	4 Present (Count: Exact)	BoCC4-Amber, WCA1i,
Clangula hyemalis	Long-tailed Duck	06/12/2004	1 Present (Count: Exact)	BoCC4-Red, WCA1i
Coccothraustes coccothraustes	Hawfinch	February 2009	11 Present (Count: Exact)	BoCC4-Red, Sect.41, Sect.42,
Cygnus columbianus subsp. bewickii	Bewick's Swan	15/02/2002	2 Present (Count: Exact)	BoCC4-Amber, Sect.41, Sect.42, WCA1i,
Cygnus cygnus	Whooper Swan	19/03/2013	26 Present (Count: Exact)	BoCC4-Amber, WCA1i,
Cygnus olor	Mute Swan	01/04/2014		BoCC4-Amber,
Emberiza calandra	Corn Bunting	2005 - 2010		BoCC4-Red, LBAP:3,
Emberiza citrinella	Yellowhammer	25/11/2015	9 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41, Sect.42,
Emberiza schoeniclus	Reed Bunting	25/11/2015	2 Total (Count: Exact)	BoCC4-Amber, LBAP:3, Sect.41, Sect.42,
Falco columbarius	Merlin	28/03/2012	1 Female (Count: Exact)	BD1, Bern2, BoCC4-Red, , WCA1i,i

Species Name	Common Name	Date	Abundance	Designations
Falco peregrinus	Peregrine	03/11/2015	1 Present (Count: Exact)	BD1, Bern2, CITESA, CMS_A2, LBCSchedule1, ScotBL, WCA1i,
Falco subbuteo	Hobby	02/08/2015	1 Total (Count: Exact)	WCA1i
Fringilla montifringilla	Brambling	25/01/2015	23 Present (Count: Exact)	WCA1i
Gallinago gallinago	Snipe	06/12/2014	1 Present (Count: Exact)	BoCC4-Amber, LBAP:3
Gavia immer	Great Northern Diver	12/01/2013	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Gavia stellata	Red-throated Diver	14/11/2011	1 Juvenile (Count: Exact)	WCA1i,
Haliaeetus albicilla	White-tailed Eagle	19/05/2011	1 Present (Count: Exact)	BoCC4-Red, WCA1i,
Linaria cannabina	Linnet	02/08/2015		BoCC4-Red, LBAP:3,
Loxia curvirostra	Common Crossbill	19/03/2014	22 Present (Count: Exact)	WCA1i,
Loxia leucoptera	Two-barred Crossbill	23/03/2014	1 Male (Count: Exact)	WCA1i
Lullula arborea	Woodlark	28/02/2014	1 Present (Count: Exact)	Sect.41, Sect.42, WCA1i
Melanitta nigra	Common Scoter	31/03/2005	1 Male (Count: Exact)	BoCC4-Red, Sect.41, Sect.42, , WCA1i,
Milvus milvus	Red Kite	19/10/2014	1 Present (Count: Exact)	WCA1i,
Numenius arquata	Curlew	2005 - 2010		BoCC4-Red, LBAP:3, , Sect.41, Sect.42,
Numenius phaeopus	Whimbrel	08/08/2011	1 Present (Count: Exact)	BoCC4-Red, WCA1i, WO1i
Passer domesticus	House Sparrow	25/11/2015		BoCC4-Red, LBAP:3, , Sect.41, Sect.42,
Passer montanus	Tree Sparrow	02/08/2015		BoCC4-Red, LBAP:3, Sect.41, Sect.42,
Perdix perdix	Grey Partridge	03/10/2015	5 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41, Sect.42,
Pernis apivorus	Honey-buzzard	02/10/2015	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Pyrrhula pyrrhula	Bullfinch	25/11/2015	1 Total (Count: Exact)	BoCC4-Amber, , LBAP:3,
Serinus serinus	Serin	17/11/2007	1 Present (Count: Exact)	WCA1i
Stercorarius parasiticus	Arctic Skua	07/05/2002	1 Present (Count: Exact)	BoCC4-Red, , UKBAP
Sturnus vulgaris	Starling	25/11/2015	100 Total (Count: Estimate)	BoCC4-Red, LBAP:3
Tringa glareola	Wood Sandpiper	28/08/2002	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Tringa ochropus	Green Sandpiper	20/06/2014	1 Present (Count: Exact)	BoCC4-Amber, WCA1i

Species Name	Common Name	Date	Abundance	Designations
Tringa totanus	Redshank	19/04/2011	4 Present (Count: Exact)	BoCC4-Amber, LBAP:3
Turdus iliacus	Redwing	06/12/2015	6 Present (Count: Exact)	BoCC4-Red, , WCA1i
Turdus philomelos	Song Thrush	15/06/2015	1 Total (Count: Exact)	BoCC4-Red, LBAP:3,
Turdus pilaris	Fieldfare	26/03/2014	400 Present (Count: Exact)	BoCC4-Red, WCA1i,
Tyto alba	Barn Owl	24/12/2015	1 Present (Count: Exact)	LBAP:3, WCA1i,
Vanellus vanellus	Lapwing	04/10/2015	8 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41, Sect.42,

Meaning of designations listed above

Designation	Meaning
BoCC4-Amber	BTO Amber List – Bird Population Status Amber
BoCC4-Red	BTO Red List – Bird Population Status Red
Sect.41/42	Section 41/42 of the NERC Act 2006/ UK Biodiversity Action Plan Species
WCA1i	Wildlife and Countryside Act 1981 Schedule 1
LBAP:3	Lincolnshire Biodiversity Action Plan (3rd Edition)

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Technical Appendix 7.3

BREEDING BIRDS SURVEY

Little Crow

Solar Park

National significant infrastructure project in the Energy Sector

Little Crow Solar Park, Scunthorpe

BREEDING BIRDS SURVEYS

On behalf of INRG Solar (Little Crow) Ltd

November 2018

BREEDING BIRD SURVEYS

LITTLE CROW SOLAR FARM, SCUNTHORPE

CONTENTS

Project title	Little Crow Solar Farm, Scunthorpe			
Project number	5642			
Document title	Breeding Bird Surveys			
Client	INRG Solar (Little Crow) Ltd			
Author	Peter Timms			
Status	Checked by	Date	Approved for C&W by	Date
V1.0	Tom Clarkson	12/07/18	Peter Timms	12/07/18
				
V2.0 *Updated to include Results of 4th visit added*			Peter Timms	07/08/18
				
V3.0 *Updated to reflect red line boundary change*	Peter Timms	19/11/18	Harry Fox	20/11/18
				

1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by INRG Solar to carry out breeding birds surveys of land proposed to accommodate Little Crow Solar Farm in Scunthorpe. The surveys were carried out between April and July 2018 by experienced bird surveyors.

1.1.2 This report aims to inform a planning application for construction of a solar farm within the site. It details the methods and results of the surveys and informs the Environmental Statement (ES) Chapter on Ecology prepared for the site.

1.1.3 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.

2 SITE DESCRIPTION

2.1.1 The site consisted of seventeen (predominantly arable) agricultural fields; with occasional patches of dense scrub, broadleaved woodland and five ponds. Hedgerows, ditches and woodland made up the site boundaries. The wider landscape is characterised by the industrial steelworkings to the west of the site, and further arable farmland and plantation woodland to the north and east. Beyond the woodland to the south lies a recently constructed solar array.

2.1.2 The development site is approximately 226 hectares (ha) in size, and the approximate centre of the site is at OS Grid Ref. SE 941099.

2.1.3 Figure 1 shows the present layout of habitats across the site according to the Phase 1 Habitats Survey.

2.1.4 The proposals for the site consist of the installation of solar panels on metal frames, which are driven into the ground, and connected by underground cables to a cabin containing a transformer. This is then connected locally to the National Grid network

Figure 1: Phase 1 Habitat Map of the Survey Area

3 SURVEY AND ASSESSMENT METHODOLOGY

3.1 Data Search

3.1.1 Lincolnshire Environmental Records Centre (LERC) was consulted for records of birds within 2km of the site.

3.2 Survey Area

3.2.1 The site consisted of seventeen (predominantly arable) agricultural fields; with occasional patches of dense scrub, broadleaved woodland and five ponds. Hedgerows, ditches and woodland made up the site boundaries. The wider landscape is characterised by the industrial steelworkings to the west of the site, and further arable farmland and plantation woodland to the north and east. Beyond the woodland to the south lies a recently constructed solar array.

3.3 Survey Timings and Protocol

3.3.1 The site was surveyed for breeding birds four times between April 2018 and July 2018, to identify which bird species were using the site for breeding or exhibited territorial behaviour and which habitats appeared to be of greatest value.

3.3.2 The surveys were carried out on the following days, under the weather conditions described in Table 1 below. Due to the large size of the site, some of the visits (namely visits 1 and 2) were split over two days.

Table 1: Dates and Weather Conditions during Breeding Bird Surveys

Survey Number	Date	Description of weather: Precipitation; Cloud (Oktas); Wind (Beaufort Scale)	Temperature (°C)	Timings
1	16/04/2018	Dry, Cloud 2, Wind 4	11-15	08:00 – 13:00
	17/04/2018	Dry, Cloud 2, Wind 4	8-10	08:00 – 11:30
2	03/05/2018	Dry, Cloud 3, Wind 2	10-16	08:30 – 13:00
3	11/06/2018	Dry, Cloud 1, Wind 2	10-22.5	05:15 – 11:00
	12/06/2018	Intermittent light drizzle, Cloud 8, Wind 2	13-16	08:00 – 10:30
4	24/07/2018	Dry, Cloud 4, Wind 2	18-25	08:30 – 13:00

3.3.3 The survey followed BTO guidelines, where the observer systematically walked through the site, ensuring that all points on site were visited to within 50m. The location and behaviour of all birds and flocks of birds seen was noted on large-scale survey maps which were later collated onto master maps for interpretation. Particular attention was paid to bird exhibiting breeding behaviour, for instance birds in full song, exhibiting antagonistic behaviour/calling, carrying nest material, carrying food, and returning to nesting sites. Standard BTO Common Birds Census symbology and species codes were used to create a survey map of each individual visit.

3.4 Personnel

3.4.1 All surveyors have been assessed under the Clarkson and Woods QA processes as competent to complete the surveys.

3.4.2 Surveys were undertaken by Harry Fox BSc MCIEEM, Mark Baker BSc MCIEEM, James Latham BSc MCIEEM, Mike Hockey Grad CIEEM, and Steve Miller affiliate member of CIEEM. Harry, Mark, James, Mike and Steve are highly experienced bird surveyors able to identify all British species by sight and sound.

Mapping

3.4.3 The site was divided up into eight survey "zones" (largely comprising agricultural fields) and twelve "boundaries" (comprising hedgerows, scrub, woodland and ditches) according to similar habitat characteristics to assist in the interpretation of data (see Table 2 & Figure 2). This separation of the site's features allowed the relative usage of the site's habitats by notable species or numbers of species to be assessed. It should be noted that these zones and boundaries combine multiple fields and hedgerows and therefore the numbering differs from that used in the Phase 1 survey map (Figure 1).

Table 2: Zones and Boundaries numbering scheme

Zone No.	Description
1	Arable fields to the north-east of the site, sown with winter barley
2	Primarily arable fields sown with winter barley and early wheat, with a block of improved grassland present
3	Arable field to the south-east of the site sown with early wheat
4	Arable field to the south of the site sown with early wheat
5	Primarily semi-improved grassland fields to the south-west of the site
6	Primarily arable fields to the west of the site sown with oil seed rape
7	Arable field towards the centre of the site sown with oil seed rape
8	Arable fields towards the north of the site sown with vining peas
Boundary No.	**Description**
B1	Mixed plantation woodland to the east of the site and poultry farm
B2	Mixed plantation woodland to the south-east of the site
B3	Broad-leaved plantation woodland towards the centre of the site
B4	Broad-leaved plantation woodland to the south of the site dividing zones 3 and 4
B5	Hedgerow, scrub and woodland habitat to the south of the site
B6	Riparian woodland, hedgerows and scrub to the west of the site
B7	Broad-leaved plantation woodland, as well as an arable field containing a portion of bare ground surrounded by trees, situated to the north of the site
B8	Broad-leaved plantation woodland and hedgerows dividing zones 6 and 7
B9	Dense scrub and hedgerow between zones 7 and 8
B10	Hedgerows and ditch in the centre of the site
B11	Hedgerow with ditch to the north of zone 4
B12	Hedgerows and ditches to the south-west of the site

Figure 2: Map showing Habitat/Boundary Zones

4 SURVEY LIMITATIONS

Survey

4.1.1 Nocturnal bird surveys were not undertaken and as such the activity on site of birds such as owls cannot be determined. In lieu of survey data, a judgement has been made based on the results of the data search and the presumed value of the habitats on site to such species.

4.1.2 The surveys offer only 'snapshots' of the Site and whilst trying to account for seasonal differences, may miss certain species which attend the site infrequently or which might choose to take up residence subsequent to completion of the surveys. 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.

4.1.3 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.

Site Compound Area

4.1.4 The survey area did not encompass the entire field surrounding the former oil well in the north east of the site, which is expected to be used to house the temporary site compound during construction of the array. This field was added to the application scheme subsequent to the completion of the breeding bird surveys. The red line boundary was amended to include this area after the surveys had been completed. The use of this area by breeding birds was not fully investigated and it is possible that bird species (including those of conservation concern) using this area were not recorded. However the survey route did follow the southern boundary of this field and this area was included within survey boundary zone B7 (figure 2 refers). As such any conspicuous activity by birds exhibiting territorial behaviour within the southern portion of this field (such as display flights or calls) would likely have been recorded, and the surveyors also noted any movement of birds into and out of this area. However it is likely that small numbers of birds and territories/nest sites within the area would have gone unrecorded as, unlike the rest of the fields within the survey area, the surveyor would not have flushed birds sat on nests. It is noted that the arable land present in this field is relatively small in size (circa 2.1 ha) and predominately surrounded by tall woodland and trees, and therefore suboptimal for certain open farmland bird species due to a lack of clear sightlines for predator detection.

4.1.5 Overall, the findings of the survey (particularly the results recorded within B7) are therefore considered to depict a reasonable but not a precise reflection of the bird use of this area during the survey period.

5 RESULTS

5.1 Data Search – Protected and Notable Species

Data obtained from Lincolnshire Environmental Records Centre (LERC)

5.1.1 The data search identified 65 notable bird species within 2km of the site since 2000 which winter in the UK (or are vagrants) and are considered relevant to this report. These species and their conservation designations are detailed in Section 8 at the end of this report. Additional records beyond the most recent record for each species have been excluded.

5.1.2 A number of birds within Section 8 were recorded within the site. This includes Lapland bunting *Calcarius lapponicus*, merlin *Falco columbarius*, peregrine *Falco peregrinus*, brambling *Fringilla montifringilla*, tree sparrow *Passer montanus*, fieldfare *Turdus pilaris* and hobby *Falco subbuteo*.

5.1.3 Details of the legislation affecting those protected species which have been identified as occurring on the site from the wintering bird surveys, or potentially occurring on the site given their ecological requirements, are detailed in Section 6.

Data Search – Local Conservation Priorities

5.1.4 Farmland birds as a group are identified as targets for conservation within the Lincolnshire Biodiversity Action Plan (BAP) 2011-2020 (3rd Edition). The species of bird listed within this group are:

- Grey partridge Perdix perdix
- Lapwing Vanellus vanellus
- Yellow wagtail Motacilla flava
- Skylark Alauda arvensis
- Corn bunting Miliaria calandra
- Linnet Carduelis cannabina
- Yellowhammer Emberiza citronella
- Reed bunting Emeriza scheoniclus
- Turtle dove Streptopelia turtur
- Bullfinch Pyrrhula pyrrhula
- Starling Sturnus vulgaris
- Tree sparrow Passer montanus
- Snipe Gallingo gallinago
- Curlew Numernius arquata
- Redshank Tringa totanus
- Barn owl Tyto alba

5.1.5 These species have been identified as local conservation priorities and therefore will be given appropriate additional weight within the ES Chapter.

5.2 Field Survey

5.2.1 In total, 55 bird species (including woodpigeon *Columba palumbus* and pheasant *Phasianus colchicus* which were not enumerated) were recorded during the survey visits. 21 of these were BTO Birds of

Conservation Concern red/amber lists[1] or Species of Principal Importance (SPI)[2], comprising 10 'red listed' birds and 11 'amber listed' birds. 10 species were listed as being SPI for nature conservation and as such are capable of being material considerations within the planning process. The patterns of abundance and distribution of each of these species is discussed later in this section, with greatest detail given to birds of conservation concern and SPIs.

5.2.2 Table 4 shows the numbers of each species encountered across all the survey visits with the peak count(s) of sightings highlighted. This enables patterns in changing abundance of each species to be observed over the course of the breeding season.

5.2.3 Table 5 shows the peak counts of each species recorded in each survey zone/ boundary. This allows the relative usage of each survey zone and habitat type to be inferred. The information in this table will be discussed in the next section for each notable species in turn.

5.2.4 In Tables 4 and 5, the bird species are colour coded to indicate their conservation status and their likely breeding status on-site is indicated by abbreviations as outlined in Table 3 below:

Table 3: Colours and symbols used in Tables 4 and 5 below

Bold text	Listed under Section 41 of the NERC Act 2006 (Species of Principal Importance - SPIs) or UK Biodiversity Action Plan species
Red fill	'Red listed' species according to BTO/RSPB Bird of Conservation Concern
Orange fill	'Amber listed' species according to BTO/RSPB Bird of Conservation Concern
Yellow fill	Peak Count of Survey for each species
Y	Breeding confirmed (nests located or adults with food/nest material, or fledglings seen)
Pr	Breeding probable
Po	Breeding possible
N	Not likely to breed on site

[1] Red list species are those 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. Amber list species are those 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.

[2] Species of Principal Importance (SPI) are listed in section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

Table 4: Numbers of Each Species Recorded During Each Survey Visit

Common Name	Latin Name	Visit				Breeding?
		1	2	3	4	
Greylag goose	*Anser anser*	2				N
Moorhen	*Gallinula chloropus*		1		2	Y
Lapwing	*Vanellus vanellus*	2	4	1	7	Pr
Woodcock	*Scolopax rusticola*		1			N
Herring gull	*Larus argentatus*		1	3	2	N
Lesser black-backed gull	*Larus fuscus*		2			N
Tawny owl	*Strix aluco*			1		Po
Buzzard	*Buteo buteo*	1	2	3	4	Po
Kestrel	*Falco tinnunculus*	2	2	2	2	Pr
Red legged partridge	*Alectoris rufa*	10	7	3	9	Pr
Stock dove	*Columba oenas*	1	1			N
Great spotted woodpecker	*Dendrocopos major*	1		1		Po
Cuckoo	*Cuculus canorus*			1		N
Skylark	*Alauda arvensis*	68	47	35	12	Y
Meadow pipit	*Anthus pratensis*	2	2	6		Pr
Yellow wagtail	*Motacilla flava*		4	8		Pr
Pied wagtail	*Motacilla alba*	1		2	1	Po
Dunnock	*Prunella modularis*	4	4	9	3	Pr
Robin	*Erithacus rubecula*	19	9	13	2	Y
Blackbird	*Turdus merula*	28	9	21	4	Y
Song thrush	*Turdus philomelos*	3		3	1	Po
Mistle thrush	*Turdus viscivorus*		3	2		Po
Treecreeper	*Certhia familiaris*	1				Po
Nuthatch	*Sitta europaea*		1		2	N
Swallow	*Hirundo rustica*	3	8	16	12	N
Swift	*Apus apus*			1		N
Lesser whitethroat	*Sylvia curruca*			1		N
Whitethroat	*Sylvia communis*	1	16	19	5	Pr
Goldcrest	*Regulus regulus*	1	3			Po
Wren	*Troglodytes troglodytes*	26	17	31	7	Y
Great tit	*Parus major*	9	10	10	1	Pr
Blue tit	*Cyanistes caeruleus*	20	15	23	15	Pr
Long-tailed tit	*Aegithalos caudatus*		4	1		Pr

Common Name	Latin Name	Visit				Breeding?
		1	2	3	4	
Blackcap	*Sylvia atricapilla*	13	20	24		
Coal tit	*Periparus ater*	4	1	2		Po
Carrion crow	*Corvus corone*	8	1	6	37	Po
Jay	*Garrulus glandarius*	1				N
Magpie	*Pica pica*	1	1		3	Po
Brambling	*Fringilla montifringilla*		4	2		Po
Goldfinch	*Carduelis carduelis*	3	11	42	18	Y
Chaffinch	*Fringilla coelebs*	47	34	38	18	Y
Chiffchaff	*Phylloscopus collybita*	11	7	6	2	Pr
Greenfinch	*Carduelis chloris*			4	4	Po
Willow Warbler	*Phylloscopus trochilus*	8	16	5	1	Pr
Garden warbler	*Sylvia borin*		3	1		Po
Wheatear	*Oenanthe oenanthe*			3		N
Bullfinch	*Pyrrhula pyrrhula*		2	5		Pr
Linnet	*Linaria cannabina*	17	20	39	23	Y
Reed bunting	*Emberiza schoeniclus*	2	8	14	17	Y
Yellowhammer	*Emberiza citrinella*	15	8	16	11	Y
Total Individuals		338	309	430	225	
Number of Species		34	38	41	28	

Note that wood pigeon and pheasant were excluded from the survey. They were recorded as present on all visits but counts were not made.

Table 5: Results of the Breeding Bird Survey (Peak Counts of Birds within Each Habitat Type)

Common name	Peak counts for each species per zone								Peak counts for each species per boundary											
	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
Greylag goose					2															
Moorhen																		1		
Lapwing						4		1												
Woodcock																			1	
Herring gull			1	2	1															
Lesser black-backed gull						2														
Tawny owl															1					
Buzzard		1		1	1	1				1					1					
Kestrel	1	1			2										1					
Red legged partridge	2	2		2		3									2	3		2		
Stock dove				1		1														
Great spotted woodpecker									1		1									
Cuckoo															1					
Skylark	12	29	8	5	4	8	7	2												1
Meadow pipit	1	4			2															
Yellow wagtail	4	1	3				2												1	
Pied wagtail		2						1												
Dunnock					1	3							1	1	1			1	2	1
Robin	4					2		1	4	2		1	2	4	1	3	2	1	1	1
Blackbird	3	3			1	1		4	3	3	3	1	4	2	4	1	3	1	5	
Song thrush						1				2				1				1	1	
Mistle thrush	1	1		1		1						2			1	1				
Treecreeper										1										
Nuthatch										1										
Swallow	3			1	11	1	2	1								2				
Swift		1																		
Lesser whitethroat														1						

Common name	Peak counts for each species per zone								Peak counts for each species per boundary											
	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
Whitethroat					2	3	1				1			2	1	1	1	5	2	3
Goldcrest										1		1		1			1			
Wren	4				1	4		1	3	3	3	4	1	2	4	2	2		2	3
Great tit		1				1			1	1	3	1	1	1	1	3	3		1	1
Blue tit	4	3			1	2		2	4	2	2	3	1	1	2	4	3	1	2	3
Long-tailed tit															1				4	
Blackcap	4	1			1	2		1	2	5	3	1	3	3	3	4	2		2	1
Coal tit										1	1	1	1		1		1			
Carrion crow			1		3		30	3							2		1	1	1	
Jay										1										
Magpie														1						
Brambling									1		1	1			2					
Goldfinch	25	2	1			1		2							2	4	6	6	1	
Chaffinch	7	2			3	5		9	1	4	3	2	4	6	4	6	3	8	2	2
Chiffchaff						2		2	2	1			2	2	3					1
Greenfinch		1														1		1		1
Willow Warbler	1												2	9	4				1	1
Garden warbler										1								1	1	1
Wheatear																			3	
Bullfinch						1								1		2			2	
Linnet	26	4			2	3	5	2		2				2	1		2	5	1	4
Reed bunting	4	3			2	2	1							3		2	3	1	2	
Yellowhammer	3	2			2	2								4		6	1	3	1	3
Count of Species	18	19	5	7	21	25	7	14	10	16	10	11	11	21	23	16	14	16	21	14

Overall Assemblage

5.2.5 The breeding bird assemblage was diverse: comprising typical species of farmland, woodland and hedgerows. Numerous summer visitors were recorded, including cuckoo, swift, swallow, willow warbler, chiffchaff, blackcap, and yellow wagtail. Other species were residents, though numbers may be swelled by an influx of migrant birds.

Temporal Changes (within season)

5.2.6 Over the course of the four surveys, the level of usage of the site by certain species varied a little. The peak number of individuals and species was recorded during Visit 3 at the beginning of June. The lowest number of species and individuals were recorded during the 4th visit in late July. It was noted that the majority of fields had been harvested by the 4th survey which may account for the drop in numbers of species which inhabit the centre of arable fields, such as skylarks, meadow pipits and yellow wagtail. The 4th visit was also conducted during an extended period of dry, hot weather which is likely to result in lower bird activity generally.

Red-listed Species

Skylark

5.2.7 The skylark is a species mainly associated with arable habitats, grassland and moorland in the UK. This species is red listed as a Species of Conservation Concern due to recent breeding and wintering population decline and range contraction. It is also a Species of Principal Importance under section 41 of the NERC Act (2006).

5.2.8 Skylark were recorded on each visit with peak numbers in the arable land in Zone 1 during Visit 1. Sightings were spread between across all Zones, although there was a stronger association Zones 1 and 2 in the north east of the site. The majority of fields at the site are suitable for breeding skylark as they provide a good supply of suitable open space, nesting and food resources as well as long sightlines for predator monitoring.

5.2.9 The site supports an excellent population of skylark and surveys indicate this is around 25 territories. Figure 3 provides a distribution map of skylark found during the survey

Yellow Wagtail

5.2.10 Yellow Wagtails are farmland bird which are usually found in damp habitats such as marshes, lowland meadows and river valleys, but there has been much greater use of arable habitats over recent years, with oil-seed rape, legume and root crops increasingly used for breeding.

5.2.11 The population has fallen by an estimated 75 per cent between 1970 and 2009. It is thought that land drainage, the conversion of pasture to arable and a decline in invertebrate numbers (notably those associated with livestock) may be behind the decline, although the species is a long-distance migrant so changes in conditions at wintering or passage grounds cannot be ruled out

5.2.12 Yellow wagtail were recorded in reasonably low numbers (peak of 8) during visits 2 and 3. This species was absent during visit 1 and visit 4, although survey visit 1 was conducted when yellow wagtail are still arriving in the UK from overseas. Most observations were made within Zones 1 and 2 in the north east of the site as well as in Zone 7 in the central western area. Individuals were also recorded in Zone 3 in the south east of the site during the third visit.

5.2.13 The site supports a modest population of yellow wagtail and surveys indicate this is around 3 territories. Figure 4 provides a distribution map of yellow wagtail skylark found during the survey

Lapwing

5.2.14 Lapwing are a typical bird of farmland, wetland and upland grassland, but now in major decline due to habitat loss.

5.2.15 The site constitutes suitable lapwing breeding habitat as they are known to nest on spring tilled arable fields comprising solely bare ground which also provides a good foraging resource. Lapwing were observed in small numbers (peak of 7) on site in Zone 7 during visits 1, 2 and 4. Display, calling and courtship behaviour was noted between those seen on site on these two visits. No nesting behaviour was observed at the site during the third visit, although an individual was seen flying overheard in Zone 8 during Visit 3.

5.2.16 The site supports a low population of breeding lapwing and surveys indicate this is probably 1 or 2 territories. Figure 5 provides a distribution map of lapwing found during the survey

Yellowhammer

5.2.17 Yellowhammers are mainly associated with open countryside and hedgerows. This species is red listed as a Species of Conservation Concern due to recent population declines. This is likely due to changes in agricultural practices, such as the removal of hedgerows and increased use of pesticides. Yellowhammers were most regularly observed within the Boundary habitats particularly in the hedgerows and B8 and B6. These features offer suitable nesting habitat e site offers suitable habitat for foraging yellowhammers and appears to support modest numbers, with a peak count of 16 recorded during Visit 3.

Linnet

5.2.18 Linnets are found on farmland wherever there is a plentiful supply of seeds throughout the year. Mixed farmland is particularly valuable. They nest in dense hedgerows, bramble or other types of scrub.

5.2.19 Linnet numbers have dropped substantially over the past few decades, with the UK population estimated to have declined by 57 per cent between 1970 and 2008. This is largely the result of a lack of food sources in modern farming. Linnet is a red listed bird of conservation concern and a Species of Principal Importance.

5.2.20 Linnet were recorded on each survey visit in low to moderate numbers and the site appears to support a medium population. No particular association with either the boundary or open field habitats was noted, although a moderate flock of 25 birds were seen flying over Zone 1 during visit 3.

Amber-listed Species

Meadow pipit

5.2.21 Like skylarks, meadow pipits are associated with open arable, grassland and heathland habitats, are ground dwelling birds and have undergone declines in recent years, hence their amber status.

5.2.22 Relatively low numbers of these birds were encountered in each visit, aside from the 4th visits when none were seen or heard. They were primarily found within open habitats to the east of the site, as for skylarks. The site appears to support a small population of meadow pipit which are likely to nest within the fields.

The surveys indicate this is probably 1 or 2 territories. Figure 6 provides a distribution map of meadow pipit found during the survey.

Dunnock

5.2.23 Dunnock inhabit any well vegetated areas with scrub, brambles and hedges, including field edges. They spend large amounts of time on the ground in amongst grassland but also remain close to shrubby vegetation cover. Dunnock abundance fell substantially between the mid-1970s and mid-1980s, after a period of population stability. Some recovery has occurred throughout the UK since the late 1990s. Dunnock is an amber listed Species of Conservation Concern and a Species of Principal Importance.

5.2.24 Dunnock were recorded in low numbers during each survey visit, and were primarily observed with the boundary habitats. This species is present all year round and the site appears to support a small breeding population.

Willow warbler

5.2.25 Willow warbler are associated with scrub and open woodland and are amber listed due to recent breeding and wintering population decline and reduction in breeding and wintering range.

5.2.26 This species were recorded in small numbers within the boundary habitats across the site during each, and were most regularly recorded at the woodland edge at the western site boundary (B6). The site probably supports small breeding population.

Reed bunting

5.2.27 Reed bunting is a resident species that is typically found in wet vegetation, but has more recently spread into farmland. It nests close to the ground amongst dense vegetation including ditch banks. They feed on the ground and in ditches and banks and favour damp or marshy grassland and swamps.

5.2.28 Reed bunting numbers in the UK have been declining since the mid-1970s, due to habitat loss. Reed bunting is an amber listed Species of Conservation Concern and a Species of Principal Importance.

5.2.29 Observations of this species occurred on site primarily in the arable field in Zones 1 and 2, as well as the hedgerow, tall ruderal and ditch habitat at Boundaries 8, 9 and 11. The surveys identified approximately four territories of this species. Figure 7 provides a distribution map of reed bunting found during the survey.

Kestrel

5.2.30 Kestrel are a relatively common and widespread bird of prey species, although are amber listed due to recent declines in population and range. Two observation of these species were observed during each survey visit, primarily flying over the open fields. The grassland present at the field margins and fields in Zone 5 provide optimal habitat for small mammals, which is the chief food source for kestrels. This species could nest in the trees or pylons present within the site, but would be more likely to nest within the woodland edges around the site.

Other Birds of Conservation Concern

5.2.31 Individuals or small numbers of each of woodcock, herring gull, cuckoo, song thrush and mistle thrush (red-listed species) as well as greylag goose, lesser black-backed gull, tawny owl, stock dove, swift, and bullfinch (amber-listed species) were recorded on one or two occasions and did not show a persistent

association with the site. It is therefore likely that they are not present within the site throughout the breeding season but may use the site opportunistically.

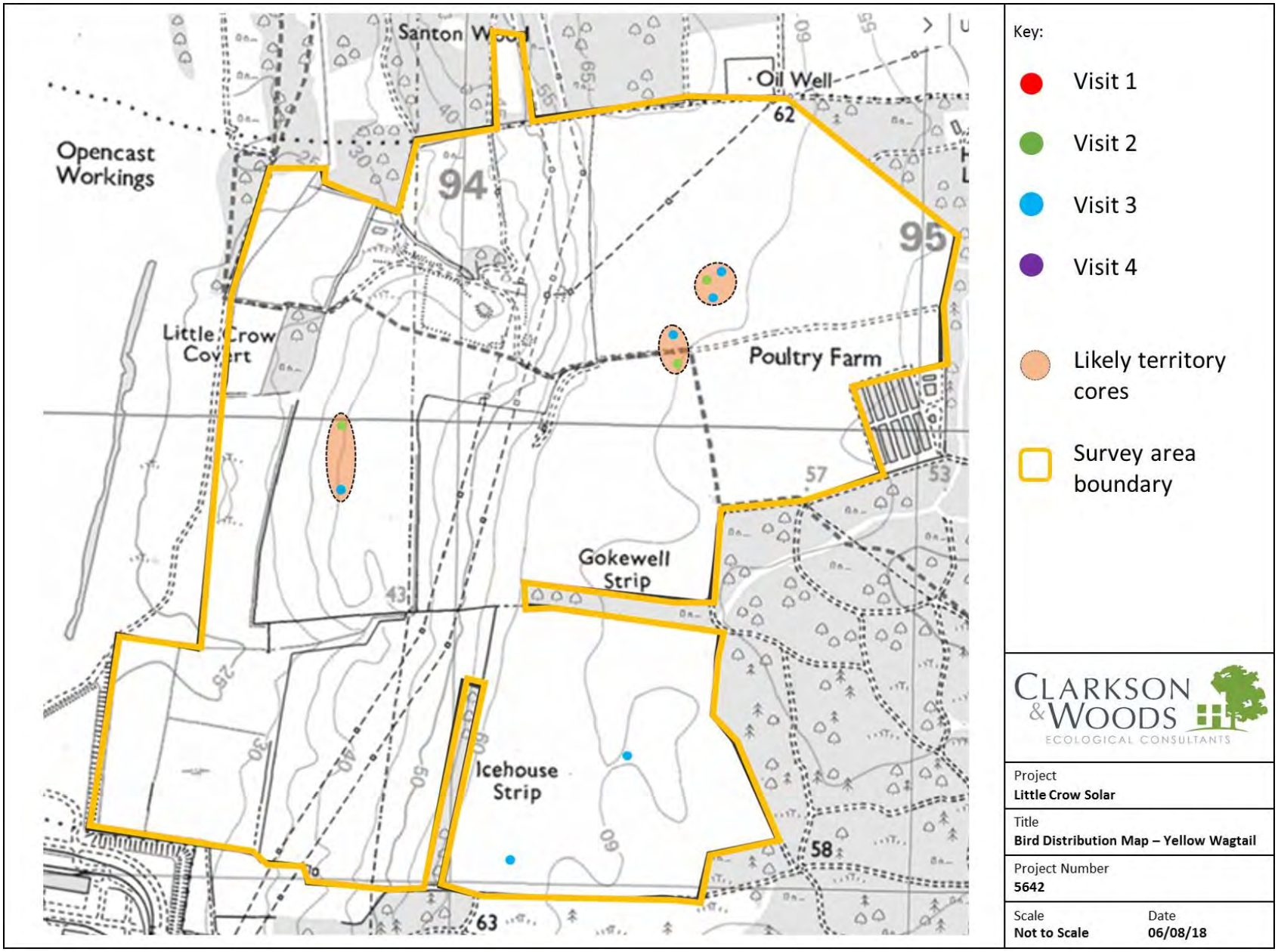

Figure 3: Skylark Distribution Map

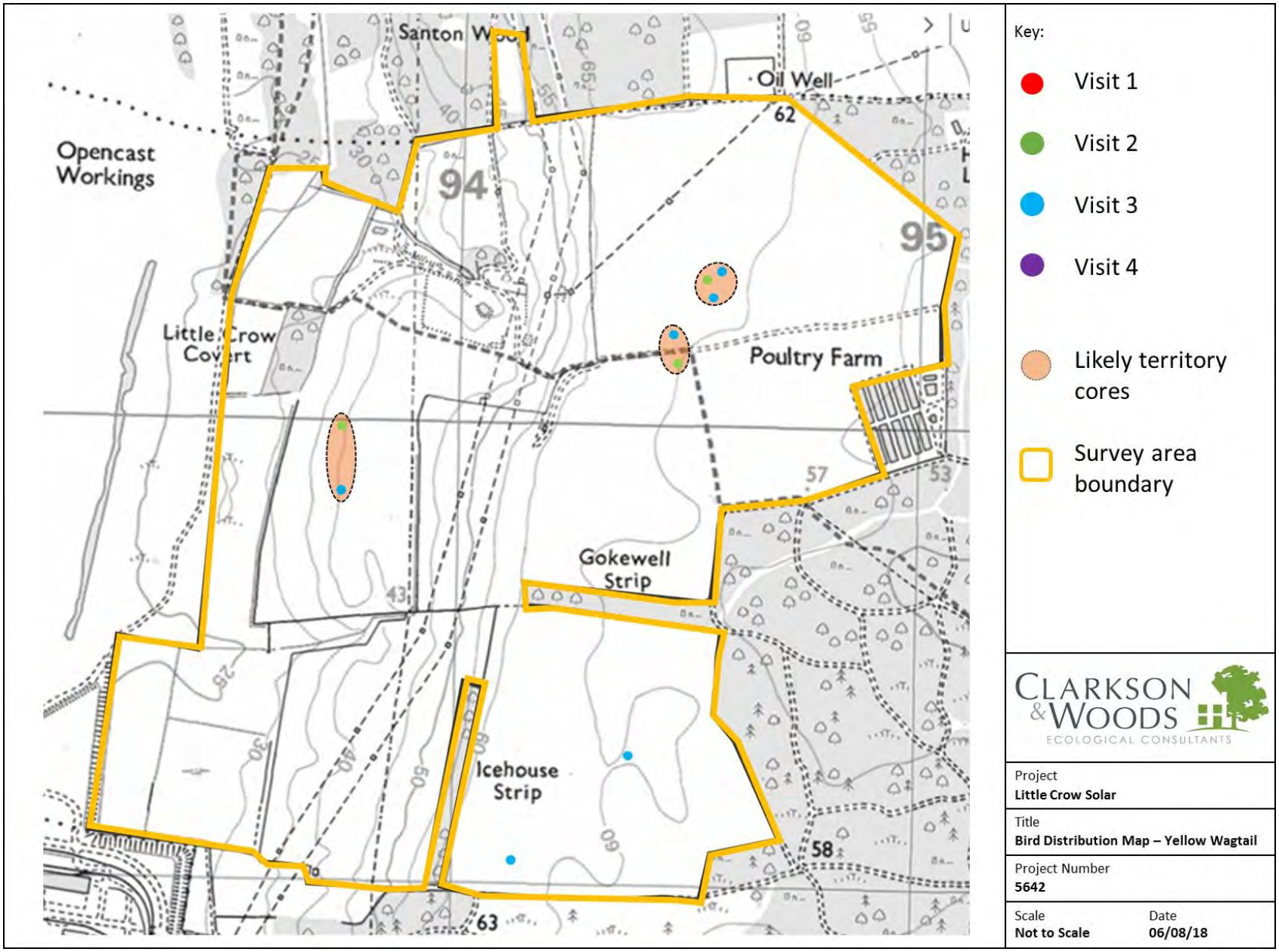

Figure 4: Yellow Wagtail Distribution Map

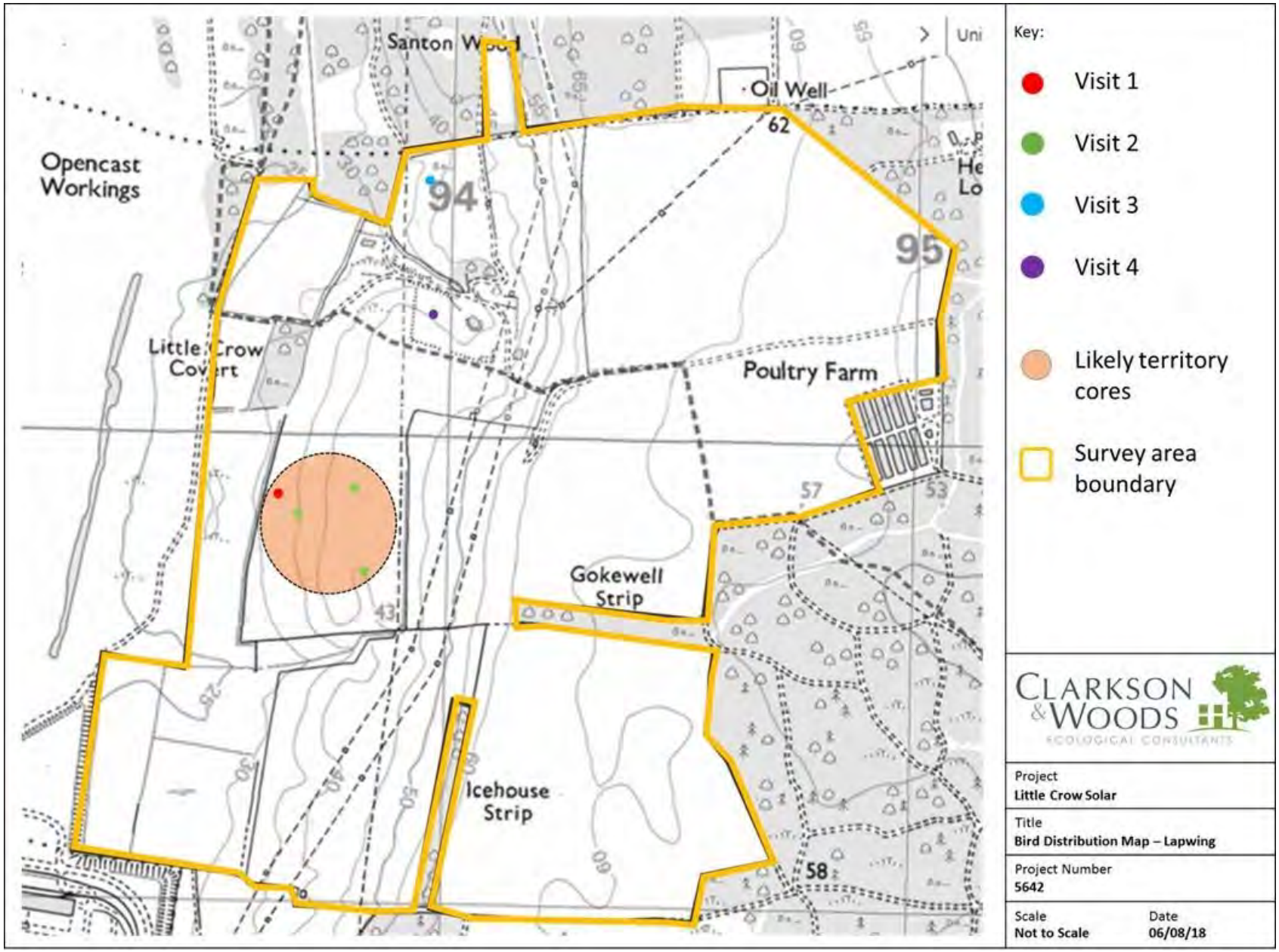

Figure 5: Lapwing Distribution Map

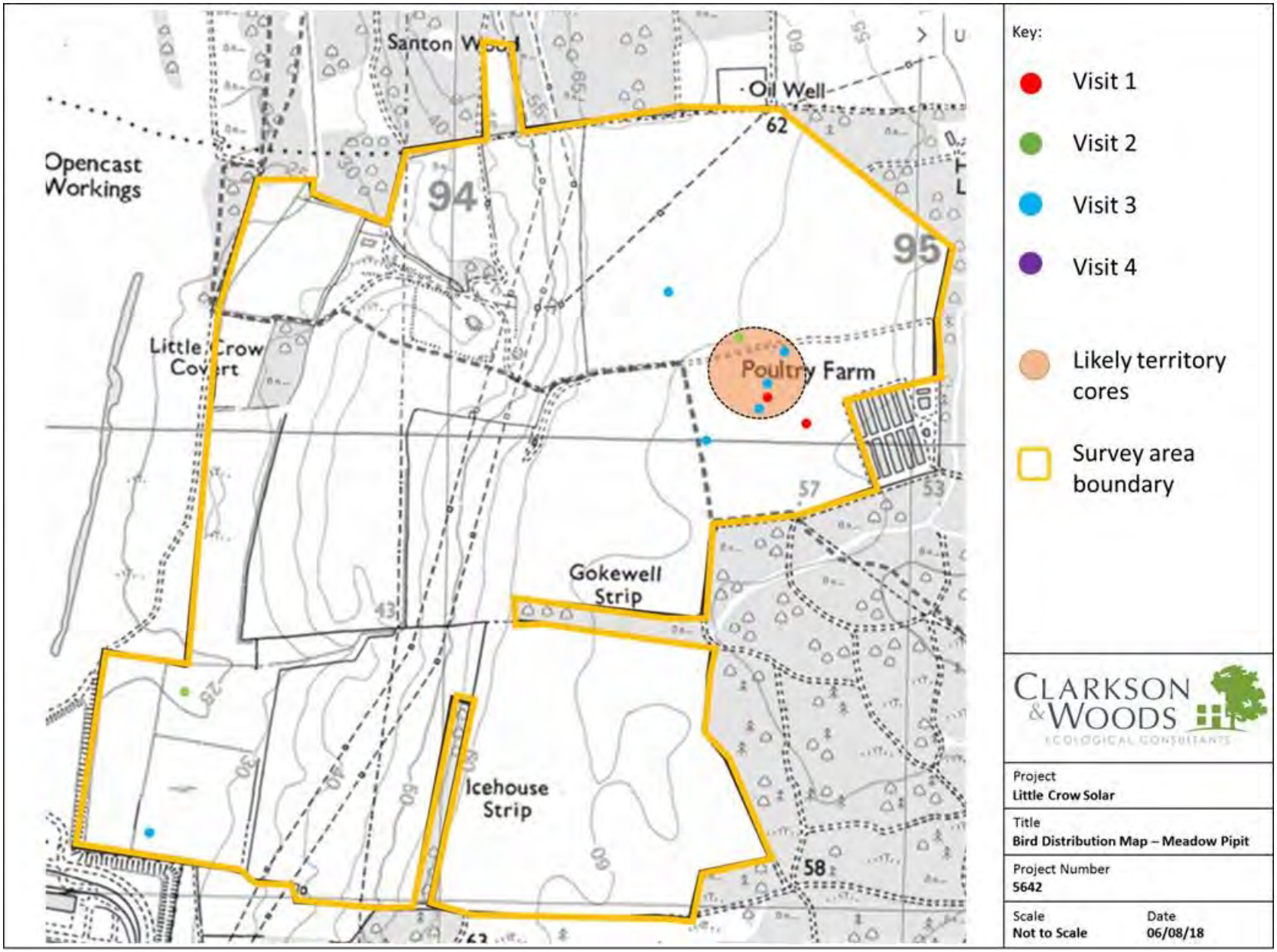

Figure 6: Meadow Pipit Distribution Map

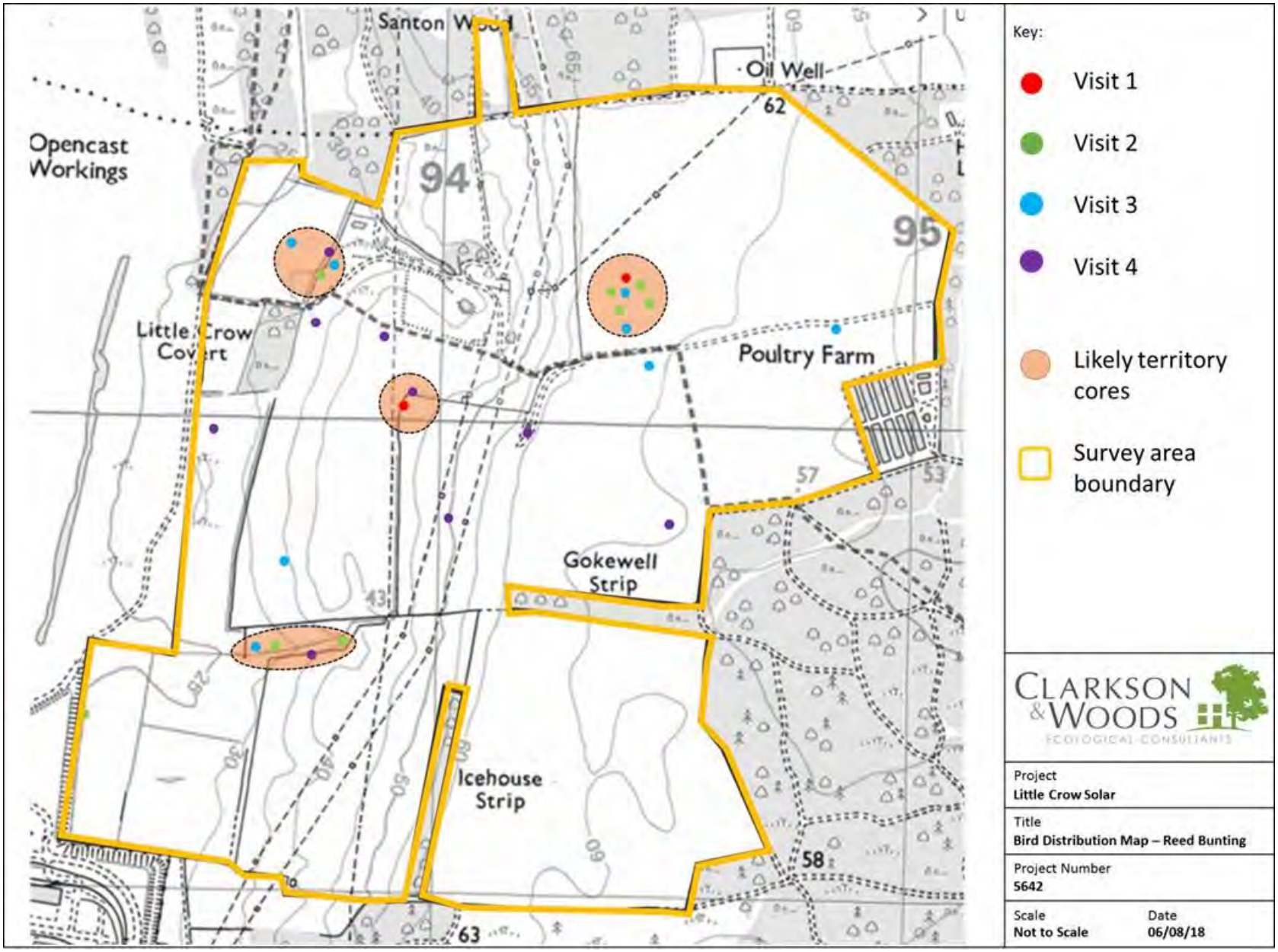

Figure 7: Reed Bunting Distribution Map

6 SUMMARY

6.1.1 A total of 55 species were identified; of which 10 were red listed birds and 11 were amber listed birds. Of these 21 bird species, 10 are also Species of Principal Importance under the NERC Act (2006) and so are a material consideration for planning.

6.1.2 The notable birds utilising the site can be split into two distinct categories; those which were recorded predominantly within open habitats and those recorded foraging predominantly in boundary habitats such as woodland and hedgerows.

6.1.3 The birds within open habitat are more likely to be directly impacted installation of a solar array. The approximate number of territories the site supports for each of these species is summarised in the Table 6 below. Although included in this summary, reed bunting may also utilise boundary habitat for nesting.

Table 6: Summary of Breeding Birds of Open Farmland

Birds Recorded within Open Habitats	Approximate Number of Territories
Skylark	25
Yellow wagtail	3
Lapwing	1 or 2
Meadow pipit	1 or 2
Reed bunting	3

6.1.4 Table 7 summaries the notable bird species that were either confirmed to be breeding or considered probably breeding within the boundary habitats at the site:

Table 7: Summary of Breeding Bird Associated with Boundary Habitats

Birds Recorded within Open Habitats
Kestrel
Dunnock
Song Thrush
Mistle Thrush
Willow Warbler
Bullfinch
Linnet
Yellowhammer

7 WILDLIFE LEGISLATION & SPECIES INFORMATION

BIRDS

All British birds, their nests and eggs (with certain exceptions) are protected under the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to: intentionally kill, injure or take a wild bird; intentionally take, damage or destroy nests which are in use or being built; intentionally take or destroy birds' eggs; or possess live or dead wild birds or eggs. A number of species receive additional protection through inclusion on Schedule 1 of the Wildlife and Countryside Act; for these it is also an offence to intentionally or recklessly disturb birds while nest building, or at a nest containing eggs or young, or to disturb the dependant young of such a bird. Penalties for offences against bird species include fines of up to £5,000 and/or up to six months in prison.

General licences for control of some bird species are issued by Natural England and Natural Resources Wales in order to prevent damage or disease, or to preserve public health or public safety, but it is not possible to obtain a licence for control of birds or removal of eggs/nests for development purposes. Consequently if nesting birds are present on a development site when works are programmed to start it is usually necessary to delay works, at least in the areas supporting nests, until any chicks have fledged and left the nest. It is usually possible, once chicks have hatched, for an experienced ecologist to predict approximately when they are likely to fledge, in order to inform programming of works on site.

PLANNING POLICY IN RELATION TO BIODIVERSITY - ENGLAND

The National Planning Policy Framework (NPPF), issued in March 2012, has superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005). Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. Further guidance is also available within the Government Circular ODPM 06/2005 on Biodiversity and Geological conservation although it should be noted that this document is currently being updated by DEFRA. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 109), including:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 115):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 118) by applying principles including:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
- development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- opportunities to incorporate biodiversity in and around developments should be encouraged;
- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and
- the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas and possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".

8 LERC RECORDS OF BIRDS FROM SURROUNDING 2KM

Species Name	Common Name	Date	Abundance	Designations
Acanthis cabaret	Lesser Redpoll	04/03/2015	3 Present (Count: Exact)	BoCC4-Red, Sect.41, Sect.42,
Accipiter gentilis	Goshawk	06/12/2003	1 Present (Count: Exact)	WCA1i,
Alauda arvensis	Skylark	27/06/2015	4 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41
Alcedo atthis	Kingfisher	01/11/2015		BoCC4-Amber, WCA1i,
Anas acuta	Pintail	23/11/2011	3 Present (Count: Exact)	BoCC4-Amber, WCA1ii,
Anas penelope	Wigeon	08/03/2015	1 Total (Count: Exact)	BoCC4-Amber,
Anas strepera	Gadwall	01/01/2013		BoCC4-Amber,
Anser anser	Greylag Goose	23/05/2015	2 Total (Count: Exact)	BoCC4-Amber, WCA1ii
Anser brachyrhynchus	Pink-footed Goose	01/11/2015		BoCC4-Amber,
Anser fabalis subsp. fabalis	Taiga Bean Goose	16/03/2011	8 Present (Count: Exact)	BoCC4-Amber,
Anser fabalis subsp. rossicus	Tundra Bean Goose	23/11/2011-07/12/2011	2 Juvenile (Count: Exact)	BoCC4-Amber,
Aythya ferina	Pochard	13/12/2015	2 Total (Count: Exact)	BoCC4-Red,
Aythya marila	Scaup	23/11/2011	1 1st calendar year male(s) (Count: Exact)	BoCC4-Red, Sect.41, , WCA1i,
Bucephala clangula	Goldeneye	20/12/2000	2 Present (Count: Exact)	BD2.2, BoCC4-Amber, WCA1ii,
Calcarius lapponicus	Lapland Bunting	27/10/2001	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Charadrius morinellus	Dotterel	25/04/2011	1 Present (Count: Exact)	BoCC4-Red, WCA1i,
Circus aeruginosus	Marsh Harrier	11/01/2012-22/02/2012	4 Present (Count: Exact)	BoCC4-Amber, WCA1i,
Clangula hyemalis	Long-tailed Duck	06/12/2004	1 Present (Count: Exact)	BoCC4-Red, WCA1i
Coccothraustes coccothraustes	Hawfinch	February 2009	11 Present (Count: Exact)	BoCC4-Red, Sect.41, Sect.42,
Cygnus columbianus subsp. bewickii	Bewick's Swan	15/02/2002	2 Present (Count: Exact)	BoCC4-Amber, Sect.41, Sect.42, WCA1i,
Cygnus cygnus	Whooper Swan	19/03/2013	26 Present (Count: Exact)	BoCC4-Amber, WCA1i,
Cygnus olor	Mute Swan	01/04/2014		BoCC4-Amber,
Emberiza calandra	Corn Bunting	2005 - 2010		BoCC4-Red, LBAP:3,
Emberiza citrinella	Yellowhammer	25/11/2015	9 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41, Sect.42,
Emberiza schoeniclus	Reed Bunting	25/11/2015	2 Total (Count: Exact)	BoCC4-Amber, LBAP:3, Sect.41, Sect.42,
Falco columbarius	Merlin	28/03/2012	1 Female (Count: Exact)	BD1, Bern2, BoCC4-Red, , WCA1i,i
Falco peregrinus	Peregrine	03/11/2015	1 Present (Count: Exact)	BD1, Bern2, CITESA, CMS_A2, LBCSchedule1, ScotBL, WCA1i,
Falco subbuteo	Hobby	02/08/2015	1 Total (Count: Exact)	WCA1i
Fringilla montifringilla	Brambling	25/01/2015	23 Present (Count: Exact)	WCA1i
Gallinago gallinago	Snipe	06/12/2014	1 Present (Count: Exact)	BoCC4-Amber, LBAP:3
Gavia immer	Great Northern Diver	12/01/2013	1 Present (Count: Exact)	BoCC4-Amber, WCA1i

Species Name	Common Name	Date	Abundance	Designations
Gavia stellata	Red-throated Diver	14/11/2011	1 Juvenile (Count: Exact)	WCA1i,
Haliaeetus albicilla	White-tailed Eagle	19/05/2011	1 Present (Count: Exact)	BoCC4-Red, WCA1i,
Linaria cannabina	Linnet	02/08/2015		BoCC4-Red, LBAP:3,
Loxia curvirostra	Common Crossbill	19/03/2014	22 Present (Count: Exact)	WCA1i,
Loxia leucoptera	Two-barred Crossbill	23/03/2014	1 Male (Count: Exact)	WCA1i
Lullula arborea	Woodlark	28/02/2014	1 Present (Count: Exact)	Sect.41, Sect.42, WCA1i
Melanitta nigra	Common Scoter	31/03/2005	1 Male (Count: Exact)	BoCC4-Red, Sect.41, Sect.42, , WCA1i,
Milvus milvus	Red Kite	19/10/2014	1 Present (Count: Exact)	WCA1i,
Numenius arquata	Curlew	2005 - 2010		BoCC4-Red, LBAP:3, , Sect.41, Sect.42,
Numenius phaeopus	Whimbrel	08/08/2011	1 Present (Count: Exact)	BoCC4-Red, WCA1i, WO1i
Passer domesticus	House Sparrow	25/11/2015		BoCC4-Red, LBAP:3, , Sect.41, Sect.42,
Passer montanus	Tree Sparrow	02/08/2015		BoCC4-Red, LBAP:3, Sect.41, Sect.42,
Perdix perdix	Grey Partridge	03/10/2015	5 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41, Sect.42,
Pernis apivorus	Honey-buzzard	02/10/2015	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Pyrrhula pyrrhula	Bullfinch	25/11/2015	1 Total (Count: Exact)	BoCC4-Amber, , LBAP:3,
Serinus serinus	Serin	17/11/2007	1 Present (Count: Exact)	WCA1i
Stercorarius parasiticus	Arctic Skua	07/05/2002	1 Present (Count: Exact)	BoCC4-Red, , UKBAP
Sturnus vulgaris	Starling	25/11/2015	100 Total (Count: Estimate)	BoCC4-Red, LBAP:3
Tringa glareola	Wood Sandpiper	28/08/2002	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Tringa ochropus	Green Sandpiper	20/06/2014	1 Present (Count: Exact)	BoCC4-Amber, WCA1i
Tringa totanus	Redshank	19/04/2011	4 Present (Count: Exact)	BoCC4-Amber, LBAP:3
Turdus iliacus	Redwing	06/12/2015	6 Present (Count: Exact)	BoCC4-Red, , WCA1i
Turdus philomelos	Song Thrush	15/06/2015	1 Total (Count: Exact)	BoCC4-Red, LBAP:3,
Turdus pilaris	Fieldfare	26/03/2014	400 Present (Count: Exact)	BoCC4-Red, WCA1i,
Tyto alba	Barn Owl	24/12/2015	1 Present (Count: Exact)	LBAP:3, WCA1i,
Vanellus vanellus	Lapwing	04/10/2015	8 Total (Count: Exact)	BoCC4-Red, LBAP:3, Sect.41, Sect.42,

Meaning of designations listed above

Designation	Meaning
BoCC4-Amber	BTO Amber List – Bird Population Status Amber
BoCC4-Red	BTO Red List – Bird Population Status Red
Sect.41/42	Section 41/42 of the NERC Act 2006/ UK Biodiversity Action Plan Species
WCA1i	Wildlife and Countryside Act 1981 Schedule 1
LBAP:3	Lincolnshire Biodiversity Action Plan (3rd Edition)

Technical Appendix 7.4

BAT ACTIVITY SURVEY

Little Crow
Solar Park

National significant infrastructure project in the Energy Sector

Little Crow Solar Park, Scunthorpe

BAT SURVEY REPORT

On behalf of INRG Solar (Little Crow) Ltd

November 2018

BAT SURVEYS

LITTLE CROW SOLAR, SANTON, LINCOLNSHIRE

CONTENTS

Project title	Santon Solar Farm, Scunthorpe, Lincolnshire			
Project number	5642			
Document title	Bat Surveys – Interim Report			
Client	INRG Solar (Little Crow) Ltd			
Author	Charlie Durigan			
Status	Checked by	Date	Approved for C&W by	Date
V1	Peter Timms	19/07/18	Tom Clarkson	03/08/18
				
V2 –*September survey results incorporated*	Peter Timms	26/09/18	Hannah Montag	05/10/18
				

1 INTRODUCTION

1.1.1 Clarkson and Woods Ltd. was commissioned by Pegasus Group on behalf of INRG to carry out bat surveys of land at Santon Solar Farm near Scunthorpe, Lincolnshire.

1.1.2 This report aims to inform a planning application for construction of a solar farm within the site. It details the methods and results of the surveys and informs the Environmental Statement (ES) Chapter on Ecology prepared for the site.

1.1.3 This report sets out the results of bat activity surveys carried out between April and September 2018.

1.1.4 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 Development Proposals

1.2.1 The proposed development comprises the construction of a photovoltaic solar farm. The installation of solar panels on metal frames are driven into the ground and connected by underground cables to a transformer, which is then connected locally to the National Grid network.

1.2.2 The array will be situated within the fields with fencing utilised to secure the site.

1.3 Survey Aims

1.3.1 Given the size of the development and significance of the proposed changes to land use, bat activity surveys were recommended to ascertain the level of use by foraging and commuting bats along with species composition and abundance. The objective of these surveys was to establish the value of the habitats and features and site as a whole to individual species of bats and bats in general in the context of the wider landscape.

2 SURVEY AND ASSESSMENT METHODOLOGY

2.1.1 The survey methods were based on current guidance set out by the Bat Conservation Trust (BCT)[1].

2.1.2 Existing habitats on site principally comprise of arable fields, bounded by a network of hedgerow, ditches and plantation woodland. These habitat types are generally ubiquitous within the local landscape, and the most suitable habitat for foraging/commuting bats (woodland and hedgerows) are expected to remain unaffected by the development. The arable fields which comprise the main development zone were considered to offer few opportunities for foraging/commuting bats. Given the habitats on site and the likely impacts of the development, a level of survey effort consistent with that recommended for habitats of 'low' suitability was therefore considered appropriate. In line with the aforementioned BCT guidelines, one survey per season (Spring -April/May, Summer -June/July/August, Autumn - September/October) have been conducted at the site. The transect surveys have been augmented by automated bat detector surveys.

[1] 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.

2.2 Data Search

2.2.1 The Extended Phase 1 Report[2] should be referred to for details of the desk study and data search with the Local Records Centre undertaken to inform baseline conditions for the site.

2.3 Personnel

2.3.1 The following ecologists assisted with the walked transects and static detector surveys (as described below):

- *Peter Timms ACIEEM (Level 1 bat licence 2016-22469-CLS-CLS)(6 years' experience)*
- *Phil Bowater AIEMA GradCIEEM (Level 1 bat licence 2017-28070-CLS-CLS) (5 years' experience)*
- *Paul Kennedy ACIEEM (Level 2 bat licence- 2015-14471-CLS-CLS) (5 years' experience)*
- *Patrick Ellison GradCIEEM (5 years' experience)*
- *Chris Poole Grad CIEEM (1 years' experience)*

2.3.2 All of the above ecologists have been assessed under the Clarkson and Woods QA processes as competent to complete the survey.

2.4 Walked Transect Surveys

2.4.1 The transect surveys involved walking a predetermined transect at a constant speed using bat detectors and recording devices. Due to the relatively large size of the site, three separate transect routes were walked in order to ensure sufficient coverage of all areas of the site.

2.4.2 The three transect routes were designed to provide a balanced overview of bat activity across the entire site. The starting point was changed for each transect survey to avoid bias during the surveys. Figure 1 below shows the routes followed by the three transects.

2.4.3 Surveys were undertaken on three evenings in April, June and September during suitable weather conditions (low wind, little to no rain and temperatures at sunset of at least 10°C).

2.4.4 Surveyors were equipped with handheld bat detectors (Echo Meter Touch with an iPad Mini 4). The surveys commenced at approximately sunset and finished 2 hours after sunset.

2.4.5 The survey recordings were later analysed on a computer using Kaleidoscope (Wildlife Acoustics) software to confirm or identify species.

2.4.6 Table 1 provides the dates, weather conditions, sunset/sunrise times, survey start and end times and ecologist details for each of the walked transects.

[2] Phase 1/Baseline Conditions Report – Little Crow Solar (July 2018) Clarkson & Woods

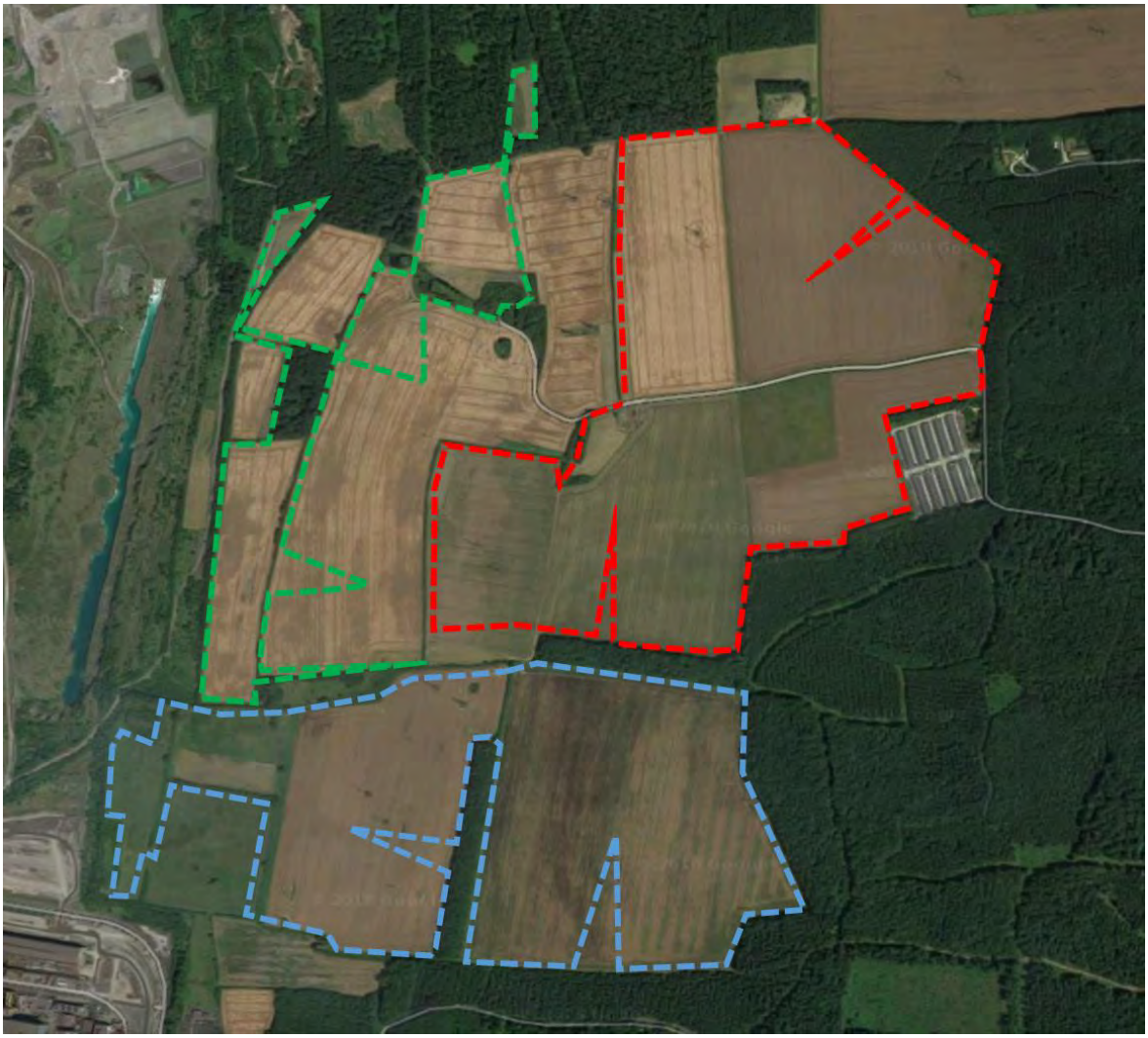

Figure 1: Walked transect routes covering the entire site

Table 1: Transect survey details

Date	Transect/ Ecologist	Sunset/ Sunrise	Survey Start Time	Survey End Time	Weather Conditions at Start	Weather Conditions at End
23/04/18	Blue / PB	20:16	20:16	22:16	13˚C,8/8 cloud cover, 4/12 wind speed, dry	12˚C,6/8 cloud cover, 4/12 wind speed, dry
	Green / PT					
	Red/ PE					
19/06/18	Blue / PT	21:34	21:34	23:34	22˚C,7/8 cloud cover, 1/12 wind speed, dry	20˚C,3/8 cloud cover, 0/12 wind speed, dry
	Green / CP					
	Red / PE					
04/09/18	Blue / PT	19:46	19:46	21:46	17˚C, 4/8 cloud cover, 1/12 wind speed,	15˚C, 6/8 cloud cover, 0/12 wind speed,
	Green / CP					
	Red / PK					

2.5 Static Automated Detector Surveys

2.5.1 Six automated static detectors (Anabat Express, Anabat Swift and Song) were deployed across the site in April/May (Spring), June (Summer) and September (Autumn), for a minimum of six consecutive nights per deployment (refer to Table 2 below for deployment and collection dates). This is a higher survey effort than recommended by the BCT for sites of low suitability habitat. For the April and June Surveys, Anabat Express (Titley Scientifc) detectors were deployed. For the September survey, one Anabat Express was deployed at Location F, two Anabat Swift detectors (also Titley Scientific) were deployed at Locations D and B, and three Wildlife Acoustics' SongMeter II+ detectors were deployed at Locations A, C and E. Detectors were placed in the same locations for all surveys, which were selected to focus on key habitat features identified during previous surveys and to ensure an even spread across the site. (Figure 2 refers). The detectors were programmed to begin recording at least 30 minutes before sunset and end recording 30 minutes after sunrise each night and logged bat passes in each static detector location.

Figure 2: Static Detector Locations

2.5.2 The deployment dates and weather conditions are detailed in Table 2 below.

Automated Species Identification Protocol

2.5.3 Data downloaded from the static detectors was processed using Wildlife Acoustics' Kaleidoscope Pro automatic species recognition software and bat species and the number of bat passes was identified.

Table 2: Static detector deployment dates and weather conditions

Date	Nightly Temperature Range	Weather
24/04/2018	13-7°C	Passing shower and cloud, wind 3/12 (Beaufort scale)
25/04/2018	11-6°C	Passing clouds, dry, wind 4/12
26/04/2018	8-5°C	Scattered clouds, dry, wind 2/12
27/04/2018	9-6°C	Mostly cloudy, dry, wind 3/12
28/04/2018	8-7°C	Partly cloudy, dry, wind 4/12
29/04/2018	9-6°C	Passing cloud, dry, wind 4/12
30/04/2018	7-3°C	Passing cloud, dry, wind 3/12
01/05/2018	12-9°C	Light rain, overcast, wind 5/12
12/06/2018	13-11°C	Overcast, dry, wind 2/12
13/06/2018	17-14°C	Passing clouds, dry, wind 5/12
14/06/2018	15-11°C	Cool, dry, wind 2/12
15/06/2018	14-12°C	Scattered clouds, dry, wind 1/12
16/06/2018	14-12°C	Cool, dry, wind 3/12
17/06/2018	16-15°C	Passing clouds, dry, 3/12
18/06/2018	19-14°C	Partly cloudy, dry, 3/12
04/09/18	17-13°C	Mostly cloudy, dry, wind 2/12
05/09/18	15-9°C	Passing clouds, dry, wind 1/12
06/09/18	12-7°C	Mostly clear, light rain, wind 2/12
07/09/18	15-10°C	Scattered clouds, dry, wind 3/12
08/09/18	15-14°C	Mostly cloudy dry, wind 3/12
09/09/18	15-13°C	Mostly cloudy, dry, 3/12

*Weather data obtained from darksky.net ©2018

3 SURVEY LIMITATIONS

3.1 Bat Activity and Automated static detector surveys

3.1.1 Bat detectors are known to be more sensitive to certain bat calls than to others for reasons such as varying bat call loudness and directionality of certain calls. This can result in certain bat species (notably horseshoe bats and long-eared bats) being under-recorded due to the limitations of current available bat detectors. The difference in recording efficiency may therefore bias any results, which has been taken into account where possible during any assessment of the results.

3.1.2 Kaleidoscope Pro automatically identifies bat calls using algorithms and provides statistical levels of confidence associated with each classified call. The confidence levels reflect that there will be certain classification errors related to each classified bat call. With experience of using the software it is, on the whole, reliable when identifying certain bat calls, especially horseshoe bat calls due to their simple and unmistakeable parameters. Other straightforward species are common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula* and serotine *Eptesicus serotinus.* However, the software has been found to be less reliable when identifying other species (long-eared *Plecotus sp.,* Leisler's *Nyctalus leisleri* and barbastelle *Barbastella barbastellus* bat species).

3.1.3 Kaleidoscope Pro does not distinguish between the various *Myotis* species and simply classifies them to genus level (i.e. *Myotis* sp.). This is in line with classification that would be achieved by manual identification due to the similar nature of *Myotis* calls making species classification subject to a high degree of error. The on-board software used by the EchoMeter Touch does, however, distinguish between *Myotis* species, but this has been found to be inconsistent.

3.1.4 Due to the software limitations, all calls are manually verified to confirm the identification is accurate. Furthermore, where the software is unsure of a bat call, it will classify the call as 'NoID'. For completeness, all NoID files were classified, where appropriate. Noise files were not checked as the vast majority of these cannot be analysed or attributed to bats or their calls.

3.1.5 Additionally, automated detectors are triggered to record when suitable ultrasound is detected and will not cease recording until either a window of 1 second of silence is recorded or 30 seconds elapses, whichever is sooner. If more than one species is present within a recording, the software can only classify one species, so is forced to select which is 'dominant'. This potentially results in an under-recording of quieter species, long-eared bats, or species with a longer pulse repetition rate.

3.1.6 Overall, the classification data produced by Kaleidoscope Pro, along with manual verification of records, is considered to provide an acceptably accurate record of bat species recorded by static bat detectors and, as such, have been used within this report.

3.2 General

3.2.1 Overnight temperatures during the first static detector deployment consistently dropped below 10°C, which may have resulted in reduced bat activity during these periods. Weather conditions were otherwise favourable for bat activity during the survey.

4 RESULTS

4.1 Data Search

4.1.1 The Phase 1/Baseline Report[3] should be referred to for details of the desk study and data search with the Lincolnshire Environmental Records Centre undertaken to inform baseline conditions for the site. However, the results of the desk study pertaining to bats are repeated in this section.

4.1.2 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 site.

4.1.3 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 site. Field records of this species, as well as Daubenton's bat *Myotis daubentonii* exist from Ashbyville Lake, approximately 1.3km south west of the site. Single records of Nathusius' pipistrelle *Pipistrellus nathusii* and Whiskered bat *Myotis mystacinus* occur within Scunthorpe and approximately 1.5km west of the site.

4.1.4 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 site.

MAGIC search for EPS (bat) Licences

4.1.5 Records of previously issued European Protected Species Licences for batsfrom within 5km of the site were obtained using the MAGIC website. Details of these licences are provided in Table 3 below.

Table 3: MAGIC records of EPS mitigation licences issued within a 2km radius of the site

Licence Ref No.	Species Covered	Dates of Licence	Distance and bearing from Site 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

[3] Baseline Conditions Report – Little Crow Solar, Santon, Lincolnshire (July 2018) Clarkson and Woods.

4.2 Survey Results

Walked transects

4.2.1 Table 4 below provides a summary of bat species and the total number of bat passes (foraging and commuting combined) recorded during the April, June and September transect surveys. These results are taken from the Echo Meter Touch and iPad Mini 4 recordings.

Table 4: Summary of May and June 2018 transect survey results (no. passes)

Species	23/04/2018 (Spring)	19/06/2018 Summer	04/09/2018 Autumn	Total
Common pipistrelle	89	68	89	246
Soprano pipistrelle	23	8	13	44
Noctule	0	10	8	18
Myotis sp.	0	7	2	9
Total no. passes	112	93	112	317

4.2.2 Figure 3 below provides a summary in heatmap form of all bat activity recorded during the transect surveys within the site across each survey season. Heatmaps show the number of bat passes in colour codes on a dark blue to red gradient – the darker blue the colour the fewer bat passes recorded compared to red, which depicts a the highest number of bat passes recorded in that area. Note that these maps do not differentiate between foraging and commuting behaviour.

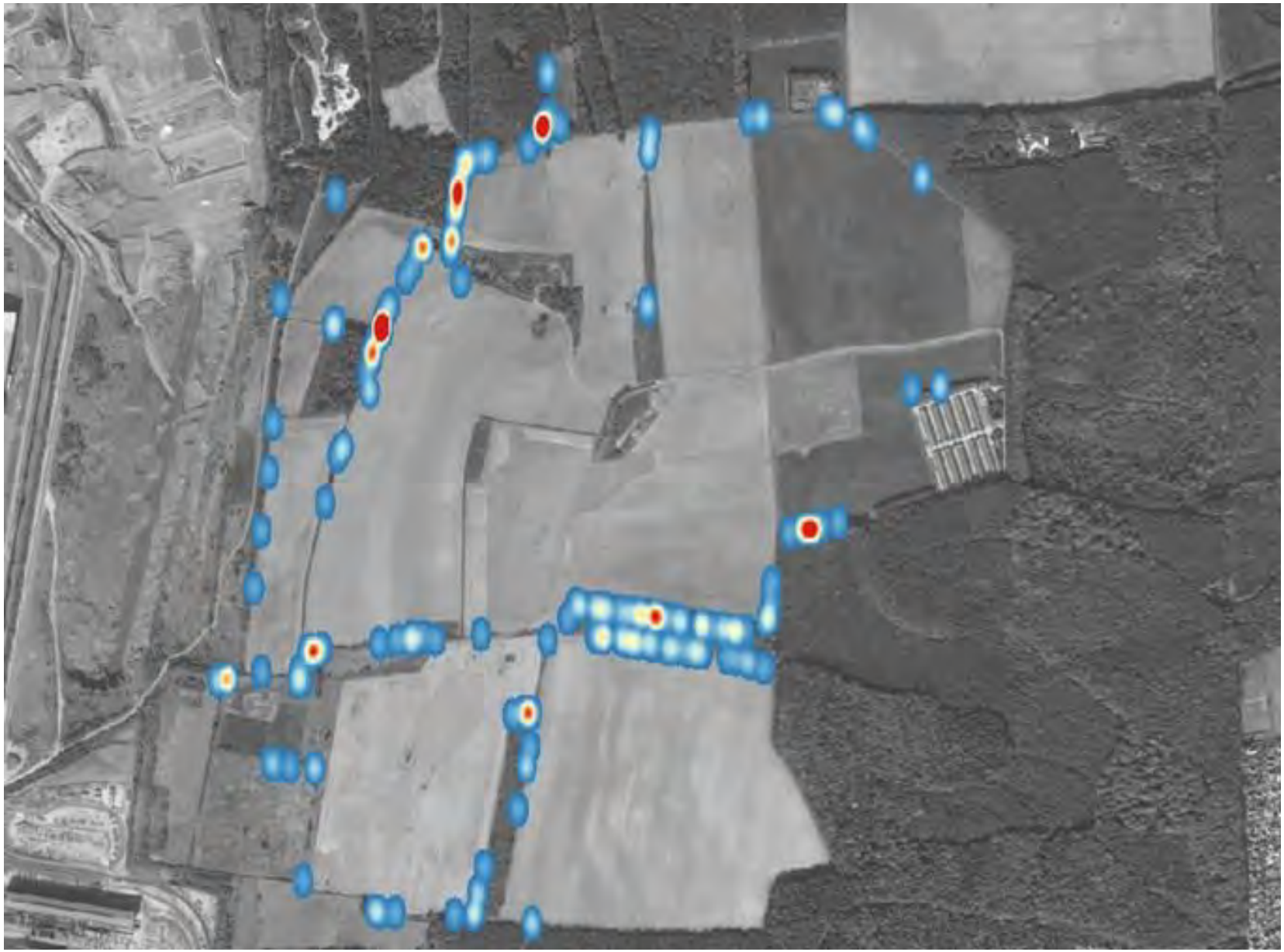

Figure 3: Heatmap showing total bat activity across all three transects

4.2.3 The highest concentration of bat activity was recorded in the north west of the site, where the habitat comprises woodland edge, a hedgerow and a pond. Another notable concentration of activity can be seen along the northern edge of a wooded shelter belt (known as 'Gokewell Strip') in the centre/east of the site. Very little activity was noted in the centre of the fields away from boundary habitats

4.2.4 The transect surveys indicated that low numbers of generally widespread species are using the site, with common pipistrelle recorded most often. Common pipistrelle call accounted for 77.6% of total bat calls. Soprano pipistrelle was the second-most recorded species, making 13.8% of calls. These were the only two species recorded during the April survey. Noctule and Myotis bat species accounted for 5.7% and 2.8% of calls respectively.

4.2.5 The number of total passes recorded was slightly higher in the April and September surveys than the June survey.

Static detector surveys - Field survey results

4.2.6 A total of 2994 bat passes were recorded across all static detectors during both surveys, 210 of which were recorded during the April-May survey, 2072 during the June survey, and 712 passes recorded in September. The following (minimum) five bat species were recorded during the surveys:

- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Noctule *Nyctalus noctula*
- Myotis species *Myotis sp. (an aggregation of common Myotis species is likely to include one or more of Natterer's bat, Daubenton's bat, Brandt's bat Myotis brandtii and whiskered bat Myotis mystacinus*
- Brown long-eared *Plecotus auritus (grey long-eared was ruled out as it has only been recorded in southern England and Wales)*

4.2.7 Table 5 below provides the results of the static bat detector surveys for each location between April and September 2018. Figure 4 also displays the total number of passes for each species recorded over the duration of the surveys.

Table 5: Results of the static bat detector surveys for each location between April and September 2018

Static location (Figure 2 refers)	Total no. bat species / passes recorded	Species	No. passes	Average No. of Passes per night	% of activity
A	5 species 301 passes 21 Nights (average passes per night = 14.33)	Common pipistrelle	194	9.24	64.45
		Soprano pipistrelle	55	2.62	18.27
		Noctule	28	1.33	9.30
		Myotis	19	0.9	6.31
		Brown long-eared	5	0.24	1.66
B	5 species 452 passes 21 Nights (average passes per night = 21.52)	Common pipistrelle	339	16.14	75
		Soprano pipistrelle	29	1.38	6.42
		Noctule	62	2.95	13.72
		Myotis	18	0.86	3.98
		Brown long-eared	4	0.19	0.88

Static location (Figure 2 refers)	Total no. bat species / passes recorded	Species	No. passes	Average No. of Passes per night	% of activity
C	5 species 517 passes 21 Nights (average passes per night = 24.62)	Common pipistrelle	468	22.29	90.52
		Soprano pipistrelle	33	1.57	6.38
		Noctule	8	0.38	1.55
		Myotis	7	0.33	1.35
		Brown long-eared	1	0.05	0.19
D	5 species 1462 passes 21 Nights (average passes per night = 69.61)	Common pipistrelle	1358	64.67	92.89
		Soprano pipistrelle	53	2.52	3.63
		Noctule	23	1.10	1.57
		Myotis	23	1.10	1.57
		Brown long-eared	5	0.24	0.34
E	5 species 96 passes 21 Nights (average passes per night = 4.57)	Common pipistrelle	69	3.29	71.88
		Soprano pipistrelle	5	0.24	5.21
		Nathusius' pipistrelle	11	0.52	11.46
		Noctule	7	0.33	7.29
		Myotis	4	0.19	4.17
		Brown long-eared	69	3.29	71.88
F	5 species 166 passes 21 Nights (average passes per night = 7.90)	Common pipistrelle	71	3.38	42.77
		Soprano pipistrelle	53	2.52	31.93
		Noctule	13	0.62	7.83
		Myotis	18	0.86	10.84
		Brown long-eared	11	0.52	6.63

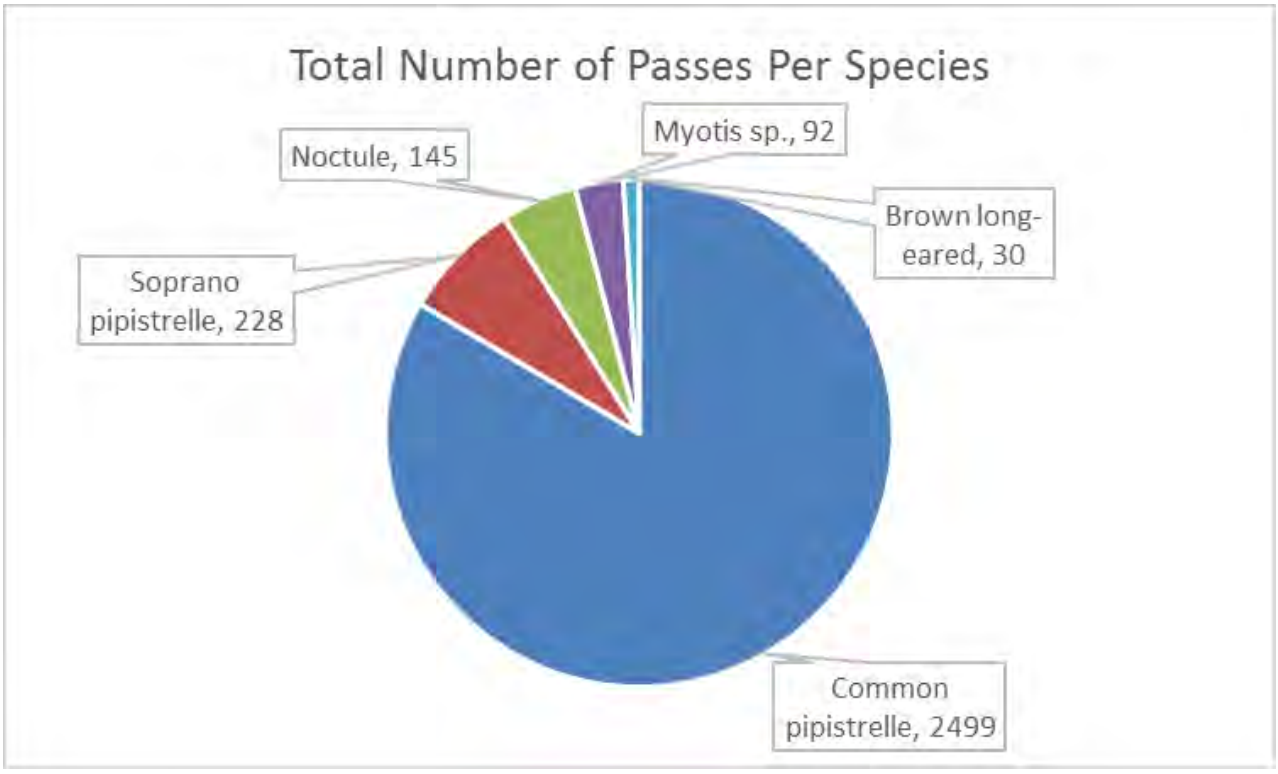

Figure 4: Summary of the species assemblage and total number of passes recorded over the survey period

4.2.8 The static detectors recorded a low number of UK native bat species utilising the site (5+ species out of the 11 known resident species in Lincolnshire). It is possible that up to 6 or 7 species use the site, given that *Myotis* species of bat are only classified to a genus level (the Myotis assemblage could comprise one of the more frequently encountered species such as whiskered, Daubenton's Natterer's and possibly Brandt's). A total of 2,994 bat passes were recorded throughout the survey period, at an average of 23.76 passes per night per detector. This is considered to represent a relatively low level of bat activity in comparison to numerous sites Clarkson and Woods have undertaken bat surveys at throughout England.

4.2.9 As with the manned transect surveys common pipistrelle was found to be the most abundant species, accounting for 83.47% of all passes with an average of 19.83 passes per night. Soprano pipistrelle and noctule were the next most frequently recorded, accounting for 7.62% and 4.84% of passes respectively, with an average of 1.81 and 1.15 passes per night respectively.

4.2.10 A total of 92 passes from Myotis sp. were recorded during the surveys which equates to an average of 0.73 passes per night and 3.07% of passes overall. A total of 30 brown long-eared calls were recorded at an average of 0.24% per night and accounting for 1% of total bat activity.

4.2.11 In terms of bat usage of different areas of the site, the highest levels of bat activity by far were recorded at the western boundary of the site, where a wooded stream corridor is present (Location D). Moderate activity was also recorded at woodland edges in the north of the site (Locations A & B) and at an area of scrub and hedgerow in the middle of the site (Location C). Lower levels of activity were recorded at south east of the site (Location F), with the south western site boundary (Location E) representing the least-used area with less than 5 passes (on average) per recording night.

4.2.12 Figure 5 below shows a visual summary of relative bat activity at each detector location

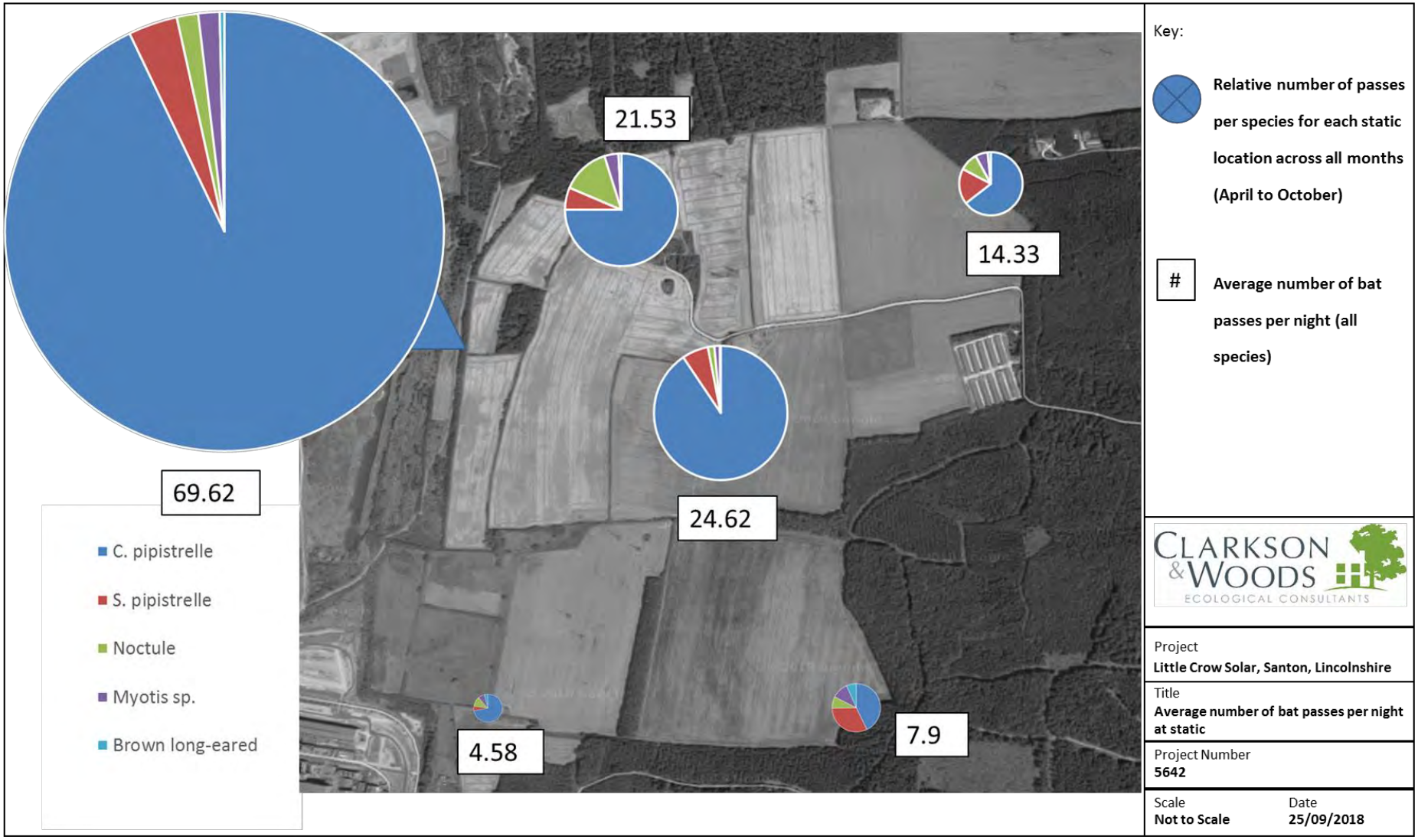

Figure 5: Bat activity at each deployment location

5 ECOLOGICAL EVALUATION

5.1.1 This section provides an analysis of the value of ecological receptors (bats) identified as occurring within or in proximity of the site. The valuation of the receptor employs the scoring method described by Wray et al[4], and reflects the rarity and conservation status of each species as well as its relative abundance and activity levels on site.

5.1.2 At least 5 species of bat were recorded within the application site during combined surveys. Table 6 below provides the status of each bat species recorded and also the importance of the site to each species based on the combined survey results.

Table 6: Ecological Evaluation

Bat species	UK status (current estimated UK population size)[5]	County status[6]	Level of activity on site	Ecological Importance (Calculated Score {Wray et al. 2010})
Common pipistrelle	Common and widespread (2,430,000)	Common and widespread	Low to moderate activity, likely by a small number of individuals	Local (2+10+3+4 = 17)
Soprano pipistrelle	Common and widespread (1,300,000). UK BAP Priority Species	Common, (but less so than common pipistrelles) and widespread	Low activity, likely by one or two individuals	Site 2+5+3+4 = 14)
Noctule	Fairly common and widespread (50,000). UK BAP Priority Species	Thought to be declining in some areas, although relatively common in the northern half of the county.	Low activity, likely by one or two individuals	Local (5+5+3+4 = 17)
Myotis sp. (exact species recorded unknown)	Daubenton's - relatively common and widespread throughout Britain with a UK estimated population of 560,000 (95,000 in England)	Common and widespread wherever wetland habitat is present	Low activity, likely by one or two individuals	Local 5+5+3+4 = 17
	Natterer's - locally common and widespread throughout Britain with a UK estimated population of 148,000 (70,000 in England)	Local, more common along the western edge of the county		

[4] Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010). Valuing Bats in Ecological Impact Assessment. In Practice, December 2010. Chartered Institute of Ecology and Environmental Management.
[5] Based on information provided by the Bat Conservation Trust http://www.bats.org.uk/
[6] Based on information provided by the Lincolnshire Biodiversity Action Plan (2011) https://www.nelincs.gov.uk/wp-content/uploads/2016/02/201110-LincolnshireBAP-3rd-edition.pdf

Bat species	UK status (current estimated UK population size)[5]	County status[6]	Level of activity on site	Ecological Importance (Calculated Score {Wray et al. 2010})
	Whiskered - uncommon but widespread in England, UK population of 64,000	Fairly common and widespread		
	Brant's -uncommon but widespread in England. UK population of 30,000	Not known possibly quite widespread		
Brown long-eared	Common and widespread (245,000). UK BAP Priority Species	Common, with nationally important colonies in the centre and north	Very low activity, likely by one individual	Site (2+5+3+4 = 14)

6 SUMMARY

6.1.1 In combination, taking all 5+ species together and levels of foraging and commuting activity into account the site is considered to be of Local importance to bats. This is due to the species assemblage present (5+ species out of the 18 resident species in the UK) and the relatively low levels of activity recorded at the site.

6.1.2 The woodland edge and hedgerow network across the site have been shown to be of most importance to bats. No bats were recorded within the arable fields during the activity surveys, and it is likely that this habitat offers low quality foraging opportunities.

7 RELEVANT LEGISLATION AND POLICY

All 17 species of bat known to breed in England and Wales, and their roost sites, are protected under the Conservation of Habitats and Species Regulations 2010 (as amended), known as the 'Habitats Regulations'. This makes it an offence to deliberately kill or injure a bat, or to deliberately disturb a bat such that its ability to hibernate, breed or rear young, or such that the species' distribution, were significantly affected. It is also an offence to damage or destroy any breeding site or resting place. Intentional or reckless disturbance of bats in their resting places, and damage to or obstruction of resting places are also offences under the Wildlife and Countryside Act 1981 (as amended). Under UK law a bat roost is "any structure or place which any wild [bat]...uses for shelter or protection". As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time. Penalties for offences against bats or their roosts include fines of up to £5,000 and/or up to six months in prison.

As a result, development works which are likely to involve the loss of or alteration to roost sites, or which could result in killing of or injury to bats, need to take place under licence. Works which could disturb bats may also be licensable, though this needs to be assessed on a case by case basis, as bats' sensitivity to disturbance varies depending on normal background levels, and the definition of disturbance offences under the Habitats Regulations is complex. In practice this means that works involving modification or loss of roosts (typically in buildings, trees or underground sites) or significant disturbance to bats in roosts are likely to be licensable.

Licences can be obtained from Natural England or the Welsh Government to permit works that would otherwise be illegal, provided it can be demonstrated that the proposed works are needed to protect public health or safety, or for other reasons of overriding public interest including social and economic reasons. It is also necessary to demonstrate that there is no satisfactory alternative to the proposed works, and that the conservation status of bats in the area will be maintained. Appropriate mitigation and post-construction monitoring are therefore a requirement of all licences.

PLANNING POLICY IN RELATION TO BIODIVERSITY

The National Planning Policy Framework (NPPF), issued in March 2012, has superseded Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005). Additional guidance can be found online at http://planningguidance.planningportal.gov.uk/blog/guidance/. Further guidance is also available within the Government Circular ODPM 06/2005 on Biodiversity and Geological conservation although it should be noted that this document is currently being updated by DEFRA. The NPPF simplifies and collates a number of previous planning documents and outlines the government's objective towards biodiversity.

The NPPF identifies ways in which the planning system should contribute to and enhance the natural and local environment (Paragraph 109), including:

- protecting and enhancing valued landscapes, geological conservation interests and soils;
- recognising the wider benefits of ecosystem services;
- minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

It also emphasises the importance of conserving biodiversity and areas covered by landscape designations (Paragraph 115):

Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.

When determining planning applications, the NPPF states that local planning authorities should aim to conserve and enhance biodiversity (Paragraph 118) by applying principles including:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;
- development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;
- opportunities to incorporate biodiversity in and around developments should be encouraged;
- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and

- the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas and possible Special Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

ECOLOGICAL ENHANCEMENTS

The Natural Environment and Rural Communities Act (2006) states that a public authority must, "in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat". DEFRA issued further guidance on implementation of this act in the document; Guidance for Local Authorities on Implementing the Biodiversity Duty (May 2007), which notes that "Conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them".

In England, the National Planning Policy Framework (NPPF), issued in March 2012, states that the planning system should contribute to "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*". It also states that "*opportunities to incorporate biodiversity in and around developments should be encouraged*".

UK BIODIVERSITY ACTION PLANS

The UK Biodiversity Action Plan (UK BAP) 2011 is a policy first published in 1994 to protect biodiversity and stems from the 1992 Rio Biodiversity Earth Summit. The policy is continuously revised to combine new and existing conservation initiatives to conserve and enhance species and habitats, promote public awareness and contribute to international conservation efforts. Each plan details the status, threats and unique conservation strategies for the species or habitat concerned, to encourage spread and promote population numbers.

Species or habitats identified as priorities under the UK Biodiversity Action Plan receive some status in the planning process through their identification as Species/Habitats of Principal Importance in England and Wales, under the Natural Environment and Rural Communities (NERC) Act 2006 (as amended).

Current planning guidance in England, the National Planning Policy Framework, does not specifically refer to Species or Habitats of Principal Importance, though it includes guidance for conservation of biodiversity in general. Supplementary guidance is available online at http://planningguidance.planningportal.gov.uk/blog/guidance/ and this guidance indicates that it is '*useful to consider*' the potential effects of a development on the habitats or species on the Natural Environment and Rural Communities Act 2006 section 41 list.

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Technical Appendix 8.1

HERITAGE DESK BASED BASELINE SURVEY REPORT

Little Crow
Solar Park

National significant infrastructure project in the Energy Sector

Little Crow Solar Park, Scunthorpe

CULTURAL HERITAGE BASELINE STUDY

On behalf of INRG Solar (Little Crow) Ltd

November 2018

LITTLE CROW SOLAR PARK, NORTH LINCOLNSHIRE

CULTURAL HERITAGE BASELINE STUDY

PREPARED BY PEGASUS GROUP | INRG SOLAR | NOVEMBER 2018 | P17-0718

Little Crow Solar Park, North Lincolnshire
Cultural Heritage Baseline Study

Pegasus Group Project Number: P17-0718

Version	Date	Author	Checked/Approved By
10 (Site boundary Rev C draft)	21st November 2018	Laura Garcia Principal Heritage Consultant Hannah Armstrong Principal Heritage Consultant Donal Lucey Senior Heritage Consultant	Gail Stoten Heritage Director Laura Garcia Principal Heritage Consultant

CONTENTS:

APPENDICES:

FIGURES:

PLATES:

1. Non-Technical Summary

1.1 Pegasus Group have been commissioned by INRG Solar (Little Crow) Ltd to carry out a Cultural Heritage Baseline Study of the proposed renewable led energy scheme on land to the east of British Steelworks site, Scunthorpe, North Lincolnshire. The results of this baseline will be used to inform the heritage chapter of the Preliminary Environmental Information Report and the Environmental Statement.

1.2 Due to time constraints, this draft report does not contain Historic Environment Record (HER) data for a revised 1km study area, which resulted from the recent alterations to the Site boundary (Rev C), which includes the addition of a proposed construction compound location. A fully revised baseline report will be produced upon receipt of updated HER data.

Archaeological Resource

1.3 One area of specific prehistoric archaeological potential has been identified within the Site (c. 0.16ha), a cropmark of a possible round barrow (**MLS22718**). However, this feature has not been positively identified by archaeological fieldwork. Poorly-recorded flints and deposits of Sutton Sand Formation within the Site and a broad prehistoric transport corridor in the area are not considered to represent any specific heritage assets within the Site.

1.4 A former Cistercian nunnery known as Gokewell Priory, was located in the northern part of the Site. Gokewell Priory was established in the 12th century, and dissolved in the 16th century. Gokewell Priory Farm was built on the site of the former medieval Gokewell Priory between the late 17th and early 19th century. Material from the former medieval Priory may have been used during the construction of the farm. Gokewell Priory Farm was itself abandoned and demolished in the late 20th century. It is probable but unproven that the below-ground remains of the former medieval Gokewell Priory and post-medieval Gokewell Priory Farm are located within the northern part of the Site (**MLS1805**). However, the core of the former medieval Gokewell Priory, where the later post-medieval Gokewell Priory Farm buildings were constructed, is not proposed for the location of solar panels. However, there is potential for below-ground remains of ancillary structures and features associated with the medieval Gokewell Priory to be present within the areas proposed for development. The potential extent of this area is demonstrated by the earthworks survey (**ELS4211**) shown on Figures 2 and 3.

1.5 Beyond the site of the former Gokewell Priory, there is no proven evidence for medieval activity within the Site. No above-ground remains of ridge and furrow earthworks survive within the Site.

1.6 The Site also contains a slight ovoid possible earthwork (**MLS22780**) enclosure preserved partly within the woodland of

Little Crow Covert which may extend west, into the adjacent field, however it is not visible as a cropmark on aerial photographs within the field to the west.

1.7 Within the southern portion of the Site are the records of two cropmarks of possible enclosures, one square (**MLS21943**) and one ovoid (**MLS21941**). These assets are located to the north of the Manby deserted medieval village (outside of the Site boundary). Due to their size and location, they are most likely to be medieval stock enclosures, of low archaeological value, although they may also be of geological origin. Analysis of aerial imagery has also indicated the presence of two partial circular cropmarks of unknown origin within the same field (**A1** and **A2**).

1.8 An undated limestone wall (**MLS21242**) was recorded adjacent to the B1027 in the north-eastern part of the Site. However, this area adjacent to a public road is unlikely to see groundworks which would impact upon this asset.

1.9 Potential below-ground remains relating to a former WWII Heavy Anti-Aircraft Battery in the eastern portion of the Site (**MLS21408**) could potentially survive.

1.10 While a number of areas containing archaeological remains or with archaeological potential have been identified by this assessment, significant archaeological constraints do not appear to be present in many areas of the Site.

Setting Assessment

1.11 It is not considered that the Site forms part of the setting of any of the identified designated heritage assets within the vicinity the Site which contributes to their heritage significance, nor has any intervisibility been identified.

1.12 The Site forms part of the setting of the non-designated site of the former medieval Gokewell Priory which makes a moderate contribution to its overall significance.

2. Introduction

2.1 Pegasus Group have been commissioned by INRG Solar (Little Crow) Ltd to carry out a Cultural Heritage Baseline Study for a proposed renewable led energy scheme on land to the east of British Steel site, Scunthorpe, North Lincolnshire, shown on Plate 1. The results of this will be used to inform the heritage chapter of the Environmental Statement to support the Development Consent Order (DCO) application.

2.2 The application site (henceforth referred to as 'the Site') is approximately 218ha in area and is located to the northwest of the settlement of Broughton and immediately to the east of the Scunthorpe Steel Works.

2.3 The application seeks permission for the construction and operation of up to 160MW capacity of ground-mounted solar photovoltaic panels, the installation of up to 90MW batteries and associated infrastructure. The proposed development is a 'Nationally Significant Infrastructure Project' (NSIP).

2.4 This Cultural Heritage Baseline Study provides information with regards to the significance of the historic environment, to inform the heritage chapter of the Environmental Statement and to fulfil the requirement given in paragraph 5.8.8 of National Policy Statement EN-1 (see 5.12 of this report for full reference) which requires:

"...the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset."

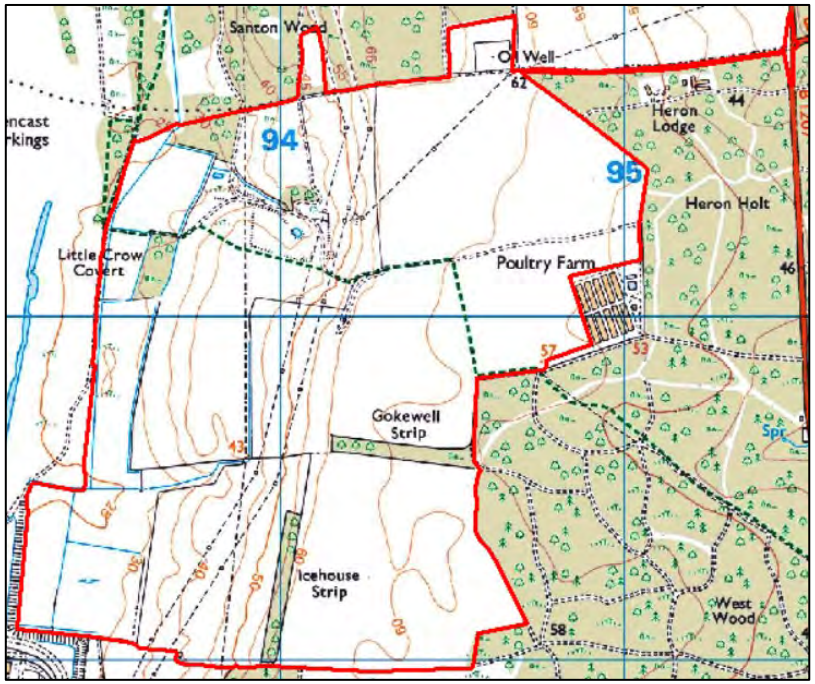


Plate 1: Site Location Plan

3. Site Description and Location

3.1 The Site, approximately 228ha in area, includes a series of post-war agricultural fields and an existing 775m-long access track, plantations and the site of a former oil well. The Site outline is irregular, but roughly rectangular in shape. The boundaries are largely formed by extant field boundaries. The southeastern boundary is formed by dense woodland and the entire Site is well enclosed by the existing vegetation. Any long-distance views available looking west are dominated by the Scunthorpe Steel Works which runs along the entire length of the Site and beyond, and includes a number of tall, industrial structures, chimneys and moving elements. The activity within the steel works is audible from within the Site boundary.

3.2 The fields within the Site are arable with the crop being harvested during the site visit. The areas of the Site under arable cultivation are subject to deep ploughing to a depth of 0.6m every year (*pers. comm*: information obtained from the landowner). The Site also contains two rows of pylons and overhead powerlines which run down the length of the Site.

3.3 The Site is surrounded by post-war agricultural fields and woodland plantations on the northern and eastern sides, with a large, modern poultry farm located directly adjacent to the eastern boundary. The eastern boundary abuts a dense block of woodland which blocks views into or out of the Site to the east. Dense woodland is also present to the south. Beyond this woodland is a recently constructed solar farm at Raventhorpe. To the west of the Site boundary is a small strip of low-lying land beside Bottesford Beck which physically separates the Site from the steel works.

3.4 The eastern part of the Site is situated on a broad plateau at approximately 60m aOD. The crest of the plateau runs through the centre of the Site on a north-northeast to south-southwest alignment. From this crest, the land within the western part of the Site slopes down fairly steeply towards the valley bottom of the Bottesford Beck which runs c.350m to the west of the western boundary, to around 25m AOD.

3.5 From within the Site, there are long-distance views available to the west, particularly from the highest points within the Site. However, the presence of the pylons and steel works in views to the west from the Site means that these views are characterised completely by modern, industrial elements. The scale of the Scunthorpe Steel Works is such that it dominates the entirety of the western panorama from the Site. Views east are more limited due to the dense vegetation and topography. The presence of the large poultry farm adds a modern, industrial element to views in this direction. The location and direction of the photographic plates below are depicted on Figure 11, using the references provided within the plate captions.

Plate 2 View west across the southern part of the former Gokewell Priory (Figure 11, A)

Plate 3 View into small woodland area, site of the former Gokewell Priory and the later Gokewell Priory Farm – possible remnants of the farm building visible (Figure 11, B)

Plate 4 View northeast (Figure 11, C)

Plate 5 View west from rising ground looking towards the steel works (Figure 11, D)

Plate 6 View of the northeastern field within the Site boundary, looking at the highest point within the Site (Figure 11, E)

Plate 7 View towards the Poultry Farm, looking southeast (Figure 11, F)

Plate 8 View north towards hay bales screening the Oil Well across northeastern portion of the Site (Figure 11, G)

Plate 9 View east towards Poultry Farm (Figure 11, H)

Plate 10 View of rooftop of Poultry Farm, looking east (Figure 11, I)

Plate 11 Looking west from footpath near the Poultry Farm, steel works visible above crest of hill (Figure 11, J)

Plate 12 View southwest across southern portion of the Site (Figure 11, K)

Plate 13 View southwest across the Site looking at the steel works (Figure 11, L)

Plate 14 View south looking at steel works (Figure 11, M)

Plate 15 View southeast across the southeastern field of the Site (Figure 11, N)

Plate 16 View south across southern field within Site, adjacent to Icehouse Strip (Figure 11, O)

Plate 17 View southwest into area adjacent to Little Crow Covert (Figure 11, P)

3.6 From within the Site, there are no views towards any designated heritage assets. Although the Site is large in scale, the topography, the Scunthorpe Steel Works and the dense woodland vegetation combine to largely enclose the Site from views outwards, and views looking towards the Site.

3.7 The nearest settlement to the Site is the village of Broughton located 860m to the southeast of the proposed Site boundary, with dense woodland between. There is no visibility of this settlement from within the Site, nor any visibility of the Site from within the settlement of Broughton.

4. Methodology

4.1 The aim of this Cultural Heritage Baseline Study is to provide a baseline of information to support the Cultural Heritage chapter of the Environmental Statement. This baseline sets out the significance of elements of the historic environment (heritage assets) and the contribution made by their setting. The assessment considers both the archaeological resource and built heritage resource.

Site Visit

4.2 A site visit was undertaken by Pegasus Group on 14th August 2017, during which the Site and its surrounds were assessed.

Sources of information and study area

4.3 The assessment has been informed by appropriate sources of information, including:

- **Historic England's National Heritage List for England (NHLE) for information on designated heritage assets;**
- **Historic England Archive AMIE data for information on non-designated heritage assets;**
- **North Lincolnshire Historic Environment Record (NLHER) for information on non-designated heritage assets, previous archaeological works, HER files and aerial photographs, consulted digitally and in-person;**
- **Historic maps and documentary sources held at the Lincolnshire Archives and Scunthorpe Library;**
- **LiDAR data: and**
- **Historic aerial photographs held at the Historic England Archives.**

4.4 For digital data sets (e.g. the NLHER) information was obtained for a 1km study area from the Site boundary (excluding the access road). Tables summarising this data are included in Appendix 1 and records are discussed in the text, where relevant. Figures depicting the data are included at Appendix 2.

4.5 Designated heritage assets were reviewed in the wider area, as professional judgement deemed appropriate.

4.6 Historic cartographic sources were reviewed for the Site, and beyond this where professional judgement deemed necessary. Such sources are reproduced in Section 6 where appropriate.

4.7 A list of sources consulted by this report is provided at Appendix 5.

Assessment of significance

4.8 In the NPPF, heritage significance is defined as:

> **"The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance."**

4.9 Historic England's *Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision Taking in the Historic Environment*[1] (henceforth referred to as *'GPA 2: Managing Significance'*) gives advice on the assessment of significance as part of the application process. It advises understanding the nature, extent, and level of significance of a heritage asset. In order to do this, *GPA 2: Managing Significance* also advocates considering the four types of heritage value an asset may hold, as identified in Historic England's *Conservation Principles*[2]; **evidential**, **historical**, **aesthetic** and **communal**. These essentially cover the heritage 'interests' given in the glossary of the NPPF, which comprise archaeological, architectural, artistic and historic interest.

4.10 *Conservation Principles* provides further information on the heritage values it identifies:

- **Evidential value: the potential of a place to yield evidence about past human activity. This value is derived from physical remains, such as archaeological remains, and genetic lines.**
- **Historical value: the ways in which past people, events and aspects of life can be connected through a place to the present - it tends to be illustrative or associative. Illustrative value is the perception of a place as a link between past and present people and depends on visibility. It has the power to aid interpretation of the past through making connections with and providing insights into past communities and their activities through shared experience of a place. By contrast, associative value need not necessarily be legible at an asset, but gives a particular resonance through association with a notable family, person, event or movement.**
- **Aesthetic value: the ways in which people draw sensory and intellectual stimulation from a place. Aesthetic values can be the result of conscious design or fortuitous outcome or a combination of the two aspects. The latter can result from the enhancement of the appearance of a place through the passage of time.**

[1] Historic England, 2015, *Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision Taking in the Historic Environment*

[2] English Heritage 2008 *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment*

- **Communal value: the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. This can be through widely acknowledged commemorative or symbolic value that reflects the meaning of the place, or through more informal social value as a source of identity, distinctiveness, social interaction and coherence. Spiritual value may also be part of communal value.**

4.11 Significance results from a combination of any, some or all of the values described above.

Setting and significance

4.12 As defined in the NPPF:

> **"Significance derives not only from a heritage asset's physical presence, but also from its setting. "**[3]

4.13 Setting is defined as:

> **The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral."**[4]

4.14 Therefore, setting can contribute to, affect an appreciation of significance or be neutral with regards to heritage values.

Assessing change through alteration to setting

4.15 How setting might contribute to these values has been assessed within this report with reference to *Historic Environment Good Practice Advice in Planning Note 3 (Second Edition): The Setting of Heritage Assets*[5] (henceforth referred to as *GPA 3: The Setting of Heritage Assets*), particularly the checklist given on page 11. This advocates the clear articulation of 'what matters and why'.

4.16 In *GPA 3: The Setting of Heritage Assets*, a stepped approach is recommended, of which Step 1 is to identify which heritage assets (both designated and non-designated) and their settings are affected. Step 2 is to assess "*whether, how and to what degree settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated*'. The guidance includes a (non-exhaustive) check-list of elements of the physical surroundings of an asset that might be considered when undertaking the assessment including, among other things: topography, other heritage assets, green space, functional relationships and degree of change over time. It also lists points associated with the experience of the asset which might be considered, including: views, intentional intervisibility,

[3] NPPF Annex 2

[4] Ibid.

[5] Historic England, 2017, *Historic Environment Good Practice Advice in Planning Note 3 (Second Edition): The Setting of Heritage Assets*

tranquillity, sense of enclosure, accessibility, rarity and land use.

4.17 Step 3 is to assess the effect of the proposed development on the significance of the asset(s). Step 4 is to explore ways to '*maximise enhancement and minimise harm'*. Step 5 is to '*make and document the decision and monitor outcomes*'.

4.18 Descriptions of significance will naturally anticipate the ways in which impacts will be considered. Hence descriptions of the significance of Listed Buildings will be discussed with reference to the building, its setting and any features of special architectural or historic interest which it possesses.

Levels of significance

4.19 In accordance with the levels of significance articulated in the NPPF, three levels of significance are identified:

- **Designated heritage assets of the highest significance, as identified in paragraph 194 of the NPPF comprising Grade I and II* Listed buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, World Heritage Sites and Registered Battlefields (and also including some Conservation Areas) and heritage assets of archaeological interest demonstrably of equivalent significance to Scheduled Monuments, as identified in footnote 63 of the NPPF;**
- **Designated heritage assets of less than the highest significance, as identified in paragraph 194 of the NPPF, comprising Grade II Listed buildings and Grade II Registered Parks and Gardens (and also some Conservation Areas); and**
- **Non-designated heritage assets. Non-designated heritage assets are defined within the Government's Planning Practice Guidance as "*buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions but which are not formally designated heritage assets*[6]".**

4.20 Additionally, it is of course possible that sites, buildings or areas have no heritage significance.

Assessment of harm

4.21 Assessment of any harm will be articulated in terms of the policy and law that the proposed development will be assessed against. For this proposed development, this will be done in accordance with the policies contained within the Overarching National Policy Statement for Energy Policy EN-1 and the policies of National Policy Statement for Renewable Energy EN-3.

4.22 In order to relate to key policy, the following levels of harm may potentially be identified:

- **Substantial harm or total loss. It has been clarified in a High Court Judgement of 2013[7] that this would be harm that would 'have such a serious impact on the significance of the asset**

[6] DCLG, Planning Practice Guidance, Paragraph: 039 (ID: 18a-039-20140306, Revision date: 06 03 2014)

[7] EWHC 2847, R DCLG and Nuon UK Ltd v. Bedford Borough Council

that its significance was either vitiated altogether or very much reduced'; and

- **Less than substantial harm. Harm of a lesser level than that defined above.**

4.23 It is also possible that development proposals will cause **no harm or preserve** the significance of heritage assets. A High Court Judgement of 2014 is relevant to this[8]. This concluded that with regard to preserving the setting of a Listed building or preserving the character and appearance of a Conservation Area, 'preserving' means doing 'no harm'.

4.24 Preservation does not mean no change; it specifically means no harm. *GPA 2: Managing Significance* states that "*Change to heritage assets is inevitable but it is only harmful when significance is damaged".* Thus, change is accepted in Historic England's guidance as part of the evolution of the landscape and environment. It is whether such change is neutral, harmful or beneficial to the significance of an asset that matters.

4.25 As part of this, setting may be a key consideration. For an evaluation of any harm to significance through changes to setting, this assessment follows the methodology given in *GPA 3: The Setting of Heritage Assets*, described above. Again, fundamental to the methodology set out in this document is stating '*what matters and why*'. Of particular relevance is the checklist given on page 13 of *GPA 3: The Setting of Heritage Assets*.

4.26 It should be noted that this key document states that:

- **"setting is not itself a heritage asset, nor a heritage designation"**[9]

4.27 Hence any impacts are described in terms of how they affect the significance of a heritage asset, and heritage values that contribute to this significance, through changes to setting.

4.28 With regards to changes in setting, *GPA 3: The Setting of Heritage Assets* states that "*conserving or enhancing heritage assets by taking their settings into account need not prevent change*".

4.29 Additionally, it is also important to note that, as clarified in the Court of Appeal[10], whilst the statutory duty requires that special regard should be paid to the desirability of not harming the setting of a Listed Building, that cannot mean that any harm, however minor, would necessarily require planning permission to be refused.

[8] EWHC 1895, R (Forge Field Society, Barraud and Rees) v. Sevenoaks DC, West Kent Housing Association and Viscount De L'Isle

[9] Historic England, 2017, Historic Environment Good Practice Advice in Planning Note 3 (Second Edition): The Setting of Heritage Assets

[10] Palmer v Herefordshire Council & Anor [2016] EWCA Civ 1061 (4th November 2016)

Benefits

4.30 Proposed development may also result in benefits to heritage assets, and these are articulated in terms of how they enhance the heritage values and hence the significance of the assets concerned.

5. Planning Policy Framework

Planning Policy Framework

5.1 This section of the Baseline Study sets out the legislation and planning policy considerations and guidance contained within both national and local planning guidance which specifically relate to the application site, with a focus on those policies relating to the protection of the historic environment.

Legislation

5.2 Legislation relating to the Built Historic Environment is primarily set out within the Planning (Listed Buildings and Conservation Areas) Act 1990 which provides statutory protection for Listed Buildings and Conservation Areas.

5.3 Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 states that:

> **"In considering whether to grant planning permission [or permission in principle] for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses".**

5.4 In the 2014 Court of Appeal judgement in relation to the Barnwell Manor case[11], Sullivan LJ held that:

> **"Parliament in enacting section 66(1) did intend that the desirability of preserving the settings of listed buildings should not simply be given careful consideration by the decision-maker for the purpose of deciding whether there would be some harm, but should be given "considerable importance and weight" when the decision-maker carries out the balancing exercise."**

5.5 Recent judgement in the Court of Appeal[12] ('Mordue') has clarified that, with regards to the setting of Listed Buildings, where the principles of the NPPF are applied (in particular paragraph 196, see below), this is in keeping with the requirements of the 1990 Act.

5.6 Scheduled Monuments are protected by the provisions of the Ancient Monuments and Archaeological Areas Act 1979 which relates to nationally important archaeological sites. Whilst works to Scheduled Monuments are subject to a high level of protection, it is important to note that there is no duty within the 1979 Act to have regard to the desirability of preservation of the setting of a Scheduled Monument.

[11] East Northamptonshire District Council v SSCLG (2015) EWCA Civ 137

[12] Jones v Mordue Anor (2015) EWCA Civ 1243

National Policy Guidelines

5.7 This project is being submitted to the Planning Inspectorate as a Nationally Significant Infrastructure Project in order to gain a Development Consent Order. Therefore, the proposed scheme will be assessed against, and recommendations made in accordance with the National Policy Statements for Energy which set out Government policy on national infrastructure energy developments.

5.8 The Energy NPSs are divided into six. The first is an overarching NPS setting out the overarching policies on all forms of energy development. The remaining five target specific energy technologies and developments including Renewable Energy in EN-3. All of the Energy NPSs were designated and adopted in 2011.

5.9 Overarching National Policy Statement for Energy (EN-1) sets out the Government policy for delivery of major energy infrastructure and should be considered in conjunction with the technology-specific NPS.

5.10 Section 5.8 of EN-1 is concerned with the historic environment, recognising that:

> **"The construction, operation and decommissioning of energy infrastructure has the potential to result in adverse impacts on the historic environment."**[13]

5.11 EN-1 states that the impacts should be considered not only on designated assets, but also on non-designated assets identified either through the development plan making process (such as local listing) or through the Planning Inspectorate's decision-making process on the basis of clear evidence that these assets have a heritage significance that merits consideration in its decisions, even though those assets are of lesser value than designated heritage assets[14].

5.12 As part of the applicant's assessment, the significance of the heritage assets affected by the proposed development should be set out, at a level of detail proportionate to importance of the heritage assets, as set out in Section 5.8.8:

> **"As part of the ES (see Section 4.2) the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. As a minimum the applicant should have consulted the relevant Historic Environment Record…and assessed the heritage assets themselves using expertise**

[13] Department of Energy and Climate Change, 2011. *Overarching National Policy Statement for Energy (EN-1)*. P90

[14] *Ibid. p91*

where necessary according to the proposed development's impact."

5.13 Section 5.8.9 expands further on 5.8.8:

> **"Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out an appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact."**

5.14 Section 5.8.10 states:

> **"The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents."**

5.15 Section 5.8.14 sets out the considerations that the Planning Inspectorate should take into in the decision-making process. This states:

> **"There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be."**[15]

5.16 This section recognises that significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting and that "**loss affecting any designated heritage asset should require clear and convincing justification.**"

5.17 Section 5.8.15 sets out the requirement for a balance to be struck between an identified harmful impact and the public benefit of development, recognising that the greater the significance of the heritage asset, the greater the justification for development will be required to be.

5.18 Section 5.8.18 of EN-1 deals specifically with developments affecting the setting of designated heritage assets. It states:

> **"the (Planning Inspectorate) should treat favourably applications that preserve those elements of the setting that make a positive contribution to, or better reveal, the significance of, the asset. When considering applications that do not do this, the (Planning Inspectorate) should weigh any negative effects against the wider benefits of the application."**[16]

5.19 EN-1 provides a mechanism whereby if heritage assets are impacted by a development, then the developer should facilitate the creation of a record of such assets. This is set out at Sections 5.8.20 to 5.8.22 of EN-1.

5.20 National Policy Statement for Renewable Energy Infrastructure (EN-3) 2011 provides specific guidance on how to assess

[15] *Ibid. p92*

[16] *Ibid. p93*

impacts arising from renewable energy technology, in this case, ground-mounted solar photovoltaic panels. At the time of writing, EN-3, the technology to develop 50MW+ schemes from solar PV arrays, was not commonplace and therefore EN-3 does not specifically consider solar energy within this guidance.

5.21 Some guidance can be taken from the section concerned with Onshore Wind Farm impacts which states that visualisations may be required to demonstrate the effects of a proposed development and that micro-siting of infrastructure should be considered to minimise the risk of damaging archaeological assets during construction.[17]

The National Planning Policy Framework (July 2018)

5.22 Whilst regard has been made to the NPPF policies set out below, Paragraph 5 of the NPPF is clear that it does not contain specific policies for NSIPs and these are to be determined in accordance with the decision making framework set out in the Planning Act 2008 and relevant NPSs, as well as any other matters that are considered both important and relevant:

- **"The Framework does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy, and may be a material consideration in preparing plans and making decisions on planning applications."**[18]

5.23 The NPPF sets out the Government's economic, environmental and social planning policies for England. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

5.24 The presumption in favour of sustainable development (the 'presumption') sets out the tone of the Government's overall stance and operates with and through the other policies of the NPPF. Conserving historic assets in a manner appropriate to their significance forms part of this drive towards sustainable development.

5.25 The purpose of the planning system is to contribute to the achievement of sustainable development and the NPPF sets out three overarching objectives to sustainable development: an economic objective, a social objective, and an environmental objective. The presumption is key to delivering these ambitions, by creating a positive pro-development framework which is underpinned by the wider economic, environmental and social provisions of the NPPF. The presumption is set out in full at paragraphs 10 and 11 of the NPPF and reads as follows:

[17] Department of Energy and Climate Change, 2011. *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. P67

[18] NPPF, paragraph 5

"So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development (paragraph 11)."[19]

"For decision-taking this means:

c) approving development proposals that accord with an up-to-date development plan without delay; or

d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting planning permission unless:

i) the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or

ii) any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."[20]

5.26 However, it is important to note that footnote 6 of the NPPF applies in relation to the bullet d, part i of paragraph 11. This provides a context for paragraph 11 and reads as follows:

"The policies referred to are those in this Framework (rather than those in development plans) relating to: habitats sites (and those sites listed in paragraph 176) and/or designated as Sites of Special Scientific Interest; land designated as Green Belt, Local Green Space, an Area of Outstanding Natural Beauty, a National Park (or within the Broads Authority) or defined as Heritage Coast; irreplaceable habitats; designated heritage assets (and other heritage assets of archaeological interest referred to in footnote 63); and areas at risk of flooding or coastal change" (our emphasis)

5.27 Heritage Assets are defined in Annex 2 of the NPPF as:

"A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the Local Planning Authority (including Local Listing)"

5.28 The NPPF goes on to define a Designated Heritage Asset as:

"World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under relevant legislation" [21]

[19] NPPF, paragraph 10

[20] NPPF, paragraph 11

[21] NPPF, Annex 2

5.29 As set out above, significance is also defined as:

> **"The value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance"** [22]

5.30 Section 16 of the NPPF relates to 'Conserving and enhancing the historic environment' and states at paragraph 190 that:

> **"Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal"**

5.31 Paragraph 192 goes on to state that:

> **"In determining planning applications, local planning authorities should take account of:**
>
> **a) The desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;**
>
> **b) The positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and**
>
> **c) The desirability of new development making a positive contribution to local character and distinctiveness"**

5.32 With regard to the impact of proposals on the significance of a heritage asset, paragraphs 193 and 194 are relevant and read as follows:

> **"When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.**
>
> **Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:**
>
> **a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional;**

[22] Ibid.

b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional"

5.33 Section b) of the above describing assets of the highest significance also includes footnote 63 of the NPPF, which states that non-designated heritage assets of archaeological interest which are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.

5.34 In the context of the above, it should be noted that paragraph 195 reads as follows:

"Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:

a) the nature of the heritage asset prevents all reasonable uses of the site; and

b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and

c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and

d) the harm or loss is outweighed by the benefit of bringing the site back into use"

5.35 Paragraph 196 goes on to state:

"Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use"

5.36 With regards to non-designated heritage assets, paragraph 197 of NPPF states that:

"The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset."

National Planning Guidance

5.37 The Department for Communities and Local Government (DCLG) launched the planning practice web based resource in March 2014, accompanied by a ministerial statement which confirmed that a number of previous planning practice guidance documents were cancelled.

5.38 This also introduced the national Planning Practice Guidance (PPG) which comprised a full and consolidated review of planning practice guidance documents to be read alongside the NPPF.

5.39 The PPG has a discrete section on the subject of 'Conserving and enhancing the historic environment' which confirms that the consideration of 'significance' in decision taking is important and states:

> **"Heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset, and the contribution of its setting, is very important to understanding the potential impact and acceptability of development proposals"** [23]

5.40 In terms of assessment of substantial harm, the PPG confirms that whether a proposal causes substantial harm will be a judgement for the individual decision-taker having regard to the individual circumstances and the policy set out within the NPPF. It goes on to state:

> **"In general terms, substantial harm is a high test, so it may not arise in many cases. For example, in determining whether works to a listed building constitute substantial harm, an important consideration would be whether the adverse impact seriously affects a key element of its special architectural or historic interest. It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed. The harm may arise from works to the asset or from development within its setting.** [24]
>
> **While the impact of total destruction is obvious, partial destruction is likely to have a considerable impact but, depending on the circumstances, it may still be less than substantial harm or conceivably not harmful at all, for example, when removing later inappropriate additions to historic buildings which harm their significance. Similarly, works that are moderate or minor in scale are likely to cause less than substantial harm or no harm at all. However, even minor works have the potential to cause substantial harm" (our emphasis)**

The Local Development Framework

5.41 Planning applications within North Lincolnshire are currently subject to policy set out within the Core Strategy and saved policies of the North Lincolnshire Local Plan.

Core Strategy

5.42 The Core Strategy, adopted in June 2011, sets out the long-term vision for North Lincolnshire and provides a blueprint for managing growth and development in the area up to 2026.

[23] PPG, paragraph 009 (ID: 18a-009/20140306 revision date 06.03.2014)

[24] PPG, paragraph 017 (ID: 18a-017-20140306 revision date 06.03.2014)

5.43 **Policy CS6** relates to the Historic Environment, stating:

> **"The council will promote the effective management of North Lincolnshire's historic assets through:**
>
> **• Safeguarding the nationally significant medieval landscapes of the Isle of Axholme (notably the open strip fields and turbaries) and supporting initiatives which seek to realise the potential of these areas as a tourist, educational and environmental resource.**
>
> **• Preserving and enhancing the rich archaeological heritage of North Lincolnshire.**
>
> **• Ensuring that development within Epworth (including schemes needed to exploit the economic potential of the Wesleys or manage visitors) safeguards and, where possible, improves the setting of buildings associated with its Methodist heritage.**
>
> **• Ensuring that development within North Lincolnshire's Market Towns safeguards their distinctive character and landscape setting, especially Barton upon Humber, Crowle and Epworth. The council will seek to protect, conserve and enhance North Lincolnshire's historic environment, as well as the character and setting of areas of acknowledged importance including historic buildings, conservation areas, listed buildings (both statutory and locally listed), registered parks and gardens, scheduled ancient monuments and archaeological remains. All new development must respect and enhance the local character and distinctiveness of the area in which it would be situated, particularly in areas with high heritage value. Development proposals should provide archaeological assessments where appropriate."**

North Lincolnshire Local Plan

5.44 The North Lincolnshire Local Plan was adopted in May 2003. It is gradually being replaced by new documents which make up the Local Development Framework; however, a number of policies are currently 'saved' and remain relevant in the decision making process.

5.45 The following saved policies pertain to the historic environment:

> **HE5 - Development affecting Listed Buildings**
>
> **"The Council will seek to secure the preservation, restoration and continued use of buildings of special architectural or historic interest.**
>
> **When applications for planning permission relating to a listed building or listed building consent are being assessed, the primary consideration will be the need to preserve or enhance the fabric and character of the building.**
>
> **Permission or consent will not be granted unless it has been demonstrated that the proposed works would secure this objective.**
>
> **The Council will encourage the retention and restoration of the historic setting of listed buildings. Proposals which damage the setting of a listed building will be resisted.**
>
> **Whenever appropriate, proposals which would entail the loss of historic fabric from a listed**

building will be conditional upon a programme of recording being agreed and implemented."

HE8 - Ancient Monuments

"Development proposals which would result in an adverse effect on Scheduled Ancient Monuments and other nationally important monuments, or their settings, will not be permitted."

HE9 - Archaeological Evaluation

"Where development proposals affect sites of known or suspected archaeological importance, an archaeological assessment to be submitted prior to the determination of a planning application will be required.

Planning permission will not be granted without adequate assessment of the nature, extent and significance of the remains present and the degree to which the proposed development is likely to affect them. Sites of known archaeological importance will be protected.

When development affecting such sites is acceptable in principle, mitigation of damage must be ensured and the preservation of the remains in situ is a preferred solution.

When in situ preservation is not justified, the developer will be required to make adequate provision for excavation and recording before and during development."

6. The Historic Environment

6.1 This section provides a review of the recorded heritage resource within the Site and its vicinity in order to identify any extant heritage assets within the Site and to assess the potential for below-ground archaeological remains. The designated assets are identified in the text with their National Heritage List for England reference (NHLE). The non-designated assets are identified with their North Lincolnshire Historic Environment Record reference (NLHER). Historic England's AMIE data has also been consulted. The AMIE records within the Site and study area are duplicates of NLHER records. The AMIE reference numbers for these records are provided within Appendix 1.

Designated Heritage Assets

Within the Site

6.2 No designated heritage assets are located within the Site.

Beyond the Site

6.3 Designated assets are shown on Figure 1.

6.4 The Scheduled Raventhorpe Medieval Settlement Earthworks immediately south-west of Raventhorpe Farm (**1016426**) are located *c.*940m to the south of the Site, with the later 17th-century Grade II Listed Raventhorpe Farmhouse *c.*900m to the south (**1346807**).

6.5 A group of designated heritage assets are located at Springfield Cottage *c.*390m northeast of the Site, comprising the Grade II Listed Springwood Cottage (**1083734**) and Stables approximately 20 metres northeast of Springwood Cottage (**1310038**).

6.6 The Grade II Listed Stone Cottage and adjoining outbuildings are located (**1310013**) *c.*900m southeast of the Site.

6.7 The Grade II Listed Broughton Grange Farmhouse (**1083736**) and Grade II Listed Coach House/Stables approximately 10 metres east of Broughton Grange Farmhouse (**1346496**) are located *c.*1.9km east of the site.

6.8 A number of Listed Buildings are located within the settlement of Broughton *c.*1-1.5km east of the Site, including the Grade I Listed Church of St Mary (**1161801**).

6.9 The Site is not located close to a Conservation Area, Registered Park and Garden, Registered Battlefield or World Heritage Site.

6.10 Potential impacts resulting from the proposed development on the heritage significance of designated heritage assets within the surrounds of the Site via a change in setting are discussed in detail in Section 7.

Previous Archaeological Works

6.11 The locations of the archaeological events recorded by the NLHER are shown on Figure 3. With the exception of the

earthworks survey of the site of the former medieval Gokewell Priory, no systematic archaeological works have taken place within the Site.

6.12 A number of previous archaeological investigations have taken place within the study area, with a small number within the Site itself related to the former location of Gokewell Priory. These comprise:

- **ELS4211 – A sketch earthwork survey was carried out in the 1970s on the possible medieval earthworks to the south and west of the post-medieval Gokewell Priory Farm (Appendix 3). This must have occurred prior to the reduction of the earthworks through agriculture *c.* the 1980s. This was undertaken by Keith Miller, and further information on the survey is provided below.**
- **ELS2566 – Photographs of the former Gokewell Priory Farm area taken in 1976.**
- **ELS3145 – Watching brief on groundworks for the Sawcliffe Area Water Mains Replacement Scheme. This recorded an east to west-orientated drystone wall near the junction of the B1027 and B1028, within or in close proximity to the Site. Three regular courses of stone above a foundation of rough stone boulders were recorded (MLS21242). The wall was undated, but thought to be later than the Roman period.**

6.13 A number of aerial photograph sorties have been flown across the Site and study area and have been identified as fieldwork events by the NLHER, which were either carried out for/by the council or by the University of Cambridge. Some of these photos show the former post-medieval Gokewell Priory Farm within the Site; however, these cannot be reproduced due to copyright restrictions. The aerial photographs of the Site and the study area recorded by the NLHER are listed below:

- **ELS800 – Aerial photographic sortie – 1956;**
- **ELS808 – Aerial photographic sortie – 1984;**
- **ELS922 – Aerial photographic survey – 1989;**
- **ELS3677 – Aerial photographic assessment and transcription – 2011;**
- **ELS3871 – Aerial photographic survey – 2012;**
- **ELS3479 – Aerial photographic survey – 2011;**
- **ELS4112 – Aerial photographic survey – 1976;**
- **ELS4125 – Aerial photographic survey – 1971.**

6.14 Other fieldwork events located outside of the Site boundary are:

- **ELS2965 – Walkover survey at Forest Pines Golf and Country Club, 2006 – Carried out by Humber Field Archaeology to investigate cropmarks shown on aerial photographs. The earthworks related to trackways which defined the boundary of the fields.**
- **ELS3685 – Yarborough Quarry desk-based assessment, 2003. Carried out by Wardell Armstrong in advance of continued use for Yarborough Quarry. Nothing of archaeological significance was identified.**
- **ELS3933 – Flint collection, 1930s. The flint**

collection and fieldwalking of D. N. Riley in the Raventhorpe area.

- **ELS3980 – Site visit to RAF Camp in Manby Woods, 2013. Carried out by Sue Oliver who took digital photographs of the former RAF camp in Manby Woods.**

- **ELS4190 – Building recording RAF Accommodation site, 2015. A photographic and measured survey was carried out in the site of a former RAF accommodation camp in Manby Wood, known as RAF Broughton. This was undertaken in advance of construction of a forestry building which would remove one of the former buildings.**

- **ELS4130 – Desk-based assessment of Solar Park on Land at Raventhorpe Farm, 2014. Carried out by AOC Archaeology in advance of the development of a solar farm.**

- **ELS4120 – Geophysical Survey, Raventhorpe, 2014. Carried out by AOC Archaeology in advance of development of a solar farm. This identified a number of archaeological anomalies including possible enclosures and structures.**

- **ELS 4274 – Archaeological Evaluation at Raventhorpe Solar park, 2014. Excavation of 47 trial trenches by AOC Archaeology in advance of the construction of the Raventhorpe Solar park. Identified a small number of Roman enclosures and post-medieval material.**

- **ELS4275 – Archaeological Evaluation, Raventhorpe Solar Park, 2014. Further element of evaluation by AOC Archaeology identified a substantial Roman enclosure ditch on the west-facing slope of the hill above Raventhorpe Farm. Possibly the site of a building.**

- **ELS4273 – Archaeological Monitoring, Raventhorpe Solar Park, 2015. Watching brief carried out by AOC Archaeology during the construction of the solar park at Raventhorpe. Two archaeological linear features were identified, tentatively interpreted as Romano-British in origin.**

6.15 Other desk-based assessments undertaken within the study area include **ELS2962 ELS3077**, **ELS3357** and **ELS4160** (while the outer edge of the study area for **ELS2962** overlaps the south-eastern edge of the Site, this can be regarded as an event which took place beyond the Site).

6.16 The Environment Agency LiDAR survey flights are also identified as events (**ELS2568**, **ELS2577**, **ELS2582**), undertaken from 2000 – 2006.

Geology and Topography

6.17 The Site features a complex geology, with the following bedrock geology recorded within the Site boundary[25]:

- **Charmouth Mudstone Formation – Mudstone;**
- **Marlstone Rock Formation - Ferruginous Limestone And Ferruginous Sandstone;**
- **Whitby Mudstone Formation – Mudstone;**

[25] http://mapapps.bgs.ac.uk/geologyofbritain/home.html

- **Grantham Formation - Sandstone, Siltstone And Mudstone;**
- **Lower Lincolnshire Limestone Member – Limestone; and**
- **Kirton Cementstone Beds – Limestone.**

6.18 Superficial deposits of sand of the Sutton Sand Formation are recorded across the Site. [26]

6.19 The topography of the Site slopes downward to the west from the centre of Site, with the western part of the Site lying in the west-facing valley overlooking Bottesford Beck, which lies outside the western Site boundary. The highest point is at around 60m AOD in the flatter eastern part of the Site which covers a long plateau, with a break of slope just beginning to fall away to the east at the eastern boundary.

Historic Background

6.20 The locations of the records identified from the NLHER are shown on Figure 2. This historic background section has been sub-divided between those assets located within the Site boundary and those located beyond, within the wider study area.

Prehistoric (10,000BC – 43AD)

Within the Site

6.21 The superficial geological deposits of Sutton Sand Formation within the western part of the Site were formed by post-glacial wind-blown processes. While there is generalised potential for such deposits to contain archaeological remains from the prehistoric to medieval periods, there is no specific evidence that such remains are located within the Site.

6.22 Three potentially prehistoric records from the NLHER have been identified from within the Site boundary. The first is the possible site of a round barrow (**MLS22718, ELS3479**) located on aerial photographs (Plate 18). The date, function and archaeological provenance of this cropmark have not been proven through fieldwork. The NLHER also records the findspot of a number of flints (**MLS6695**). These flints were recorded in a gazetteer of 1976, however the location, the methodology of collection and the collector is not known.

[26] Ibid.

Plate 18 Cropmark of possible round barrow within Site

6.23 The third potentially prehistoric feature within the Site is the posited route of a prehistoric track (**MLS20003**) called the Jurassic Way, which runs from Winteringham to Lincoln. This is the record of a broad trade route corridor which ran across Britain during the prehistoric period, rather than a tightly-defined trackway and therefore its geographical scope is widespread. The line of the trade route is supposed to have been in the vicinity of Santon and the site of the former Gokewell Priory Farm, but given the potential geographical spread of this feature, this is more of an estimation of a broad transport corridor rather than a precise location of a trackway.

Beyond the Site

6.24 There are a number of records of prehistoric and possible prehistoric activity within the wider study area. There are a small number of other findspots of flints within the study area which originate from the 1976 gazetteer (**MLS7556, MLS7563**). Again, as the exact locations of the finds cannot be ascertained, they cannot be assigned any heritage value.

6.25 Two putative sites of potential long barrows are identified *c*. 620m and *c*.860m northeast of the Site (**MLS93**) (100m and 745m north of the existing access track). These are identified by the NLHER as 'site A' and 'site B', with 'site B' being that closer to the Site. The evidence for these possible features is derived from aerial photography, however, the NLHER record states that "*nothing is visible at site 'B'*. Site B is located on the east-facing slope, off the crest of the plateau which runs southward through the Site. This feature has not been proven through fieldwork to be present or to be archaeological in origin.

6.26 To the southeast of the Site boundary, a single flint arrowhead was found within Manby Wood *c*.65m south-east of the Site (**MLS1822**) in the 1950s. To the south of this and around Raventhorpe and the Stonewall Reservoir, a number of flint artefacts have been recovered. These include a single Mesolithic microlith (**MLS22657**) and over 700 pieces of worked flint which were recovered during fieldwalking undertaken to the west and

north of Stonewall Reservoir prior to the construction of the solar farm at Raventhorpe, *c*.200m – *c*.950m south of the Site (**MLS26068**, **MLS26069**).

6.27 A findspot of prehistoric pottery is recorded *c*.950m to the southeast of the Site boundary, on the outskirts of Broughton. This is the findspot of prehistoric pottery sherds and a Roman brooch (**MLS1818**).

Prehistoric summary

6.28 Potential prehistoric archaeological remains within the Site comprise the site of a possible prehistoric round barrow, although this is currently unproven. The full extent of the feature is unclear, but even if an area of 40m by 40m was considered to have potential, this would equate to 0.16ha.

6.29 The ambiguously-located flint finds and deposits of Sutton Sand Formation within the Site do not necessarily suggest the presence of further archaeological remains within the Site. The broad transport corridor of the Jurassic Way is indicative of a general prehistoric travel route across the area, and not a specific road or trackway. Overall, this evidence in itself is not considered to represent high potential for further prehistoric archaeological remains to be present within the Site.

Roman (43AD – 410)

Within the Site

6.30 The line of the former Ermine Street Roman road (**MLS100**) follows the line of the B1027, a small portion of which is included in the Site boundary at the eastern-most extent. The former Roman road runs to the west of Broughton on a north-south alignment, and this particular portion runs north to meet Winteringham where there is a known Roman crossing of the Humber.

Beyond the Site

6.31 There are a number of other records of Roman activity from within the study area, most of which are associated with the fieldwalking which was undertaken at Raventhorpe prior to the construction of Raventhorpe solar farm. Fieldwalking to the north and west of Stonewall Reservoir, *c*.200m – 1.14km south of the Site, recovered 298 sherds of Roman pottery (**MLS26070**). Fieldwalking to the south and east of the reservoir *c*. 800m – 1.4km south of the Site found 276 sherds (**MLS26071**). Further archaeological work was undertaken around the solar farm site and to the southwest of the reservoir; a substantial Roman-period rectilinear ditch and bank enclosure was identified during evaluation *c*.980m south of the Site (**MLS26072**). The evaluation recorded indirect evidence of potentially high-status occupation, such as potentially Roman CBM (ceramic building material) fragments, possible roof tile fragments and pieces of tile which had been scored to hold plaster.

6.32 Roman pottery and glass recorded at Raventhorpe *c*.580m south of the Site (**MLS1819**) were found within the ploughsoil, and were not associated with the fieldwalking which took place in

advance of the solar farm construction.

Roman Summary

6.33 Recorded Roman archaeological remains are located beyond the Site. It is possible that the Site comprised part of an agricultural landscape during the Roman period. The Roman road known as Ermine Street is located to the east of the Site, and the Roman remains found at Ravensthorpe indicate the presence of Roman settlement activity in the wider landscape away from the road. There is therefore some potential for Roman-period remains within the Site, although there is no current evidence to suggest that this potential is high.

Early Medieval and Medieval (410 – 1540)

Within the Site

6.34 The medieval period sees the first documented activity within the Site.

6.35 Within the northern part of the Site is the location of the former Gokewell Priory, a small Cistercian nunnery founded by William De Alta Ripa in the 12th century (**MLS1805, ELS800, ELS2566, ELS4211**). The former Priory was a minor establishment with a small community of nuns, dissolved in 1536. The former Priory was not a grand or large establishment. The revenue of the Priory "*was probably never more than sufficient for ten or twelve nuns*."[27] In 1440 there were eight sisters recorded as living within the Priory and at the time of Dissolution, only seven nuns remained, including the Prioress.[28] The yearly revenue at Gokewell never exceeded £10 and the lifestyle would have been spartan, with food supplied from the surrounding land, including fish from the ponds, at least one of which is an extant water feature, located to the south of the core of the former Priory buildings. Following the dissolution of Gokewell Priory in 1536, Gokewell Priory Farm was built on the site of the Priory at some point between the late 17th and early 19th century (see post-medieval section, below).

6.36 The NLHER detailed record references a 19th-century documentary source named as "Trollope 1868, 178, n.31" which mentions burials at the site. However, the original source could not be identified and was not located at the North Lincolnshire Local Studies Library in Scunthorpe or Lincolnshire Archives. This source allegedly states: "*A few years ago several stone coffins buried in the cemetery were brought to light*." This is presumably a reference to a former medieval burial ground within the Gokewell Priory precinct, although it has not been possible to verify this.

6.37 The extent of the former Priory precinct is unknown, however Abraham de la Pryme, an antiquarian writing in the 17th century, visited the former Priory following the Dissolution, and seemingly prior to the construction of Gokewell Priory Farm. He

[27] Page, W. (Ed.) 1906. *Victoria County History, A History of the County of Lincoln, Volume 2*. 156-157

[28] Ibid

noted that the wall of the precinct encompassed an area of between 20 and 30 acres[29] (the areas of cropmarks and earthworks recorded by the NLHER comprise *c*. 18-20 acres). This would extend it beyond the area of woodland but it is likely that the main core of the buildings is located in the wooded area, with the surrounding precinct made up of the potential burial ground, ancillary buildings and areas for subsistence, i.e. vegetable gardens, fishponds etc. De la Pryme states that a holy well called Nun's Well was located within the Priory. He also mentions that the floor of a former church was located at about 4 feet (*c*.1.2m) below-ground during excavation for agricultural reasons, and that "*a little town*" was also located at the Priory, the latter of which may refer to a small number of ancillary buildings/lay residences which may have been associated with it. Given the relative poverty of the priory, it is not likely to have been associated with a settlement of any substantial size.

6.38 In the 1970s earthworks of ponds and ditches associated with Gokewell Priory still survived to the south, east and west of the later Gokewell Priory Farm. The earthworks were recorded during an earthwork survey in the 1970s which forms part of the NLHER file for Gokewell and is reproduced below (Plate 19) and in more detail in Appendix 3.

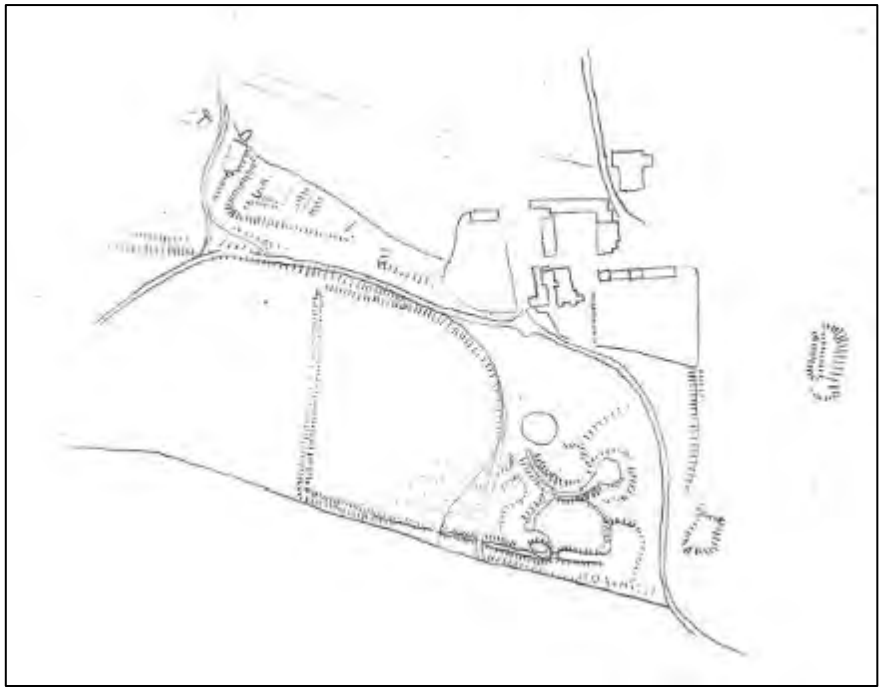


Plate 19 1970s Gokewell earthworks survey

6.39 Cropmarks of some of the former earthworks have also been mapped by the NLHER (Plate 20 and Figure 2). These earthworks extend beyond the approximate area of the Gokewell Priory indicated by the NLHER data (Figure 2 **MLS1805**).

[29] https://thejournalofantiquities.com/2014/01/20/gokewell-priory-scunthorpe-north-lincolnshire/

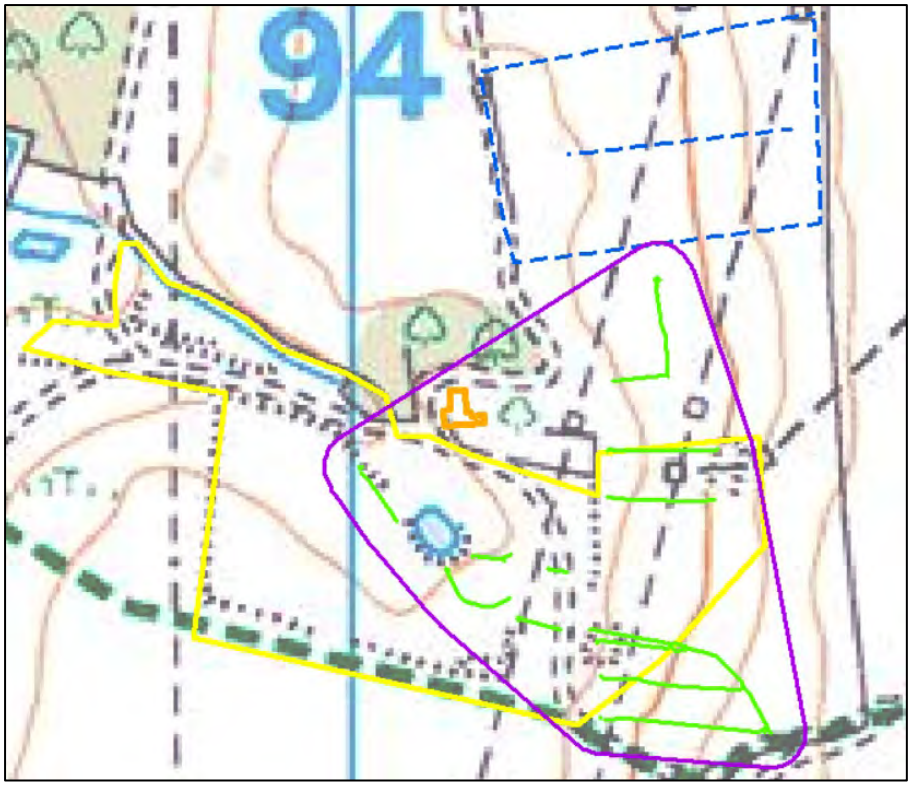


Plate 20 Cropmark features (green), area of former ridge and furrow earthworks (blue), approximate Gokewell Priory extent recorded by NLHER (purple), extent of earthworks recorded by survey (yellow) and a former farm building (orange)

6.40 While it has not been possible to copy or reproduce the aerial photographs held by the NLHER for copyright reasons, the earthworks can also be seen on aerial photographs held at the Historic England Archives (Plate 21).

Plate 21 1956 aerial photograph of earthworks at the former Gokewell Priory Farm[30]

[30] Historic England RAF/58/1934 Frame 133

6.41 A current aerial image of the Site is provided at Plate 22, below.

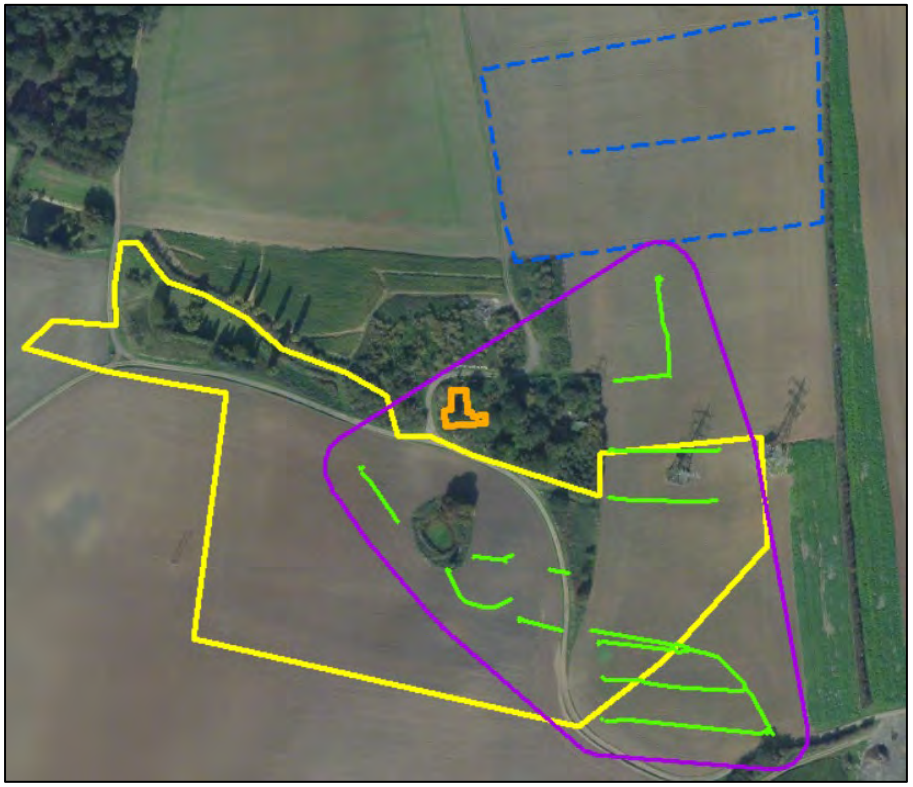


Plate 22 Current aerial image of Site[31]

6.42 There are few traces of the former Gokewell Priory surviving as earthworks today as the arable and other agricultural use of the fields, including recurring ploughing activity, has reduced and levelled the earthworks. In some cases, the levelling revealed limestone rubble which was present within the banks. One pond is still visible, with a few other possible pond features also remaining visible. Some evidence of ditches and banks can still be seen, but the traces are very faint.

6.43 The construction of the later Gokewell Priory Farm buildings at the location of the main former Priory buildings may have preserved elements of the former medieval Priory beneath the foundations. However, this area is currently within a small pocket of woodland and is not included within the proposed area for solar panels.

6.44 The area surrounding the core of the former Gokewell Priory, where the ancillary buildings of the former Priory may have been located and where the earthworks were once visible, has less potential for survival of archaeological remains due to ploughing and deliberate levelling of the earthworks; this area is included in the area for placement of solar panels.

6.45 The site of the former Gokewell Priory was assessed for Scheduling by Historic England in 1998. The Non-Scheduling Report concluded that "*a case for national importance cannot be made at this time given the lack of evidence for surviving remains*." A copy of this report is reproduced in Appendix 4.

[31] Bing Maps Aerial - © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS

Beyond the Site

6.46 A number of small settlements were established in the vicinity in the early medieval period, some of which are still extant but others which have shrunk or disappeared.

6.47 The deserted medieval village of Manby (**MLS1806**) is located c.130m to the south of the Site. It was mentioned in the Domesday book as *Mannebi* held by Edwin which means that it was established and large enough to pay tax by the time of the Domesday survey in 1086. There are no remains of the village today, other than possible remnants of ridge and furrow. The 1st edition Ordnance Survey map shows a track running east-west to a number of buildings which are no longer extant. The HER records a block of former ridge and furrow earthworks associated with Manby (also recorded as **MLS1806**) which was formerly present within the southern part of the Site. However, there is no evidence to suggest that settlement activity associated with Manby extended into the Site, although the 1824 Ordnance Survey map appears to record outlying post-medieval buildings at Manby immediately south of the Site boundary (Plate 23).

Plate 23 1824 Ordnance Survey map depicting Manby

6.48 The Scheduled Monument of Raventhorpe which lies *c.*920m to the south of the Site is another example of a deserted medieval village. It was first recorded 1067 and then again in the Domesday book where it was recorded as a settlement held by Peterborough Abbey. To the north of the Scheduled monument are various cropmarks of linear and sub-ovoid/irregular features (**MLS1828**), which may represent outlying agricultural features associated with the settlement, and which extend to within *c.* 500m of the Site.

6.49 There are three areas of ridge and furrow and a headland (two areas labelled **MLS21187,** and **MLS21642**) located to the

northwest and northeast of Raventhorpe. Given the location close to Manby and Raventhorpe it is likely that part of the Site was possibly used as common land to provide for both communities, along with the former Gokewell Priory.

Early Medieval and Medieval Summary

6.50 There is potential for medieval archaeology to survive below-ground within the Site in the area of the former Gokewell Priory. This could include below-ground remains of the chapel and main Priory structures.

Post-medieval and Early Modern (1540 – 1914)

Within the Site

6.51 The Site is recorded on the 1824 Ordnance Survey map (Plate 24). This depicts Gokewell Priory Farm in the northern part of the Site, along with a number of trackways, mostly concentrated in the vicinity of the farm (NLHER refs. **MLS1027** and **MLS25419**).

Plate 24 1824 Ordnance Survey map

6.52 Some time after the dissolution of the former medieval Gokewell Priory in 1536, Gokewell Priory Farm had been constructed at the former location of the core of the Priory. The exact date of construction of Gokewell Priory Farm is unknown, possibly in the late 17th century but more likely in the 18th century. It had certainly been constructed by the early 19th century as is demonstrated by its depiction on the 1824 Ordnance Survey map (Plate 25).

6.53 The siting of Gokewell Priory Farm at the location of the former core of the medieval Gokewell Priory is logical as it would have facilitated the easy re-use of the ruined building material from the former Gokewell Priory within the buildings of Gokewell Priory Farm which replaced it. However, there are conflicting accounts as to whether the material from Gokewell Priory was incorporated into the later Gokewell Priory Farm. The NLHER record file includes a reference from the 1978 earthwork survey which states that there was "*no sign of re-used dressed masonry*" whereas Pevsner states that there were "*fragments of C13 stones reset in farm buildings*."[32] The 1989 Pevsner reference may have been copied from the 1964 edition, and is therefore likely to have been based on observation of the buildings prior to their demolition.

Plate 25 1824 map showing Gokewell Priory Farm

6.54 The layout of Gokewell Priory Farm is depicted clearly on 1956 Ordnance Survey mapping and aerial photography (Plate 26 to Plate 29). This area, following the demolition of the former Gokewell Priory Farm between *c*. 1991 and 2003, was left to be reclaimed by nature and is now covered in trees.

[32] Harris J. and Pevsner N. 1989 ed. *The Buildings of England, Lincolnshire*. p. 194

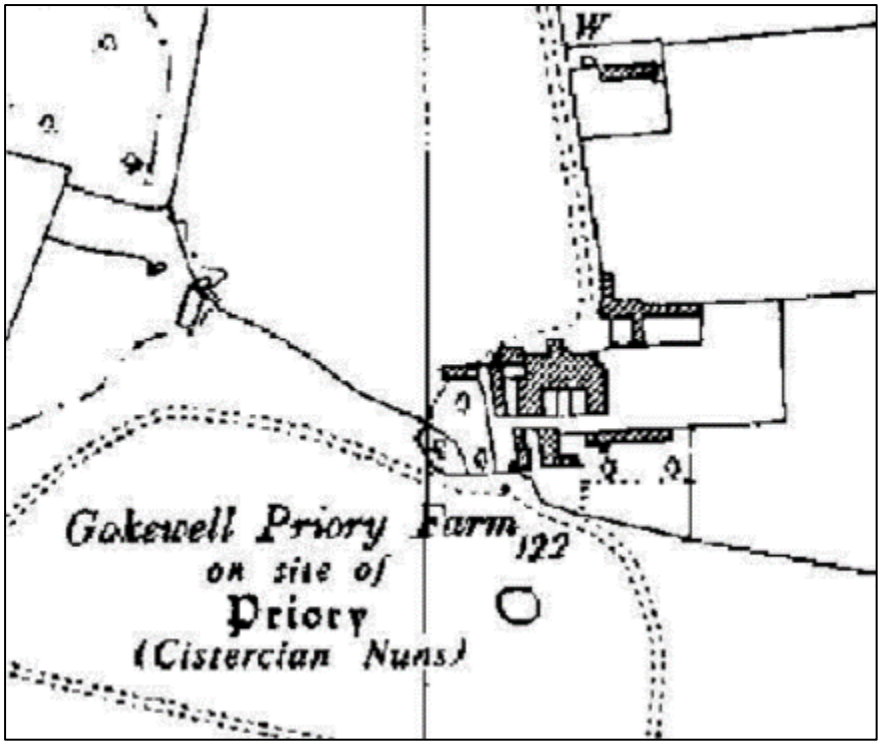


Plate 26 1956 Ordnance Survey map of Gokewell Priory Farm

Plate 27 1956 aerial photograph of Gokewell Priory Farm

Plate 28 1956 aerial photograph of Gokewell Priory Farm, looking southwest

Plate 29 1956 aerial photograph of Gokewell Priory Farm, looking south

6.55 The Broughton Tithe Map of 1842 (Plate 30) provides the first detailed depiction of the Site. Details as to the ownership and use of each of the individual land parcels is detailed in Table A and illustrated on Figure 7, informed by the Tithe Apportionment which accompanied the map. The Tithe Map and Apportionment details that during the mid-19th century, the Site was under the ownership of The Right Honourable Earl of Yarborough, and tenanted by William Brown.

Plate 30 Extract from Broughton Tithe Map, 1842.

Table A: Tithe Apportionment details

Plot	Plot Name	Owner	Tennant	Use
609	Great Dunnow Leys	The Rt Hon Earl of Yarborough	William Brown	Grass
610	Horse Back	The Rt Hon Earl of Yarborough	William Brown	Grass
611	Little Dunnow Leys	The Rt Hon Earl of Yarborough	William Brown	Grass
612	Rough Close	The Rt Hon Earl of Yarborough	William Brown	Pasture
613	Manby Close	The Rt Hon Earl of Yarborough	William Brown	Pasture
614	Feeding Close	The Rt Hon Earl of Yarborough	William Brown	Pasture
615	Goswell Beck	The Rt Hon Earl of Yarborough	William Brown	Pasture
616	Goswell Beck	The Rt Hon Earl of Yarborough	William Brown	Pasture
617	Eleven Acres	The Rt Hon Earl	William	Pasture

		of Yarborough	Brown	
618	Plantation	The Rt Hon Earl of Yarborough	The Rt Hon Earl of Yarborough	Plantation
619	Eight Acres	The Rt Hon Earl of Yarborough	William Brown	Pasture
620	Hill Side Close	The Rt Hon Earl of Yarborough	William Brown	Arable
621	Hill Side	The Rt Hon Earl of Yarborough	William Brown	Arable
622	Lime Kiln Close	The Rt Hon Earl of Yarborough	William Brown	Arable
623	Twenty Two Acres	The Rt Hon Earl of Yarborough	William Brown	Arable
624	Wood Eleven Acres	The Rt Hon Earl of Yarborough	William Brown	Arable
627	Plantation	The Rt Hon Earl of Yarborough	Himself	Wood
628	Far Twenty Acres	The Rt Hon Earl of Yarborough	William Brown	Arable
629	Twenty Acres	The Rt Hon Earl of Yarborough	William Brown	Arable
630	Fourteen Acres	The Rt Hon Earl of Yarborough	William Brown	Arable
631	Old Wives Garth	The Rt Hon Earl of Yarborough	William Brown	Arable
632	Cana Close	The Rt Hon Earl of Yarborough	Himself	Arable
633	Far Knowles	The Rt Hon Earl of Yarborough	William Brown	Arable
634	Stony Dales	The Rt Hon Earl of Yarborough	William Brown	Arable
635	Twenty One Acres	The Rt Hon Earl of Yarborough	William Brown	Arable
636	Little Holt Hill	The Rt Hon Earl of Yarborough	The Rt Hon Earl of Yarborough	Pasture
637	North Close	The Rt Hon Earl of Yarborough	William Brown	Pasture

638	Paddock	The Rt Hon Earl of Yarborough	William Brown	Pasture
639	Paddock, Stacky and Buildings	The Rt Hon Earl of Yarborough	William Brown	-
640	House, Gardens etc.	The Rt Hon Earl of Yarborough	William Brown	-
641	Cottages, Yard and Gardens	The Rt Hon Earl of Yarborough	William Brown	-
642	Ned's Close	The Rt Hon Earl of Yarborough	William Brown	Pasture
643	Horse Close	The Rt Hon Earl of Yarborough	William Brown	Pasture
644	Clamors	The Rt Hon Earl of Yarborough	William Brown	Pasture
646	Knowles Close	The Rt Hon Earl of Yarborough	William Brown	Arable
647	Roughs	The Rt Hon Earl of Yarborough	William Brown	Pasture
648	Diamond Leys	The Rt Hon Earl	William	Arable
		of Yarborough	Brown	
649	Wood	The Rt Hon Earl of Yarborough	Himself	Wood
651	Labourers Close	The Rt Hon Earl of Yarborough	William Brown	Grass
653	Wood	The Rt Hon Earl of Yarborough	Himself	Wood
655	Wood	The Rt Hon Earl of Yarborough	Himself	Wood

6.56 Field number 622 is named 'Lime Kiln Close' in the Tithe Apportionment, which could refer to a former lime kiln which may have been located within or adjacent to the field. This putative feature could have been located within the Site, on the Site boundary, or on the edge of woodland areas immediately adjacent to the field, either inside or outside the Site. It is unknown if below-ground remains of this feature would survive in situ, given the arable use of the field.

6.57 The Tithe Map clearly depicts Gokewell Priory Farm, annotated as 'Cokewell'. All of the Gokewell Priory Farm buildings were, however, demolished between *c*. 1991 and 2003. The former Gokewell Priory Farm buildings were located within an area which is now a pocket of woodland, which is not proposed for

the placement of solar panels.

6.58 The morphology of the Site had already seen a degree of change by the late 19th century, with the Ordnance Survey mapping of 1889-91 (Plate 31 and Figure 8) demonstrating that a number of fields had been consolidated and areas of woodland extended. In particular, the fields in the southeastern portion had been consolidated into one very large field.

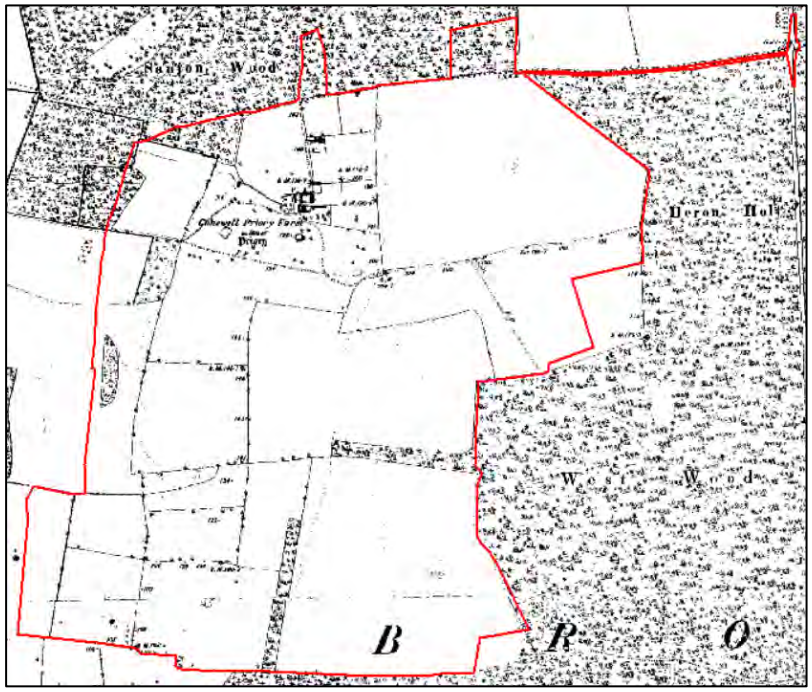


Plate 31 1889 -1891 Ordnance Survey Map

6.59 The mapping shows that the only buildings within the Site in the late 19th century were the buildings of Gokewell Priory Farm (Plate 31), the remaining fields being in arable and pasture use. The 1889-91 Ordnance Survey map shows Manby Hall to the south of the Site, with the buildings of Raventhorpe located directly south of this.

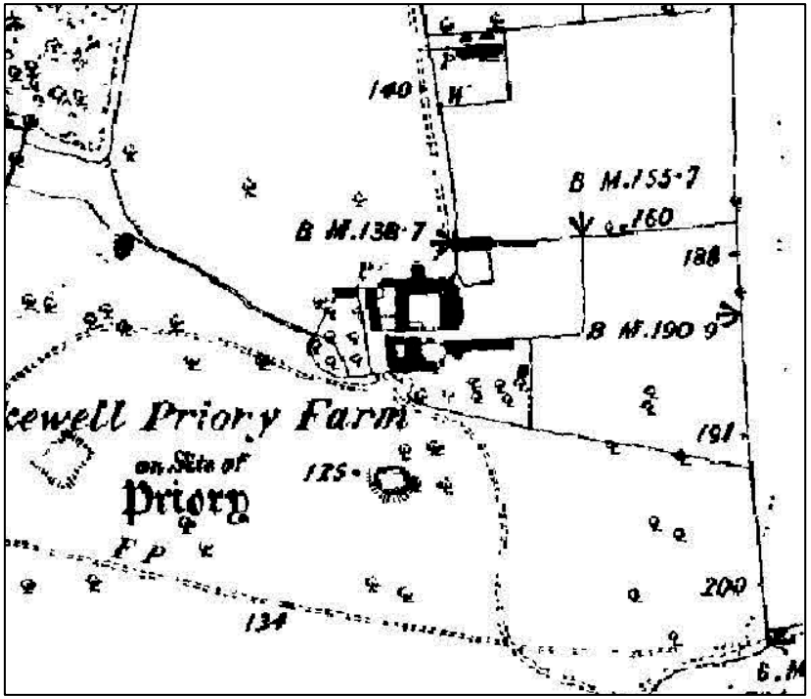


Plate 32 Close-up of Gokewell Priory Farm on 1889-91 Ordnance Survey Map

6.60 No substantial changes are recorded within the Site by the 1908 Ordnance Survey map (Plate 33 and Figure 9), apart from the reversion of a field in the southwestern part of the Site to scrubland.

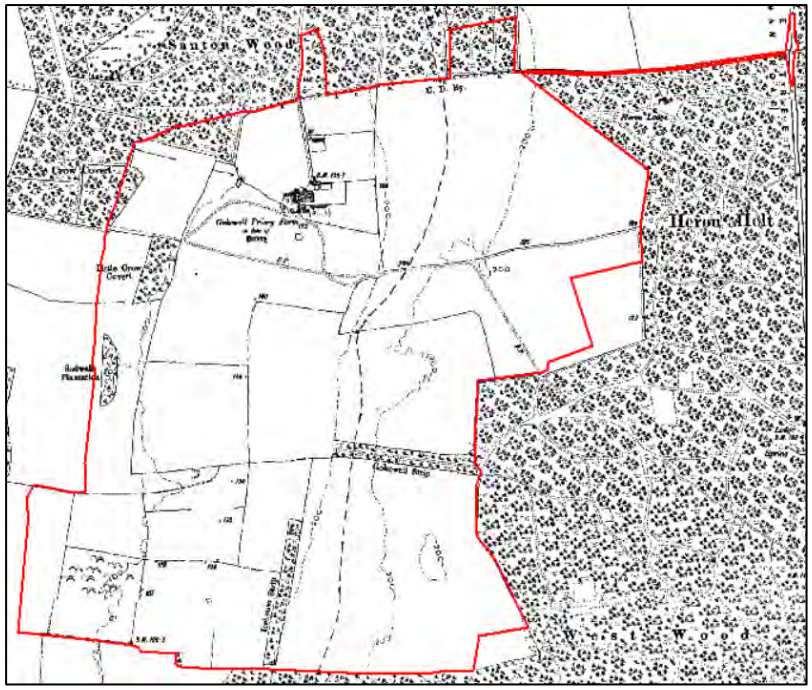


Plate 33 1908 Ordnance Survey Map

Beyond the Site

6.61 Within the medieval settlement of Manby around 300m to the south of the proposed development boundary, Manby Hall was constructed *c*. 245m south of the Site in the post-medieval period (**MLS19488**). A designed landscape of formal gardens and parkland was associated with Manby Hall (**MLS21526**). The 1908 Ordnance Survey map shows that there was a formal, possibly walled, garden to the southwest of the hall with a plantation surrounding the garden. The entrance carriage drive is depicted leading from Ermine Street through Manby Wood. There is also a record of a linear boundary identified from aerial photography (**MLS21643**) within Manby Wood c.80m south-east of the Site which may be related to the wider parkland of Manby Hall. The Hall and the elements of the landscaped garden are no longer extant.

6.62 The 19th century saw the establishment of farmsteads within the area as agricultural activity increased. Farmsteads were constructed at High Santon *c*. 790m north of the Site (**MLS25150**) and at Manby *c*. 275m south of the Site (**MLS25431**). Both of these farmsteads survive.

Post-medieval and Early Modern Summary

6.63 There is potential for post-medieval archaeology within the Site, but this is likely to be associated with agriculture, for example, field boundaries and ridge and furrow (the area of the former Gokewell Priory Farm buildings is not proposed for the construction of solar panels). A lime kiln may have been located within the Site. If below-ground remains of this feature are located within the Site and have survived subsequent ploughing, or were not deliberately removed to facilitate ploughing, they would, at most, be of a level of significance commensurate with a non-designated heritage asset.

Modern (1914 – present)

Within the Site

6.64 Within the Site is the record of a World War II Heavy Anti-Aircraft Battery (**MLS21408**). It was identified as Scunthorpe

H10, but was recorded as de-armed in 1942. Any surviving below-ground remains of this feature are considered to be of low heritage value.

6.65 Throughout the modern period, the consolidation of smaller fields into larger parcels continued, in particular during the post-war period, gradually establishing the Site as seen today. By the latter half of the 20th century, the majority of the field boundaries had been removed, leaving large blocks of arable land. Gokewell Priory Farm (Plate 34) is shown until the late 1980s after which it is no longer depicted; the site of the farm is now covered by a small copse of trees. This establishment of a modern agricultural landscape is also demonstrated by the Historic Landscape Characterisation data (Figure 4). This identifies that the Site contains the Historic Landscape type of Modern Fields, dating from 1945 onwards. This means that this landscape, with its large, open fields has very little time depth and low historic legibility.

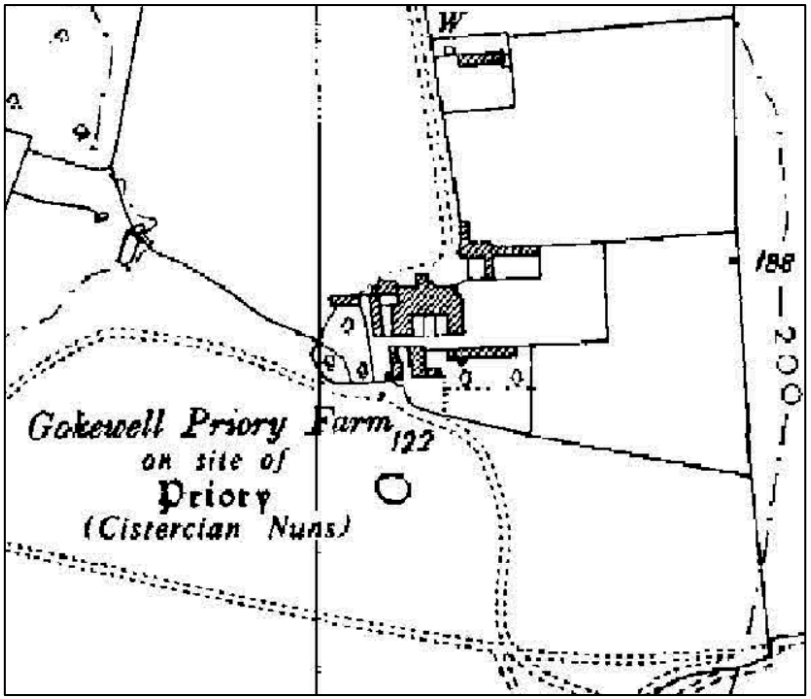


Plate 34 Close up of Gokewell Priory Farm on 1956 Ordnance Survey map

6.66 The final modern record identified from the NLHER is a linear cropmark (**MLS24688, ELS808**) running across the southeastern portion of the Site. The landowner has confirmed that this relates to a modern water main. It has no heritage value.

Beyond the Site

6.67 To the north of the Site, adjacent to the 1km study area boundary, another Heavy Anti-Aircraft Battery is recorded at

High Santon (**MLS22523**), located near High Santon Farm. This Anti-Aircraft Battery dates from World War I and was armed with an 18-pound gun.

6.68 To the east and southeast of the Site, beyond the Site boundary were two sites associated with the RAF from WWII. The first was the site of a military supply depot (**MLS22696**) 209MU RAF Broughton. It was opened in 1943 within Far Wood and closed in 1946. The depot supplied equipment to the local air bases and was made up of a number of buildings including Nissen Huts, emergency water supply tanks, vehicle workshops, and a number of concrete buildings. The site was occupied by other businesses after the war, including a bus garage. The site was investigated in 2013 by volunteers in advance of a partial development of the site which recorded a number of the buildings through measured survey.

6.69 To the southeast of the Site boundary was the site of a former WWII accommodation site associated with the supply depot of 209MU RAF Broughton (**MLS22710**). The site may have been used by WAAFs but was also used as emergency accommodation in the post-war period. The site was investigated in 2015 when part of the site was going to be developed.

6.70 The surrounds of the Site also experienced much change during the post-war period, principally the land to the west with the gradual expansion of the Scunthorpe Steel Works from the 1950s onwards. This steel works now occupies a massive swathe of landscape to the west, stretching the entire length of the Site (Plate 35, Figure 10). The steel works were established in the late 19th century as the Redbourn Hill Works with the Brumby Common East ironstone quarry located to the south. The works then expanded in the first half of the 20th century with the 1956 Ordnance Survey mapping showing they had already expanded to cover a large area with the site of the quarry now covered with buildings and infrastructure.

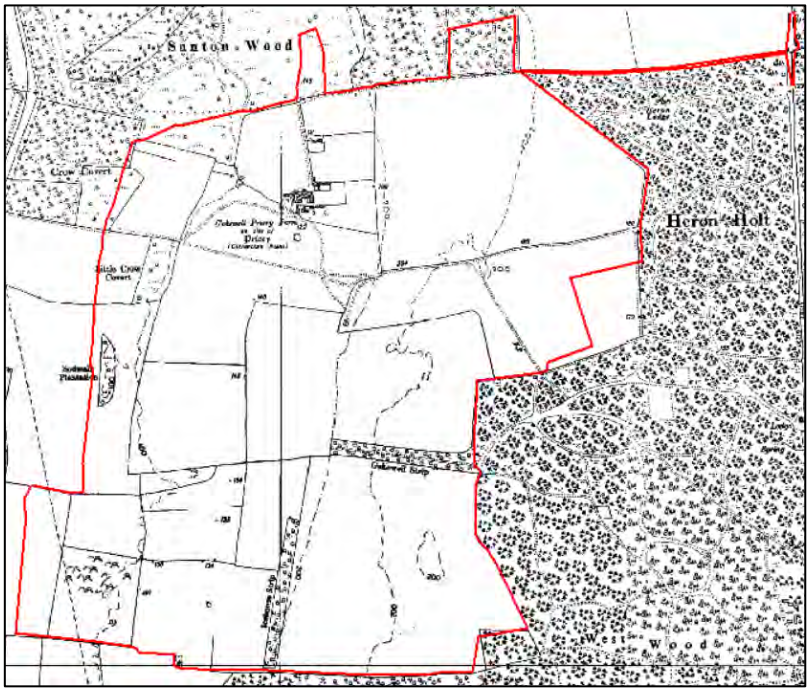


Plate 35 1956 Ordnance Survey Map showing extent of Scunthorpe Steel Works to west

Modern Summary

6.71 The Site is not considered to have potential for significant archaeological remains of modern date. Remains relating to the anti-aircraft battery may survive below ground, although are likely to be of low heritage value.

Undated

Within the Site

6.72 An undated slight earthwork of a possible enclosure has been identified within the northwestern portion of the Site (Plate 36, Plate 37) mostly located within Little Crow Covert (**MLS22780**). It comprises an ovoid ditch measuring 72m by 55m. The earthwork portion of this feature appears to survive as a slight trace within the woodland, whereas the western part located within the agricultural field appears to have been ploughed out – the basis for the NLHER polygon continuing in this area is unclear. It is unknown whether a part of this feature survives below-ground within the agricultural field. This feature has not been archaeologically tested so its date, function and archaeological value are unknown.

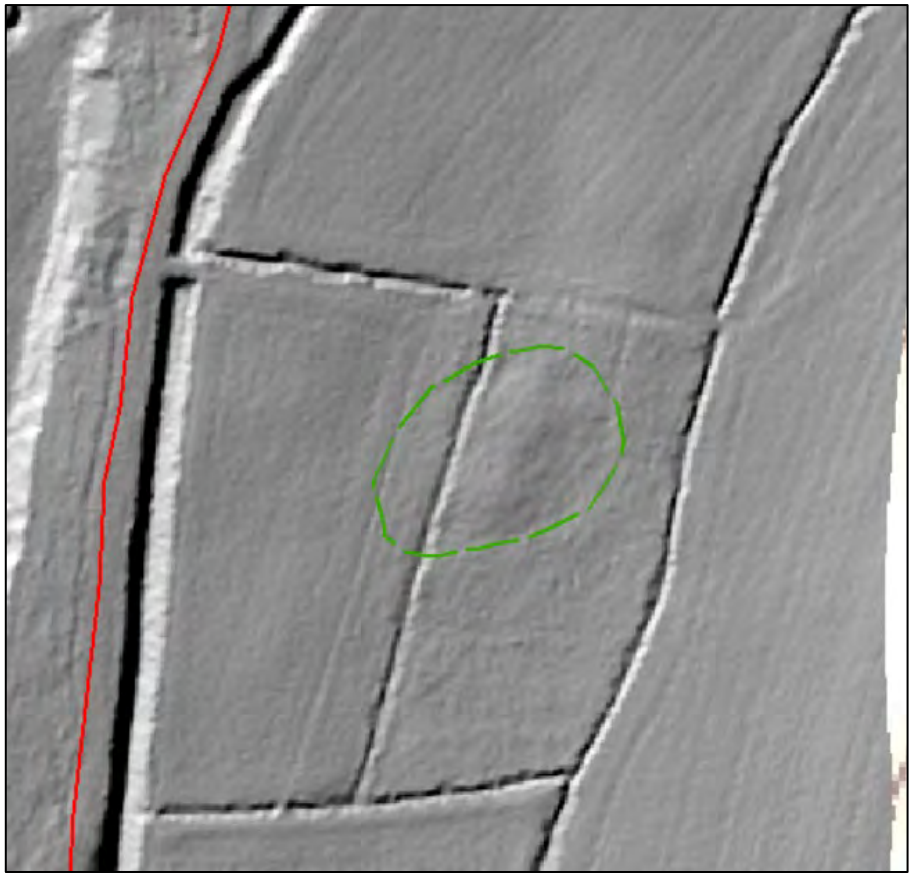


Plate 36 Lidar and NLHER data (green) depicting possible enclosure

Plate 37 Aerial image showing location of possible enclosure[33]

6.73 Four undated cropmarks lie within the Site. These include a square feature (**MLS21941**) and a small ovoid feature located to the west (**MLS21943**). These assets are located to the north of the Manby deserted medieval village (located outside of the Site boundary). These cropmarks were transcribed by the NLHER from 2008 Google imagery. These features are considered most likely to be stock enclosures of medieval date, due to their size and location, with a low archaeological value. However, a geological (non-archaeological) origin for these features is also considered to be likely.

6.74 Within the same field are two partial circular cropmarks, *c*.12m in diameter (**A1**, **A2**), visible on a 1973 aerial photograph (Plate 38). These features could represent partially ploughed-out ring ditches, although geological or agricultural origins are equally possible.

6.75 Within the Site there is also the record of finds from the vicinity of Gokewell Priory Farm (**MLS2333**) noted from a gazetteer, however there is no further information for this, and therefore this findspot has no heritage value.

6.76 A watching brief on a water mains replacement scheme (**ELS3145**) recorded an undated stone wall in a trench within or in close proximity to the northeastern part of the Site (**MLS21242**). It comprised three regular courses of unmortared limestone on a foundation of rough stone. No dating evidence was found, although the wall was speculated by the excavating archaeologists to be medieval to modern.

[33] Bing Maps Aerial - © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS

Plate 38 1973 aerial photograph[34]

Beyond the Site

6.77 There are a number of unknown-period records on the NLHER beyond the Site area.

6.78 Two sites of springs are recorded, one called Manby Springs (**MLS22666**), the other located within Manby Wood near to West Wood Lodge (**MLS22667**). This spring is within a stone circular basin and possibly associated with Manby Estate.

6.79 Immediately north-east of the Site and the B1027 is an amorphous or sub-rectangular possible enclosure feature now obscured within woodland, but previously identified from aerial photographs (**MS24695**). It is labelled as an Old Quarry on historic Ordnance Survey mapping.

6.80 There are two records of mounds (**MLS19644, MLS1813**) which were once considered as potential archaeological assets but are now considered as natural features; the former definitively identified as a result of archaeological excavation.

Summary of Archaeological Potential

6.81 Five areas of archaeological potential have been identified within the Site; the possible site of a ring ditch; an ovoid enclosure partially surviving as a trace earthwork within woodland; the area surrounding the core of the former medieval Gokewell Priory (also surrounding and beyond the area of the later post-medieval Gokewell Priory Farm buildings), which may have contained ancillary structures or a burial ground; and two possible medieval stock enclosures (although these may also be geological in origin) and two nearby small partial circular cropmarks of unknown origin.

[34] Historic England OS/73195 11315 Frame 37

7. Setting Assessment

7.1 Step 1 of the methodology recommended by the Historic England guidance *The Setting of Heritage Assets* (see *Methodology* above) is to identify which heritage assets might be affected by a proposed development.

7.2 Development proposals may adversely impact heritage assets where they remove a feature which contributes to the significance of a heritage asset, or where they interfere with an element of a heritage asset's setting which contributes to its significance, such as interrupting a key relationship or a designed view.

7.3 It is widely accepted (paragraph 201 of the NPPF) that not all parts of a heritage asset will necessarily be of equal significance. In some cases, certain elements of a heritage asset, including important parts of its setting, can accommodate substantial changes whilst preserving the significance of the assets as a whole. It is therefore key to understand the significance of any asset which may potentially be affected by development proposals in order to understand the scope for and acceptability of change. Significance can be derived from many elements, including the historic fabric of a building, the layout of space or the land use associated with a building or an area, i.e. its setting.

7.4 Consideration was made as to whether non-designated heritage assets include the Site as part of their setting which contributes to their significance, having regard to their importance and the provision of a proportionate level of detail, as set out in Section 5.8.8 EN-1. The site of the former Gokewell Priory was considered to potentially include the Site as an element of its setting which contributes to its significance, and it has therefore been assessed below.

7.5 There are no designated assets within the Site boundary. Consideration was therefore made as to whether any of the designated heritage assets present within the vicinity include the Site as part of their setting which contributes to their heritage significance, and therefore may potentially be affected by development within the Site.

7.6 Primary focus was placed upon designated heritage assets within a 2km study area around the Site boundary (excluding the access road), with assets beyond this distance considered where necessary based upon professional judgement.

7.7 Designated heritage assets within the 2km study area are set out below, with their locations depicted on Figure 1, and distances are measured from the main body of the Site excluding the existing access road:

- **Scheduled Earthworks of Raventhorpe Medieval Settlement, located *c.*920m south of the Site (NHLE Ref: 1016426);**

- **Grade II Raventhorpe House, located *c.* 875m south of the Site (NHLE Ref: 1346807);**

- **Grade II Listed Springwood Cottage, located *c.*390m northeast of the Site (*c.*315m north of the access track (NHLE Ref: 1083734));**

- **Grade II Listed Stable Northeast of Springwood Cottage, located *c.*420m northeast of the Site (NHLE Ref: 1310038);**

- **Grade II Listed Low Santon Farmhouse (1346494), located c. 1.93km north of the Site;**

- **Grade II Listed Barn Approximately 30 Metres North of Low Santon Farmhouse (1310004), located c. 1.98km north of the Site;**

- **Grade II Listed Stone Cottage and Adjoining Outbuildings, Broughton, located *c.*900m southeast of the Site (NHLE Ref: 1310013);**

- **Grade II Listed 66 High Street, Broughton, located *c.*1.5km southeast of the Site (NHLE Ref: 1083740);**

- **Grade I Listed Church of St Mary Broughton and the Grade II Listed Church Gates, located *c.*1.4km southeast of the Site (NHLE Refs: 1161801 and 1083741);**

- **Grade II Listed The Hollies, Broughton, located *c.*1.4km southeast of the Site (NHLE Ref: 1309931);**

- **Grade II Listed Broughton War Memorial, located *c.*1.5km southeast of the Site (NHLE Ref: 1391424);**

- **Grade II Listed Broughton Grange Farmhouse, located 1.9km east of the Site (NHLE Ref: 1083736); and**

- **Grade II Listed Coach House/Stable approximately 10m east of Broughton Grange Farmhouse, located 1.9km east of the Site (NHLE Ref: 1346496).**

7.8 During the site visit it was ascertained that as a result of the natural topography, existing built form and mature vegetation that there was no intervisibility between the Site and the assets listed above. As a result, these assets have not been taken forward for full assessment. Further detail on the reasons why the Site does not form part of the setting of these assets is set out below.

Scheduled Raventhorpe Medieval Village (1016426) and Grade II Listed Raventhorpe House (1346807)

7.9 The Scheduled Earthworks of Raventhorpe Medieval Village are located *c.*920m to the south of the Site. Intervening land is occupied by dense woodland, existing built form and an extant solar farm located to the southeast of the Site. It is considered that the key elements of the surroundings of the asset which now contribute to its heritage significance are confined to its immediate agricultural surrounds, and the experience and appreciation of the asset from immediate area. The immediate surrounds of the Scheduled Monument are however to some degree overtly modern in character, including the presence of overhead powerlines (which in places extend into the monument). There is no designed relationship between the

assets and the Site, and the wider agricultural surrounds, of which the Site forms part, are not considered to contribute to the experience of the assets. As a result, it is not considered that the Site makes an appreciable contribution to such surrounds, or their visual character, and direct historical or functional connections are considered to be unlikely.

Plate 39 View northwest across Raventhorpe DMV, steel works visible in background

Plate 40 View west looking at Grade II Listed Raventhorpe Farmhouse

7.10 The Grade II Listed Raventhorpe House is located to the north of the Scheduled Monument, *c*.875m to the south of the Site, with the intervening distance occupied by dense woodland, existing built form and a modern agricultural landscape. The asset is located within a clearly-defined boundary plot, amongst a grouping of additional ancillary buildings. It is considered that the key elements of the surroundings of the assets which contribute to their heritage significance via setting are primarily associated with the interrelationship between the House and the Scheduled Monument, position within the defined boundary plot, and experience and appreciation of the assets from their immediate surrounds. There is no designed relationship between the assets and the Site, and the wider agricultural surrounds

which the Site is part of are not considered to contribute to the experience of the asset. As a result, it was not considered that the Site made an appreciable contribution to such surrounds, or their visual setting, and direct historical or functional connections are considered to be unlikely.

Listed Buildings at Springwood Cottage (1083734 and 1310038)

7.11 The designated heritage assets at Springwood Cottage (Grade II Listed) area located *c.*390m northeast of the Site, with the intervening distance occupied by dense woodland and a modern agricultural landscape. The assets are located within a clearly defined boundary plot, amongst a grouping of additional ancillary buildings. It is considered that the key elements of the surroundings of the assets which may contribute to their heritage significance via setting are primarily associated with their interrelationship, position within the defined boundary plot and experience and appreciation of the assets from their immediate surrounds. There is no designed relationship between the assets and the Site, and the wider agricultural surrounds of which the Site comprises part are not considered to contribute to the experience of the assets. As a result, it was not considered that the Site made an appreciable contribution to such surrounds, or their visual setting, and direct historical or functional connections are considered to be unlikely.

Listed Buildings within Broughton

Plate 41 View west within Broughton looking at Grade I Listed St. Mary's Church – no view of the site

7.12 The group of designated heritage assets within the settlement of Broughton are located within the urban environment of the settlement, separated from the Site by *c.*1-1.5km of dense vegetation and existing built form. The key elements of the surrounds of these assets which may contribute to their heritage significance are primarily associated with their immediate environs, and in particular the street scenes within which they are located. As a result, it was not considered that the Site made

an appreciable contribution to such surrounds, or their visual setting, and direct historical or functional connections are considered to be unlikely.

Non-Designated Site of Gokewell Priory

7.13 The site of the former medieval Gokewell Priory (NLHER ref. **MLS1805**) is located within the northern area of the Site. This asset and its historical and archaeological background are set out in Section 6 of this Baseline Study. Gokewell Priory survives as above-ground remnant earthworks and potential below-ground archaeological remains, and principally derives its significance from the archaeological interest and evidential value of said remains.

7.14 The landscape surrounding the site of the former medieval priory has undergone extensive change since the medieval period. The medieval field systems are no longer extant, and the surrounding area is now made up of very large, modern blocks of agricultural land. The agricultural regimes have also changed noticeably since the medieval period, with more intensive ploughing and use of the land. This has resulted in a general sense of agricultural surroundings remaining, however the character of this agricultural activity and the use of the land bears little relation to the medieval agricultural landscape. The former extent of the landholding of the Priory is unknown, although it is highly likely to have included the surrounding agricultural land. As a result, the agricultural surrounds, although modern in character, are considered to make a moderate contribution to its illustrative historical value, by enabling its former location within an agricultural landscape to be appreciated.

7.15 The Site forms part of the agricultural surrounds of the asset which makes a moderate contribution to its significance through its illustrative historical value.

Assessment Summary

7.16 Based upon the above it is not considered that the Site forms part of the setting of the designated heritage assets within the 2km study area which contributes to their heritage significance, and they will not be impacted upon by the proposals. As such, none of the designated heritage assets within the 2km study area have been taken forward for further, detailed assessment.

7.17 With regard to designated heritage assets beyond the 2km study area, due to the surrounding topography, existing vegetation and built form it was concluded during the site visit that the Site did not form part of the setting of designated heritage assets beyond the 2km study area, and thus no further assets were taken forward for assessment.

7.18 The Site forms part of the setting of the non-designated site of Gokewell Priory which makes a moderate contribution to its significance. The Site is not considered to contribute to the significance of other non-designated heritage assets.

8. Discussion

Archaeological Resource

8.1 One area of specific prehistoric archaeological potential has been identified within the Site (c. 0.16ha), a cropmark of a possible round barrow (**MLS22718**). However, this feature has not been positively identified by archaeological fieldwork. Poorly-recorded flints and deposits of Sutton Sand Formation within the Site and a broad prehistoric transport corridor in the area are not considered to represent any specific heritage assets within the Site.

8.2 A former Cistercian nunnery, Gokewell Priory, was located in the northern part of the Site. Gokewell Priory was established in the 12th century, and abandoned in the 16th century. Gokewell Priory Farm was built on the site of the former Gokewell Priory between the late 17th and early 19th century. Material from the former medieval Priory may have been used during the construction of the farm. Gokewell Priory Farm was itself abandoned and demolished in the late 20th century. The below-ground remains of the former medieval Gokewell Priory and the later post-medieval Gokewell Priory Farm are located within the northern part of the Site (**MLS1805**). However the core of the medieval Gokewell Priory, where the later post-medieval Gokewell Priory Farm buildings were constructed, is not proposed for the location of solar panels.

8.3 However, there is potential for below-ground remains of ancillary structures and features associated with the former medieval Gokewell Priory to be present within the areas proposed for development. The potential extent of this area is demonstrated by the earthworks survey (**ELS4211**) shown on Figures 2 and 3.

8.4 Beyond the former Gokewell Priory there is no proven evidence for medieval activity within the Site. No above-ground remains of ridge and furrow earthworks survive within the Site.

8.5 Two possible medieval stock enclosures (**MLS21943**, **MLS21941**) of low archaeological value (or potential geological origin) and two nearby partial circular features of unknown origin (**A1**, **A2**) are suggested within the Site by cropmarks.

8.6 The Site also contains a slight ovoid possible earthwork enclosure preserved within the woodland of Little Crow Covert (**MLS22780**). Its origin and nature are currently unknown, and it does not appear to extend above-ground into the open-field area of the Site.

8.7 An undated limestone wall (**MLS21242**) was recorded adjacent to the B1027 in the northeastern part of the Site. However, this area adjacent to a public road is unlikely to see groundworks which would impact upon this asset.

8.8 Potential below-ground remains relating to a former WWII Heavy Anti-Aircraft Battery (**MLS21408**) could potentially survive within the eastern portion of the Site.

8.9 There is no current evidence to suggest that significant constraints are present across the majority of the Site.

Setting Assessment

8.10 Designated and non-designated assets within the Site and its vicinity have been considered within this baseline. It has been assessed that the proposed Site does not form part of the setting of the designated heritage assets which contributes to their significance. Therefore, at this stage, no harm to these designated assets has been identified. It is considered that the Site forms part of the setting of the non-designated heritage asset of the site of the former medieval Gokewell Priory which makes a moderate contribution to its significance through its illustrative historical value, by enabling its former location within an agricultural landscape to be appreciated.

Appendix 1: Heritage Data

Designated Heritage Assets within the 2km Study Area

Listed Buildings

ListEntry	Name	Grade	LegacyUID	NGR
1083734	SPRINGWOOD COTTAGE	II	165975	SE 95066 11064
1083736	BROUGHTON GRANGE FARMHOUSE	II	165983	SE 96985 10327
1083740	66, HIGH STREET	II	165992	SE 96194 08716
1083741	CHURCHGATES	II	165994	SE 96076 08640
1161801	CHURCH OF ST MARY	I	165995	SE 96036 08625
1310038	STABLE APPROXIMATELY 20 METRES NORTH EAST OF SPRINGWOOD COTTAGE	II	165976	SE 95042 11070
1309931	THE HOLLIES	II	165993	SE 96079 08683
1310013	STONE COTTAGE AND ADJOINING OUTBUILDINGS	II	165982	SE 95607 09138
1346807	RAVENTHORPE FARMHOUSE	II	165707	SE 93654 08114
1346496	COACH HOUSE/STABLES APPROXIMATELY 10 METRES EAST OF BROUGHTON GRANGE FARMHOUSE	II	165984	SE 97005 10340

1391424	BROUGHTON WAR MEMORIAL	II	493248	SE 96158 08664
1346494	Low Santon Farmhouse	II	165977	SE 94001 12784
1310004	Barn Approximately 30 Metres North of Low Santon Farmhouse	II	165978	SE 94001 12824

Scheduled Monuments

ListEntry	Name	LegacyUID	NGR
1016426	Raventhorpe medieval settlement earthworks immediately south west of Raventhorpe Farm	32621	SE 93595 07948

Data obtained from North Lincolnshire Historic Environment Record and Historic England AMIE Database

Monument Records Within the Site

NLHER MONUID / *HE AMIE REF.*	**PERIOD**	**MONTYPES**	**GRIDREF**	**NAME**	**DESCRIPTION**
MLS22718 *1576008*	Bronze Age	ROUND BARROW	SE 9417 0980	ROUND BARROW, GOKEWELL	Possible round barrow identified from aerial photographs - not proven by fieldwork
MLS6695	Prehistoric	FINDSPOT	SE 940 100	FLINTS	Findspots of flints listed in a gazetteer of 1976. No value.
MLS20003 *1035165*	Early Neolithic to Roman	TRACKWAY	SE 922 097	JURASSIC WAY PREHISTORIC TRACKWAY	The line of the prehistoric Jurassic Way trackway from Lincoln to Winteringham. This is quite conjectural though the line of the track is shown passing High Santon and Gokewell on old Lincolnshire maps like Armstrong 1778.

MLS1805	Medieval	CISTERCIAN NUNNERY, PRIORY	SE 9412 1026	FORMER GOKEWELL PRIORY (SITE OF)	Site of a Cistercian Nunnery founded by William de Alta Ripa in 1148 or 1185. Dissolved in 1536. Earthworks remain to the south of the former Gokewell Farm. The earthworks are now gone, levelled by agriculture with little above ground evidence remaining. There is potential for survival in the area below the later farm buildings. Assessed for scheduling in 1998. not taken forward.
MLS1027/MLS25419	Post Medieval	FARMHOUSE	SE 940 103	GOKEWELL PRIORY FARMHOUSE (SITE OF)	This farmhouse is no longer extant, demolished in the 1980s. It was built on the site of the former Gokewell Priory, the site of a Cistercian Nunnery founded in the 12th century. It is possible the farm buildings incorporated fabric from the former priory.
MLS21408 *1473342*	Modern	HEAVY ANTI AIRCRAFT BATTERY	SE 944 100	HEAVY-ANTI AIRCRAFT BATTERY (SITE OF), GOKEWELL	Site of heavy anti-aircraft battery designated Scunthorpe H10 east of Gokewell. De-armed in 1942.
MLS24688	Modern	TRACKWAY	SE 944 091	TRACKWAY, WEST OF MANBY WOOD	Cropmark of a modern water main.
MLS21941	Undated	SQUARE ENCLOSURE	SE 9391 0926	SQUARE FEATURE, NORTH OF MANBY DMV	A closed square feature, too small for an enclosure identified north of Manby DMV. Probable medieval stock enclosure.
MLS21943	Undated	OVAL ENCLOSURE	SE 9371 0919	SMALL OVOID ENCLOSURE, NORTH OF MANBY DMV	Small ovoid enclosure north of Manby DMV on aerial photographs. Probable medieval stock enclosure.
MLS22780	Unknown	ENCLOSURE?	SE 9362 1018	POSSIBLE ENCLOSURE, LITTLE CROW COVERT	Site of an incomplete ovoid ditch within little Crow Covert visible as earthwork on LiDAR. Possible enclosure?
MLS2333	Unknown	FINDSPOT	SE 9405 1035	FINDS (DETAILS NOT RECORDED)	Finds listed in an old gazetteer - no value
MLS1806 *63412*	Medieval	DESERTED SETTLEMENT	SE 936 088	MANBY DMV (SITE OF)	Manby DMV mentioned in Domesday. Possible remains of ridge and furrow in the vicinity of the asset. Settlement located outside the Site, although former associated ridge and furrow is located within the Site.

MLS21242	Undated	Wall	SE 9549 1081 (point)	LIMESTONE WALL, WEST OF ROWLAND PLANTATION	A section of limestone wall was recorded during a watching brief on a water main replacement, on the B1207 west of Rowland Plantation, 2000. It was undated.
MLS100 *1031689*	Roman	ROAD	SE 951 091	ERMINE STREET	The line of Ermine Street Roman road. In this area, it runs on the west side of Broughton forming the modern road. It runs towards Winteringham to cross the Humber.
ELS2729	Medieval	Ridge and furrow	SE 9419 1047	Ridge and furrow	Area of former ridge and furrow earthworks recorded as part of the Ridge and Furrow Project (ELS2729). This former block of ridge and furrow does not have a MONUID reference number.

Additional features identified within Site

Reference	Description	Easting	Northing
A1	Circular cropmark identified from aerial photography	493702	409400
A2	Circular cropmark identified from aerial photography	493844	409508

Event Records Within the Site

EVUID	EVENTNAME	ORGANISATION	DISPLAY DATE	NGRQUALIFIER	EASTING	NORTHING
ELS800	Aerial photographic sortie	Cambridge University Air Committee	1956	Centred on	493320	410085

ELS800	Aerial photographic sortie	Cambridge University Air Committee	1956	Centred on	493320	410085
ELS808	Aerial photographic sortie	Cambridge University Air Committee	1984	Centred on	484400	412600
ELS922	Aerial photographic survey	Jasair	1989	-	498050	411900
ELS4211	Earthwork Survey, Gokewell Priory Farm	Keith Miller	1976-1982?	-	4940	4102
ELS3145	Watching brief on Sawcliffe area water mains replacement	Pre-Construct Archaeology	October 1999	-	-	-

Monument Records Beyond the Site

NLHER MONUID / *HE AMIE REF.*	**PERIOD**	**MONTYPES**	**GRIDREF**	**NAME**	**DESCRIPTION**
MLS22657	Late Mesolithic	FINDSPOT	SE 931 082	MESOLITHIC FLINT, RAVENTHORPE	Findspot, single microlith at Raventhorpe
MLS26068	Late Mesolithic to Early Bronze Age	LITHIC SCATTER	SE 9404 0825	WORKED FLINT, NORTH & WEST OF STONEWALL RESERVOIR	48 pieces of worked flint found during fieldwalking to the north and west of Stonewall Reservoir in 2014 at Raventhorpe (ELS4274). Carried out by AOC archaeology prior to solar farm.
MLS1818 *63339*	Early Bronze Age to Roman	FINDSPOT	SE 9553 0863	POTTERY & BROOCH	Findspot of a Roman brooch and prehistoric pottery from the head of a stream on south side of mound near Ermine Street
MLS1822 *63421*	Bronze Age	FINDSPOT	SE 9470 0904	FLINT ARROWHEAD	Findspot of a flint arrowhead from 1950

MLS7556	Prehistoric	FINDSPOT	SE 9550 0911	FLINTS & POTTERY	Findspots of flints and pottery listed in a gazetteer of 1976. No value.
MLS7563	Prehistoric	FINDSPOT	SE 9370 0819	FLINTS	Findspots of flints listed in a gazetteer of 1976. No value.
MLS1819 *63464*	Roman	FINDSPOT	SE 942 084	RB POTTERY/GLASS & MASONRY, 1975	Findspot of Roman pottery and glass from ploughsoil
MSL26069	Prehistoric	Findspots	Centred SE 9426 0787	WORKED FLINT, SOUTH & EAST OF STONEWALL RESERVOIR	709 pieces of worked flint were collected during extensive fieldwalking to the north and west of Stonewall Reservoir, Raventhorpe, 2014 (ELS4274). They included three arrowheads.
MLS26070	Roman	ARTEFACT SCATTER	SE 9404 0822	ROMANO-BRITISH POTTERY, NORTH & WEST OF STONEWALL RESERVOIR	298 pieces of roman pottery recovered during fieldwalking north and west of Stonewall reservoir prior to solar farm. Arch evaluation discovered nothing in this location
MLS26071	Roman	ARTEFACT SCATTER	SE 9426 0787	ROMANO-BRITISH POTTERY, SOUTH & EAST OF STONEWALL RESERVOIR	276 pieces of Roman pottery recovered during field walking south and east of Stonewall reservoir prior to Solar farm.
MLS26072	Roman	ENCLOSURE, BUILDING	SE 9391 0781	ROMANO-BRITISH ENCLOSURE, WEST OF STONEWALL RESERVOIR	Roman enclosure identified to southwest of Stonewall Reservoir in 2014 prior to construction of solar farm.
MLS21187	Medieval	RIDGE AND FURROW, OPEN FIELD	SE 93 06	OPEN FIELD SYSTEM, HOLME	Area of ridge and furrow northeast of Twigmoor Grange in Holme parish. Also areas of ridge and furrow identified around the Raventhorpe DMV
MLS1806 *63412*	Medieval	DESERTED SETTLEMENT	SE 936 088	MANBY DMV (SITE OF)	Manby DMV mentioned in Domesday. Possible remains of ridge and furrow in the vicinity of the asset. Settlement located outside the Site, although former associated ridge and furrow is located within the Site.
MLS21642	Medieval to Post Medieval	BOUNDARY BANK	SE 9401 0842	LINEAR HEADLAND OR BANK	Section of linear headland between parish of Broughton and Holme.
MLS21643	Post Medieval	BOUNDARY BANK	SE 948 088	LINEAR BOUNDARY, MANBY WOOD	Section of linear cropmark on aerial photographs as a possible woodland feature?
MLS19488	Post Medieval	HOUSE	SE 9365 0875	MANBY HALL (SITE OF)	The site of Manby Hall as labelled on Ordnance survey mapping

MLS25150	Post Medieval to Modern	FARMSTEAD	SE 9403 1160	HIGH SANTON, APPLEBY	Partially extant farmstead, 19th century. Farmhouse and buildings around a courtyard. Some survival of historic fabric.
MLS21526	Post Medieval to Modern	LANDSCAPE PARK	SE 9365 0881	FORMER LANDSCAPE GARDEN, MANBY HALL	Location of the designed landscape of Manby Hall shown on 2nd Ed Ordnance Survey maps. Some areas still legible.
MLS25431	Post Medieval to Modern	FARMSTEAD	SE 9366 0871	MANBY HALL FARM, BROUGHTON	Partially extant 19th century farmhouse with some survival of original buildings. Located within a manor grouping
MLS22523 *1474188*	Modern	HEAVY ANTI AIRCRAFT BATTERY	SE 941 116	HEAVY ANTI AIRCRAFT BATTERY (SITE OF), HIGH SANTON	General location record for a WWI anti-aircraft battery at High Santon armed with an 18 pounder in 1917.
MLS22696	Modern	MILITARY DEPOT	SE 9554 1022	RAF BROUGHTON EQUIPMENT PARK (SITE OF)	Site of a military supply depot 209MU RAF Broughton opened in 1943 located within Far Wood. Closed in 1946. The site was investigated in 2013 which found concrete bases of 23 buildings.
MLS22710	Modern	DISPERSED SITE	SE 954 090	FORMER RAF CAMP, MANBY WOOD	Remains of a WWII accommodation site associated with 209 MU RAF Broughton. May have been used as emergency housing post-war. Located as two groups within Manby Wood with concrete foundations remaining in 2013. Some areas have been removed by development.
MLS19644 *63291*	Unknown	MOUND	SE 9557 0870	MOUND (NON ANTIQUITY)	Site of a former mound - not archaeological
MLS22666	Unknown	SPRING	SE 9553 0864	MANBY SPRINGS	Two springs located near a church. Possible ritual association? Run together to form Moor Beck
MLS22667	Unknown	SPRING	SE 9546 0964	SPRING, NEAR WESTWOOD LODGE	A spring within Manby Wood inside a stone circular basin likely to be a post-med estate management feature - possibly piped to Westwood Lodge to the north.
MLS1813	Unknown	NON ANTIQUITY	SE 9563 0896	MOUNDS & CROPMARKS, BROUGHTON VILLAGE	Site of a mound once thought to be an antiquity - now known to be a sand hill
MLS1828	Unknown (poss. Medieval)	Cropmarks	SE 9374 0801	Cropmarks	Outlying cropmarks possibly associated with Raventhorpe Deserted Medieval Village

MLS24695	Unknown	Enclosure? Quarry?	Centred to SE95601090	FORMER QUARRY, ROWLAND PLANTATION	A small, sub-rectangular earthwork? enclosure was visible on air photographs taken in 1976. Centred to SE95601090, it measured c. 35m by 30m, with an apparent entrance on the eastern side. There were other indistinct marks to the south-west, possibly denoting a larger, more irregular enclosure centred to SE95551086, perhaps 75m across. This area was under new tree planting on post-2010 air photographs. The small enclosure was shown as an 'Old Quarry' on the Ordnance Survey second edition map of 1908
MLS93	Unknown	LONG BARROW?	SE 9535 1120	POSSIBLE LONG BARROW (SITE OF), BROOM HILL	Two possible sites of a long barrow identified from aerial photography. Nothing confirmed through fieldwork.

Desk-Based Assessment Records Beyond the Site

TITLE	MONUID	EVENTUID	SOURCEUID	TECHNIQUE	MONTH YEAR	ORIGINATOR
Desk-Based Assessment of Forest Pines, Broughton		ELS2962	SLS3522	Dba	April 2005	Humber Field Archaeology
DBA, Lakeside, 2009		ELS3357	SLS3977	Desk based assessmen	October 2009	CgMs
Desk-based Assessment of land at Somervell Road		ELS3077	SLS2481	Desk	September 1994	Lindsey Archaeological Service
Raventhorpe Solar Farm		ELS4130	SLS6920	DBA	August 2014	AOC Archaeology
Archaeological DBA, land off Appleby Lane		ELS4160	SLS6964	DBA	January 2015	MOLA

A misplotted AMIE record for an archaeological excavation at Appleby Lane, Broughton, has not been included in the table above (AMIE ref. 1326286).

Event Point, Watching Brief Polyline and Watching Brief Event Region Records Beyond the Site

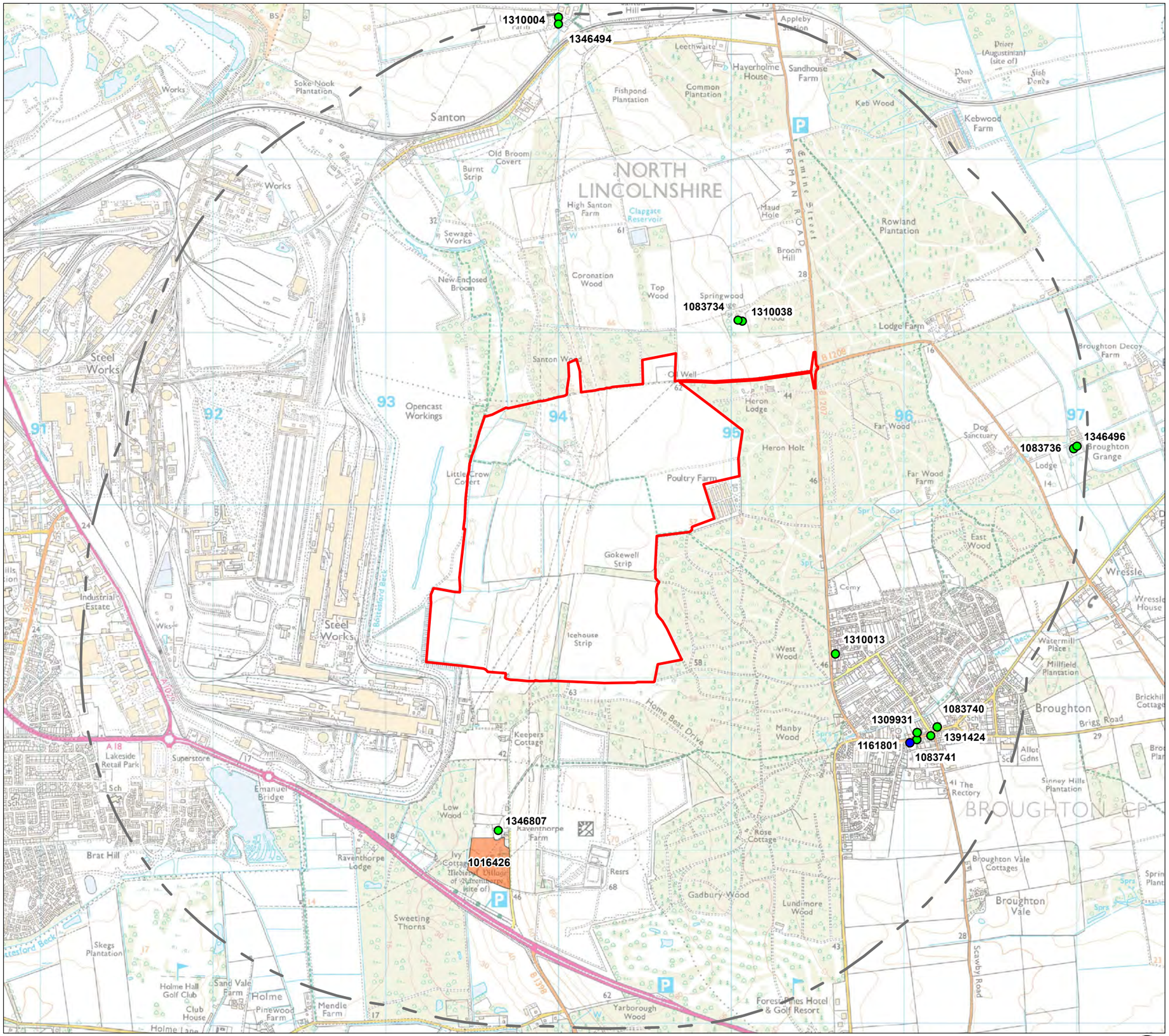
EVUID	EVENTNAME	ORGANISATION	DISPLAYDATE	NGRQUALIFIER	EASTING	NORTHING
ELS800	Aerial photographic sortie	Cambridge University Air Committee	1956	Centred on	493320	410085
ELS808	Aerial photographic sortie	Cambridge University Air Committee	1984	Centred on	484400	412600
ELS922	Aerial photographic survey	Jasair	1989		498050	411900
ELS2568	LIDAR survey flights, 2001	Environment Agency	2001		500000	412000
ELS2577	LIDAR survey flights, 2000	Environment Agency	2000		499077	418002
ELS2582	LIDAR survey flights, 2006	Environment Agency	2006		0	0
ELS2965	Walkover survey at Forest Pines Golf and Country Club, Broughton, North Lincolnshire, 2006	Humber Field Archaeology	2006		495306	408368
ELS3685	Yarbrough Quarry, Scunthorpe	Wardell Armstrong	2003		493226	410449
ELS3871	Air photography	Innervisions Aerial Photography	2012		489850	417100
ELS3933	Flint collection by DN Riley, Raventhorpe	Unassigned	1939		493130	408208
ELS3980	Site visit, Manby Woods	North Lincolnshire Council	2013		495476	409139
ELS4112	Aerial photographic survey	Meridian Airmaps Ltd	1976		489750	409450
ELS4120	Raventhorpe, Scunthorpe - Archaeological Geophysical Survey	AOC Archaeology Group	2014		493973	408172
ELS4125	Aerial photographic survey	Hunting Surveys Ltd	1971		490200	411550
ELS4130	Solar Park on Land at Raventhorpe Farm, Scunthorpe	AOC Archaeology Group	2014		494172	408127
ELS4190	Historic building recording, former RAF accommodation, Manby Woods	Beckside Buildings & Installations Limited	2015		495499	408951
ELS4273	Archaeological Monitoring, Raventhorpe Solar Park, Raventhorpe Farm	AOC Archaeology Group	2015		493838	408222

ELS4274	Archaeological Evaluation, Raventhorpe Solar Park - Fieldwalking	AOC Archaeology Group	2014		494216	408145
ELS4275	Archaeological Evaluation, Raventhorpe Solar Park - Trial Trenching	AOC Archaeology Group	2014		494291	408051

Fieldwalking Survey Region Records Beyond the Site

TITLE	MONUID	EVENTUID	SOURCEUID	MONTHYEAR	ORIGINATOR
Raventhorpe Solar Park - Archaeological Evaluation	MLS	ELS	SLS7243	September 2014	AOC Archaeology Group

Appendix 2: Figures



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0 1,000 Meters

N

Legend

- Site
- Study Area
- Scheduled Monuments

Listed Buildings Grade:

- I
- II

Revisions:
First Issue- 18/09/2017 RG
Second Issue - 06/02/2018 DL
Third Issue - 16/11/2018 RGO

Figure 1: Designated Heritage Assets

Little Crow Solar Park, North Lincolnshire

Client: INRG Solar
DRWG No: **P17-0718.7** Sheet No: - REV:**C**
Drawn by: DL / RGO Approved by: GS
Date: 16/11/2018
Scale: 1:22,500 @ A3

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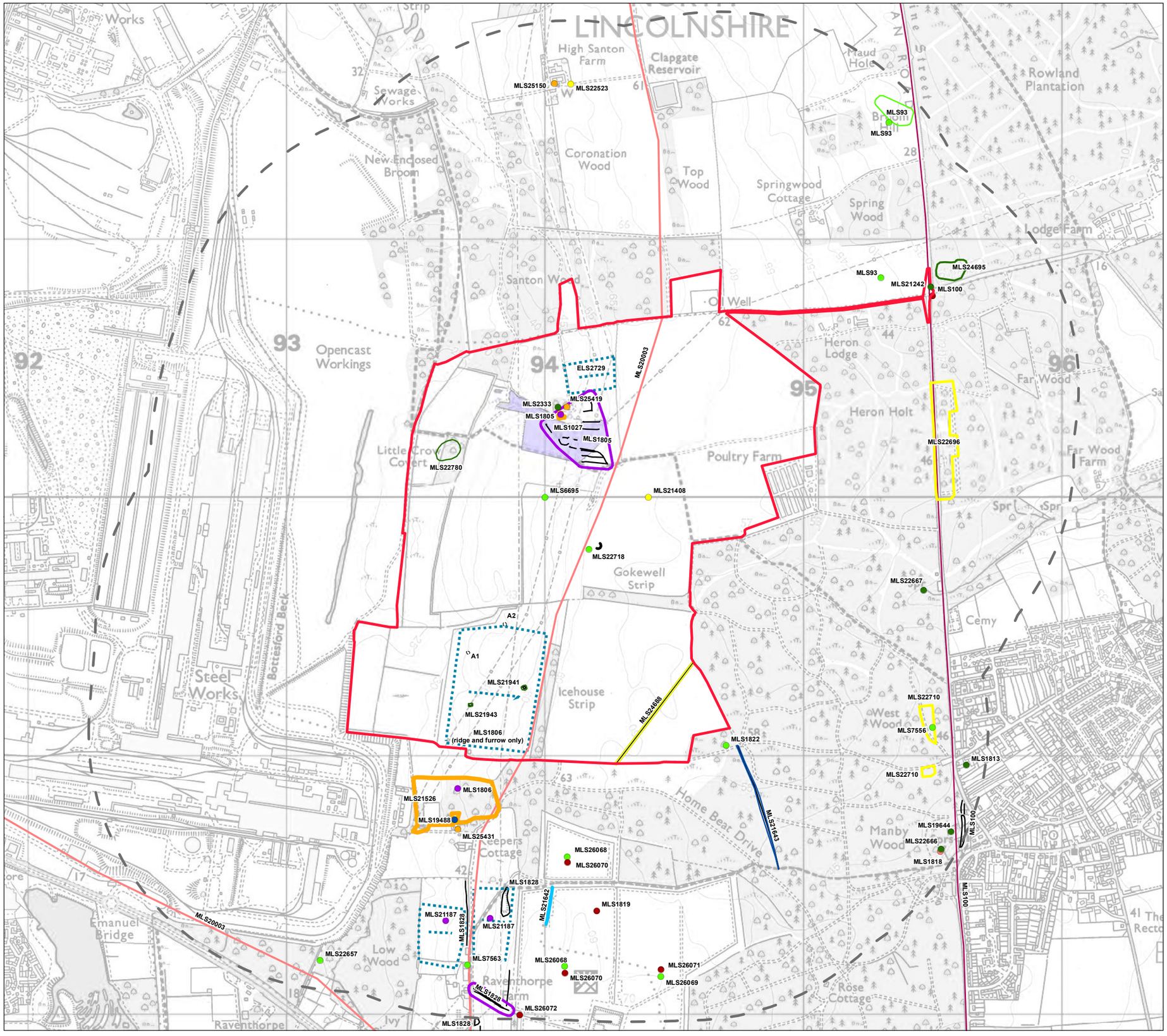

Legend

- Site
- Study Area
- Undated
- Modern
- Post-medieval - modern
- Post-medieval
- Medieval - post-medieval
- Medieval
- Roman
- Prehistoric - Roman
- Prehistoric
- Former ridge & furrow area
- Cropmarks
- Approximate extent of Gokewell earthworks survey

Revisions:
First Issue- 18/09/2017 RG
Second Issue - 06/02/2018 DL
Third Issue - 28/02/2018 DL
Fourth Issue - 05/04/2018 DL
Fifth Issue - 16/11/2018 RGO

Figure 2: North Lincolnshire HER Monument and Cropmark Data

Little Crow Solar Park, North Lincolnshire

Client: INRG Solar
DRWG No: **P17-0718.8** Sheet No: - REV:**C**
Drawn by: RG/DL/RGO Approved by: GS
Date: 16/11/2018
Scale: 1:15,000 @ A3

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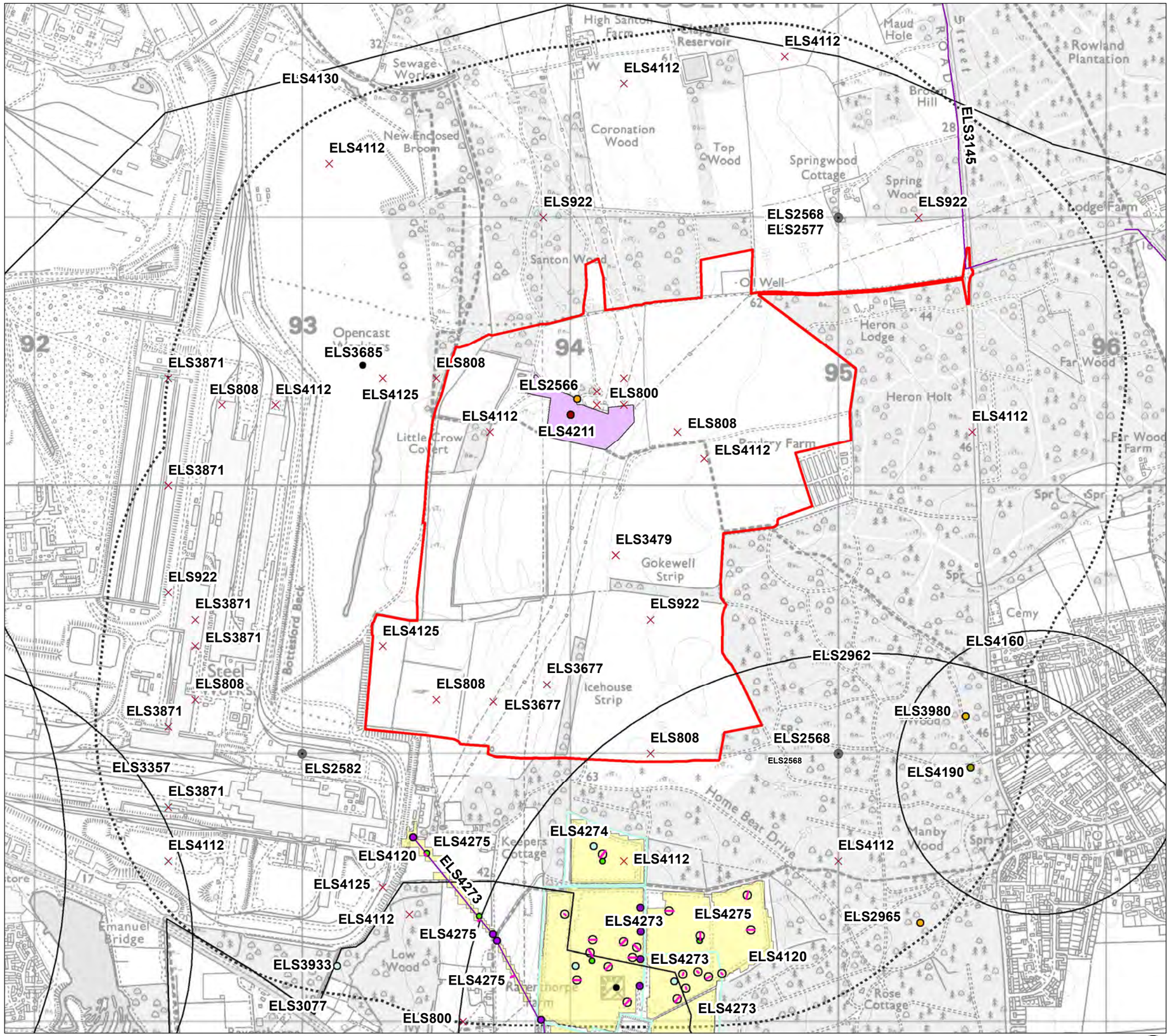


PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

0 1,000 Meters

N

Legend

- Site
- Study Area
- Aerial photo survey/sortie/assessment & transcripton
- Fieldwalking event point
- Archaeological evaluation 4275 trench
- Trial trenching event point
- Watching brief event point
- Earthwork survey event point
- Site visit/photo event point
- Historic building recording event point
- Geophysical survey event point
- Lidar survey event point
- Desk-based assessment event point
- Watching Brief Polygon
- Watching Brief Line
- Desk Based Assessment region
- Fieldwalking Survey selection
- Geophysical Survey
- Gokewell earthworks survey

Duplicate event points within polygons of the same EVUID have not been labelled, for clarity

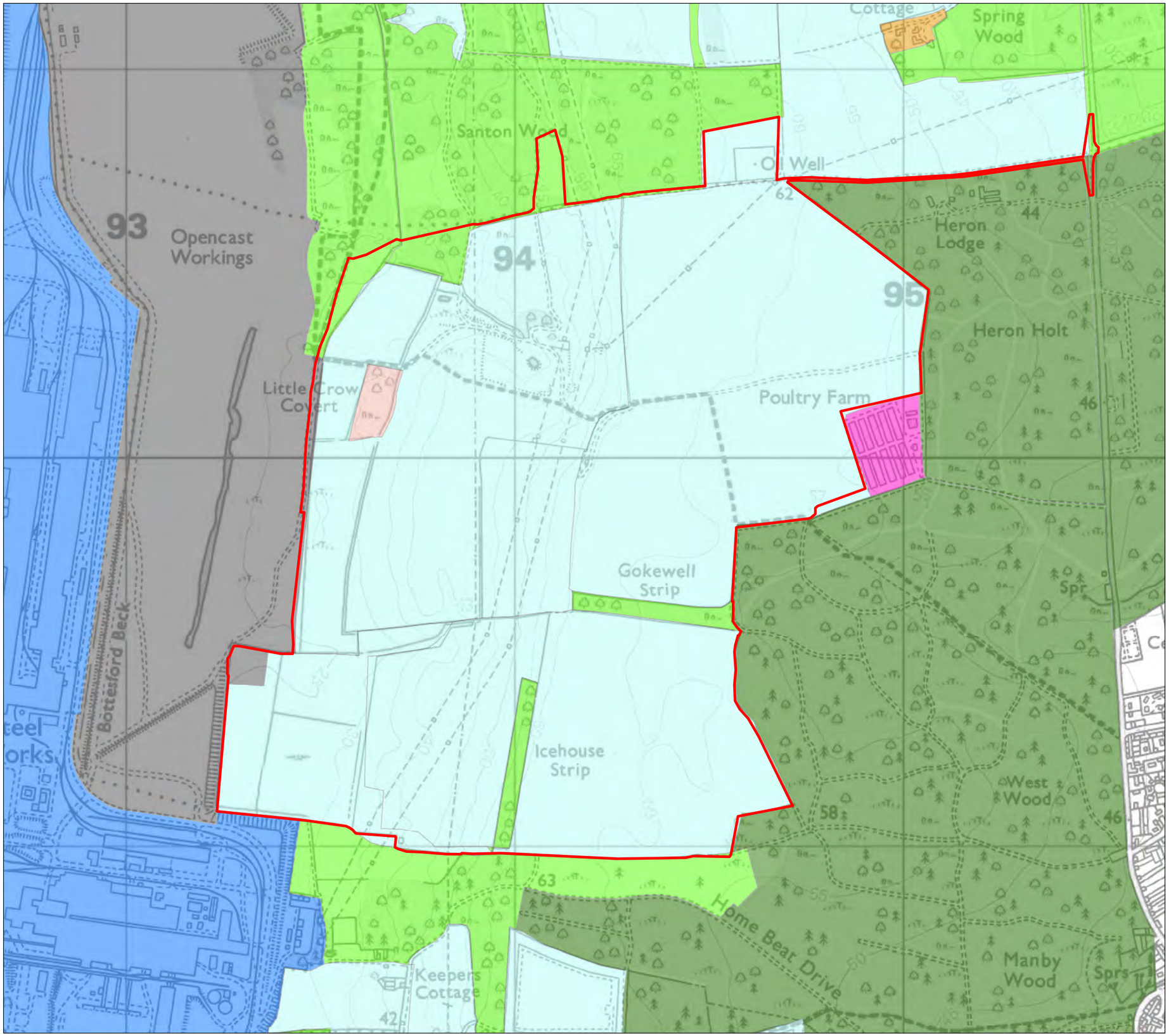
Figure 3: North Lincolnshire HER Archaeological Event Data

Little Crow Solar Park, North Lincolnshire

Revisions:
First Issue- 18/09/2017 RG
Second Issue - 06/02/2018 DL
Third Issue - 16/11/2018 RGO

Client: INRG Solar
DRWG No: **P17-0718.9** Sheet No: **-** REV:**C**
Drawn by: RG/DL/RGO Approved by: GS
Date: 06/02/2018
Scale: 1:14,500 @ A3

Pegasus Planning



Legend

- Site

HLCTYPE

- Ancient/Semi Natural Woodland (early medieval to modern)
- Fox Coverts (post-medieval to modern)
- Ironstone Quarry (modern)
- Isolated Farmstead (post-medieval to modern)
- Livestock Rearing (modern)
- Modern Fields
- Other Factory (post-medieval to modern)
- Plantation Woodland (post-medieval to modern)

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0 1,000 Meters

N

Revisions:
First Issue- 18/09/2017 RG
Second Issue - 06/02/2018 DL
Third Issue - 16/11/2018 RGO

Figure 4: Historic Landscape Characterisation Data

Little Crow Solar Park,
North Lincolnshire

Client: INRG Solar
DRWG No: **P17-0718.10** Sheet No: **-** REV:**C**
Drawn by: DL/RGO Approved by: GS
Date: 16/11/2018
Scale: 1:10,000 @ A3

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