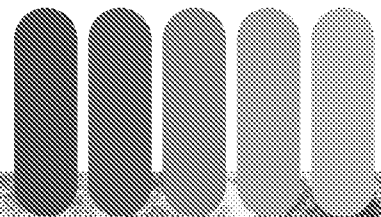


Ecological Appraisal

January 2017



HOOK LANE PAGHAM

on behalf of:
Hallam Land Management Ltd



Hallam Land Management Ltd

Land West of Hook Lane, Pagham, West Sussex

Ecological Appraisal

January 2017

FPCR Environment and Design Ltd

Registered Office: Lockington Hall, Lockington, Derby DE74 2RH

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Rev	Issue Status	Prepared / Date	Approved/Date
-	Draft	LC / 01.11.16	MEL / 09.11.16
	Draft	LC / 02.12.16	DAH / 02.12.16
	Final	LC / 13.12.16	DAH / 13.12.16
	Revision A	LC / 06.01.17	DAH / 06.01.17

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1.0 INTRODUCTION

- 1.1 The following Ecological Appraisal has been prepared by FPCR Environment and Design Ltd on behalf of Hallam Land Management Ltd for land east of Hook Lane, Rose Green, Pagham, Bognor Regis (central OS Grid Reference SZ 896991).
- 1.2 It provides the results of an Extended Phase 1 Habitat and Preliminary Protected Species survey undertaken during September 2015 and subsequent specific species surveys undertaken in 2015 and 2016. The objective of the initial survey was to gain an understanding of the baseline ecology of the application site and immediate surrounding area and to determine whether the application site supports or has the potential to support protected, rare or otherwise notable species.
- 1.3 This preliminary assessment was followed by subsequent targeted surveys for protected, rare or otherwise notable species or groups.

Site Context

- 1.4 The site comprises approximately 17.2 ha of arable land with hedgerows and a central drainage ditch running in an east to west direction bisecting the field. Semi-improved grassland field margins are associated to east, west and southern boundaries, and species-poor grassland can be found along the northern boundary. A field boundary drainage ditch, which runs along the north-western boundary is also present. Both on-site ditches have good connectivity to each other and to the wider area. A further 19 water bodies were identified through inspection of OS maps and aerial images, within 500m of the application boundary.
- 1.5 The site is situated on the northern fringe of Pagham, which lies to the west of Bognor Regis. The surrounding landscape is composed largely of agricultural land with residential dwellings and gardens to the east and the south.

Development Proposals

- 1.6 The proposals are for a residential development of up to 300 units with associated infrastructure including a care home, play area and road infrastructure. There is also scope for a school to be incorporated within the development, this will be dependent on a review by the Local Planning Authority. The existing central drainage ditch will be realigned to follow a meandering channel set within open space. Small sections of the hedgerows which run along Hook Lane on the eastern boundary, and along Pagham Road on the western boundary will be removed for pedestrian and vehicular access, and 6.65ha of green infrastructure will be incorporated.

2.0 METHODOLOGY

Background

- 2.1 In order to compile existing baseline information, relevant ecological information was requested from both statutory and non-statutory nature conservation organisations including
- Sussex Biodiversity Record Centre (SxBRC)
 - Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk);
- 2.2 Further inspection of colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk) was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.
- 2.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- 15km around the application area for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
 - 2km around the application area for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs). 2km around the application site for species records (e.g.: protected, Species of Principal Importance as listed on Section 41 of the NERC Act [2006]¹ or other notable species).
 - 1km around the application site for sites of County Importance (e.g. Sites of Importance for Nature Conservation (SINC) / Local Wildlife Sites (LWS).

Flora

- 2.4 The initial survey was undertaken in September 2015 based on the standard Extended Phase I Habitat Survey Methodology as recommended by Natural England², to identify specific habitats and features of ecological interest. These findings were updated during subsequent protected species surveys undertaken during site visits in 2015 and 2016. Habitats were marked on a base plan and where appropriate, target notes were made. An inspection of the site for the presence of any invasive weed species was also carried out. Features such as trees were considered with regard to their ecological value and potential to provide suitable habitats for protected species.
- 2.5 Hedgerows were surveyed individually using the Hedgerow Evaluation and Grading System (HEGS)³ to enable identification and evaluation of hedgerows of nature conservation importance within the site. Hedgerows were graded on a scale of 1-4, within which grades 1 and 2 are generally considered to be of nature conservation priority:

¹ The Natural Environment and Rural Communities Act 2006. [Online]. Available from: <http://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed 11/11/2013]

² JNCC. (1990). Handbook for Phase 1 habitat survey – a technique for environmental audit. Peterborough: JNCC

³ Clements, D. & Toft, R. (1992). Hedgerow Evaluation and Grading System (HEGS) – a methodology for the ecological survey, evaluation and grading of hedgerows. Countryside Planning and Management

- 1= high to very high value
- 2 = moderately high to high value
- 3 = moderate value
- 4 = low value

- 2.6 Hedgerows were also considered against the Hedgerow Regulations 1997 Wildlife and Landscape criteria⁴, to identify any hedgerows, which would be classified as “important” for nature conservation under this part of the act. Under this methodology, hedgerows are considered according to the average number of woody species per 100m of hedgerow. Additional features which enhance hedgerows, when found in association with the hedge, such as mature trees, ditches and hedge banks are also considered.
- 2.7 It should be noted that hedgerows may also qualify as Important under the Archaeological criteria of this Act, which is beyond the scope of this assessment.

Fauna

- 2.8 During the surveys of the site, observations, signs of or suitable habitat for any species protected under Part 1 of the Wildlife and Countryside Act 1981 (as amended), the Conservation of Habitats and Species Regulations 2010 (as amended)⁵ and the Protection of Badgers Act 1992⁶ were noted with particular attention being given to the potential presence of bats, hazel dormouse *Muscardinus avellanarius*, great crested newt *Triturus cristatus*, water vole *Arvicola amphibius* and badger *Meles meles*. Throughout the survey consideration was also given to the existence and use of the site by other protected species or locally notable fauna such as Species of Principal Importance as listed on Section 41 of the NERC Act (2006), reptiles, birds and any Local Biodiversity Action Plan (LBAP) or Red Data Book (RDB) species.

Badgers

- 2.9 As part of the survey all hedgerows, scrub and other suitable habitats within the site and immediately adjacent, were searched for evidence of badger activity. The standard methodology was used, as outlined by Harris, Creswell and Jefferies⁷ (1989). This involved a thorough search for evidence of the presence of badgers, including:
- Setts, including earth mounds, evidence of bedding and runways between setts;
 - Latrines, often located close to setts, at territory boundaries or adjacent to favoured feeding areas;
 - Prints and paths or track ways;
 - Hairs caught on rough wood or fencing; and
 - Other evidence including snuffle holes, feeding and playing areas and scratching posts.

⁴ The Hedgerow Regulations 1997 – Statutory Instrument 1997 No. 1160. [Online]. London: HMSO. Available from <http://www.legislation.gov.uk/ukSI/1997/1160/contents/made> [Accessed 11/11/2013].

⁵ The Conservation of Habitats and Species Regulations (as amended 2012). [Online]. Available from: <http://www.legislation.gov.uk/ukSI/2010/490/contents/made> [Accessed 11/11/2013]

⁶ The Protection of Badgers Act 1992 (as amended). London: HMSO [Online]. Available from: <http://www.legislation.gov.uk/ukpga/1992/51/contents> [Accessed 03/05/2013].

⁷ Gresswell, P., Harris, S. & Jefferies, D.J. (1989). Surveying Badgers. The Mammal Society Publication No.9 Mammal Society

- 2.10 The identification of snuffle holes, scratching posts or feeding signs on their own are not necessarily conclusive evidence of the presence of badgers. A number of such signs need to be seen in conjunction before they can be said to be conclusive of badger activity.

Reptiles

- 2.11 A strategic reptile presence / absence survey was undertaken within the site at specific locations identified as offering potential habitat suitability for the species. The survey was undertaken based on methodology detailed in the Herpetofauna Workers Manual⁸, the Froglife Advice Sheet 10 - Reptile Survey⁹ and Reptiles: Guidance for Developers¹⁰. Methods involved a search for basking reptiles on/under naturally occurring and strategically positioned artificial refugia. These were placed in locations that offered the most suitable habitat for common reptiles, i.e. structurally diverse grassland habitats with areas of bare ground/short vegetation and wetland features. Froglife recommends between five and ten refuges per hectare, the survey area measures approximately 17.2 hectares in size, however as the development footprint comprised of arable fields, suitable habitats were limited to the hedgerow and ditch margins. As a result, approximately 71 artificial refugia were spread throughout the site on 25th August 2015.
- 2.12 The surveys within the site were carried out following those guidelines within the Froglife Advice Sheet¹⁰, which recommend surveys undertaken:
- At temperatures of between 9°C-18°C;
 - On sunny / cloudy days with little or no wind; and
 - Between 09:00 & 11:00 and between 1600 & 1900 hrs.
- 2.13 In addition, guidance also recommends:
- Using regularly spaced corrugated tin sheeting / similar (0.5m²) as artificial refugia with a black upper side;
 - Approaching refugia from downwind, casting no shadow and with care so as to not disturb basking animals when checking;
 - That lifting and replacing tins, to check for the presence of reptiles underneath in hot weather is undertaken with care, to avoid potential harm to any animals underneath; and
 - That the location and number of tins are mapped to aid survey and avoid the possibility of leaving tins *in situ* after completion of the survey.
- 2.14 To confirm the presence / likely absence of reptiles within the site and inform the population assessment, seven reptile surveys were carried out between September and October 2015; these were conducted within the recommended survey period and during conditions optimal for reptile sightings. The dates of these surveys can be seen below:

⁸ Gent, T & Gibson, S (2003) Herpetofauna Worker's Manual. JNCC, Peterborough.

⁹ Froglife (1999) Reptile Survey; an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

¹⁰ English Nature (2004) Reptiles: guidance for developers. English Nature, Peterborough.

Table 1. Reptile Survey Date and Weather Conditions

Survey Occasion	Date & Time	Weather
1	01/09/15 11:05	Sunny conditions, light breeze, rain earlier in the day, cloud cover 50%, 15°C
2	04/09/15 11:05	Sunny conditions, light breeze, rain earlier in the day 15°C
3	08/09/15 09:44	Sunny conditions, light breeze, no cloud, 15°C
4	11/09/2015 07:40	Sunny conditions, light breeze, no rain, cloud cover, light dew, 15°C
5	17/09/2015 10:20	Sunny conditions, light breeze, no rain, light dew, 15°C
6	21/09/2015 10:35	Overcast, light breeze, no rain, cloud cover 100% 15°C
7	23/09/2015 10:55	Sunny conditions, occasional strong breeze, no rain, 14°C

- 2.15 Reptile populations were assessed in accordance with population level criteria as stated in the Key Reptile Site Register. This system classifies populations of individual reptile species into three population categories assessing the importance of the population (Table 2). These categories are based on the peak number of adult animals observed during individual survey occasions.

Table 2. Key Reptile Site Survey Assessment Categories (Froglife Advise Sheet 10)

Species	Low Population (Number of Individuals)	Good Population (Number of Individuals)	Exceptional Population (Number of Individuals)
Adder	<5	5-10	>10
Common lizard	<5	5-20	>20
Grass snake	<5	5-10	>10
Slow worm	<5	5-20	>20

Bats

Tree Assessments

- 2.16 Tree assessments were undertaken from ground level, with the aid of a torch and binoculars where required. During the survey features considered to provide suitable roost sites for bats such as the following were sought:
- Trunk cavity – Large hole in trunk caused by rot or injury.
 - Branch cavity - Large hole in branch caused by rot or injury.
 - Trunk split – Large split / fissure in trunk caused by rot or injury.
 - Branch spilt – Large split / fissure in branch caused by rot or injury.
 - Branch socket cavity – Where a branch has fallen from the tree and resulted in formation of an access point in to a cavity.
 - Woodpecker hole – Hole created by nesting birds suitable for use by roosting bats.
 - Lifted bark – Areas of bark which has rotted / lifted to form suitable access point / roost site for bats.
 - Hollow trunk – Decay in heartwood leading to internal cavity in trunk.

- Hazard beam failure – Where a section of the tree stem/branch has failed causing collapse and leading to longitudinal fractures / splits / cracks along its length.
- Ivy cover – Dense / mature ivy cover where the woody stems could create small cavities / crevices.

2.17 The trees were classified into general bat roost potential groups based on the presence of features listed above. Table 3 below classifies the potential categories as accurately as possible. This table is based upon Table 8.4 in Bat Surveys – Good Practice Guidelines¹¹. This published table is aimed at the assessment of trees scheduled for arboricultural work rather than those affected by proposed development. As such, the strategy and recommendations described in Table 3 have been designed to reflect the more intensive survey effort required to satisfy the requirements of the planning process.

Table 3. Bat Survey Protocol for Trees

Tree Category and Description	Survey Requirements Prior to Determination.	Recommended Mitigation Works and/or Further Surveys.
Category 1 Confirmed bat roost with field evidence of the presence of bats, e.g. live / dead bats, droppings, scratch marks, grease marks and / or urine staining.	Identified on a plan and in the field. Further assessments such as climb and inspect and/or dusk/dawn surveys should be undertaken, if the trees are affected by the development, to provide an assessment on the likely use of the roost, numbers and species of bat present.	Avoid disturbance where possible. Felling or other works that would affect the roost would require an EPS licence with like for like roost replacement as a minimum. Works may also be subject to timing constraints.
Category 2a Trees that have a high / moderate potential to support bat roosts.	Identified on a plan and in the field to assess the potential use of suitable cavities, based on the habitat preferences of bats. Where the tree(s) will be affected by the proposed development, further assessment such as climb and inspect and/or dusk/dawn surveys (up to 2/3 nocturnal surveys) should be undertaken (as appropriate), to ascertain presence/absence of roosting bats. Trees may be upgraded if presence of roosting bats is confirmed or downgraded following further surveys if features present are of low suitability and / or no evidence of a breeding site or resting place * is found within features that can be assessed fully.	Trees where no bat roost confirmed after further surveys: Avoid disturbance where possible. In situations where disturbance cannot be avoided and where no evidence of occupation of suitable cavities has been confirmed during the initial surveys or nocturnal surveys (as appropriate), further precautionary survey work following the granting of planning permission and prior to works being completed is recommended to ensure features have not been occupied by bats. The additional precautionary survey work could comprise further nocturnal surveys during

¹¹ Bat Conservation Trust (2012) Bat Surveys Good Practice Guidelines – 2nd Edition. London

Tree Category and Description	Survey Requirements Prior to Determination.	Recommended Mitigation Works and/or Further Surveys.
		the active bat season immediately prior to felling or management works or the completion of additional aerial inspections. Use "soft felling" techniques, removing ivy cover by hand and avoid cutting through tree cavities is recommended once the presence of a roost has been discounted.
Category 2b Trees with a low potential to support bat roosts.	Identified on a plan and in the field to assess the potential use of suitable cavities, based on the habitat preferences of bats. Where the tree(s) will be affected by the proposed development, further assessment such as climb and inspect and/or dusk/dawn surveys (one nocturnal survey) should be undertaken (as appropriate), to ascertain presence/absence of roosting bats. Trees may be upgraded if presence of roosting bats is confirmed or downgraded following further surveys if features present are not suitable for bats and / or no evidence of a breeding site or resting place* is found within features that can be assessed fully.	Trees where no bat roost confirmed after further surveys: Avoid disturbance where possible. In situations where disturbance cannot be avoided and where no evidence of occupation of suitable cavities has been confirmed during the initial surveys or nocturnal surveys (as appropriate), further precautionary survey work following the granting of planning permission and prior to works being completed is recommended to ensure features have not been occupied by bats. The additional precautionary survey work could comprise further nocturnal surveys during the active bat season immediately prior to felling or management works or the completion of additional aerial inspections. Use "soft felling" techniques, removing ivy cover by hand and avoid cutting through tree cavities is recommended once the presence of a roost has been discounted.
Category 3 Trees with no / negligible potential	Identified on a plan and in the field to assess the potential use of suitable cavities, based on the habitat preferences of bats.	None.

Tree Category and Description	Survey Requirements Prior to Determination.	Recommended Mitigation Works and/or Further Surveys.
to support bat roosts.		

* The Conservation of Habitats & Species Regulations 2010 (as amended) affords protection to breeding sites or resting places at all times. For an area to be classified as a breeding site or resting place, the Regulations require there to be a reasonably high probability that the species will return to the sites and / or place.

Confirmation of a breeding site or resting place in trees can be established through the completion of aerial inspection and / or nocturnal surveys (as appropriate). In situations where nocturnal surveys are completed and a breeding site or resting site is not confirmed, the survey effort is considered to be sufficient to reasonably discount the presence of roosting bats (for a period of time as defined in Natural England's current Standing Advice). However, further precautionary works may be recommended if the tree is affected by works.

Where features of a tree are identified as providing potential to be used as a breeding site or resting place, evidence of current or previous use of the feature should be identified during an aerial inspection to necessitate the completion of further detailed nocturnal survey work prior to the granting of planning permission. In situations where no evidence of use is identified it is reasonable to conclude that a feature is not being used as a breeding site or resting place as defined by the Regulations but further precautionary measures may be recommended if a tree is affected by development to ensure occupation has not occurred following completion of the survey. If the presence of a breeding site or resting place cannot be discounted from ground level or aerial inspections, nocturnal survey work should be completed.

Bat Activity Surveys

- 2.18 Following the initial Extended Phase 1 Habitat and Preliminary Protected Species survey in 2015, bat survey effort was assessed using Natural England¹² and BCT guidance (2012)¹³. This assessed the site to be of medium size and providing low habitat quality (Table 7.2, Bat Surveys – Good Practice Guidelines). In accordance with BCT guidance (2012), the survey effort required one static detector to be utilised during activity surveys which were to be undertaken during each season (spring, summer and autumn). The first two surveys, completed in August 2015 (summer), and October 2015 (autumn) were undertaken in line with this guidance.
- 2.19 Updated survey guidance from the Bat Conservation Trust¹⁴ was published in early 2016; this recommends that any site, regardless of its size, should be subject to activity assessments. Under this new guidance the site was considered to be of low suitability and falls under the seasonal survey requirements, having completed summer and autumn surveys in 2015, thereby only requiring spring surveys in 2016 to complete the seasonal survey requisite under the BCT 2016 guidelines. The deviations from the BCT 2012 guidance are a) the requirement of the static (passive) detector units to be in position for five consecutive nights instead of three b) point counts during the manual activity surveys were to be kept between 3 – 5 minutes and c) commencement of manual activity surveys was to begin at sunset, rather than 15 minutes before.
- 2.20 Survey effort was increased owing to the presence of barbastelle *Barbastella barbastellus* an Annex II species (Habitats Directive) during the May static surveys. Manual and automated activity

¹² Jones AJ (2004) Bat Mitigation Guidelines, English Nature

¹³ Hundt L (2012) Bat Surveys: Good Practice Guidelines, 2nd edition, Bat Conservation Trust, London.

¹⁴ Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London

surveys were increased to monthly from seasonal survey effort from June onwards and two static detector units were deployed during each survey from July onwards.

Manual Activity Surveys

- 2.21 The primary objective of the manual activity surveys was to identify key foraging areas, commuting routes and general species utilisation of the site.
- 2.22 The transect route was determined prior to survey in order to cover representative habitats within the site (as per BCT Guidance) and included point counts, (each point count being either 7 minutes long (2015) or 5 minutes long (2016), during which time all bat activity was recorded). The point counts were strategically located throughout the site to ensure the comprehensive coverage of habitats present.
- 2.23 Dusk manual activity surveys commenced approximately 15 minutes before sunset (2015) or at sunset (2016) and continued for approximately 2-3 hours. Surveys were undertaken in suitable conditions that were close to optimal as described within the BCT guidance (2016), where sunset temperatures were 10°C or above with no rain or strong winds.
- 2.24 The surveys were undertaken by appropriately experienced ecologists from FPCR. Each transect was walked at a steady pace using Wildlife Acoustic Inc. Echo Meter Touch bat detectors in conjunction with Echo Meter Touch app and Apple Inc. iPad to provide back-up information and enable identification of bats encountered. When a bat passed by, the species, time and behaviour was recorded on a site plan.
- 2.25 Post-survey, bat calls were analysed using BatSound Pro (Petterssons Elektronik) and AnalookW (Titley Electronics), by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. From this, the level of bat activity across the site in relation to the number of foraging and commuting contacts were assessed.
- 2.26 The timings and weather conditions for the activity transects are shown in Table 4 below.

Table 4. Transect Survey Timings and Weather Conditions

Survey ref/ Date	Survey Type	Start Time	Sunset/ Sunrise Time	Finish Time	Weather Conditions (temp °C; cloud cover %; wind; and rain)
Activity Transects					
Transect 1 – 25 th August 2015	Transect	19:47	20:04	21:47	80% cloud; light breeze; no rain; temp: 16°C
Transect 2 – 8 th October 2015	Transect	18:12	18:27	20:28	95% cloud; gentle breeze; no rain; temp: 14°C
Transect 3 – 23 rd May 2016	Transect	20:58	20:58	22:58	20% cloud; no wind; no rain; temp: 14°C
Transect 4 – 28 th June 2016	Transect	21:20	21:20	00:20	5% cloud; breezy, no rain, temp: 15°C
Transect 5 – 26 th July 2016	Transect	20:57	20:57	23:57	100% cloud; light breeze; no rain; 19°C
Transect 6 – 15 th August 2016	Transect	20:22	20:22	23:22	5% cloud; light breeze; no rain; 19°C

Survey ref/ Date	Survey Type	Start Time	Sunset/ Sunrise Time	Finish Time	Weather Conditions (temp °C; cloud cover %; wind; and rain)
Transect 7 – 21 st September 2016	Transect	19:02	19:02	22:02	50% cloud; light breeze; no rain; 16°C
Transect 8 – 22 nd September 2016	Transect	03:50	03:50	06:50	80% cloud; no wind; no rain; 14°C

- 2.27 The weather conditions were considered wholly representative of those typical of a temperate, maritime or 'oceanic' climate. Timing of the surveys is considered appropriate to provide a representative seasonal cross-section of bat activity across the application site.

Automated Activity Surveys

- 2.28 Static (passive) recording broadband detectors were deployed within the application site to record the passing behaviours of bats from a fixed position to supplement the manual activity surveys. These automated logging systems (SM2BAT+ (2015), and SM4BAT+ (2016), Wildlife Acoustics) saved all recordings onto an internal storage device for analysis. These were positioned at locations where habitats would be impacted as a result of development, and at locations that provide suitability for navigational/foraging routes.
- 2.29 The required number of devices were placed in locations around the site for a minimum of three nights (2015) and a maximum of five nights (2016) during suitable and / or typical weather conditions. The detector was programmed to activate 30 minutes before dusk and recorded continuously until 30 minutes following sunrise. The output from this detector was subject to analysis using the AnalookW software package (Titley Electronics) and BatSound (version 4). The locations of the SM2 and SM4 detectors can be seen in Figure 2.
- 2.30 The analysis of the SM2BAT+ and the SM4BAT+ files recorded can highlight the presence of more than one bat if they are recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as it forages in close proximity for an extended period. Therefore, each sound file is counted as a single bat pass. The number of bat passes does however reflect the relative importance of the location of the detector by calculating the bat passes per hour.
- 2.31 The timings for static detector surveys undertaken are shown in Table 5 below.

Table 5. Static Detector Survey Dates

Survey Occasion	Location/s (see Figure 2)	Date/Timings
Static Survey 1 – August 2015	One unit: S1 – H6, south of ditch, along eastern boundary.	25 th August to 28 th August 2015 – 3 nights

Survey Occasion	Location/s (see Figure 2)	Date/Timings
Static Survey 2 – October 2015	One unit: S2 – H6, north of ditch, along eastern boundary.	8 th to 11 th October 2015 – 3 nights
Static Survey 3 – May 2016	One unit: S3 – H4, towards south-western corner.	12 th to 17 th May 2016 – 5 nights
Static Survey 4 – June 2016	One unit: S4 – H1, along northern boundary.	28 th June to 3 rd July – 5 nights
Static Survey 5 – July 2016	Two units: S5 – H4, towards centre of eastern boundary. S6 – Northern extent of H5.	18 th to 23 rd July 2016 – 5 nights (for both units)
Static Survey 6 – August 2016	Two units: S7 – H6, north of ditch, along eastern boundary. S8 – H4, along western boundary towards southern extent.	15 th – 20 th August 2016 – 5 nights (for both units)
Static Survey 7 – September 2016	Two units: S9 – H1, centre of northern boundary. S10 – Towards centre of H4.	21 st – 26 th September 2016 – 5 nights (for both units)

Great Crested Newts (GCN)

2.32 The site was assessed in order to identify potential habitat suitable for use by GCNs during their terrestrial phase. In addition, any water bodies found within the site were noted and described to assess their potential to support an amphibian population, including GCN. Where possible access was sought to all water bodies within 500m of the proposed development site, which had suitable conceivable habitat connections to it. All ponds (where accessible) were assessed using a Habitat Suitability Index (HSI) (Oldham *et al.*, 2000¹⁵). The HSI for the GCN incorporated ten suitability indices, all of which are factors known to affect this species; these are as follows:

- Geographic location;
- Pond area;
- Pond drying;
- Water quality;
- Shade;
- Presence of water-fowl;
- Presence of fish;

¹⁵ Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10 (4), 143-155.

- Number of linked ponds;
- Terrestrial habitat; and
- Macrophytic coverage.

2.33 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Pond suitability is then determined according to the following scale:

Table 6. Habitat Suitability Index Scores and Pond Suitability

HSI Score	Pond Suitability
<0.5	Poor
0.5 - 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

Field Surveys

2.34 Survey methods followed those recommended by Natural England as detailed in the Great Crested Newt Mitigation Guidelines (English Nature, 2001). To determine the presence or absence of great crested newts, four individual survey visits were completed between April and May 2016 with at least two of these visits undertaken within the peak season of mid-April to mid-May. On each survey occasion three of a possible four different techniques were employed (egg search, sweep net, bottle trap and torch). A summary of these techniques is detailed below:

Bottle Trapping

2.35 Bottle traps were set within the water body in the evening at densities of one trap per two metres of shoreline (where feasible) and left overnight for inspection in the morning. Traps were partially submerged in the water leaving an air bubble in the bottle and secured by a cane marked with a high visibility tape to ensure relocation the following day. Care was taken to ensure that trapping did not occur during excessively warm weather, when the temperature inside the trap could rise considerably, reducing oxygen levels and potentially suffocating the newts.

Sweep Netting

2.36 Long handled sweep-nets were used to sample the margins of the pond for great crested newts, with approximately 15 minutes of netting per 50 m of shoreline.

Torching

2.37 Torching involved searching the water body after dusk using high-powered torches to scan the margins and potential display areas for newts. The perimeter of the pond was walked slowly spending approximately 15 minutes torching each 50m of shoreline recording any newts observed. Torch surveys are unsuitable within heavily vegetated and / or turbid ponds or after periods of heavy rain as visibility is diminished.

Egg Searching

- 2.38 Newts lay single eggs on leaves of aquatic plants or other suitable pliable material, after which the material is folded over the egg to protect it. Great crested newt eggs can be distinguished from those of the other newts by their size, shape and colour. Submerged vegetation was examined for newt eggs and folded leaves gently opened to check for eggs. Once a great crested newt egg is identified, no further leaves need to be examined to minimise any further potential disturbance.
- 2.39 All surveys were conducted by at least one licensed ecologist from FPCR Environment and Design Ltd. All surveys were completed during suitable conditions i.e. when the ambient air temperature exceeds 5°C, with little / no wind and no rain. Below are the survey dates and the weather conditions in which field surveys were undertaken.

Table 7. GCN Survey Dates and Weather Conditions

Date	Temperature °C		Rain	Wind
	PM	AM		
13 th April 2016	15	6	0	0
28 th April 2016	10	12	1	0
4 th May 2016	12	10	0	0
19 th May 2016	14	12	2	0
25 th May 2016	14	12	0	0
6 th June 2016	16	14	0	0

Population Size Class Assessment

- 2.40 Population size class assessments are based on the highest maximum, (peak) count of adult GCNs observed on any one survey occasion. The below table details the population size class assessment.

Table 8. Determining Population Size Class (Great Crested Newt Mitigation Guidelines, 2001)

Population Size Class	Peak Counts
Low Population	0 – 10 animals
Medium Population	11 – 100 animals
High Population	> 101 animals

Dormice

- 2.41 Sussex is considered to be a good county for the hazel dormouse¹⁶ and they are therefore widespread within the suitable habitats this county provides. Although no dormouse records were returned from SxBRC within 2km from the site, it is well known that this species is under-recorded, and the boundaries along the site provide good habitat and foraging opportunities for this species therefore as a precautionary measure surveys were conducted within the site.
- 2.42 Dormouse presence / likely absence surveys were undertaken in accordance with current good practice guidelines within The Dormouse Conservation Handbook¹⁷. Surveys involved placing standard dormouse nest tubes every 20m in suitable habitat, approximately 1.5m above ground level. Fifty tubes were installed on the 4th December 2015 and surveys of the tubes were undertaken between May and September 2016 in order to ascertain presence / likely absence of dormice.
- 2.43 The survey results are used in conjunction with an index of probability, which indicates the likelihood of finding dormice during this period (see Table 9).

Table 9. Index of Probability for Recording Dormice in Nesting Tubes

Month	Index of Probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

- 2.44 The survey has been scored for effort according to the method developed from the South West Dormouse Project¹⁸. The scoring system provides an overall index of effort by multiplying the sum of the months the tubes were checked by the number of tubes used. A score of 20 (or above) is deemed a thorough survey.
- 2.45 The number of tubes used is based on 50 as a standard (i.e. 50 = 1), with fewer tubes reducing the overall score and more tubes increasing the score (i.e. 25 tubes halves the score to 0.5 and 100 tubes doubles the score to 2).

¹⁶ [http://www.mammal.org.uk/sites/default/files/files/SE%20Mammal%20Atlas-1%20\(Introduction%20section\).pdf](http://www.mammal.org.uk/sites/default/files/files/SE%20Mammal%20Atlas-1%20(Introduction%20section).pdf) [Accessed on 7th December 2015]

¹⁷ Bright, Morris & Mitchell-Jones (2006) The Dormouse Conservation Handbook. English Nature, Peterborough.

¹⁸ Chanin & Woods (2003) English Nature Report No. 524 on nest tube surveying. English Nature, Peterborough.

Water Vole

2.46 A specific detailed Water vole survey was carried out on 25th May 2016 during suitable weather conditions. This followed the standard methodology of Strachen *et al.* as described in the Water Vole Handbook (Third Edition, 2011)¹⁹. This involved identification of water vole activity within the survey areas, using field evidence such as:

- Faeces - these are 8 - 12mm long and 4 - 5 mm wide, cylindrical with blunt ends. The colour is variable, though often green, and they are generally odourless or have a faint musky smell.
- Latrines - the majority of droppings are deposited at latrine sites, used to mark range boundaries, favoured spots close to nests and where they leave and enter water. Latrines often consist of a flattened mass of old droppings topped with fresh ones.
- Feeding stations - water voles often bring pieces of cut vegetation to favoured feeding stations close to the water's edge and leave remains in neat piles. The cut vegetation is typically 100mm long and is cut at a perfect 45° angle.
- Burrows - many burrows can be found in riverbanks, but those constructed by water voles are typically wider than they are high, with a diameter of 4 - 8cm. The holes are generally closer to the water's edge than those made by other species. Around these holes, well-grazed 'lawns' can often be found, where the water voles have chewed the vegetation short.
- Footprints – identifiable prints in soft margins of the watercourse
- Runways – low tunnels that are pushed through the vegetation often leading to burrows or feeding stations.

Winter Bird Surveys

2.47 Please see the Winter Bird Survey 2015/16 Report (Appendix L) for WBS methodology.

Breeding Bird Surveys

2.48 The survey methodology employed was broadly based on that of territory mapping (Bibby *et al.*, 2000) as developed by the British Trust for Ornithology (BTO). Standard BTO species codes and symbols for bird activities were used to identify birds and denote activity, sex and age where appropriate.

2.49 The criteria used in the assessment of breeding birds has been adapted from the standard criteria proposed by the European Ornithological Atlas Committee (EOAC 1979)²⁰ and are grouped into four categories:

- *Non-breeder* e.g. flyover or observed in unsuitable habitat.
- *Possible breeder* e.g. birds observed in suitable habitat or singing male recorded.
- *Probable breeder* e.g. pair in suitable habitat, territory defended, agitated behaviour or nest building; and
- *Confirmed breeder* e.g. recently fledged young observed, adult birds carrying food for young.

¹⁹ Strachen, R., Moorhouse, T. & Gelling, M. (2011) Water vole Conservation Handbook (third edition). WildCRU: Oxford

²⁰ EOAC (1979) Categories of Breeding Bird Evidence. European Ornithological Atlas Committee.

- 2.50 The survey was conducted to ascertain the sites potential to support bird species with an associated conservation status as WCA Schedule I, NERC S41 species and / or BoCC Red or Amber list species. These species are likely to be of the greatest threat in relation to further decline, and are commonly referred to as 'notable' species.
- 2.51 Three surveys were undertaken during the hours after dawn in the period April, May and June 2016 (Table 11). A route was planned prior to the surveys being undertaken, paying particular attention to any linear features, such as hedgerows and tree lines, and natural features such as scrub. Bird surveys were not undertaken in unfavourable conditions such as heavy rain or strong wind, which may negatively affect the results. Weather conditions are provided in Table 11 below.

Table 11. Breeding Bird Survey Dates and Weather Conditions

Date	Cloud Cover (%)	Rain	Wind	Visibility
13.04.16	60	0	0	Very Good
21.05.16	60	0	2 / 3	Excellent
08.06.16	5	0	0	Excellent

Assessment Methodology for Wintering Breeding Bird Surveys and Breeding Bird Surveys

- 2.52 The conservation value of bird populations has been measured using two separate approaches; nature conservation value and conservation status. The CIEEM guidance on ecological impact assessment assesses nature conservation value within a geographical context²¹. To attain each level of value, an ornithological resource or one of the features (species population or assemblage of species) should meet the criteria set out in Table 12 below. In some cases, professional judgement may be required to increase or decrease the allocation of specific value, based upon local knowledge.
- 2.53 Recent county annual bird report, The Sussex Bird Report 2014 as published by the Sussex Ornithological Society was consulted to inform the assessment.

Table 12. Evaluation Criteria

Nature Conservation Value	Selection Criteria
International	A species which is part of the cited interest of an SPA and which regularly occurs in internationally or nationally important numbers. A species present in internationally important numbers (>1% of international population).
National	A species which is part of the cited interest of a SSSI and which regularly occurs in nationally or regionally important numbers. A nationally important assemblage of breeding or over-wintering species. A species present in nationally important numbers (>1% UK population). Rare breeding species (<300 breeding pairs in the UK).

²¹ CIEEM (2016). Guidelines for Ecological Impact Assessment 2006 in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Nature Conservation Value	Selection Criteria
Regional	Species listed as Priority Species under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006), which are not covered above, and which regularly occurs in regionally important numbers. Species present in regionally important numbers (>1% of regional population). Sustainable populations of species that are rare or scarce within a region. Species on the BoCC Red List and which regularly occurs in regionally important numbers.
County	Species listed as Priority Species under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006), which are not covered above and which regularly occurs in county important numbers Species present in county important numbers (>1% of county population). Sustainable populations of species that are rare or scarce within a county, or listed as priority species for nature conservation under S41 of the NERC Act. A site designated for its county important assemblage of birds (e.g. a SINC Site). Species on the BoCC Red List and which regularly occur in county important numbers.
Local	Other species of conservation interest (e.g. all other species on the BoCC Red and Amber List or listed as Priority Species under Schedule 41 of the NERC Act (2006) which are not covered above) regularly occurring in locally sustainable populations. Sustainable populations of species which are rare or scarce within the locality.
Site	Species that are common and widespread

Constraints and Limitations

- 2.54 During the great crested newt surveys it was not possible to survey all of the ponds identified within 500m of the application boundary as no owner could be identified via Land Registry for pond P3 and ditch D3. Whilst surveys were not completed on all the waterbodies within the surrounds, access had been granted to enough waterbodies to get a representation of the population dynamics within the area. Consequently, the restrictions to surveying third party ponds have not been identified as a significant constraint in assessing the effects of the development on the local newt population.
- 2.55 Although the reptile survey on the 11th September was undertaken at 7:40am and therefore outside of Froglife's recommended guidelines, it is unlikely that this has resulted in a significant detrimental effect to the data as the weather conditions at that time were still suitable for reptiles to use the refugia. The results are therefore still considered to be representative of the site.
- 2.56 Due to the initial assessment of the site being of low habitat quality for bats, seasonal surveys commenced in May. Following the identification of Annex II species within the application site in May, the survey effort was increased to monthly surveys, however this meant that April was not represented. Due to the size of the site and the features present, surveys completed from May to October inclusive are considered to adequately assess the assemblage and activity levels of the bats using the site.
- 2.57 Due to the variable properties of bat echolocation calls it is not always possible to identify a series of echolocation calls down to species level. In the majority of cases it was possible to identify to genus level which was suitable to allow potential affects to be assessed and appropriate mitigation

designed. The lower amplitude of calls of species such as brown long-eared bat *Plecotus auritus* or barbastelle *Barbastella barbastellus* or the higher-pitched calls of species such as the horseshoe bats are more difficult to detect and calls may not have been received by the directional microphone at the time of recording. Therefore, it was possible that these species may have been under recorded.

- 2.58 The static (passive) recording units do not discern between individual bats or a single bat passing the microphone several times and therefore the data recorded can only provide an indication of bat activity as bat registrations per unit time.
- 2.59 It is considered that the overall dataset obtained were representative of the level of bat activity within the application site during the survey period. Furthermore, it is unlikely that the above limitations have resulted in a significant detrimental impact upon the quality of the data and will have minimal effect on the subsequent conclusions and recommendations provided within the ecological assessment made here.
- 2.60 Throughout the static detector surveys from October 2015 through to June 2016 one SM2 / SM4BAT unit was deployed, however due to the presence of Annex II species within the application site in May and availability of SM4BAT units, this was increased to two SM4BAT units from July to September.
- 2.61 During the July dormouse survey, it was noted that the scrub along the eastern boundary had developed significantly, thereby creating suitable habitat for dormice. Due to this a further 20 dormouse nest tubes were installed on the 28th July.

3.0 RESULTS

Desk Study

Statutory and Non-Statutory Sites of Nature Conservation Importance

Statutory Sites of International Conservation Value

- 3.1 The Multi-Agency Geographic Information for the Countryside (MAGIC) website indicates that there are five internationally designated site within 15km of the application boundary.
- 3.2 Pagham Harbour is designated as a Ramsar Site and a Special Protection Area (SPA) and is situated approximately 1.6km and 1.9km west, respectively. The area comprises an extensive area of saltmarsh and intertidal mud-flats and is designated due to its importance to many breeding and overwintering bird populations.
- 3.3 The Council has identified a 5km zone of influence around Pagham Harbour SPA. Developments of one net new dwelling or more within this zone will be required to make a financial contribution towards mitigating for increased recreational pressure and potential impacts to the SPA supporting habitats.
- 3.4 Chichester and Langstone Harbours are situated approximately 6.4km north-west of the site and are designated as Special Protection Areas (SPA) and a Ramsar site. They are large, sheltered estuarine basins comprising extensive sand- and mud-flats exposed at low tide. These harbours are designated due to being a wetland of international importance and regularly supporting over 20,000 waterfowl.
- 3.5 Solent Maritime is Special Area of Conservation (SAC) and is located approximately 11.5km west. This area is designated for containing many Annex I habitats, including estuaries, Spartina swards and Atlantic salt meadows.
- 3.6 Kingley Vale is situated approximately 12.5km north and is designated as a Special Area of Conservation (SAC). This area is designated due to being the largest area of yew woodland in Britain.
- 3.7 Singleton and Cocking Tunnels is located approximately 14.8km north and is designated as a Special of Conservation (SAC) due to supporting the Annex II species barbastelle bat *Barbastella barbastellus* and Bechstein's bat *Myotis bechsteini*.

Statutory Sites of National Conservation Value

- 3.8 There are two Sites of Special Scientific Interest (SSSI) located within 2km of the site:
- 3.9 Bognor Reef SSSI is located approximately 1.2km north of the site and is designated for geological interest as well as containing an extensive area of vegetated shingle, a habitat type which is rare in Britain.
- 3.10 Pagham Harbour SSSI is located approximately 1.6km west and is designated due to containing an extensive area of salt-marsh and mudflats which are important feeding areas for birds.
- 3.11 The proposed development site falls within the impact risk zone for both Bognor Reef SSSI and Pagham Harbour SSSI. The Local Planning Authority (LPA) has recommended to consult Natural

England for any proposed developments where there will be a net gain or more than 50 residential units.

- 3.12 Full details of all statutory sites of international and national importance can be found in Appendix B: Statutory Designated Sites.

Non-Statutory Designated Sites

- 3.13 Data received from SxBRC identified no non-statutory sites within 1km of the application boundary.

Protected / Notable Species Records

- 3.14 Several records of protected, notable or local BAP species are present within 2 km of the site, detailed in Table 13 below. Due to large number of bird records within 2km of site, only bird records present within 1km of the site are included.

Table 13. Protected and Notable Species Records

Species	Conservation Status	Distance and Bearing (from application boundary) and Potential On-Site Habitat
<u>Mammals – Terrestrial (Non-bats)</u>		
European Water Vole <i>Arvicola amphibius</i>	WCA, NERC, SBAP	Multiple records dating from 1999 – 2014; closest to site approx. 600m south. Limited suitable habitat on site – ephemerally wet central drainage ditch, and shallow ditch on north-west of site with connectivity to Pagham Rife.
West European Hedgehog <i>Erinaceus europaeus</i>	WCA (Partial protection under Schedule 6), NERC, SBAP	Three records from 1999 – 2014; approx. 500m south, 1km south-east and 1.5km south-west. Suitable foraging habitat on site.
Brown Hare <i>Lepus europaeus</i>	SBAP	Two records from 2006 and 2011: Approx. 1.5km south-west, 1.7km west. Suitable foraging habitats on site.
<u>Herpetofauna</u>		
Slow worm <i>Anguis fragilis</i>	WCA, NERC, SBAP	Two records; both from 2014 approx. 1km south-east. Suitable habitats on site – arable field and ditch margins, and hedgerow bases.
Common lizard <i>Zootoca vivipara</i>	WCA, NERC, SBAP	Two records: approx. 1.4 and 1.6km south-west, records from 2002 and 2014 respectively. Suitable habitats on site – arable field and ditch margins, and hedgerow bases.
Grass snake <i>Natrix natrix</i>	WCA, NERC, SBAP	One record from 2010 approx. 2km south-west. Suitable habitats on site – arable field and ditch margins, and hedgerow bases.

Species	Conservation Status	Distance and Bearing (from application boundary) and Potential On-Site Habitat
Great Crested Newt <i>Triturus cristatus</i>	WCA, NERC, SBAP, CHSR	One record from 2002 approx. 1.7km north-west. Suitable terrestrial habitat on site in the form of arable field and ditch margins, and hedgerow bases.
<u>Bats</u>		
Unidentified bats species <i>Chiroptera</i> sp.	WCA, CHSR	Two roost records both from 2012. Closest approx. 350m east with a count of +150 bats. Second record 1km east with a count of 100+ bats. Suitable commuting and foraging habitat on site.
Brown Long-eared <i>Plecotus auritus</i>	WCA, NERC, SBAP, CHSR	Two records, both recorded in 2009: one maternity roost 730m south recorded, and one record 825m south-east. Suitable commuting and foraging habitat on site.
Serotine <i>Eptesicus serotinus</i>	WCA, CHSR	Two records; one from 2003 approx. 1620m south, one from 2006 approx. 1700 north. Suitable commuting and foraging habitat on site.
Noctule <i>Nyctalus noctula</i>	WCA, NERC, SBAP, CHSR	One record from 2006 approx. 2km south-west. Suitable commuting and foraging habitat on site.
Unidentified Pipistrelle Species <i>Pipistrellus</i> sp.	WCA, CHSR	Multiple records dating from 2007 - 2014; closest to site is approx. 976m east. One roost within records dated 2008 approx. 1.8km east. Suitable commuting and foraging habitat on site.
Unidentified <i>Myotis</i> species <i>Myotis</i> sp.	WCA, CHSR	One record from 1999 approx. 1.5km south-west. Suitable commuting and foraging habitat on site.
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	WCA, NERC, SBAP, CHSR	Multiple records dating from 2003 - 2011; closest to site 1.6km south. Suitable commuting and foraging habitat on site.
Unidentified Long-eared species <i>Plecotus</i> sp.	WCA, CHSR	Two records; closest to site is a roost approx. 1.7km north-east recorded in 2008. Other record from 2011 approx. 1.9km south-west. Suitable commuting and foraging habitat on site.

Species	Conservation Status	Distance and Bearing (from application boundary) and Potential On-Site Habitat
Brown Long-eared <i>Plecotus auritus</i>	WCA, CHSR	Two records, both recorded in 2009; closest to site is a maternity roost approx. 730m south recorded. Other record is approx. 820m south-east. Suitable commuting and foraging habitat on site.
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	WCA, CHSR	Multiple records dating from 2006 - 2011; closest to site 1.7km north and 1.7km north-east. Suitable commuting and foraging habitat on site.
Unidentified <i>Nyctalus</i> species <i>Nyctalus</i> sp.	WCA, CHSR	One record from 2006 approx. 1.7km north-east. Suitable commuting and foraging habitat on site.
Whiskered Bat <i>Myotis mystacinus</i>	WCA, CHSR	One record from 2006 approx. 1.7km north-east. Suitable commuting and foraging habitat on site.
Daubenton's Bat <i>Myotis daubentonii</i>	WCA, CHSR	One record from 2006 approx. 1.7km north-east. Suitable commuting and foraging habitat on site.
Birds (Present within 1km from site)		
Black-tailed Godwit	WCA, BoCC Red, NERC	One record from 2001 approx. 479m north-west.
Cetti's Warbler <i>Cettia cetti</i>	WCA	Multiple records dating from 2005 - 2013; closest to site is approx. 479m north-west.
Common Tern <i>Sterna hirundo</i>	BoCC Amber	One record from 2005 approx. 270m north-west.
Corn Bunting <i>Emberiza calandra</i>	BoCC Red, NERC	One record from 2000 approx. 617m north-west.
Gadwall <i>Anas strepera</i>	WCA (General protection Schedule 2, part1, Schedule 3, part3), BoCC Amber	Multiple records dating from 2000 - 2013; closest to site is 479m west.
Grey Partridge <i>Perdix perdix</i>	BoCC Red, NERC	Multiple records dating from 2000 - 2011 approx. 479m north-west.
Lapwing <i>Vanellus vanellus</i>	BoCC Red, NERC	Two records both from 2000; closest to site approx. 479 north-west.
Snipe <i>Gallinago gallinago</i>	WCA (General protection Schedule 2, part1, Schedule 3, part3), BoCC Amber	One record from 2001 approx. 552m north-west.

Species	Conservation Status	Distance and Bearing (from application boundary) and Potential On-Site Habitat
Swift <i>Apus apus</i>	BoCC Amber	Multiple records dating from 2000 - 2013; closest to site is approx. 479 north-west.
Wigeon <i>Anas penelope</i>	WCA (General protection Schedule 2, part1, Schedule 3, part3), BoCC Amber	One record from 2001 approx. 840m north.

Key to Conservation Status: HR – CHSR – The Conservation of Habitats and Species (Amendment) Regulations 2012, WCA – Wildlife & Countryside Act, NERC – Natural Environment & Rural Communities Act 2006, SBAP – Sussex Biodiversity Action Plan Priority Species, PBA – Protection of Badgers Act 1992, BoCC RED/AMBER: Birds of Conservation Concern Red and Amber lists.

- 3.15 A large number bird records with four figure and two figure grid references (low resolution) that are adjacent to, or encompass the site were also provided. These include many common and widespread species, and also more rare species i.e. NERC S41 species of principal importance or listed on Schedule 1 of the Wildlife and Countryside Act. These included Avocet *Recurvirostra avosetta*, Barn Owl *Tyto alba*, Firecrest *Regulus ignicapilla*, Garganey *Anas querquedula*, Hobby *Falco Subbuteo*, Kingfisher *Alcedo atthis*, Little Tern *Sternula albifrons*, Turtle Dove *Streptopelia turtur* and Yellow Wagtail *Motacilla flava*. Owing to the low resolution of these records it is not possible to give definitive distances of each from the site.

Field Results- Habitats and Flora

- 3.16 Habitat descriptions of the site are provided below. Target Notes (TN) and the locations of the habitats described below can be found on Figure 2 – Phase I Habitat Plan.

Arable

- 3.17 The site was dominated by a large expanse of arable land, which at the time of survey was supporting maize crop. As is typical of this habitat type, floral diversity was low due to the intensive management practices and the input of fertiliser, pesticide and herbicide. Field margins and headlands were present and supported species-poor semi-improved grassland and arable weeds. The majority of margins were 3-4m in width, with a larger headland present at the northern extent of the site, measuring approximately 6m in width.
- 3.18 During the initial Extended Phase 1 Habitat Survey the headland at the northern extent of the site had been ploughed and a species-poor grassland had begun to establish. This area was characterised by a sward dominated by broad-leaved grass species and a low diversity of herbs limited to common and widespread species such as creeping buttercup *Ranunculus repens* and goats rue *Galega officinalis*. The remaining field margins to the south, east and west supported higher diversity, albeit intrinsically limited, containing species such as dove's foot cranesbill *Geranium molle*, sharp-leaved fluellen *Kickxia elatine*, black nightshade *Solanum nigrum* and fat hen *Chenopodium album*. During subsequent visits to the site during 2016 the vegetation within headlands had established into tall swards, maintaining a species poor composition.

Hedgerows

- 3.19 Six mixed species hedgerows were present along all boundaries of the site. Three of these hedgerows which lay on the northern and western boundaries (H1, H2 and H4) were found to provide moderately high to very high conservation value in accordance with HEGS, largely due to supporting a large number of mature trees and forming intact structures with no gaps. Ash *Fraxinus excelsior*, field maple *Acer campestre* and sycamore *Acer pseudoplatanus* largely dominated these hedgerows.
- 3.20 Hedgerows H3 and H6 were found to provide moderate conservation due to their limited connectivity to the wider environment, and containing a low number of mature standards and only 10-30% native dominant species. The hedgerow to the eastern and south-eastern boundary (H5) was found to be sparse and gappy with tall ruderal species and scattered scrub in the gaps. This hedgerow was of a mixed composition and was found to provide a moderate conservation value in accordance to HEGS. Table 14 provides a summary of hedgerow survey results.
- 3.21 All hedgerows within the application site contained over 80% native species and were therefore identified as Habitats of Principal Importance under Section 41 of the NERC Act (2006).

Table 14. Summary of Hedgerow Survey Results

Ref	Canopy Sp.	Length (m)	Notes	HEGS Value and Score	Important Under REGS / Average Species per 30m
H1	<i>Ac, Ps, Cm, Fe, Ap, Rc, Sn, Rf, Qr sp.</i>	205	Tall field boundary hedgerow adjacent to Sefter Road; 36 mature standards, 2 young trees, no gaps, 2 connections, mixed composition	-1 High value	Not important 5 sp/30m
H2	<i>Ac, Ps, Cm, Fe, Rc, Rf, Ap</i>	33	Tall field boundary hedgerow adjacent to Sefter Road; 15 mature standards, 1 young tree, no gaps, 2 connections, 1 native dominant species	2 + Moderately high to high value	Not important 5 sp/30m
H3	<i>Cm, Rf, Fe, Ps, Ap, variegated holly</i>	29	Small residential boundary hedgerow adjacent to Sefter Cottage; 3 mature standards, no gaps, 1 connection, 2 native dominant species	3 Moderate value	Not important 3 sp/30m
H4	<i>Ap, Rf, Cm, Fe, Ac, Rc, Ps, Qc</i>	531	Tall field boundary hedgerow adjacent to Pagham Road; 71 mature standards, 3 young trees, no gaps, 2 connections, 2 native dominant species	2 + Moderately high to high value	Not important 5 sp/30m
H5	<i>Ps, Rf, Ac, Ra, Rc, Ia, Ca, Sx sp., Cs, Si, Jr,</i>	511	Field boundary hedgerow adjacent to Hook Lane; no mature standards, 5 young standards, 30%+ gaps, 1 connection, mixed composition	2 - Moderately high to high value	Not important 2.4 sp/30m
H6	<i>Ps, Ca, Cm, Ac, Qr, Lv, Rc, Cs</i>	325	Field boundary hedgerow adjacent to Hook Lane; 2 mature standards, 2 young standards 0 – 10% gaps, 1 connection, mixed composition	3+ Moderate value	Not important 4 sp/30m

Key to hedgerow species: Cm *Crataegus monogyna* Hawthorn, Ps *Prunus spinosa* Blackthorn, Fe *Fraxinus excelsior* Ash, Rc *Rosa canina* agg Dog-rose, Qr *Quercus robur* English oak, Qr sp. *Quercus* species Oak species Sn *Sambucus nigra* Elder, Ca *Corylus avellana* Hazel, Ia *Ilex aquifolium* Holly, Ap *Acer pseudoplatanus* Sycamore, Lv *Ligustrum vulgare* Wild privet, Sx sp. *Salix* sp Willow species *oleifolia*, Ac *Acer campestre* Field maple, Qc *Quercus cerris* Turkey oak, Rf *Rubus fruticosus* ag. Bramble aggregate, Qu *Quercus* sp. Oak species. Cs *Cornus sanguinea* Common dogwood Si *Sorbus intermedia* Swedish Whitebeam Jr *Juglans regia* Common walnut, Ra *Rosa arvensis* Field rose

Tall Ruderal

- 3.22 Small patches of tall ruderal vegetation were present on the south-eastern boundary and north-western corner adjacent to Sefter Cottage. These areas were dominated by common nettle *Urtica dioica* and common hogweed *Heracleum sphondylium*.

Ditch

- 3.23 Two ditches were present within the application site. The central drainage ditch (D1) bisecting the arable field measured approximately 1m in width and up to 1.5m in depth. The ditch and margins (approximately 3m on either side) were very overgrown with tussock grassland on the banksides and ruderal elements largely dominating the channel. Scattered scrub was also occasionally present.
- 3.24 During the Phase 1 Habitat survey in September D1 was dry; however, where the ditch could be observed, bare mud and damp areas were present that suggests the ditch is ephemerally wet. During visits to the site in the winter, particularly during a wintering bird survey in January 2016, the eastern sections of this ditch was holding a large amount of water due to recent heavy rainfall; this had also subsequently meant that there were areas of standing water within the eastern stretches of the site.
- 3.25 The second ditch (D2) was recorded running slowly in a southerly direction on the north-western boundary where it was culverted under a road to the north and a residential area to the west. The channel was approximately 1m in width and 1m in height and held maximum of 10cm of water during surveys. Substrate in the channel consisted of gravel and stones, and banksides were vegetated with species including common ivy *Hedera helix*, bramble, hedge bindweed *Calystegia sepium* and common nettle. Hemlock water dropwort *Oenanthe crocata* was the only aquatic / marginal species recorded in D2. Water levels within this ditch were also erratic and dependant on rainfall.
- 3.26 One further drainage ditch (D2a) was located off site, adjacent to and running the entire length of the northern boundary which then culverted under Hook Lane at the north-eastern corner. The slopes of the ditch were shallow with a channel measuring less than 0.5m. Grass species were present suggesting the ditch would be dry for large majorities of the year as more aquatic species should be present if water was more prevalent. However during some of the surveys of the site in winter, this ditch held more water in response to heavy rainfall.

Fauna

Badger

- 3.27 During the Phase I Habitat survey no badger setts, latrines, runs or squeezes were identified within the application site. One badger faecal deposit and several maize cobs which had been stripped in a way that could be characteristic of badger were found, which suggests badgers might be using the site for foraging before the arable crop is harvested; however, during subsequent visits to the site no further evidence of badger was found.

Reptiles

- 3.28 Seven reptile surveys were carried out between September and October 2015, these were conducted within the recommended survey period and during conditions optimal for reptile sightings. The table below summarises the total number of reptiles recorded during the above period.

Table 15. Reptiles Recorded During Each Survey

Survey Date	Common Lizard
01/09/15	0
04/09/15	2 x female adults 1 x male adult 1 x adult (unknown sex) 4 x juveniles
08/09/15	1 x female adult 1 x male adult 1 x adult (unknown sex)
11/09/15	3 x male adults 3 x adults (unknown sex) 13 x juveniles
17/09/15	6 x female adults 2 x male adults 6 x juveniles (unknown sex) 11 x adults (unknown sex)
21/09/15	2 x female adults 1 x adult (unknown sex) 1 x juvenile (unknown sex)
23/09/15	1 x female adult 7 x adults (unknown sex) 4 x juveniles

- 3.29 The identification of a peak adult count of 19 common lizards suggests that the site supports a 'good population' of the species, with numerous juvenile lizards indicating that the populations is successfully breeding and viable.

Bats

- 3.30 There were no buildings to assess within the application site and no trees were identified as having bat roosting potential.

Manual Activity Surveys

- 3.31 The habitats within the site and within the immediate surroundings, including semi-mature trees, hedgerows and scrub provide foraging and commuting routes for bats. In order to establish the

significance of these habitats for bats in this area, further nocturnal survey work was completed in accordance with BCT guidance (2012 & 2016).

- 3.32 Over the course of manual activity surveys undertaken between August 2015 and September 2016 activity levels were observed to peak during the June to August 2016 surveys, with two contacts being the minimum (August 2015) and 19 contacts the maximum (August 2016); the average number of bats per transect was 11. The point counts ranged from 4 contacts (May 2016) to 11 (June 2016), with an average of 6 contacts per survey.
- 3.33 Common pipistrelles were the most recorded bat species during the manual activity surveys, with 49.30% of the contacts, soprano pipistrelles were the next with 36.62%. Nathusius pipistrelle were the next most frequently recorded with 5.63%. The bat contacts which were not confirmed beyond genus levels were *Nyctalus* 4.93% and *Myotis* species 2.82%. Serotine were the least frequently recorded bat with 0.70%.
- 3.34 The majority of the activity occurred on the northern and western boundaries along hedgerows H1, H2, H3 and H4. There were also periods of activity along the eastern boundary and sporadic activity along the central ditch, however the number of bat contacts were generally low throughout the site. See Table 16 for a summary and Figures in Appendix C to J.

Table 16. Bat Transect Summary of Results 2015 – 2016

Month	Total Contacts (Point Number Bracket)	Species Recorded (in abundance order, most to least)	Activity Summary
August 2015 (Spring) Appendix A	7 (5)	<u>Transect</u> 2 Common pipistrelle. <u>Point Count</u> 3 Common Pipistrelle, 2 soprano pipistrelle.	<u>Transect</u> The two contacts occurred along hedgerow H4 and both consisted of foraging passes. <u>Point Count</u> All activity occurred along hedgerow H4 during PC6. Two of the five contacts consisted of foraging behaviour by common pipistrelles, and the remaining contacts were commuting passes.
October 2015 (Autumn) Appendix B	18 (5)	<u>Transect</u> 8 Common pipistrelle, 4 soprano pipistrelle, and 1 Nathusius pipistrelle. <u>Point Count</u> 3 Common pipistrelle, and 2 soprano pipistrelle.	<u>Transect</u> The majority activity, 7 out of the total 13 encounters, occurred along hedgerow H4. Nearly all, 6 out of the 7 encounters, consisted of commuting passes. The remaining contacts occurred south of the ditch along hedgerow H6, along the northern boundary of the site and one commuting pass was observed along the ditch. <u>Point Counts</u> Activity was consistent with contacts recorded during the transect with activity occurring along hedgerow H4, hedgerow H6 and in the north-western corner of the site.
May 2016 (Summer) Appendix C	10 (4)	<u>Transect</u> 3 Common pipistrelle, and 3 soprano pipistrelle. <u>Point Count</u> 3 Common pipistrelle, and 1 soprano pipistrelle.	<u>Transect</u> All activity occurred in the northern extent of the site. Two commuting and one foraging pass was recorded along hedgerow H1. Two commuting passes occurred along the ditch and one further commuting pass was recorded at the north most point of hedgerow H1. <u>Point Count</u> Continuous foraging behaviour by one common and one soprano pipistrelle was recorded during PC4 along hedgerow H1. Two commuting passes were recorded, one at PC6 along hedgerow H4, and one at PC8 along hedgerow H5. Both of these contacts were identified as common pipistrelles.
June 2016 Appendix D	28 (11)	<u>Transect</u> 8 Soprano pipistrelle, 5 common pipistrelle, and 4 <i>Nyctalus</i> species.	<u>Transect</u> The majority of the contacts recorded occurred along the northern (hedgerow H1) or the western (hedgerows H2, H3 and H4) boundary (12 of the 17 contacts). Continuous foraging behaviour was recorded along all hedgerows with the exception of hedgerow 6. <i>Nyctalus</i> species were recorded making commuting passes along hedgerow H1, hedgerow H5 and the ditch.

Month	Total Contacts (Point Number Count in Bracket)	Species Recorded (in abundance order, most to least)	Activity Summary
		<u>Point Count</u> 4 soprano pipistrelle, 3 <i>Nyctalus</i> species, 3 common pipistrelle, and 1 serotine.	<u>Point Count</u> Just over half (6 out of 5) contacts recorded consisted of continuous foraging with all of this behaviour occurring along, or adjacent to, hedgerow H4. The remaining activity consisted of commuting passes which were observed along hedgerow H5 (two contacts) and hedgerow H6 (two contacts), with one commuting pass occurring along hedgerow H3.
July 2016 Appendix E	18 (5)	<u>Transect</u> 7 Common pipistrelle, and 6 soprano pipistrelle. <u>Point Count</u> 4 Common pipistrelle, and 1 soprano pipistrelle.	<u>Transect</u> All behaviour observed consisted of commuting passes, the majority of which occurred along hedgerow H1 (4 contacts) or hedgerow H4 (5 contacts). <u>Point Count</u> Continuous foraging behaviour was recorded at PC3 (hedgerow H4/H5) by two common pipistrelles. The remaining 3 contacts recorded consisted of commuting passes, two of which occurred along hedgerow H3 and one along hedgerow H1.
August 2016 Appendix F	26 (7)	<u>Transect</u> 13 Common pipistrelle, 5 soprano pipistrelle, and 1 <i>Nathusius</i> pipistrelle. <u>Point Count</u> 7 Common pipistrelle.	<u>Transect</u> The majority of activity was recorded along the north and western boundary of the site (13 contacts). Both commuting and foraging behaviour was recorded in these areas. In addition to this activity five contacts were recorded along the ditch and one further contact recorded along H6. These each consisted of commuting passes. <u>Point Count</u> All activity recorded was identified as common pipistrelle with all but one of the seven contacts consisting of commuting passes. The one remaining contact consisted of continuous foraging which occurred at PC7 on hedgerow H6.
September 2016 (Dusk) Appendix G	19 (7)	<u>Transect</u> 5 Soprano pipistrelle, 4 common pipistrelle, 2 <i>Nathusius</i> pipistrelle, and 1 unidentified <i>Myotis</i> species. <u>Point Count</u> 4 Common pipistrelle, and 3 soprano pipistrelle.	<u>Transect</u> Activity was recorded along each hedgerow on site. Five contacts were recorded along hedgerow H2 and included an unidentified <i>Myotis</i> species foraging. Two <i>Nathusius</i> pipistrelles were recorded each making a single commuting pass, one along hedgerow H4 and one along hedgerow H5. <u>Point Count</u> Half of the activity recorded occurred along hedgerow H4 and consisted of commuting passes identified as common pipistrelles. Two soprano pipistrelles were observed continuously foraging at PC2 along hedgerow H6, and the two remaining contacts occurred along the ditch at PC3 and at PC10.
September 2016 (Dawn)	16 (7)	<u>Transect</u> 5 Soprano pipistrelle, 2 <i>Nathusius</i> pipistrelle, 1	<u>Transect</u> The majority of activity occurred along hedgerow H4 (four passes), and hedgerow H1 (two passes), and consisted of commuting passes. Three further contacts were recorded, two along the ditch and one along H6.

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Month	Total Contacts (Point Number Bracket)	Species Recorded (in abundance order, most to least)	Activity Summary
Appendix H		common pipistrelle, and 1 unidentified <i>Myotis</i> species. <u>Point Count</u> 3 Soprano pipistrelle, 2 Nathusius pipistrelle, and 2 unidentified <i>Myotis</i> species.	<u>Point Count</u> Five out of the seven contacts recorded occurred along hedgerow H4 where both foraging and commuting activity was recorded. An unidentified <i>Myotis</i> species was recorded continuously foraging at PC4 on hedgerow H4.

Automated Activity Surveys

- 3.35 The following paragraphs detail the findings of the automated activity surveys. In this context, the term 'registration' refers to a unique sound file created over the course of a number of seconds. Based on this, numerous 'registrations' does not necessarily refer to multiple bats (unlike the manual activity survey section above where the number of bats can often be visually identified), as one bat can create a number of registrations, for example a bat which is foraging in the area surrounding the microphone for a sustained period of time.

Overall Summary

- 3.36 During the automated surveys, where 10 successful units were installed on August and October 2015 as well as between April to September 2016, a total of 10,004 registrations were recorded, with common pipistrelle (approximately 60.26% of total data), soprano pipistrelle (32.79%), *Myotis* sp (1.5%), *Pipistrellus* sp (1.21%), *Nathusius* pipistrelle (0.62%), *Nyctalus* sp (0.52%), barbastelle (0.44%), *Plecotus* sp (0.05%) and serotine (0.03%).
- 3.37 Table 17 summarises the activity levels recorded and the locations of the units; from these surveys, there appears to be two particular areas (hedgerows H1 and H4) that had higher numbers of registrations in comparison to other locations. The June static on hedgerow H1 recorded 3962 registrations but surveys in September 2016 recorded 1634 registrations.
- 3.38 The most notable species recorded during surveys was barbastelle (Annex II species), which was recorded only on four of the ten survey occasions. Barbastelle bats were recorded during the May, July and September surveys with a peak of 22 registrations at H1 during September with the remaining registrations recorded along H4. The barbastelle activity only made up 0.44% of the dataset.
- 3.39 Please see Figure 2 for static (passive) detector unit locations and Tables 17 and 18 for full results.

Table 17. Static Activity Summary 2015 – 2016

Survey Period	Unit Reference / Location	Total Registrations Over 5 nights	Species recorded (in order of abundance and total number of registrations)	Summary of Activity	Barbastelle Activity
25 th – 28 th August 2015	Unit 1: Hedgerow H6, adjacent to the ditch	34	4 species: Common pipistrelle (24), soprano pipistrelle (6), <i>Pipistrellus</i> sp (2) and <i>Nyctalus</i> sp (2).	Common pipistrelle activity occurred sporadically through each night, with a small peak of 15 registrations on 27 th August and a drop of 2 registrations on 25 th August. The majority of soprano pipistrelle recordings were single registrations in the early mornings with exception of three registrations in the evening of 27 th August. The two <i>Nyctalus</i> species registrations occurred at 03:00 and 03:30 on 28 th and two <i>Pipistrellus</i> contacts occurred during night of 25 th .	None recorded.
8 th – 11 th October 2015	Unit 2: Within the northern extent of Hedgerow H6	94	4 species: Common pipistrelle (62), soprano pipistrelle (21), <i>Myotis</i> sp (6) and <i>Nathusius</i> pipistrelle (5).	Single registrations from <i>Myotis</i> species were recorded over two nights, (9 th and 11 th August). The majority of registrations for <i>Nathusius</i> pipistrelle occurred on evening of 8 th . Common pipistrelle registrations occurred consistently through the evening, with a peak of 31 registrations recorded on 8 th and a drop of 9 registrations on 10 th October. Soprano pipistrelles followed a similar trend but in lower numbers.	None recorded.

Survey Period	Unit Reference / Location	Total Registrations Over 5 nights	Species recorded (in order of abundance and total number of registrations)	Summary of Activity	Barbastelle Activity
12 th – 17 th May 2016	Unit 3: Hedgerow H4, south-west corner of the site	1362	6 species: Common pipistrelle (766), Soprano pipistrelle (563), <i>Myotis</i> sp (17), <i>Pipistrellus</i> sp (14), barbastelle (1), and serotine (1).	Common pipistrelle registrations occurred consistently through the evening and mornings, with a peak of 306 registrations recorded on 16 th May and a drop of 37 registrations on 13 th May. The trend was similar with soprano pipistrelles, with a peak of 239 registrations on 16 th May and a drop of 12 registrations on 13 th May. <i>Myotis</i> species were recorded in low numbers sporadically over the survey period and a single serotine registration was recorded on the evening on 15 th May.	One registration on 13 th May at 01:52.
28 th June – 3 rd July 2016	Unit 4: Within the eastern extent of H1	3962	3 species: Common pipistrelle (2906), soprano pipistrelle (1031) and <i>Pipistrellus</i> sp (25),	Common pipistrelle registrations occurred in high numbers each night, with a peak of 766 registrations on 30 th June and a drop of 181 registrations on 29 th June. Soprano pipistrelles followed a similar trend but in lower numbers, with a peak of 439 registrations on 28 th June and a drop of 8 registrations on 30 th June. <i>Pipistrellus</i> species were recorded in low numbers most nights.	None recorded.
18 th – 23 rd July 2016	Unit 5: Within the northern extent of Hedgerow H4 western boundary	1613	7 species: Soprano pipistrelle (998), Common pipistrelle (551), <i>Nyctalus</i> sp (38), <i>Myotis</i> sp (14), <i>Pipistrellus</i> sp (12), barbastelle (6) and Nathusius pipistrelle (4).	Common pipistrelle registrations occurred consistently through the evening and mornings, with a peak of 303 registrations recorded on 20 th July and a drop of 45 registrations on 19 th July. Soprano pipistrelles followed a slightly different trend with higher numbers overall and a peak of 548 on 20 th July and a drop of 69 on 21 st July. Nathusius, <i>Myotis</i> and <i>Nyctalus</i> species were recorded sporadically and in low numbers over the survey period.	Six registrations were recorded between 23:15 and 23:45 on 22 nd July.

Survey Period	Unit Reference / Location	Total Registrations Over 5 nights	Species recorded (in order of abundance and total number of registrations)	Summary of Activity	Barbastelle Activity
	Unit 6: Hedgerow H6, eastern boundary	105	5 species: Common pipistrelle (49), soprano pipistrelle (48), <i>Nyctalus</i> sp (4), <i>Pipistrellus</i> sp (3) and <i>Nathusius</i> pipistrelle (1).	Common pipistrelle registrations occurred consistently through the evening and mornings, with a peak of 23 registrations recorded on 18 th July and a drop of 2 registrations on 19 th July. Soprano pipistrelles followed a similar trend. <i>Nyctalus</i> species were only recorded in low numbers on 18 th and 22 nd July. <i>Nathusius</i> pipistrelle was only recorded on 20 th July.	None recorded.
15 th – 20 th August 2016	Unit 7: Hedgerow H8 on the eastern boundary	667	7 species: Common pipistrelle (273), soprano pipistrelle (76), <i>Pipistrellus</i> sp (35), <i>Myotis</i> sp (15), <i>Nyctalus</i> sp (5), <i>Nathusius</i> pipistrelle (3) and serotine (1).	Common and soprano pipistrelle registrations occurred consistently through the evening and mornings, with a peak of 42 and 26 registrations respectively recorded on 19 th and 20 th August. The lowest activity for these species was recorded on the 16 th and 17 th August with 10 and 4 registrations respectively. <i>Myotis</i> species were recorded in low numbers ranging from 1 to 3 registrations on each night. Serotine and <i>Nathusius</i> pipistrelle were also recorded with one registration each between 21:00 and 22:00 hours on the 17 th , with <i>Nathusius</i> pipistrelle making one further registration on the 15 th August.	None recorded.
	Unit 8: Within southern extent of hedgerow H4	101	7 species: Soprano pipistrelle (44), common pipistrelle (43), <i>Pipistrellus</i> sp (7), <i>Nyctalus</i> sp (3), <i>Myotis</i> sp (2), <i>Nathusius</i> pipistrelle (1) and serotine (1).	Soprano and common pipistrelle registrations followed the same trend, both with a small peak of 11 and 15 registrations (respectively) recorded on 17 th and 18 th August and a drop of 2 and 0 registrations (respectively) on 19 th August. <i>Pipistrellus</i> species were recorded in low numbers during most nights. <i>Nyctalus</i> species, <i>Myotis</i> species, <i>Nathusius</i> pipistrelle and serotine were recorded sporadically with no more than 3 registrations per species recorded.	None recorded.

Survey Period	Unit Reference / Location	Total Registrations Over 5 nights	Species recorded (in order of abundance and total number of registrations)	Summary of Activity	Barbastelle Activity
21 st – 26 th September 2016	Unit 9: Within hedgerow H1 on the northern boundary of the field	1634	6 species: Common pipistrelle (1131), soprano pipistrelle (407), Nathusius pipistrelle (30), <i>Myotis</i> sp (24), barbastelle (22), <i>Pipistrellus</i> sp (16) and <i>Plecotus</i> sp (4).	Common pipistrelle registrations occurred in high numbers each night, with a peak of 381 registrations on 21 st September and a drop of 80 registrations on 25 th September. Soprano pipistrelles followed a similar trend but in lower numbers, with a peak of 113 registrations on 23 rd and a drop of 55 registrations on 24 th and 25 th September. <i>Pipistrellus</i> species, <i>Myotis</i> species and Nathusius pipistrelles were recorded in low numbers during most nights. <i>Plecotus</i> species, were recorded sporadically with no more than 3 registrations recorded in a night.	22 registrations occurred sporadically through the late evening and early mornings, with a peak of 11 registrations recorded on 22 nd and a drop of 2 registrations on 23 rd September. No barbastelles were recorded on 24 th .
	Unit 10: Within hedgerow H4.	432	7 species: Common pipistrelle (223), soprano pipistrelle (96), <i>Myotis</i> sp (72), Nathusius pipistrelle (18), barbastelle (15), <i>Pipistrellus</i> sp (7) and <i>Plecotus</i> sp (1).	Common pipistrelle registrations occurred consistently through the evening and mornings, with a peak of 56 registrations recorded on 24 th September and a drop of 14 registrations on 23 rd September. Soprano pipistrelles and <i>Myotis</i> species followed a slightly different trend with lower numbers overall. <i>Pipistrellus</i> species and Nathusius pipistrelles were recorded in low numbers most nights. A single <i>Plecotus</i> species was recorded on 21 st September with no other recordings over the survey period.	15 registrations occurred over the survey period, with 8 registrations recorded on 22 nd September and 7 registrations recorded on 25 th September.

Table 18. Data Collected from the Static Bat Detectors

Recording period (2015)	Species Recorded and Data Analysis (in order of peak numbers recorded)																													
	No. of hours analysed	Unit Number	Common Pipistrelle			Soprano Pipistrelle			Nathusius Pipistrelle			Pipistrellus species			Nyctalus species			Myotis species			Barbastelle			Serotine			Plecotus species			Total Number of Registrations
			Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	Period total	Peak nightly count	Av.per hour	
25th - 28th August 2015	33	1	24	15	0.73	6	4	0.18	0	0	0.00	2	1	11.00	2	1	0.06	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	34
8th - 11th October 2015	42	2	62	21	1.48	21	10	0.50	5	4	0.12	0	0	0.00	0	0	0.00	6	4	0.14	0	0	0.00	0	0	0.00	0	0	0.00	94
12th - 17th May 2016	49	3	766	306	15.63	563	239	11.49	0	0	0.00	14	6	0.29	0	0	0.00	17	10	0.35	1	1	0.02	1	1	0.02	0	0	0.00	1362
28th June - 3rd July 2016	43	4	2906	766	66.83	1031	439	23.75	0	0	0.00	25	10	0.58	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3962
18th - 23rd July 2016		5	551	303	12.24	988	548	21.96	4	3	0.09	12	5	0.27	38	25	0.84	14	5	0.31	6	6	0.13	0	0	0.00	0	0	0.00	1613
	45	6	49	23	1.09	48	15	1.07	1	1	0.02	3	3	0.07	4	3	0.09	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	105
15th - 20th August 2016		7	114	42	1.90	57	25	0.95	2	1	0.03	9	4	0.15	0	0	0.00	9	3	0.15	0	0	0.00	1	1	0.02	0	0	0.00	192
	60	8	43	15	0.72	44	13	0.73	1	1	0.02	7	3	0.12	3	2	0.05	2	2	0.03	0	0	0.00	1	1	0.02	0	0	0.00	101
September 21st - 26th 2016		9	1131	381	16.16	407	113	5.81	30	14	0.43	16	7	0.23	0	0	0.00	24	13	0.34	22	11	0.31	0	0	0.00	4	3	0.06	1634
	70	10	223	56	3.19	96	35	1.37	18	7	0.26	7	3	0.10	0	0	0.00	72	26	1.03	15	8	0.21	0	0	0.00	1	1	0.01	432

Great Crested Newt

- 3.40 Two waterbodies (D1 and D2) were identified within the applications site and 19 further water bodies were identified within a 500m radius (Figure 3). Eleven of these waterbodies were located within residential areas and were therefore sufficiently isolated with no suitable linkages to the site.
- 3.41 Surveys were concentrated in areas with pooled or standing water, therefore only ditches D1 and D5, and waterbodies P1, P4 and P5 were surveyed.
- 3.42 Ditch D1 was located within the application site and comprised an ephemeral wet channel. At the time of survey the channel, which ran in a northerly to southerly direction, was wet as was the channel which connected with this and ran to the eastern boundary. The wet section of the ditch varied in depth from 2cm – 60cm and had a silty substrate.
- 3.43 Ditch D5 lies approximately 42m west of the application site at the closest point and was a slow flowing deep run-off ditch. The ditch had steep sided banks dominated by ruderal vegetation and common reed. The ditch was heavily inundated with ruderal weeds and fish were present identified at the time as chub *Squalius cephalus*.
- 3.44 Pond P1 was located approximately 49m west of the site. This pond was once an old cattle 'dip' now converted into an ornamental pond. The pond was heavily silted but had a cobblestone bottom with a depth varying from 30cm – 90cm. The margins were heavily managed with mown lawns and regularly trimmed shrubs. Common reed and bog bean occupy the shallows in the western end. The pond is kept at a constant level by an inlet from the east and an outflow to the west but does completely dry out during drought years.
- 3.45 Pond P4 which was situated approximately 331m west was an agricultural settling pond fed by ditches from its western and northern aspects. The pond varied in depth from approximately 30cm – 2.5m. Common reed dominated the margins which was encroaching towards the centre of the pond. The pond was surrounded by dense scrub. The pond had fish present but these were not identified.
- 3.46 Pond P5 was a 'flow pond' located at the northern end of D6 and connected to D5. The pond is used to manage the flow of the irrigation and run-off ditches to prevent flooding. The depth is unknown but certainly exceeds 1.5m. At the time of survey the banks had been managed with the surrounding willow and scrub cleared. The eastern bank was vegetated by common reed. Chub were also present in this pond.
- 3.47 Terrestrial habitat for GCN was present, although limited, in the form of the hedgerow bases, field margins and scrub. The arable habitat was considered to provide sub-optimal foraging and commuting habitat for GCN.
- 3.48 During the survey period, ditches D2a, D3 and D4 were dry, ditches D2 and D6 were flowing, and pond P2 was a very large reservoir approximately 11,063.20 m². Access was not granted to pond P3 and ditch D3 as no owner could be identified via Land Registry.

Habitat Suitability Index (HSI)

- 3.49 An HSI assessment was undertaken on all surveyed waterbodies. The HSI scores are summarised in the table below and the full assessment is available in Appendix K.

Table 19. Summary of HSI Assessment

Pond	HSI Score	Predicted Presence	HSI Category
P1	0.80	79%	Good
P4	0.86	93%	Excellent
P5	0.78	79%	Good
D1	0.69	55%	Average
D5	0.52	20%	Below Average

Aquatic Presence / Likely Absence Surveys

- 3.50 No evidence of GCN was identified within any of the waterbodies surveyed in 2016. Smooth newts *Lissotriton vulgaris* were recorded in pond P1, with a peak count of 14 recorded on the 4th May 2016. Palmate newts *Lissotriton helveticus* were recorded in pond P1 and ditch D1 with a peak count of 10 recorded in pond P1 on the 4th May 2016.
- 3.51 During reptile surveys in September 2015, four smooth newts and one palmate newt were found underneath reptile mats along the eastern boundary and within the margin of ditch D1.

Dormice

- 3.52 No records of dormice were returned from Sussex Biological Records Centre from within a 2km radius of the application boundary.
- 3.53 Dormice tubes were spread along suitable hedgerows throughout the site (see Figure 5). The more suitable habitats were those that had a dense canopy coverage, which would provide a continuous corridor of movement without individuals needing to access the ground. Only six hedgerows were associated with the site, these were all restricted to the boundary.
- 3.54 Dormouse tubes were installed within all hedgerows and suitable scrub bounding the site during December 2015, with a further 20 tubes installed during July, and subsequently checked on 27th April 2016, 5th May 2016, 7th June 2016, 26th July 2016, 15th August 2016 and 23rd September 2016. No evidence of dormice was recorded during these surveys.
- 3.55 The survey effort when calculated scores 21 which complies with the recommended minimum survey effort score of 20 (refer to methodology section) marking the threshold of accepted probability for determining absence of the species from a site subject to survey using the nest tube technique. Given no dormice have been recorded, the species does not currently pose a constraint to the Proposed Development.

Water Vole

- 3.56 The full length of the on-site ditch D1 was surveyed for signs of small mammal activity on the 19th of May 2016. In addition to this the waterbody was checked for any evidence during each GCN survey.

- 3.57 Small mammal activity was observed along the full wet length of the on-site ditch. Evidence recorded included burrows, latrines and mammal paths. A total of 27 burrows were recorded, these were differing in their use as some had vegetation growing over the entrances with debris seen, but also some had started to partially collapse and the soil crumbled around the entrance; the majority were consistent with water vole characteristic structure but only some were likely to have been recently used as vegetation was absent immediately around the entrance. Six latrines were recorded along this ditch, these consisted of a few fresh droppings. The more recent field evidence, fresh latrines and newly created burrows were found in the wet sections of the ditch running from the eastern boundary to the middle of the site. The section that ran west from this point was dry and no evidence of small mammal activity was observed.
- 3.58 Evidence of water voles was recorded off site around the banks of pond P4 located approximately 500m south west. This included a number of burrows with associated latrines and feeding stations as well as a single individual observed swimming across pond P4. Pond P4 is well connected to the on-site ditch through a system of agricultural irrigation ditches; however is separated by a culvert that runs under Pagham Road and the associated residential houses in north west.
- 3.59 During the placement of reptile refugia in August 2015, the initial Phase 1 Habitat survey conducted in September 2015 and survey updates in May 2016, ditch 2 was surveyed for water vole, where no evidence was found. Surveys were also undertaken along ditch D2a, where there was no evidence of water vole activity.

Wintering Birds

- 3.60 A total of 40 species were recorded within the application boundary during the surveys, including eighteen species that are listed as NERC species of principal importance and / or feature on the BoCC Red and Amber lists (Table 20). Full survey results are provided in Appendix L WBS Data Tables.
- 3.61 No Brent geese or other Pagham Harbour SPA / Ramsar designated species were recorded on the site in winter.

Table 20. NERC, LBAP and/or BoCC Red- and Amber-Listed Bird Species Recorded at Hook Lane during Winter Bird Surveys 2015/16 and Their Recent Status in Sussex

Species	Conservation Status	Recent Status in Sussex ²²
Common shelduck	Amber	Fairly common winter visitor and scarce passage migrant
Mallard	Amber	Common resident and winter visitor
Curlew	NERC, LBAP, Red	Common passage migrant and winter visitor
Common snipe	Amber	Fairly common winter visitor
Black-headed gull	Amber	Very common to abundant passage migrant and winter visitor
Herring gull	NERC, LBAP, Red	Very common resident; status uncertain as passage migrant; and winter visitor

²² 2014 Sussex Bird Report. Fairly common = 201-2000 birds in winter; Common = 2001-10,000 birds in winter; Very common = 10,001-60,000 birds in winter; Abundant = 60,000+ birds in winter.

Species	Conservation Status	Recent Status in Sussex ²²
Great black-backed gull	Amber	Common winter visitor and passage migrant
Stock dove	Amber	Common resident and possible winter visitor
Kestrel	Amber	Fairly common resident and passage migrant
Skylark	NERC, LBAP, Red	Very common but declining resident, and probably common passage migrant and winter visitor
Starling	NERC, LBAP, Red	Common but declining resident and very common to abundant winter visitor
Song thrush	NERC, LBAP, Red	Very common but decreasing resident and partial migrant, common passage migrant and winter visitor
Dunnock	NERC, LBAP, Amber	Very common resident
House sparrow	NERC, LBAP, Red	Very common but possibly declining resident
Grey wagtail	Red	Scarce resident and fairly common passage migrant and winter visitor
Meadow pipit	Amber	Common but declining resident; very common passage migrant and winter visitor
Linnet	NERC, LBAP, Red	Fairly common but decreasing resident and partial migrant
Reed bunting	NERC, LBAP, Amber	Fairly common resident; passage and winter visitor

Breeding Birds

- 3.62 A total of 36 bird species were recorded. A full table of results that includes breeding status is provided in Appendix M. Eleven species were recorded as either *confirmed* or *probable* breeders. Twelve *possible* breeders and thirteen *non-breeders* were recorded.
- 3.63 Of the 36 species recorded seven were NERC S41 and / or BoCC Red list species, these are shown in Table 21 below along with breeding status on the application site and within Sussex. Additional 'notable' species include six Amber listed species, these were all categorised as non-breeders and are illustrated in Figure 6. No WCA Schedule I species were recorded.

Table 21. NERC, LBAP and/or BoCC Red- and Amber-Listed Bird Species Recorded at Hook Lane during Breeding Bird Surveys 2016 and Their Recent Status in Sussex

Species	Scientific Name	Conservation Status	Survey Area Breeding Status	Breeding Status in Sussex†
Dunnock	<i>Prunella modularis</i>	Amber list NERC LBAP	Probable (in association with boundary hedgerows)	Very common resident
Herring gull	<i>Larus argentatus</i>	Red list NERC LBAP	Non-breeder	Very common resident and winter visitor
House sparrow	<i>Passer domesticus</i>	Red list NERC LBAP	Confirmed (maxima of three colonies along hedgerow boundaries)	Very common but possibly declining resident
Linnet	<i>Carduelis cannabina</i>	Red list NERC LBAP	Possible	Fairly common but decreasing resident and partial migrant
Song thrush	<i>Turdus philomelos</i>	Red list NERC LBAP	Possible	Fairly common but decreasing resident and partial migrant; common passage migrant and winter visitor
Starling	<i>Sturnus vulgaris</i>	Red list NERC LBAP	Possible	Very common to abundant winter visitor
Yellowhammer	<i>Emberiza citrinella</i>	Red list NERC LBAP	Possible	Fairly common resident

† The Sussex Bird Report 2014 (No.67) The Sussex Ornithological Society.

- 3.64 No significant numbers of individuals or breeding pairs were recorded on the application site. Of note was the presence of five foraging shelduck *Tadorna tadorna* during the April survey.

Other Species

- 3.65 During the manual bat activity survey on the 26th July two hedgehogs were observed on the application site. One was located halfway along the eastern boundary and the second was located on the northern side of the central ditch.
- 3.66 No evidence of brown hare was found during the initial Phase 1 Habitat survey or subsequent visits to the site.

4.0 DISCUSSION AND RECOMMENDATIONS

- 4.1 The following section provides an evaluation of the site and identifies the likely ecological constraints associated with the proposed development. Where appropriate, measures for the avoidance, mitigation and compensation of any likely potential impacts together with any enhancements are discussed.

Site Proposals

- 4.2 The proposed development consists of up to 300 residential units with associated infrastructure and a Sustainable Drainage System (SuDS). The development will result in the loss of arable land and small sections of the hedgerow along the eastern and western boundaries; however, additional tree planting and enhancements are proposed along the northern and western boundaries and an area totalling 6.65ha of green infrastructure is also to be provisioned.

Statutory and Non-Statutory Designated Sites

- 4.3 Two SSSIs lie within 2km of the site, the nearest being Bognor Reef SSSI which is located approximately 1.2km north of the site, and Pagham Harbour SSSI which lies approximately 1.6km west of the site. The site falls within the Impact Risk Zones for both of these SSSIs.
- 4.4 Bognor Reef SSSI can be accessed from the site via a series of roads and pedestrian pathways and would consist of a walk of approximately 1.5km (one way), which would involve more than a 3km circular walk based on residents walking to and from the SSSI and a walk along the seafront. The majority of this circular walk would take place in built up residential areas with busy roads, and it unlikely that residents would use this walk on a daily basis based on distance and quality of walk.
- 4.5 The site is linked to Pagham Harbour SSSI via a public right of way and would involve an approximate 2km walk (one way), which, if used as a circular route would cover approximately 4km, and is considered to be in excess of the average daily walking distance undertaken by the majority of people. Research published by Natural England for the Thames Basin Heaths SPA²³ found that average walking route length of a local visitor with a dog was 2.63km, with 75% of dog walkers covering up to 3.23km. 'Local visitors' who were walking without a dog on average covered a slightly longer distance of 2.51km, with 75% covering up to 3.80km.
- 4.6 The 6.65ha of green infrastructure will provide two large areas of open space to the north-west of the site and one smaller area to the south, some of which will be fenced off allowing for areas of 'off lead' activities for dogs. Dog and litter bins will be positioned at the entry to the green infrastructure (GI) and where proposed footpaths within the site meet existing footpaths, this will minimise the nutrient effects to the wider area.
- 4.7 Due to the distances involved in travelling to the sites above, it is not considered that either of these SSSIs would be visited on a regular basis, therefore public pressures upon the designated habitats would remain negligible.
- 4.8 Pagham Harbour SPA, Ramsar and SSSI is located within 2km west of the site and is designated as a Wetland of International Importance for many bird populations. Natural England has advised that the proposed development has the potential to have a significant effect on the European site

²³ Natural England (2014) Results of the 2012/13 visitor survey on the Thames Basin Heaths Special Protection Area (SPA). [Online].

- through increased recreational pressure, and also has the potential to impact on the supporting habitat for SPA birds.
- 4.9 Natural England, together with Arun and Chichester District Councils have developed a joint interim scheme of mitigation for increased recreational pressure resulting from residential development in the area. The mitigation will include a package of on and off-site measures including in-perpetuity wardening, delivery of access management, education and interpretation, signage and monitoring.
- 4.10 Natural England have advised that this development should:
- “demonstrably fall within the agreed strategic approach and provide adequate contributions towards this strategy”*
- 4.11 The contribution towards this strategy currently stands at £1,275 per dwelling (although this is currently under review).
- 4.12 The Arun Local Plan's housing allocation has been challenged, which has led to a revised Objectively Assessed Need for Housing. The application site has been included for a potential allocation for 300 units.
- 4.13 Arun District Council commissioned Urban Edge Environmental Consulting (UE) to complete Habitats Regulations Assessment for the Arun Local Plan: Supplementary Work Stage 2 Report: Screening for Likely Significant Effects (June, 2016). This HRA concludes that for a 300-unit allocation in North Pagham there would be no significant effect on Pagham Harbour SPA/Ramsar alone, however, significant effects are possible in combination and lists disturbance, supporting habitat, and water pollution.
- 4.14 Table 22 shows the extent of impact (on Pagham Harbour) SPA / Ramsar and the screening conclusion taken directly from tables 5.2, 5.4 and 5.8 of the Arun Local Plan HRA Stage 2 Screening (UE, 2016). A third column has been included here to show the additional information and mitigation measures from this proposed scheme and subsequent new conclusion.

Table 22. Screening conclusions for mitigation measures based on the Arun Local Plan HRA Stage 2 Screening (UE, 2016) and additional information and mitigation measure from the proposed scheme

Extent of Impact on SPA/Ramsar	Screening Conclusion	Additional Information and Mitigation Measures
<u>Disturbance</u> Likely to be deliverable in compliance with ENV DM2	Likely significant effect in combination. Adverse effect on site integrity not likely once mitigation is applied.	A financial contribution of £1275.00 per unit is to be made. 6.65ha of suitable on-site green space provision that provides circular walking and dog exercise areas for residents. Located in the North West of the site will pull local residents away from direction of the SPA / Ramsar. A Likely Significant Effect Alone: No A Likely Significant Effect in Combination: No
<u>Supporting Habitat</u>	Unlikely to significantly affect the SPA /	Seven wintering/SPA bird surveys were undertaken during 2015/16 (October - March) where no SPA /

Counts of 17 and 150 Brent goose at Sefter Farm in winter 2002/03, but the records are geolocated to junction of Sefter and Pagham roads and it is not certain which field the record relates.	Ramsar alone; effects in combination are possible and will require further survey and assessment.	Ramsar species, including dark-bellied brent geese, were recorded. The records of brent geese are from "Sefter Farm" and relate to low resolution records within the 1km grid square SZ8999. The geolocated position on the road junction relates only to the centre of the grid square. While it is still not possible to fully rule out that these records were from the application site, it does seem more plausible that they relate to habitat on Sefter Farm north of Pagham Road which is geographically more connected with Pagham Rife and open countryside. Other local records suggest Sefter Farm to the north is regularly bird watched adding weight to the likelihood the records were from this area. A 2km SBRC search of brent geese returned a total of 562 records. Few records fell outside the SPA/Ramsar itself or land immediately adjacent (see Figure 7 for record locations). Only three records fell within the Tetrad that includes the application site – the two Sefter Farm records already mentioned and a count of 1000 at Bognor Nyetimber in 2008. It is reasonable to state that if brent geese were to regularly use the application site, given its accessible and viewable location, their presence would be conspicuous and it would be expected that there would have been records submitted to the local records office. Brent geese tend not to use supporting habitat far from their favoured coast or tidal estuary / river areas. Their preferred habitat once eel grass beds have been depleted tends to be grazing marsh and winter wheat crops close to tidal estuaries in open areas with low disturbance. Only the last three winters land use is known (including this coming winter) on the application site and no winter wheat crop has been sown. The lack of food source and distance from their main habitat closer to the harbour are likely to be the main reasons for lack of suitability. The application site offers little potential as supporting habitat and is atypical for brent geese. It is considered extremely unlikely based on historical records, the seven wintering bird survey visits and
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		the lack of suitable habitat on the application site that the application site is supporting habitat for dark-bellied brent geese associated with Pagham Harbour SPA/Ramsar. A Likely Significant Effect Alone: No A Likely Significant Effect in Combination: No
<u>Water Pollution</u>	Unlikely to significantly affect the SPA/Ramsar alone; effects in combination possible.	Water discharge levels on-site will be controlled and managed by additional drainage ditches, re-profiling and meandering of existing central ditch, and creation of attenuation including of waterbodies and a new channel along the western boundary. The site is within the catchment of the Pagham treatment works and Southern Water has confirmed that there is sufficient capacity for this site (please see WSP Drainage Assessment). The Arun Local Plan HRA Stage 2 Screening (UE, 2016) states the Headroom Capacity of Pagham WWTW in combination with the following plans should be considered at the Appropriate Assessment stage: • Publication Arun Local Plan (October 2014), particularly Policy H SP1: Strategic Housing, Parish and Town Council Allocations; • Chichester District Local Plan: Key Policies 2014-2029 (adopted); • Chichester District Local Plan: Draft Site Allocation DPD (preferred approach); and • Amended Pagham Draft Neighbourhood Plan (emerging). No strategic development locations within the Chichester Local Plan fall within the Pagham WWTW catchment. An application for 8 dwellings (16/01332/REM) is the only current Chichester District Council residential application within the catchment. The remaining plans are yet to be adopted and therefore not possible to consider in combination with the proposed development at present.

		There would not presently be an in-combination effect on Pagham Harbour SPA / Ramsar as a result of water pollution due to the proposed development. Likely Significant Effect Alone: No Likely Significant Effect in Combination: No
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- 4.15 Table 23 provides a summary of site evaluation findings taken from Table 6.1 of the Arun Local Plan HRA Stage 2 Screening (UE, 2016) alongside the conclusions based on this study. Overall, it can be concluded that the only outstanding potential significant effect from the proposed application on Pagham Harbour SPA / Ramsar that has not been fully screened out for the local plan, is that of the Headroom Capacity of Pagham WWTW in combination with the emerging plans (please see Arun Local Plan HRA Stage 2 Screening (UE, 2016)). The suitability for allocation should therefore be adjusted accordingly raising it from Low – Medium suitability for allocation to Low – High.

Table 23. Updated summary of site evaluation findings for the Arun Local Plan HRA based on Arun Local Plan HRA Stage 2 Screening (UE, 2016) and the information gathered for this application

Source	Significant Effect Alone	In Combination	Suitability for Allocation
Conclusion of Arun Local Plan HRA Stage 2 Screening Table 6.1 (UE, 2016)	No	Yes: disturbance (but mitigation available); supporting habitats (Pagham Harbour); water pollution.	Low - Medium
Conclusion based on the additional work for this application	No	Yes: Water Pollution (further information required for in combination effects for emerging local plans).	Low - High

- 4.16 As Southern Water has confirmed that there is sufficient capacity for Pagham treatment works (please see WSP Drainage Assessment), and as there is presently not likely to be a significant in combination effect on Pagham Harbour SPA / Ramsar with existing adopted plans, it can be concluded there will be no significant effect on Pagham harbour SPA / Ramsar alone or in combination as a result of the proposed development.
- 4.17 MAGIC website indicates that (along with those above) there are four further Internationally Designated Sites. These include Chichester and Langstone Harbours SPA and Ramsar, Solent Maritime SAC, Kingley Vale SAC, and Singleton and Cocking Tunnels SAC.
- 4.18 Chichester and Langstone Harbours SPA and Ramsar is a wetland of international importance and is situated approximately 6.4km north-west of the site. It is designated for regularly supporting over

20,000 waterfowl, including populations of European importance of species such as dark-bellied brent goose, black-tailed godwit, dunlin and grey and ringed plover.

- 4.19 There is a 5.6km zone of influence for Chichester and Langstone Harbours SPA and Ramsar which the application site falls outside of this area, therefore there is no set mitigation requirement from the Local Planning Authority (LPA).
- 1.1 The site is located approximately 6.4km north-west, which as mentioned above, is in excess of the average daily walking distance undertaken by the majority of people and it is therefore unlikely new residents would visit the Chichester and Langstone harbours SPA / Ramsar on a daily basis. There are also strategies in place in order to minimise the impact of public pressure including interpretation facilities and panels located at strategic locations on the harbour footpaths, warden and ranger services with an educational remit in all nature reserve areas, and an educational officer is employed by the Chichester Harbour Conservancy to instruct both school parties and adults in the cultural and nature conservation aspects of the harbour. It is therefore anticipated that recreational effects on this designated sites will be negligible.
- 4.20 The remaining Special Areas of Conservation, Solent Maritime SAC designated for containing many Annex I habitats, is located approximately 11.5km west, Kingley Vale SAC, designated for supporting Britain's largest yew woodland, is situated approximately 12.5km north, and Singleton and Cocking Tunnels SAC, designated due to supporting the Annex II species barbastelle bat and Bechstein's bat, is located approximately 14.8km north. Owing to the distances involved in travelling to the sites above, it is not considered that these sites would be visited on a regular basis, therefore public pressures upon the designated habitats would be negligible.

Habitats/Flora

- 4.21 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:
- Inclusion within specific policy (e.g. veteran trees, ancient woodland and linear habitats in NPPF, or non-statutory site designation),
 - Identification as a habitat of principal importance for biodiversity under Natural Environment and Rural Communities Act (NERC) 2006 and consequently identification as a Priority Habitat within England and the local area.
- 4.22 Under NPPF development should seek to contribute a net gain in biodiversity with an emphasis on improving ecological networks and linkages where possible. It is recommended that hedgerows, where possible, are to be retained, buffered and enhanced to ensure the site's connectivity into the wider area is maintained. The hedgerows bounding the site contained native species and, as such, qualify as habitats of principal importance under NERC. All hedgerows are important in their functions as corridors and foraging and nesting habitats for wildlife and as such are identified as priority habitats. In addition, hedgerows are listed as Sussex BAP Habitats and current targets aim to retain and increase the number of hedgerows and hedgerow trees within Sussex.
- 4.23 The cultivated arable habitats, which comprise the majority of the site, were found to be of low intrinsic and conservation importance, with no rare or notable species recorded. Being more than 2m in width, the arable margins have potential to qualify as Habitats of Principal Importance (Arable Field Margins) and Priority Habitats within Sussex, however due to the species-poor character of these, the lack of regular management and their widespread and common occurrence, these are

considered to be of negligible conservation value. Marginal habitats will be retained, and where lost, compensated for through incorporation of species-rich and tussock-forming grassland throughout the proposed development, specifically around water features (attenuation facilities and ditches) and northern and southern extent of the site.

- 4.24 Six hedgerows were recorded within the site associated with field boundaries, none of which were assessed as important hedgerows under the Hedgerow Regulations 1997. All hedgerows present do have a moderate (H3, H6), moderately high to high (H2, H4 and H5) or high conservation (H1) value when considered against the criteria of the Hedgerow Evaluation and Grading System (HEGS) and all are classed as Habitats of Principal Importance under the NERC Act (2006) due to the dominance of native species, and therefore require consideration under the NPPF.
- 4.25 The network of hedgerows within the application site provides connectivity between habitats both within the application site and within the wider landscape. Hedgerows H1, H2 and H3 will be retained and buffered within the proposals. Small sections of hedgerows H4, H5 and H6 will be removed for pedestrian and vehicular access, however the majority of hedgerow H4 will be enhanced with additional planting and buffered (minimum 20m) ensuring that the small amount of hedgerow loss resulting from proposals is compensated for. Owing to the large proportion of gaps that already exist within hedgerows H5 and H6, and the maturity of these features, the loss will not have a detrimental impact upon the hedgerow resource.
- 4.26 Hedgerows H1, H2, H3 and H4 will be strengthened by additional planting, and where practicable, buffer zones will be allowed to develop consisting of strips of natural ground flora at the base, increasing the value of the hedgerows as corridors for wildlife movement.
- 4.27 All of the mature trees present within the site provide potential habitats for invertebrates, nesting birds and other wildlife and will be retained where possible. These will be protected from damage and from soil compaction during works by erecting and maintaining fenced Root Protection Areas (RPAs). Further native tree and scrub planting is to be incorporated throughout the GI, along boundaries and within the main body of the site as compensation for the unavoidable loss of trees during the removal of small sections of hedgerows H5 and H6.
- 4.28 Preference will be given within the planting scheme throughout the entire application site, including existing hedgerows and boundary features, to the use of locally native woody species, with an emphasis on species bearing nectar, berries, fruit and nuts, as these enhance the foraging opportunities for local wild fauna including birds and invertebrates. Suitable small tree species for inclusion in hedgerow and garden planting schemes include field maple *Acer campestre*, silver birch *Betula pendula*, wild cherry *Prunus avium*, bird cherry *P. padus*, holly *Ilex aquifolium*, crab apple *Malus sylvestris* and rowan *Sorbus aucuparia*. Other shrub species suitable for inclusion within the soft landscaping design include hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, blackthorn *Prunus. spinosa*, dog rose *Rosa canina*, honeysuckle *Lonicera periclymenum* and wild privet *Ligustrum vulgare*.
- 4.29 Where possible planting within the site will seek to provide additional habitat for urban and suburban wildlife. While native species are often of value to biodiversity generally, it is now clear that many cultivated varieties and exotic plants are also good for wildlife provided that their flowers are not too complex or that hybrid varieties, which may produce little or no pollen or nectar and so are not of interest to bees, butterflies or other pollinating insects, are not used. The planting strategy, both within private and public areas, will therefore combine a range of native species and where appropriate, such as in gardens and more formal areas, with a range of ornamental species

with an accepted value for biodiversity. A range of small shrubs, low growing woody species, grasses and perennials, would provide a range of forms, sizes and finer scale variation to enhance the future structural and three-dimensional complexity of the site.

Fauna

- 4.30 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats and Species Regulations 2010. Some species, for example badgers, also have their own protective legislation (Protection of Badgers Act 1992 as amended). The impact that this legislation has on the planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory obligations and their impact within the Planning System.
- 4.31 This guidance states that as the presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species, and the extent to which they are affected by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions for example.
- 4.32 In addition to protected species, there are those that are otherwise of conservation merit, such as species of principal importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006. These are recognised in the NPPF which advises that when determining planning applications, LPA's should aim to conserve and enhance biodiversity by applying a set of principles including:
- *If significant harm resulting from a development cannot be avoided....., adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
 - *Development proposals where the primary objective is to conserve or enhance biodiversity should be encouraged.*
- 4.33 The implications that various identified species or those that are thought reasonably likely to occur may have for developmental design and programming considerations are outlined below:

Badger

- 4.34 Badgers are protected under the Protection of Badgers Act 1992²⁴. This act is based on the need to protect badgers from baiting and deliberate harm or injury and makes it an offence to:
- Wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempted to do so; and
 - Intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.
- 4.35 A sett is defined as:
- “Any structure or place that displays signs indicating current use by a badger”

²⁴ The Protection of Badgers Act 1992 (as amended). London: HMSO [Online]. Available from <http://www.legislation.gov.uk/ukpga/1992/51/contents> [Accessed 03/05/2016].

- 4.36 During the field studies one badger faecal deposit and several maize cobs which had been stripped in a way that could be considered characteristic of badger were found, which suggests badgers might be using the site for foraging before arable crop is harvested; however, during subsequent visits to the site no other evidence of badger was found.
- 4.37 Due to the transient nature of badgers it is not unexpected to find evidence of badger within an arable field, and due to no badger sett being found on the application site or within the immediate surrounding area; and no observation of any other signs of use or occupation, badger pose no constraints to the development. As a precautionary measure any excavations such as ditches or foundations should be covered overnight, or a means of escape provide which should include sloping banks, as this will prevent badgers and other mammals falling in and becoming injured and trapping. Also any piping such as that used for drainage, should also be covered and inspected before use, to ensure that mammals have not become trapped.

Reptiles

- 4.38 All common reptile species, including slow worm, common lizard and grass snake are partially protected under Section 9(1) and 9(5) of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This legislation protects these animals from:
- Intentional killing and injury; and
 - Selling, offering for sale, possessing or transporting for the purpose of sale or publishing advertisements to buy or sell a protected species.
- 4.39 This partial protection does not directly protect the habitat of these reptile species. Where these animals are present on land that is to be affected by development, the implications of legislation are that providing that killing can *reasonably be avoided* then an operation is legal. This requires that:
- the animals must be protected from injury or killing;
 - mitigation should be provided to maintain the conservation status of the species; and
 - following operations the population should be monitored.
- 4.40 All common reptile species, including common lizard, are species of principal importance under section 41 of the Natural Environment and Rural Communities Act 2006 (NERC) and priority species in England.
- 4.41 The site was predominantly arable which provided unsuitable and sub-optimal habitats for reptiles. Suitable habitats were generally limited to field and ditch margins which provided foraging, commuting and basking opportunities for reptiles.
- 4.42 Reptile surveys undertaken during 2015 have confirmed the site supports a good population of common lizard. The surveys indicated that the populations are focused along the east and west field margins and both the northern and southern side of the central ditch.
- 4.43 The proposed development will result in the loss of all field margins along the eastern boundary adjacent to Hook Lane, and the central drainage ditch will be realigned resulting in the loss of the ditch margins, where common lizard have been recorded.
- 4.44 The GI proposed in the north, western and southern extents of the site will be enhanced to provide suitable habitat mosaics for reptiles including hedgerows, scrub and tussocky grassland.

Hibernacula will also be created in appropriate areas of GI in order to provide basking, refuge and hibernation opportunities for reptiles. In addition, a habitat buffer is proposed along the western boundary, which will consist of a wide strip (minimum 20m) of tussock grassland and scrub habitats, maintaining linkages around the site.

- 4.45 Mitigation measures will be carried out in two phases. This will involve creation of a receptor site within the GI in the north-western extent of the site and, subsequently a trapping and translocation exercise. The area of GI to the north-west of the site will be enhanced for reptiles prior to any construction works; ensuring that receptor habitats are allowed to mature into a state which would be optimal for reptiles. This will include the creation of grassland mosaics, hibernaculum and refuge habitats such as hedgerows.
- 4.46 Once the receptor habitats have established, the removal of reptiles from the development site can commence. To prevent causing an offence under the Wildlife & Countryside Act 1981 (as amended); a trapping and translocation exercise will be undertaken, with habitat manipulation to aid in the reptile removal. Artificial refugia will be spread around the suitable habitats onsite and a period of trapping undertaken, whereby individuals which are caught will be moved to the prepared receptor area. The receptor area will be fenced off with TAF for the duration of the development in order to ensure no reptile moves into the development area whilst work is being undertaken. Due to the proposed development site being isolated by busy roads (Hook Lane, Sefton Lane and Pagham Road) it will not be necessary to fence off the entire site with TAF.
- 4.47 Once sufficient trapping has been completed, any removal of vegetation required for construction such as grassland cover/scrub, will be undertaken under the supervision of an experienced ecologist and undertaken at appropriate times of the year when reptiles are active (April to September, temperature >10°C).
- 4.48 Full details of mitigation will be provided in a Construction and Environmental Management Plan (CEMP) and/or a Reptile Mitigation Strategy.

Bats

- 4.49 All bat species and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010. In summary, these make it an offence to damage, destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat.

Manual Activity Surveys

- 4.50 The activity transects recorded six bat species (order of abundance) common pipistrelle, soprano pipistrelle, Nathusius pipistrelle, *Nyctalus* species, *Myotis* species and serotine. The contacts ranged from two (August 2015) to 19 (August 2016), which over the current surveys averages 11 contacts per transect (excluding point counts). The level of bat activity during the transect surveys was negligible and therefore is not considered to be significant.
- 4.51 The activity recorded within the site was focused in the north and western extent, along hedgerow H1, H2, H3 and H4. Minor periods of activity were also recorded along the eastern boundary and sporadic activity was recorded along the central drainage ditch.
- 4.52 Based upon the transect findings it is considered that the hedgerows and central drainage ditch support commuting and foraging bats; with those areas in the north and west of highest value.

Automated Activity Surveys

- 4.53 The registration numbers were the lowest in August 2015 and October 2015 on the eastern boundary, with a total of 34 and 94 registrations respectively. The highest level of activity was recorded during June / July 2016 with 3962 registrations occurring along hedgerow H1 on the northern boundary. Other periods of high activity include 1634 registrations also on the northern boundary recorded during September 2016, and 1613 and 1362 registrations on the western boundary recorded in June / July 2016 and May 2016 respectively. The other activity levels recorded numbers between 101 and 432 registrations; the total number registrations over the seven static periods was 9529.
- 4.54 There were 44 registrations from barbastelle bats during the May, July, and September 2016 surveys. The peak of barbastelle activity occurred in September where 22 registrations were recorded along hedgerow H1 on the northern boundary, and 15 registrations were recorded along hedgerow H4 on the western boundary of the site. The remaining passes were recorded in July (6 registrations along hedgerow H4) and 1 registration in May along hedgerow H6 on the eastern boundary. These species are Annex II species of the Habitats Directive and are species of Principal Importance under S41 of the NERC Act (2006). The Joint Nature Conservation Committee (JNCC)²⁵ UK status and distribution information for barbastelles shows that there are records of these species in the vicinity of the site, although this is not in sufficient detail to accurately assess, and specific consultations recorded no such species within 2km of the site; JNCC note that:
- "The barbastelle is widely distributed across southern England and across Wales but is likely to have been significantly under-recorded within its range."*
- 4.55 Barbastelle bats are known to utilise woodland, streams and rivers; the immediate habitats around the development are lacking significant woodland areas, however, the site is located within close proximity to Pagham Rife, approximately 465m west, which could provide foraging opportunities for this species. The Joint Nature Conservation Committee UK Status & Trends distribution map suggests that the species have been recorded within the wider area, and so it is not surprising that barbastelle have been recorded in low numbers.
- 4.56 The majority of barbastelle registrations occurred along hedgerow H1 on the northern boundary and along H4 on the western boundary. The residential area of Pagham can be found to the east of the site with increases in light pollution and urban landscapes; barbastelle tend to avoid such areas, so it is not expected that the individual/s came from these areas as more registrations would have been anticipated throughout the season. It is likely that they were using habitats to the north or west, and then came into the site, however, one barbastelle registration was recorded on the eastern boundary on the 12th May 2016 which is unusual due to the light pollution found there. Barbastelles are known to forage over large distances, with foraging routes changing during the season in response to life stages and food availability, it is therefore likely that the site falls within the home range of barbastelles; but due to the low registration numbers, the site does not function as an important resource.

Mitigation and Enhancements for the Local Bat Population

- 4.57 The retention of the hedgerows around the peripheries will ensure connectivity is maintained; and the inclusion of 6.65ha of GI will have a beneficial effect on the local bat assemblages, particularly

²⁵ The Joint Nature Conservation Committee UK Status & Trends: Barbastelle. <http://jncc.defra.gov.uk/publications/JNCC312/species.asp?FeatureIntCode=S1306>. Assessed 06.08.16

in the north and west where new foraging and commuting opportunities will be provided with the structural planting, open grassland areas and attenuation.

- 4.58 To minimise impacts on bats, proposals will adopt a sensitive external lighting scheme which will be designed to minimise light spill on retained and proposed habitats of value to commuting and foraging bats. The lighting scheme would be designed with regard to current guidance provided by the Bat Conservation Trust²⁶ and the Institution of Lighting Professionals²⁷ and adopt the following principles:
- The avoidance of direct lighting of existing trees, hedgerows, scrub, woodland, or proposed areas of habitat creation/landscape planting;
 - Buffer zones and GI are not to be illuminated;
 - The implementation of 'hop-overs' adjacent to any hedgerow gaps greater than 7m wide will allow continued echolocation across the break thereby allowing continued usage of the hedgerow as a foraging/commuting area. It will also reduce the potential for road traffic accidents to bats (and also for birds);
 - During the construction period, no lighting should be used in proximity to boundary features, if needed lights will be directional focuses/shrouded;
 - Lighting that is incorporated into the development design should comprise low pressure sodium lights, as they emit at one wavelength so attract less insects;
 - Directional lighting and avoidance upward lighting and / or light spillage;
 - Lighting columns to be as short as possible, although in some locations taller columns would allow reduced horizontal spill and
 - Security lighting on properties backing on to sensitive hedgerows and woodland will be low wattage LED, which will be installed on properties at construction stage to forestall a future homeowner installing unsuitable lighting which could impact on bats.
- 4.59 The 20m buffer along the northern and western boundaries will distance the residential units away from more natural habitats, where dark corridors will be maintained. These areas will benefit all bat species, but particularly barbastelle bats that could utilise the corridors as linkages to surrounding areas, but also the creation of attenuation will attract a variety of prey items, which potentially could increase the foraging potential and value of the site to bats.
- 4.60 Roads and buildings in close proximity to the new GI and existing boundary habitats should have lighting sensitively positioned, so to avoid illumination of canopies which could reduce bat suitability. Below are a number of measures that will be inherent to the design to limit light disturbance during the construction and operational phase:
- During the construction period, no lighting should be used in proximity to boundary features, if needed lights will be directional focuses/shrouded;
 - Buffer zones and GI are not to be illuminated;
 - Lighting that is incorporated into the development design should comprise low pressure sodium lights, as they emit at one wavelength so attract less insects;

²⁶ Bat Conservation Trust (2011) Statement of the impact and design of artificial light on bats

²⁷ Institution of Lighting Professionals (2011) Guidance Notes for Reduction of Obtrusive Light

- Any upward lighting will need to be avoided; and
 - Security lighting on properties backing on to sensitive hedgerows and woodland will be low wattage LED, which will be installed on properties at construction stage to forestall a future homeowner installing unsuitable lighting which could impact on bats.
- 4.61 Roosting opportunities should be enhanced through the installation of bat boxes on retained trees or incorporated on to selected new buildings. These could include Ibstock bat bricks or Schwegler 1FR Bat Tubes which can easily be incorporated into the walls of the new buildings and Schwegler 1F and 2FN bat boxes for trees. The provision of such features would be in accordance with National and Local Planning Policy helping to enhance biodiversity within the local area.
- 4.62 The bat assemblages recorded within the site consisted of common and widespread species; with the exception of barbastelles which occurred on three survey occasions. The application site location falls within the range of this species but does not function as an important commuting or foraging resource. The proposed enhancements and habitat creation will enhance features already present along with creating new areas of grassland and attenuation, which will have a minor / moderate beneficial effect at a site / local level.

Great Crested Newts

- 4.63 The great crested newt is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations 2010 (as amended) making it a European Protected Species.
- 4.64 It is an offence to:
- capture, kill, disturb or injure great crested newts (intentionally or recklessly);
 - damage or destroy a breeding or resting place (intentionally or recklessly);
 - disturb a great crested newt while it's in a structure or place of shelter or protection (intentionally or recklessly);
 - obstruct access to their resting or sheltering places (intentionally or recklessly); and
 - possess, sell, control or transport live or dead great crested newts, or parts of great crested newts.
- 4.65 They are also a Species of Principal Importance in England under Section 41 NERC Act and a European Protected Species. In addition, GCN is a Priority Species within the Sussex BAP. The lifecycle of GCN means they spend a considerable amount of their time on land foraging, commuting and hibernating.
- 4.66 One record of great crested newt approximately 1.7km north-west of the site was returned from SxBRC during the data search. The central ephemeral wet drainage ditch and a number of other waterbodies suitable for breeding GCN are present on the application site and within the wider area. Suitable terrestrial habitats which provide shelter for foraging, commuting and resting purposes, for GCN are present on the application site but limited to hedgerow bases, field margins and scrub.
- 4.67 Presence / likely absence surveys were completed on waterbodies P1, P2 and P4, and ditches D1 and D5, during which no GCNs were recorded.

- 4.68 Pond 2 was a large reservoir approximately 11,063.20 m², which contained a population of fish. The Great Crested Newt Conservation Handbook states that GCN prefer small to medium sized breeding ponds, around 50 – 250m², and that they can suffer heavy predation by fish²⁸. Therefore, due to the size of the waterbody, and likelihood of predation by fish leading to any breeding population present to have very low fecundity, pond 2 was deemed to be unsuitable for GCN and was not surveyed.
- 4.69 Ditches D2 and D6 were flowing during the survey period and ditches D2a and D4 were dry. None of these ditches were surveyed as they were unsuitable for this species.
- 4.70 Access was not granted to survey waterbodies P3 and D3, however suitable terrestrial habitat in the form of hedgerow bases occur within the immediate vicinity of these waterbodies which are likely to be utilised by GCN (should they be present), and a road separates this area from the site. Consequently, it is considered unlikely that if GCN are present within P3 and / or D3, that they would travel to the proposed development to utilise the limited suitable areas of terrestrial habitat.
- 4.71 Smooth newts were identified within P1, and palmate newts were identified within P1 and D1. Both smooth and palmate newts were observed onsite during reptile surveys. These species are afforded protection from sale only under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended)²⁹. As such, there is no statutory constraint to development in relation these species.
- 4.72 No GCNs were recorded within any of the ponds within the proposed development site, and P3 and D3 which were not surveyed had suitable habitat within the vicinity of the waterbody and so individuals are not likely to commute to the proposed development. There is no constraint to the development from this species.

Dormice

- 4.73 The hazel dormouse is listed under Annex IVa of the EC Habitats Directive and as a result is covered by the Conservation of Habitats and Species Regulations 2010 (as amended). It is also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these make it an offence to:
- deliberately capture or intentionally take a dormouse;
 - deliberately or intentionally kill or injure a dormouse;
 - to be in possession or control of any live or dead dormouse or any part of, or anything derived from a dormouse;
 - damage or destroy a breeding site or resting place of a dormouse;
 - Intentionally or recklessly obstruct access to any place that a dormouse uses for shelter or protection;
 - intentionally or recklessly disturb a dormouse while it is occupying a structure or place that it uses for shelter or protection;
 - deliberately disturb any dormouse in particular any disturbance which is likely to
 - impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or

²⁸ Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001), Great Crested Newt Conservation Handbook, Froglife, Halesworth.

²⁹ Act of Parliament, (1981). The Wildlife and Countryside Act 1981 (as amended), London: HMSO

- to affect significantly the local distribution or abundance of the species to which they belong.

4.74 No hazel dormouse records have been provided by SxBRC within 2km of the application boundary, however dormice are historically known to be present within the wider area. The network of hedgerows within the application site provide suitable commuting and foraging resources for dormice. Due to the presence of corridors into the wider area, dormouse presence could not be discounted and strategic presence / likely absence surveys have been completed during 2016. Through these surveys, no evidence of dormouse was identified within the application site and therefore this species does not pose a constraint to development.

Water Vole

4.75 Water voles are fully protected under Section 9 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to: -

- Intentionally kill, injure or take water voles from the wild;
- Intentionally or recklessly damage or destroys any structure or place used for shelter or protection by water vole;
- Intentionally or recklessly disturb water voles whilst occupying a structure or place which it uses for shelter or protection;
- Intentionally or recklessly obstructs access to any structure or place which water vole uses for shelter or protection; and
- Sells, offers or exposes for sale, or has in his possession or transports for the purpose of sale, any live or dead water vole, or any part of, or anything derived from, such an animal.

4.76 Water voles are a species of Principal Importance under Section 41 NERC Act (2006). The water vole is also a Sussex Biodiversity Action Plan species.

4.77 National Planning Policy Framework (NPPF), the Government's policy on Biodiversity and Geological Conservation, advises Local Authorities to take measures to protect the habitats of species of principal importance, of which water vole is one, for the conservation of biodiversity.

4.78 Evidence of water vole was recorded on both banks of the wet section of the central on-site drainage ditch D1. In addition to this evidence was found around the banks of pond P4 off site, including burrows, associated latrines, feeding stations and a single individual was observed swimming across the pond. Pond P4 is located near a number of field ditches, which run towards the Application Site, where water voles would need to travel approximately 650m from pond P4 into the site, this would also include individuals going through a culvert under the Pagham Road. There are no associated ditches to the east of the site, so this linear ditch represents the end of the habitat connectivity, and as reported this ditch does dry out during the summer months and has limited foraging resources as marginal vegetation are in short supply. The lack of suitable habitat would therefore only sustain a small number of water voles, and as vegetation dies out during the winter months alternative foraging opportunities are limited.

4.79 It is thought that the burrows recorded along ditch D1 could be utilised as different stages of the year, as previously mentioned the east sections have recorded higher water levels during the winter months which could potentially flood burrows in these eastern sections. Although it is common for higher burrows to be utilised during such events, individuals may move westwards where water levels are less erratic.

- 4.80 Ditch D2 was fast flowing, heavily shaded and bank side flora consisted of ivy, bramble, hedge bindweed and common nettle. Water voles feed primarily on grasses, rushes, sedges and reeds, and have a preference for slow moving or still water courses³⁰. As both food and water course requirements were lacking from ditch D2, it is unsurprising that no water vole evidence was recorded here.

Mitigation and Enhancements for the Local Water Vole Population.

- 4.81 It is recommended that more surveys be undertaken closer to time of construction, this will help to assess the population dynamics but also provide more up to date data sets, from which population sizes can be estimated, which are required for a Natural England licence (see below).
- 4.82 As water voles are protected under Section 9 of the W&C Act (1981, as amended), the proposed realignment of ditch D1 would result in an offence being committed if no mitigation measures were to be adopted before the construction phase; thus having a significant effect on individuals within the site.
- 4.83 The length of ditch D1 is approximately 440m, this is therefore too large an area for such displacement techniques and will therefore require a site specific Natural England licence, with a trapping and relocation exercise needed. The precise mitigation measures will need to be confirmed at the detailed planning stage, however works on this ditch will try to be focused during periods where the ditch has little to no water present, but also meet the timing detailed within The Water Vole Mitigation Handbook (2016)³¹; where it is suggested for such work to be between 15th September to 30th November or 1st March to 15th April, although this will need to fit in with the construction program.
- 4.84 The translocation methods will need to be confirmed at the detailed design stage, but also with discussions with Natural England and the drainage consultant to ensure that working methods are possible; the two proposed methods are:
- a) A phase realignment and reprofiling of ditch D1 – Working from the eastern part of the ditch and undertake the construction works in small sections. These will limit the degree of habitat loss to a number of stages, however lengths of over 100m are likely to be more beneficial. This would then mean that the newly construction parts of the ditch could be recolonised as the development progresses;
 - b) Trapping of the entire ditch and translocation – It may be possible to create the new ditch network along the western boundary of the site or within other attenuation basins, which will have water vole favourable design and species planted. These new waterbodies will be created as soon as possible and allowed to establish, once this has occurred then a trapping exercise can take place along ditch D1 where individuals trapped will be translocated to soft release pens along the new waterbodies.
- 4.85 A detailed method for exclusion of water voles will be provided within a Water Vole Mitigation Strategy and Method Statement; which will be written after additional and more up to date surveys have been conducted. These documents will also provide details on the habitat creation to be undertaken within the proposed development, which will be finalised when a final masterplan has

³⁰ Biodiversity Sussex Website, Species Action Plan for Water Vole, [ONLINE] Available from <http://www.biodiversitysussex.org/watervole.html>

³¹ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

been agreed. However, the measures will include ditch and bank profiles that will favour marginal and aquatic vegetation establishment, and also profile and content that would be utilised for burrow construction. The enhancement of the existing ditch and incorporation of additional ditches and water bodies will increase the potential for water voles in the future, therefore having a potential beneficial effect at local level.

Wintering Birds

- 4.86 A total of eight surveys were completed during which 40 species were recorded within the application site, including eighteen notable species of medium or high conservation concern. All recorded species are fairly common to abundant birds in Sussex and the UK.
- 4.87 The application site is assessed as being of **Local** nature conservation value to the eighteen-notable species.
- 4.88 Impacts of development were considered for the 14 most vulnerable species recorded within the application site. Minor negative residual impacts are predicted for curlew, herring gull, skylark, linnet and common snipe. The proposed development is expected to result in negligible residual impacts for grey wagtail, reed bunting, shelduck black-headed gull and great black-backed gull..
- 4.89 Other than in the short term, i.e. during the construction phase, the proposals and suggested compensation are expected to have a positive residual impact for four notable species currently using the site in winter - starling, house sparrow, dunnoek and song thrush.
- 4.90 No Pagham Harbour SPA / Ramsar species for which the site is designated were recorded using the site in winter and, therefore, the application site is considered to have little value to any of the species, including Brent goose i.e. habitats are not considered 'supporting habitat'.
- 4.91 The proposed GI detailed in the current development framework plan aims to retain the majority of existing hedgerows and trees within the application site, to enhance hedgerows with native species planting and to create new habitats including further woodland planting, waterbodies and green corridors throughout the site. The retention of existing vegetation and provision of these new areas, along with a new resource of residential gardens, will provide some compensation for the loss of suitable winter habitats for many of the recorded species. The GI will increase the degree of usable habitat across the site for a number of urban edge species, along with providing corridors for movement. Furthermore, the GI proposals have the potential to attract new species associated with areas of woodland edge and scrub, e.g. bullfinch *Pyrrhula pyrrhula* (Amber-listed / S41 NERC Act).
- 4.92 In addition, bird boxes, such as Schwegler 2m bird boxes, will be installed on trees around the site and sparrow terraces, similar to Schwegler 1SP will be installed on buildings in order to provide additional habitats for urban and woodland edge species.
- 4.93 For full details of discussion and recommendations, please see Appendix L – Winter Bird Survey 2015/16 Report for full details.

Breeding Birds

Evaluation

- 4.94 The overall breeding bird assemblage recorded was typical of edge-of-settlement farmland with only common and widespread generalist woodland / garden species present. The boundary features, hedgerows and trees, offer the greatest opportunities for breeding birds within the application site with the majority of species recorded in association with these features. No notable birds typically associated with arable farmland were confirmed or recorded as probable breeders within the application boundary. No ground nesting birds were recorded within the survey area.
- 4.95 The application area supported six notable NERC S41, BoCC Red listed species and / or local biodiversity action plan species. These included the confirmed breeding house sparrows in association with the hedgerow boundaries, probable breeding dunnock from boundary hedgerows, the possible breeding linnet, song thrush starling and yellowhammer. Herring gulls were observed loafing or flying over the site and considered a non-breeding species. The species observed are all common and widespread both nationally and within Sussex, their presence on the survey is typical and expected on a site of this nature.
- 4.96 No significant numbers or flocks of notable or non-notable species were recorded during the surveys. The breeding bird assemblage is of no more than **local** conservation value.

Mitigation and Enhancement

- 4.97 The most likely negative effects from a residential development of this type on the assemblage recorded would be as a result of:
- Direct loss / change of breeding habitat;
 - Disturbance during construction and / or operation.
- 4.98 The retention of the majority of features present within the site suitable for breeding birds will ensure continued use of the site by local bird populations. Hedgerow enhancements through supplementary standard native tree planting, green open space and SUDS features will provide and increase in foraging and nesting resources available for local bird populations. In addition, residential gardens and provision of a range of nest boxes within appropriate locations across the site will provide further enhancements.
- 4.99 The construction works most likely to disturb and impact on nesting birds is the initial ground works, vegetation clearance and construction activities which result in noise and vibration. The following is recommended to be included within a Construction and Environmental Management Plan:
- Removal of any vegetation suitable to support nesting birds will take place outside of the bird breeding season (March to August inclusive) to protect nesting birds and prevent an offence under the Wildlife and Countryside Act 1981.
 - If vegetation is proposed for removal during the bird breeding season (March to August inclusive), it should first be inspected by a suitably qualified ecologist to ensure an offence under the Wildlife and Countryside Act 1981 is not committed. If an active nest is discovered, the vegetation containing the nest will remain in situ and an appropriate buffer stipulated by the ecologist adopted until the young have fledged.

- The retained hedgerows and other woody nesting habitat should be buffered protected with Heras fencing during construction to protect it from accidental damage or disturbance.
- 4.100 The proposed scheme will lead to a **negligible** short term effect on the breeding bird assemblage with an overall **minor positive** effect in the medium to long term as the new habitat provision matures.

Other Species

West European Hedgehog

- 4.101 The West European Hedgehog is partially protected under Schedule 6 of the Wildlife and Countryside Act (1981) and the Wild Mammals Protection Act (1996), and is listed as a 'Species of Principal Importance' under the Natural Environment and Rural Communities Act (2006). Together taken this makes it an offence to:
- deliberately or intentionally kill a hedgehog without a licence; or
 - trap a hedgehog without a licence.
- 4.102 During the desk study, three records of west European hedgehog were returned within 2km of the site and two hedgehogs were observed within the application site during the 26th July bat survey.
- 4.103 Hedgehogs are a generalist species and require large areas of contiguous habitat. Threats to hedgehog include loss of habitat, reduced habitat quality, and habitat fragmentation. Hedgerows can provide food, shelter from predators and can be important for nesting sites during hibernation. They are also vital corridors facilitating movement³²
- 4.104 The loss of small sections of hedgerows H5 and H6 on the eastern boundary of the site will have a **negligible impact** on hedgehogs as the matrix of gardens and green spaces in towns and cities can support the highest densities of hedgehogs³³. Residential garden fences should have small holes cut at the bottom (approximately 13cm x 13cm³⁴) in order to keep connectivity and enable free movement for this species. Hedgerow highway signs can be purchased from the People's Trust for Endangered Species which will advise residents why there is a hole and will help encourage them to keep it open.
- 4.105 The remaining hedgerows within the application site will be enhanced and buffered providing high quality habitat for hedgehogs to utilise. The area of GI within the southern and north-western extent of the site should contain suitable hibernaculum for this species, including log piles and patches of brush, which will allow hedgehogs to safely hibernate over winter as well as providing important habitat for insects during the warmer months which hedgehogs can feed on.

³² Henry Johnson, (2015) Conservation Strategy for West-European Hedgehog (*Erinaceus europaeus*) in the United Kingdom (2015-2025) People's Trust for Endangered Species (PTES)

³³ Hubert, P., Julliard, R., Biagianti, S. & Marie-Lazarine, P. (2011) Ecological factors driving the higher hedgehog (*Erinaceus europaeus*) density in an urban area compared to the adjacent rural area. Landscape and Urban Planning, 103, 34-43

³⁴ Hedgehog Street [ONLINE] Available at <http://www.hedgehogstreet.org/pages/link-your-garden.html>

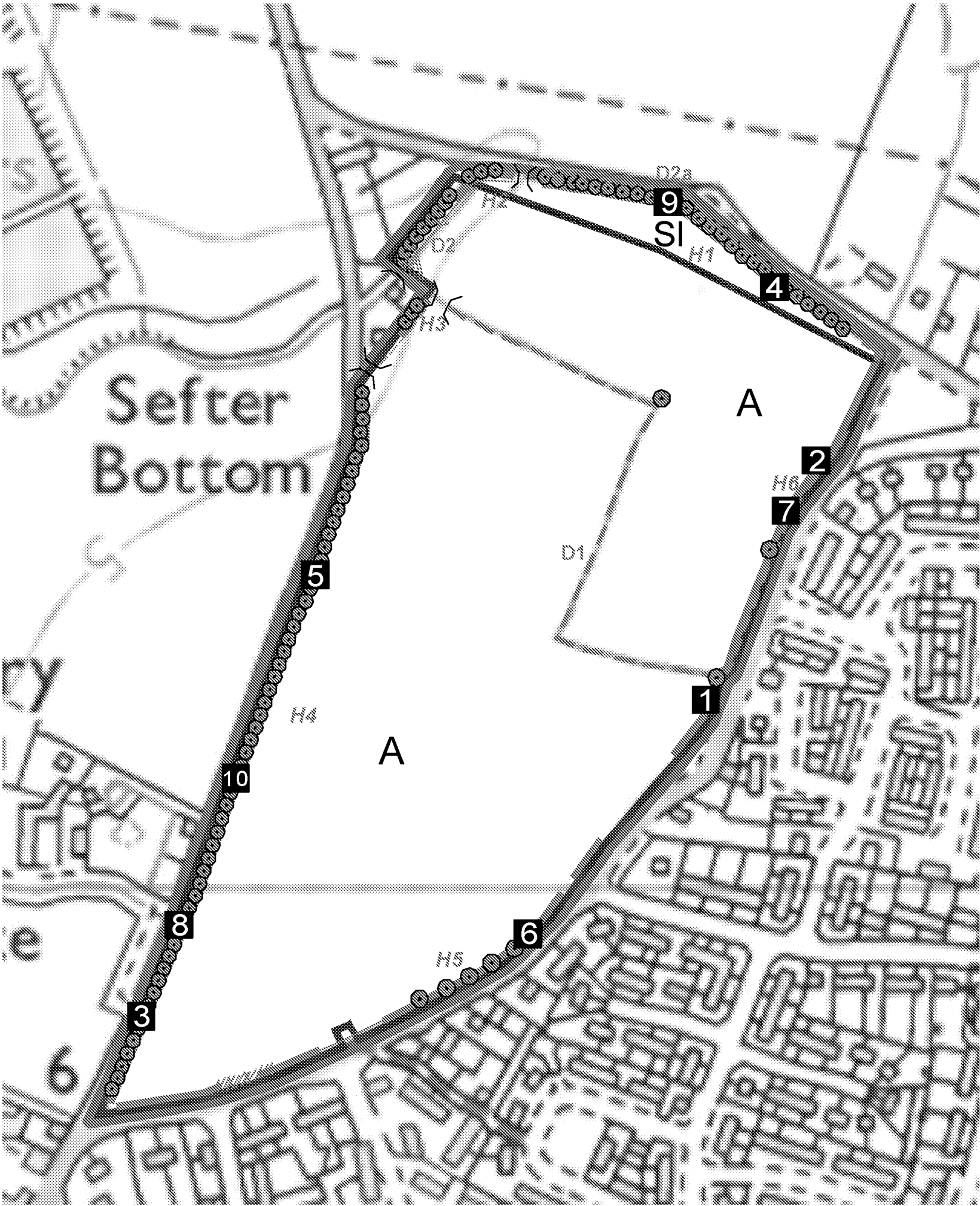
Brown Hare

- 4.106 Two records of brown hare were returned from SxBRC within 2km of the site, however, no evidence of brown hare was identified during the initial Phase 1 Habitat survey or subsequent visits to the site, and therefore does not pose constraint to development.

5.0 NON-TECHNICAL SUMMARY

- 5.1 The site comprises approximately 17.2 ha of arable land with associated field margins, hedgerows and a central drainage ditch bisecting the arable field. One further drainage ditch is present on the north-western boundary, which is well connected to the on-site central ditch and flows into the Pagham Rife. Six hedgerows were present within the application site, none of which are classified as 'important' under the Hedgerow Regulations, however, all are habitats of Principle Importance. The arable field and associated field margins were found to be of low intrinsic and conservation importance, with no rare or notable species recorded.
- 5.2 Pagham Harbour Ramsar and SPA is located 1.6km and 1.9km west of the application site, respectively. The council have identified a 5km zone of influence and therefore a financial contribution of £1275 per unit is required towards mitigating for increased recreational pressure and potential impacts to the SPA supporting habitats. The HRA Stage 2 Screening undertaken on behalf of Arun District Council had identified that this proposed development would not have an effect on the SPA/Ramsar, although this scoping could not rule out in combination effects; however surveys and proposed mitigation works will ensure that there are no effects from disturbance, loss of suitable habitats and water pollution. It has therefore been concluded that this proposed development will have no significant effects alone or in combination.
- 5.3 Four further Statutory Designated Sites and two Non-Statutory Designated Sites have been identified with 15km and 2km of the application, respectively. Due to the intervening distance it is considered that public pressures upon the designated habitats would remain negligible.
- 5.4 Suitable reptile habitat on site comprised the semi-improved field and ditch margins. A good population of common lizard have been recorded through presence / likely absence surveys, therefore a receptor site will be created within the GI in the north-western extent of the site and, subsequently a trapping and translocation exercise will be undertaken prior to the commencement of construction activities.
- 5.5 Monthly bat surveys have identified common and widespread bat species using the site, with the majority of activity recorded being that of common and soprano pipistrelle bats. Barbastelle bats (Annex II species) have been recorded in low numbers utilising the boundary features which is unsurprising as they have been recorded within the wider area. Boundary features will be buffered and enhanced around the peripheries and dark corridors will be maintained along the northern and western boundaries. 6.65ha of GI and the creation of attenuation features will benefit the local bat population.
- 5.6 Evidence of water vole was recorded on both banks ditch D1 within the site. The habitat is unlikely to support high numbers of water voles as foraging opportunities are restricted to a few marginal plants; during the winter, such vegetation die back reducing foraging significantly. Mitigation measures will be undertaken to ensure that water voles are not harmed during the realignment and construction works; this will take the form of a trapping and translocation exercise. The details of this mitigation will be detailed within a Water Vole Mitigation Strategy and Method Statement, which will be written on the confirmation of the final planning application and additional surveys. A licence from Natural England will be applied for once full planning permission has been granted and the method statement agreed. The habitat enhancement and creation of additional water bodies will ensure that more foraging and refuge opportunities are available in the long term, which will have a beneficial effect on the Favourable Conservation Status of this species.

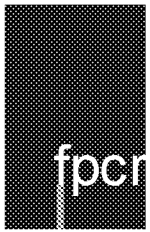
- 5.7 During winter bird surveys, 40 species were recorded within the application site, all of which are fairly common to abundant birds in Sussex and the UK. No Pagham Harbour SPA / Ramsar species for which the site is designated were recorded using the site, therefore, the application site is considered to have little value to any of the species.
- 5.8 Six notable species of medium or high conservation concern were recorded within the application site during the breeding bird surveys. The retention and enhancements of hedgerows, creation of attenuation and provision of nest boxes will ensure continued use of the site by local bird populations.
- 5.9 It is recommended that works start on site prior to the breeding bird season. If this is not possible and clearance of suitable nesting bird habitat is required during the breeding season the site should be checked for the presence of active nests by a suitably qualified ecologist.
- 5.10 Presence / likely absence surveys were undertaken for the hazel dormouse and GCN owing to suitable habitat within and surrounding the application site. No evidence for the hazel dormouse or GCN was recorded therefore neither are considered to be a constraint to development.
- 5.11 The proposed development will retain the majority of hedgerows, enhancing them with native planting which will yield fruiting bodies and create refuge for a range of wildlife. The northern and western boundaries will be buffered in order to maintain discreet dark corridors for bat species, reptiles and invertebrates. Small sections of the hedgerow along the eastern and western boundaries will be removed in order to facilitate the implementation of access and these minor losses will be compensated for through the creation of new habitats such as grassland and attenuation. The proposed development will have a long term beneficial effect on the conservation value at a site level.



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-  Survey Area
-  Application boundary
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Ephemerally Wet Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin
-  1. August 2015
2. October 2015
3. May 2016
4. June 2016
5 & 6. July 2016
7 & 8. August 2016
9 & 10. September 2016



Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Static Location Plan

Figure 2 6932-E-02



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- Survey Area
- Pond/Reservoir with Reference

P1 - 49m west
P2 - 241m west
P3 - 309m north-west
P4 - 331m west
P5 - 415m west

- Ditch/Drain with Reference

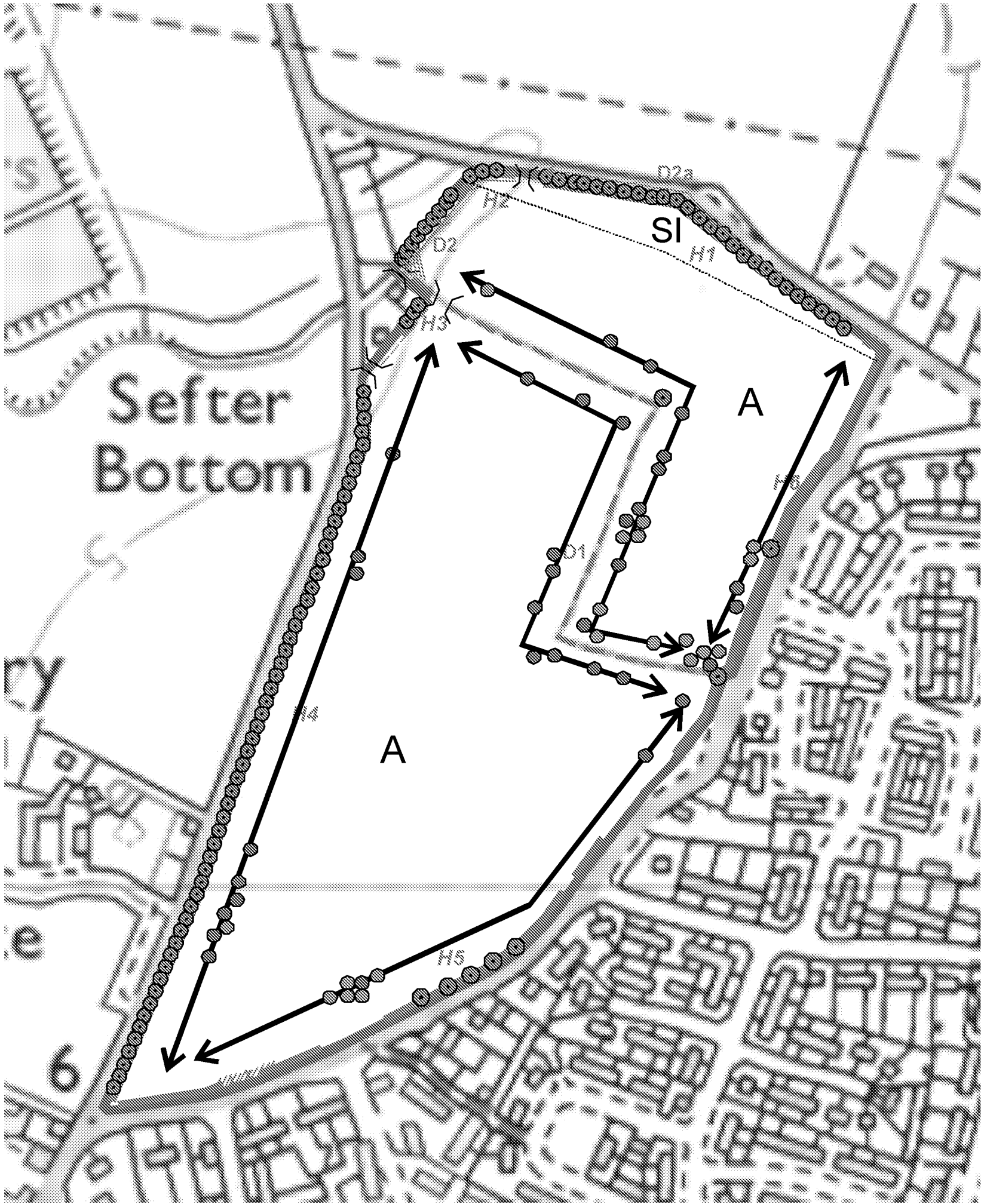
D1 - On site
D2 - On site
D2a - 0m
D3 - 21m north
D4 - 41m west
D5 - 42m west
D6 - 371m west

- Drain without Reference

Hallam Land and Management Ltd

Rose Green, Pagham
Bognor Regis

POND LOCATION PLAN



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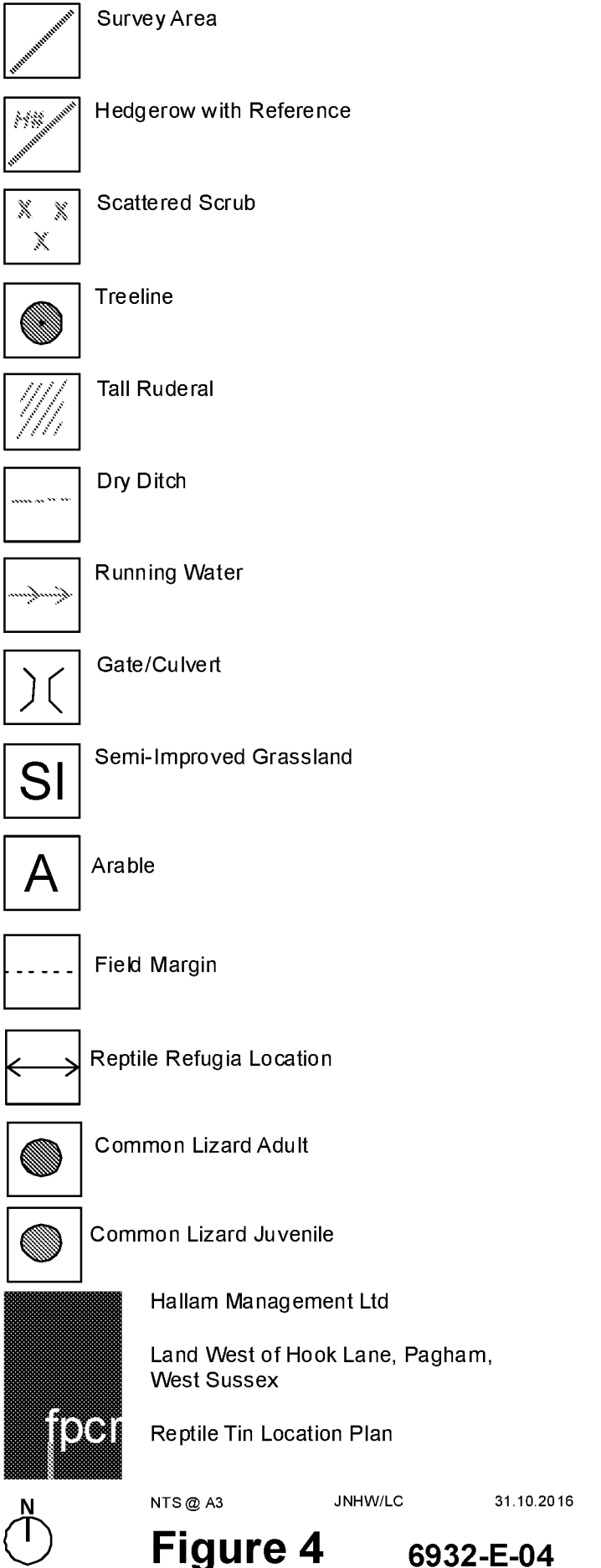
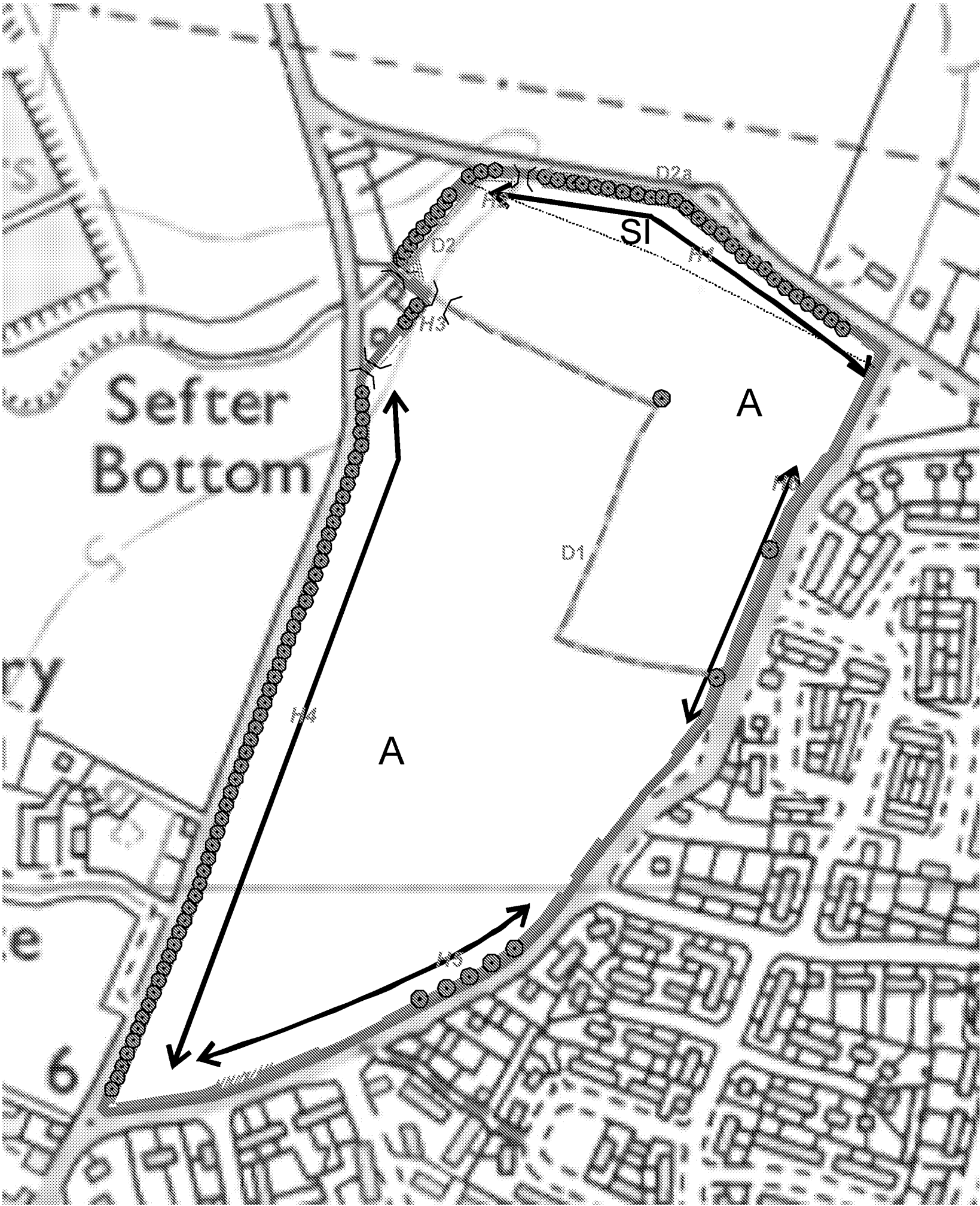


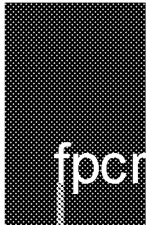
Figure 4 6932-E-04



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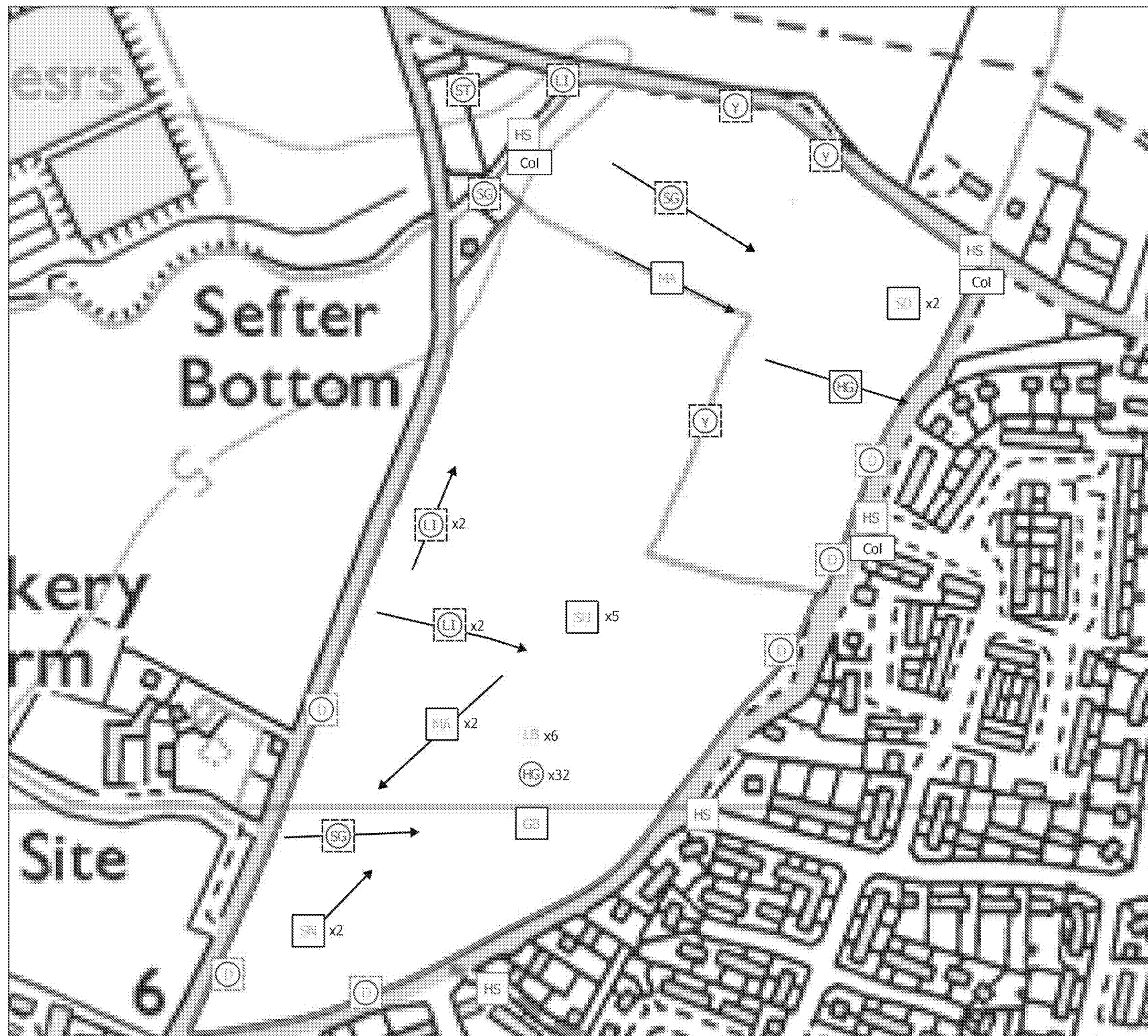
-  Survey Area
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Dormouse Tube Location
-  Field Margin



Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Dormouse Tube Location Plan



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Key

Survey Area

Fly over only

Confirmed Breeder

Probable Breeder

Possible Breeder

Non-breeder

Dunnock

Great Black-backed Gull

Herring Gull

House Sparrow

Lesser Black-backed Gull

Linnet

Mallard

Shelduck

Snipe

Snow Bunting

Song Thrush

Starling

Stock Dove

Yellowhammer

for
Hallam Land Management Ltd
project
Land West of Hook Lane, Pagham
West Sussex
drawing title
BREEDING BIRD SURVEY PLAN

scale
1:2,722

drawn
BL / MES

date
6/1/2017

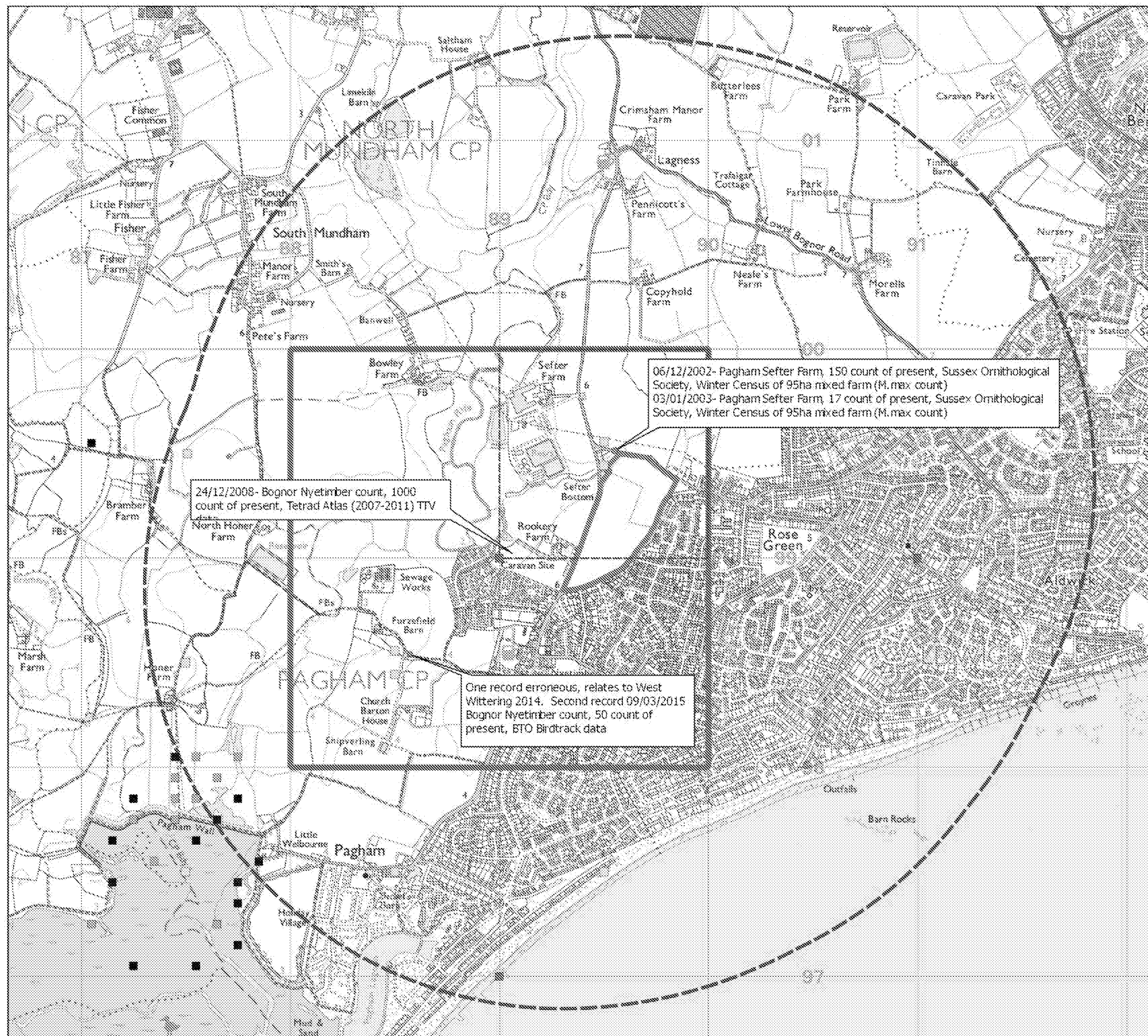


Number of sheets
Figure 6

6932-E-06A

FPCR Environment and Design Ltd, Lockington Hall, Lockington, Derby, DE74 2RH • t:01509 672 772 • f:01509 674 565 • e: mail@fpcr.co.uk • w: www.fpcr.co.uk

masterplanning • environmental assessment • landscape design • urban design • ecology • architecture • arboriculture



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Key

- Survey Area
- 2km buffer
- 1km grid square
- Tetrad encompassing site

Brent geese records 2000-2015

- 4 fig grid reference
- Tetrad records
- 2000-2009 6 fig grid reference
- 2010-2015 6 fig grid reference

1km
Hallam Land Management Limited
project
Land West of Hook Lane, Pagham
West Sussex
checked by
Records for brent geese within 2km of
application site from 2000-2015

scale
1:15,000
drawn
APD/UC
date
6/1/2017

Number / sheet number
Figure 7

6932-E-07

Appendix A: Botanical Species List

Scientific Name	Common Name	Margins	Arable Weeds	Ditch & Ditch Margins	Scrub/Tree/Hedgerow
<i>Acer campestre</i>	Field Maple				X
<i>Acer pseudoplatanus</i>	Sycamore				X
<i>Arrhenatherum elatius</i>	False Oat-Grass	X		X	
<i>Anagallis arvensis</i>	Scarlet Pimpernel	X	X	X	
<i>Holcus lanatus</i>	Yorkshire Fog	X		X	
<i>Calystegia sepium</i>	Hedge Bindweed	X		X	
<i>Chenopodium album</i>	Fat Hen	X	X	X	
<i>Sisymbrium officinale</i>	Hedge Mustard	X	X	X	
<i>Rumex crispus</i>	Curled Doc	X	X	X	
<i>Convolvulus arvensis</i>	Field Bindweed	X	X	X	
<i>Arvena sp.</i>	Wild Oat		X		
<i>Stachys palustris</i>	Marsh Woundwort	X		X	
<i>Senecio jacobaea</i>	Common Ragwort	X	X	X	
<i>Matricaria chamomilla</i>	Scented Mayweed	X	X	X	
<i>Helminthotheca echinoides</i>	Bristly Oxtongue	X	X	X	
<i>Galium album</i>	Hedge Bedstraw	X		X	
<i>Polygonum aviculare</i>	Common Knotgrass	X	X	X	
<i>Taraxacum officinale</i>	Common Dandelion	X		X	
<i>Epilobium montanum</i>	Broad-leaved Willowherb	X		X	
<i>Cirsium arvense</i>	Creeping Thistle	X		X	
<i>Poa trivialis</i>	Rough Meadow-grass	X		X	
<i>Lapsana communis</i>	Nipplewort	X	X	X	
<i>Anthriscus sylvestris</i>	Cow Parsley	X		X	
<i>Urtica Dioica</i>	Common Nettle	X		X	
<i>Solanum nigrum</i>	Black Nightshade		X		
<i>Lamium album</i>	White Dead Nettle	X		X	
<i>Rubus fruticosus</i> ag.	Bramble	X		X	X
<i>Pteridium sp.</i>	Bracken	X		X	
<i>Achillea millefolium</i>	Yarrow	X		X	
<i>Artemisia vulgaris</i>	Common Mugwort	X		X	
<i>Hedera sp.</i>	Ivy	X		X	X
<i>Plantago major</i>	Greater Plantain	X	X	X	
<i>Poa annua</i>	Annual meadow-grass	X		X	
<i>Lathyrus pratensis</i>	Meadow Vetchling	X		X	
<i>Lolium perenne</i>	Perennial Rye-grass	X		X	
<i>Elymus repens</i>	Common Couch-grass	X		X	
<i>Cirsium vulgare</i>	Spear Thistle	X		X	
<i>Trifolium repens</i>	White Clover	X		X	
<i>Centaurea nigra</i>	Common Knapweed	X		X	
<i>Trifolium pratense</i>	Red Clover	X		X	
<i>Euphorbia helioscopia</i>	Sun Spurge	X	X		
<i>Veronica officinalis</i>	Common Field Speedwell	X	X	X	
<i>Senecio erucifoliusci</i>	Hoary Ragwort	X		X	

Scientific Name	Common Name	Margins	Arable Weeds	Ditch & Ditch Margins	Scrub/Tree/Hedgerow
<i>Stachys sylvatica</i>	Hedge Woundwort	X		X	
<i>Raphanus raphanistrum</i>	Wild Radish	X	X	X	
<i>Coronopus didymus</i>	Swinecress	X	X		
<i>Persicaria maculosa</i>	Redshank	X	X	X	
<i>Sonchus asper</i>	Prickly Sow-thistle	X	X	X	
<i>Poa annua</i>	Annual Meadow-grass	X		X	
<i>Vicia sepium</i>	Bush Vetch	X		X	
<i>Festuca arundinacea</i>	Tall Fescue	X		X	
<i>Stellaria media</i>	Common Chickweed	X	X	X	
<i>Ranunculus repens</i>	Creeping Buttercup	X		X	
<i>Heracleum sphondylium</i>	Common Hogweed	X		X	
<i>Quercus</i> saplings	Oak saplings	X		X	
<i>Agrostis stolonifera</i>	Creeping Bentgrass	X		X	
<i>Prunus spinosa</i> saplings	Blackthorn saplings	X		X	
<i>Echinochloa crus-galli</i>	Cockspur Grass	X		X	
<i>Pulicaria dysenterica</i>	Common Fleabane	X		X	
<i>Equisetum arvense</i>	Field Horsetail	X	X	X	
<i>Sonchus oleraceus</i>	Smooth Sow Thistle	X	X	X	
<i>Malva neglecta</i>	Common Mallow	X			
<i>Vicia hirsuta</i>	Hairy Tare	X		X	
<i>Geranium molle</i>	Doves Foot Cranesbill		X		
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	X	X		
<i>Erodium cicutarium</i>	Common Storksbill		X		
<i>Fallopia convolvulus</i>	Black Bindweed		X		
<i>Dactylis glomerata</i>	Cocksfoot Grass	X		X	
<i>Galega officinalis</i>	Goat's Rue	X			
<i>Epilobium hirsutum</i>	Great Willowherb	X		X	
<i>Angelica sylvestris</i>	Wild Angelica			X	
<i>Salix caprea</i>	Goat Willow			X	
<i>Scrophularia nodosa</i>	Common Figwort			X	
<i>Glechoma hederacea</i>	Ground-ivy	X		X	
<i>Rumex obtusifolius</i>	Broad-leaved Dock	X		X	
<i>Solanum dulcamara</i>	Bittersweet	X		X	
<i>Phleum pratense</i>	Timothy-grass	X		X	
<i>Bromus hordeaceus</i>	Soft Brome	X		X	
<i>Kickxia elatine</i>	Sharped-leaved Fluellen		X		

Appendix B. Statutory Designated Sites

Site Name	Designation	Approximate Location	Size (ha)	Reasons for Designation
Bognor Reef	SSSI	1.2km south	64.4	<u>SSSI</u> This site comprises a long stretch of foreshore of great geological interest and an extensive area of vegetated shingle, a habitat type which is rare in Britain. At the western end is a small area of old sand dune with an interesting flora, including one Schedule 8 species.
Pagham Harbour	Ramsar SPA SSSI	1.6km west 1.9km west 1.6km west	629.01 636.86 615.92	<u>Ramsar</u> Ramsar Criterion 6 Dark-bellied Brent Goose <i>Branta bernicla bernicla</i> <u>SPA</u> The site qualifies under Article 4.1 of the Directive Annex I species Little Tern <i>Sterna albifrons</i> Ruff <i>Philomachus pugnax</i>. The site also qualifies under Article 4.2 of the Directive Annex I species Pintail <i>Anas acuta</i> <u>SSSI</u> The site comprises an extensive area of salt-marsh - a nationally threatened habitat – and tidal mudflats. These areas are rich in algae and invertebrates and provide important feeding areas for birds. Vegetated shingle is also present and is classified as a nationally rare community.
Chichester and Langstone Harbours	Ramsar SPA	6.4km north-west	5810.03 5810.95	<u>Ramsar</u> Ramsar Criterion 5 Assemblages of international importance - 76480 waterfowl Ramsar Criterion 6 Ringed Plover <i>Charadrius hiaticula</i> Black-Tailed Godwit <i>Limosa limosa islandica</i> Common Redshank <i>Tringa tetanus</i> Dark-bellied Brent Goose <i>Branta bernicla bernicla</i>

				Common Shelduck <i>Tandorna tandorna</i> Grey Plover <i>Pluvialis squatarola</i> Dunlin <i>Calidris alpina alpina</i> <u>SPA</u> The site qualifies under <u>Article 4.1</u> of the Directive <u>Annex I species</u> Pintail <i>Anas acuta</i> Shoveler <i>Anas clypeata</i> Teal <i>Anas crecca</i> Wigeon <i>Anas Penelope</i> Turnstone <i>Arenaria interpres</i> Dark-bellied Brent Goose <i>Branta bernicla bernicla</i> Sanderling <i>Calidris alba</i> Dunlin <i>Calidris alpina alpina</i> Ringed Plover <i>Charadrius hiaticula</i> Bar-Tailed Godwit <i>Limosa lapponica</i> Red-breasted merganser <i>Mergus serrator</i> Curlew <i>Numenius arquata</i> Grey Plover <i>Pluvialis squatarola</i> Little Tern <i>Sterna albifrons</i> Sandwich Tern <i>Sterna sandvicensis</i> Common Tern <i>Sterna hirundo</i> Common Shelduck <i>Tandorna tandorna</i>
Solent Maritime	SAC	11.5km west	11243.18	<u>Annex I Habitats</u> 1130 Estuaries 1320 Spartina swards <i>Spartinion maritimae</i> 1330 Atlantic salt meadows <i>Glaucopuccinellietalia maritimae</i> Also qualifies under Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: 1110 Sandbanks which are slightly covered by sea water all the time 1140 Mudflats and sandflats not covered by sea water at low tide 1150 Coastal lagoons (priority feature) 1210 Annual vegetation of drift lines 1310 Salicornia and other annuals colonising mud and sand

				2120 "Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")" Annex II species present as a qualifying feature: Desmoulin's whorl snail <i>Vertigo moulinsiana</i>
Kingley Vale	SAC	12.5km north-west	200.94	Annex I habitats 91J0 <i>Taxus baccata</i> woods of the British Isles. It is the largest area of yew woodland in Britain.
Singleton and Cocking Tunnels	SAC	14.8km north	1.99	Annex II species present as a qualifying feature: Barbastelle <i>Barbastelle barbastellus</i> Bechstein's bat <i>Myotis bechsteini</i>

Appendix C: Transect Data 25th August 2015Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 20:04					
1	Start 19:54 – Finish 20:04					
2	Start 20:11 – Finish 20:18					
3	Start 20:25 – Finish 20:30					
4	Start 20:37 – Finish 20:45					
5	Start 20:52 – Finish 21:00					
	1	20:58	Common Pipistrelle	Foraging	6	Hedgerow H4
6	Start 21:08 – Finish 21:17					
	2	21:15	Common Pipistrelle	Foraging	3	Hedgerow H4
7	Start 21:25 – Finish 21:30					
8	Start 21:38 – Finish 21:47					

Point Count Data

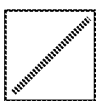
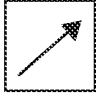
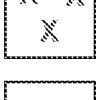
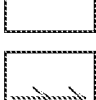
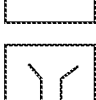
Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 19:47 – Finish 19:54				
2	Start 20:04 – Finish 20:11				
3	Start 20:18 – Finish 20:25				
4	Start 20:30 – Finish 20:37				
5	Start 20:42 – Finish 20:52				
6	Start 21:01 – Finish 21:08				
	21:00	2 x Common Pipistrelle	Foraging	4	Hedgerow H4
	21:04	Common Pipistrelle	Commuting	1	Hedgerow H4
	21:05	Soprano Pipistrelle	Commuting	2	Hedgerow H4
	21:07	Soprano Pipistrelle	Commuting	2	Hedgerow H4
7	Start 21:18 – Finish 21:25				
8	Start 21:30 – Finish 21:38				

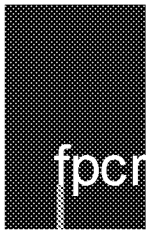
NV = Non-Visual



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-  Survey Area
-  Bat Transect Route
-  Point Count
-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin



Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 25th August 2015

Appendix D: Transect Data 8th October 2015

Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 18:27					
1	Start 18:12 – Finish 18:19					
2	Start 18:26 – Finish 18:36					
3	Start 18:43 – Finish 18:55					
	1	18:46	2 x Common Pipistrelle	Commuting	1	Hedgerow H4
	2	18:47	Common Pipistrelle	Commuting	1	Hedgerow H4
	3	18:49	Common Pipistrelle	Commuting	1	Hedgerow H4
	4	18:52	Soprano Pipistrelle	Commuting	1	Hedgerow H4
4	Start 19:02 – Finish 19:14					
	5	19:05	Nathusius Pipistrelle	Commuting	1	Hedgerow H4
	6	19:06	Common Pipistrelle	Commuting	1	Hedgerow H4
	7	19:07	Soprano Pipistrelle	Commuting & Foraging	Continuous	Hedgerow H4
5	Start 19:21 – Finish 19:32					
	8	19:23	Soprano Pipistrelle	Commuting	1	Adjacent to ditch
	9	19:28	Common Pipistrelle	Commuting	2	Hedgerow H6
	10	19:30	Common Pipistrelle	Commuting & Foraging	3	Hedgerow H6
6	Start 19:39 – Finish 19:46					
	11	19:43	Common Pipistrelle	Foraging	3	Hedgerow H1/road
7	Start 19:53 – Finish 20:03					
	12	19:59	Soprano Pipistrelle	Commuting & Foraging	Continuous	Hedgerow H2/ditch
8	Start 20:10 – Finish 20:21					

Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 18:19 – Finish 18:26				
2	Start 18:36 – Finish 18:43				
3	Start 18:55 – Finish 19:02				
	18:58	Common Pipistrelle	Commuting & Foraging	1	Hedgerow H4 on western boundary
	18:58	Soprano Pipistrelle	Commuting & Foraging	1	Hedgerow H4 on western boundary
4	Start 19:14 – Finish 19:21				
5	Start 19:32 – Finish 19:39				
	19:37	Common Pipistrelle	Commuting	1	Hedgerow H6 on eastern boundary
6	Start 19:46 – Finish 19:53				
7	Start 20:03 – Finish 20:10				
	20:03	Soprano Pipistrelle	Foraging	Continuous	Along treeline/ditch on north-western corner of site (same bat as recorded in transect 7)
8	Start 20:21 – Finish 20:28				
	20:21	Common Pipistrelle	Foraging	Continuous	Along hedgerow H6 on eastern boundary (heard faintly)

NV = Non-Visual



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- Survey Area
- Bat Transect Route
- Point Count
- Bat Contact with Reference
- Hedgerow with Reference
- Scattered Scrub
- Treeline
- Tall Ruderal
- Dry Ditch
- Running Water
- Gate/Culvert
- Semi-Improved Grassland
- Arable
- Field Margin

Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 8th October 2015

NTS @ A3 LC 05.11.2015

Appendix D 6932-E-AD

Appendix E: Transect Data 23rd May 2016Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 20:58					
1	Start 21:20 – Finish 21:24					
2	Start 21:29 – Finish 21:33					
3	Start 21:38 – Finish 21:45					
	1	21:43	Common Pipistrelle	Commuting	1	Hedgerow H1/ Semi Improved Grassland
	2	21:44	Soprano Pipistrelle	Commuting	1	Hedgerow H1/ Semi Improved Grassland
4	Start 21:50 – Finish 21:55					
	3	21:51	Common Pipistrelle	Foraging	3	Hedgerow H1/ Semi Improved Grassland
5	Start 22:00 – Finish 22:05					
6	Start 22:10 – Finish 22:16					
	4	22:12	Soprano Pipistrelle	Commuting	1	Riparian Ditch/ Semi Improved Grassland
	5	22:13	Common Pipistrelle	Commuting	1	Riparian Ditch/ Semi Improved Grassland
	6	22:15	Soprano Pipistrelle	Commuting	1	Hedgerow H3/ Field Margin
7	Start 22:21 – Finish 22:26					
8	Start 22:31 – Finish 22:40					
9	Start 22:44 – Finish 22:54					

Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 21:15 – Finish 21:20				
2	Start 21:24 – Finish 21:29				
3	Start 21:33 – Finish 21:38				
4	Start 21:45 – Finish 21:50				
	21:45	Common Pipistrelle	Foraging	Continuous	Hedgerow H1 on the northern boundary.
	21:45	Soprano Pipistrelle	Foraging	Continuous	Hedgerow H1 on the northern boundary.
5	Start 21:55 – Finish 22:00				
6	Start 22:05 – Finish 22:10				
	22:09	Common Pipistrelle	Commuting	1	Dry ditch/ Semi Improved Grassland. Hedgerow H4.
7	Start 22:16 – Finish 22:21				
8	Start 22:26 – Finish 22:31				
	22:27	Common Pipistrelle	Commuting	1	Hedgerow H5 on the western boundary.
9	Start 22:40 – Finish 22:45				
10	Start 22:44 – Finish 22:54				

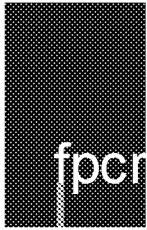
NV = Non-Visual



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-  Survey Area
-  Bat Transect Route
-  Point Count
-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin

 Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 23rd May 2016

NTS @ A3 JMT/LC 23.05.16

 **Appendix E** 6932-E-AE

Appendix F: Transect Data 28th June 2016

Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 21:20					
1	Start 21:25 – Finish 21:31					
	1	21:31	* <i>Nyctalus</i> sp.	Commuting	1	Hedgerow 1. NV
2	Start 21:41 – Finish 21:55					
3	Start 22:00 – Finish 22:10					
	2	22:07	*Soprano Pipistrelle	Commuting	1	Hedgerow 4. NV
4	Start 22:15 – Finish 22:25					
	3	22:16	*Soprano Pipistrelle	Foraging	1	Hedgerow 4. NV
	4	22:18	*Common Pipistrelle	Commuting	1	Hedgerow 4. NV
	5	22:21	*Soprano Pipistrelle	Foraging	Continuous	Hedgerow 4. NV
5	Start 22:30 – Finish 22:47					
	6	22:40	*Common Pipistrelle	Foraging	Continuous	Hedgerow 4. NV
	7	22:44	*Common Pipistrelle	Foraging	1	Hedgerow 4. NV
	8	22:45	*Soprano Pipistrelle	Foraging	Continuous	Hedgerow 4. NV
6	Start 22:55 – Finish 23:09					
	9	22:55	*Soprano Pipistrelle	Commuting	1	Hedgerow 5. NV
	10	22:59	* <i>Nyctalus</i> sp.	Commuting	2	Hedgerow 5. NV
	11	23:02	* <i>Nyctalus</i> sp.	Commuting	1	Hedgerow 5. NV
7	Start 23:14 – Finish 23:24					
8	Start 23:29 – Finish 23:41					
	12	23:34	* <i>Nyctalus</i> sp.	Commuting	1	Dry ditch. NV
9	Start 23:46 – Finish 00:00					
	13	23:57	Soprano Pipistrelle	Foraging	Continuous	Hedgerow 3. NV
10	Start 00:05 – Finish 00:20					
	14	00:06	2 x Soprano Pipistrelle	Foraging	Continuous	Hedgerow 2/Stream. NV
	15	00:08	Common Pipistrelle	Foraging	Continuous	Hedgerow 2/Stream. NV
	16	00:10	Soprano Pipistrelle	Foraging	Continuous	Hedgerow 1. NV
	17	00:11	Common Pipistrelle	Foraging	Continuous	Hedgerow H1. NV
	18	00:17	*Common Pipistrelle	Foraging	Continuous	Hedgerow 1. NV

Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 21:20- Finish 21:25				
2	Start 21:36- Finish 21:41				
	21:39	* <i>Nyctalus</i> sp.	Commuting	1	Hedgerow H6. NV
3	Start 21:55- Finish 22:00				
4	Start 22:10- Finish 22:15				
	22:10	*Soprano Pipistrelle	Foraging	Continuous	Hedgerow 4. NV
5	Start 22:25- Finish 22:30				
6	Start 22:47- Finish 22:52				
	22:48	*Soprano Pipistrelle	Foraging	Continuous	Hedgerow 5. NV
	22:50	*Common Pipistrelle	Foraging	Continuous	Hedgerow 5. NV
	22:51	*Soprano Pipistrelle	Foraging	Continuous	Hedgerow 5. NV
	22:51	*Serotine	Commuting	2	Hedgerow 5. NV
7	Start 23:09- Finish 23:14				
	23:10	* <i>Nyctalus</i> sp.	Commuting	2	Hedgerow 5/ ditch margin. NV
8	Start 23:24- Finish 23:29				
	23:25	* <i>Nyctalus</i> sp.	Commuting	1	Hedgerow H6/ Dry ditch. NV
9	Start 23:41- Finish 23:46				
10	Start 00:00- Finish 00:05				
	00:01	Common Pipistrelle	Foraging	Continuous	Hedgerow 3/ dry ditch. NV
	00:01	Soprano Pipistrelle	Foraging	Continuous	Hedgerow 3/ dry ditch. NV
	00:04	Common Pipistrelle	Commuting	1	Hedgerow 3/ dry ditch. NV

NV

= Non-Visual

* = Due to technical errors, bat species could not be verified by analysis



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-  Survey Area
-  Bat Transect Route
-  Point Count
-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin

Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 28th June 2016

NTS @ A3 JMT/LC 27.09.16

Appendix F 6932-E-AF

Appendix G: Transect Data 16th July 2016

Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 20:57					
1	Start 21:02 – Finish 21:13					
2	Start 21:18 – Finish 21:34					
	1	21:24	Soprano Pipistrelle	Commuting	2	Hedgerow H4/Field Margin. NV.
	2	21:25	Common Pipistrelle	Commuting	1	Hedgerow H4/Field Margin. NV.
	3	21:27	Soprano Pipistrelle	Commuting	1	Hedgerow H4/Field Margin. NV.
	4	21:31	Soprano Pipistrelle	Commuting	1	Hedgerow H4/Field Margin. NV.
	5	21:32	Common Pipistrelle	Commuting	2	Hedgerow H4/Field Margin. NV.
3	Start 21:42 – Finish 21:53					
	6	21:49	Common Pipistrelle	Commuting	1	Hedgerow H5/Arable Margin. NV.
4	Start 21:59 – Finish 22:14					
5	Start 22:19 – Finish 22:31					
6	Start 22:36 – Finish 22:52					
	7	22:46	Common Pipistrelle	Commuting	1	Ditch Margin. NV.
7	Start 22:57 – Finish 23:15					
	8	22:58	Soprano Pipistrelle	Commuting	1	Hedgerow /Field Margin. NV.
	9	23:07	Common Pipistrelle	Commuting	3	Hedgerow H1/Field Margin. NV.
	10	23:09	Soprano Pipistrelle	Commuting	1	Hedgerow H1/Field Margin. NV.
8	Start 23:21 – Finish 23:35					
	11	23:22	Common Pipistrelle	Commuting	3	Hedgerow H1/Field Margin. NV.
	12	23:29	Common Pipistrelle	Commuting	4	Arable Margin. NV.
9	Start 23:40 – Finish 23:49					
	13	23:48	Soprano Pipistrelle	Commuting	1	Ditch Margin/Oak Tree. NV.
	End 23:57					

Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 20:57 – Finish 21:02				
2	Start 21:13 – Finish 21:18				
3	Start 21:34 – Finish 21:39				
a	21:35	Common Pipistrelle	Foraging	Continuous.	Hedgerow H4/H5
b	21:37	Common Pipistrelle	Foraging	Continuous.	Hedgerow H4/H5
4	Start 21:54 – Finish 21:59				
5	Start 22:14 – Finish 22:19				
6	Start 22:31 – Finish 22:36				
7	Start 22:52 – Finish 22:57				
	22:54	Common Pipistrelle	Commuting	2	Hedgerow H3/Field Margin. NV.
	22:57	Soprano Pipistrelle	Commuting	2	Hedgerow H3/Field Margin. NV.
8	Start 23:15 – Finish 23:20				
	23:16	Common Pipistrelle	Commuting	4	Hedgerow H1/Field Margin. NV.
9	Start 23:35 – Finish 23:40				
10	Start 23:54 – Finish 23:57				

NV = Non-Visual



-  Survey Area
-  Bat Transect Route
-  Point Count
-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin

Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 26th July 2016

Appendix H: Transect Data 15th August 2016

Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 20:22					
1	Start 20:27 – Finish 20:45					
2	Start 20:50 – Finish 21:01					
3	Start 21:06 – Finish 21:14					
	1	21:11	Soprano pipistrelle	Commuting	1	Edge of ditch. NV.
4	Start 21:19 – Finish 21:30					
	2	21:21	Common pipistrelle	Commuting	1	Edge of ditch. NV.
	3	21:28	Soprano pipistrelle	Commuting	1	Edge of ditch. NV.
5	Start 21:35 – Finish 21:56					
	4	21:36	Common pipistrelle	Commuting	1	Edge of ditch. NV.
	5	21:48	Soprano pipistrelle	Commuting	2	Hedgerow H1. NV.
	6	21:50	Common pipistrelle	Foraging	2	Hedgerow H1. NV.
	7	21:54	Soprano pipistrelle	Foraging	4	Hedgerow H1. NV.
	8	21:55	Common pipistrelle	Commuting	2	Hedgerow H1. NV.
6	Start 22:01 – Finish 22:18					
	9	22:03	Soprano pipistrelle	Commuting	2	Hedgerow H1. NV.
	10	22:03	Common pipistrelle	Commuting	4	Hedgerow H1. NV.
	11	22:06	Common pipistrelle	Foraging	Continuous	Hedgerow H1. NV.
	12	22:09	Common pipistrelle	Foraging	Continuous	Hedgerow H1. NV.
	13	22:17	Common pipistrelle	Commuting	3	Hedgerow H6. NV.
7	Start 22:23 – Finish 22:42					
	14	22:28	Common pipistrelle	Commuting	Continuous	Arable margin. NV.
	15	22:36	Nathusius' pipistrelle	Commuting	1	Ditch. NV.
8	Start 22:47 – Finish 22:55					
	16	22:51	Common pipistrelle	Commuting	2	Arable margin. NV.
9	Start 23:00 – Finish 23:06					
10	Start 23:11 – Finish 23:22					
	17	23:13	Common pipistrelle	Commuting	1	Hedgerow H4. NV.
	18	23:19	Common pipistrelle	Commuting	1	Hedgerow H4. NV.
	19	23:22	Common pipistrelle	Foraging	Continuous	Hedgerow H4. NV.
	End 23:22					

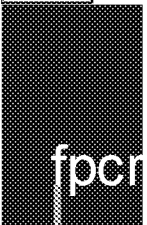
Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 20:22 – Finish 22:27				
2	Start 20:45 – Finish 20:50				
3	Start 21:01 – Finish 21:06				
4	Start 21:14 – Finish 21:19				
5	Start 21:30 – Finish 21:35				
	21:33	Common pipistrelle	Commuting	1	Edge of ditch. NV.
6	Start 21:56 – Finish 22:01				
	21:59	Common pipistrelle	Commuting	1	Hedgerow H1. NV.
7	Start 22:18 – Finish 22:23				
	22:20	Common pipistrelle	Foraging	Continuous	Hedgerow H6. NV.
	22:20	Common pipistrelle	Commuting	1	Hedgerow H6. NV.
8	Start 22:42 – Finish 22:47				
	22:44	Common pipistrelle	Commuting	1	Ditch. NV.
9	Start 22:55 – Finish 23:00				
	22:59	Common pipistrelle	Commuting	1	Hedgerow H1. NV.
10	Start 23:06 – Finish 23:11				
	23:10	Common pipistrelle	Commuting	1	Hedgerow H1. NV.

NV = Non-Visual



-  Survey Area
-  Bat Transect Route
-  Point Count
-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin



Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 15th August 2016

Appendix I: Transect Data 21st September 2016

Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunset 19:02					
1	Start 19:02 – Finish 19:14					
	1	19:24	Soprano Pipistrelle	Foraging	Continuous	Hedgerow H6
	2	19:30	2 x Soprano Pipistrelle	Foraging	Continuous	Hedgerow H6
2	Start 19:37 – Finish 19:48					
3	Start 19:53 – Finish 20:02					
	3	19:59	Common Pipistrelle	Foraging	2	Hedgerow H3. NV
4	Start 20:07 – Finish 20:15					
5	Start 20:20 – Finish 20:28					
	4	20:22	Nathusius Pipistrelle	Commuting	1	Hedgerow H1. NV
	5	20:26	Common Pipistrelle	Commuting	1	Hedgerow H1. Heard very faintly. NV
6	Start 20:33 – Finish 20:41					
	6	20:38	Nathusius Pipistrelle	Commuting	1	Hedgerow H5. NV
7	Start 20:46 – Finish 21:02					
8	Start 21:07 – Finish 21:27					
9	Start 21:32 – Finish 21:44					
10	Start 21:49 – Finish 22:02					
	7	21:52	Soprano Pipistrelle	Commuting	1	Hedgerow H2/Stream. NV
	8	21:53	<i>Myotis</i> sp.	Foraging	3	Hedgerow H2/Stream. NV
	9	21:57	Soprano Pipistrelle	Commuting	1	Hedgerow H2/Stream. NV
	10	21:57	Common Pipistrelle	Foraging	3	Hedgerow H2/Stream. NV
	11	22:00	Common Pipistrelle	Foraging	3	Hedgerow H2/Stream. NV
	End 22:02					

Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 19:14 – Finish 19:19				
2	Start 19:32 – Finish 19:37				
	19:32	2 x Soprano Pipistrelle	Foraging	Continuous	Hedgerow H6
3	Start 19:48 – Finish 19:53				
	19:50	Soprano Pipistrelle	Foraging	2	Ditch. NV
4	Start 20:02 – Finish 20:07				
5	Start 20:15 – Finish 20:20				
	20:16	Common Pipistrelle	Commuting	2	Hedgerow H4. NV
6	Start 20:28 – Finish 20:33				
	20:28	Common Pipistrelle	Commuting	1	Hedgerow H4. NV
	20:31	Common Pipistrelle	Commuting	1	Hedgerow H4. NV
7	Start 20:41 – Finish 20:46				
8	Start 21:02 – Finish 21:07				
9	Start 21:27 – Finish 21:32				
10	Start 21:44 – Finish				
	21:46	Common Pipistrelle	Commuting	1	Ditch margin. NV

NV = Non-Visual



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-  Survey Area
-  Bat Transect Route
-  Point Count
-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin



Hallam Management Ltd

Land West of Hook Lane, Pagham,
West Sussex

Bat Transect: 21st September 2016

Appendix J: Transect Data 22nd September 2016

Transect Data

Track/Transect No.	Encounter Number	Time	Species	Activity	No. Passes	Habitat
	Sunrise 06:50					
1	Start 03:50 – Finish 04:06					
	1	03:52	Soprano Pipistrelle	Commuting	4	Hedgerow H1. NV
	2	04:00	Common Pipistrelle	Commuting	1	Hedgerow H1. NV
2	Start 04:11 – Finish 04:26					
	3	04:25	Nathusius Pipistrelle	Commuting	1	Hedgerow H6. NV
3	Start 04:31 – Finish 04:50					
4	Start 04:55 – Finish 05:09					
	4	04:58	Soprano Pipistrelle	Commuting	1	Ditch margin. NV
5	Start 05:14 – Finish 05:27					
	5	05:22	<i>Myotis</i> sp.	Commuting	1	Hedgerow H4. NV
	6	05:23	Soprano Pipistrelle	Commuting	1	Hedgerow H4. NV
6	Start 05:32 – Finish 05:43					
	7	05:35	Nathusius Pipistrelle	Commuting	1	Hedgerow H4. NV
	8	05:42	Soprano Pipistrelle	Commuting	1	Hedgerow H4. NV
7	Start 05:48 – Finish 06:00					
8	Start 06:05 – Finish 06:10					
9	Start 06:15 – Finish 06:28					
	9	06:17	Soprano Pipistrelle	Foraging	2	Ditch margin
10	Start 06:33 – Finish 06:38					
11	Start 06:45 – Finish 06:50					
	End 06:50					

Point Count Data

Point Count No.	Time	Species	Activity	No. Passes	Habitat
1	Start 04:06 – Finish 04:11				
	04:07	<i>Myotis</i> sp.	Commuting	1	Hedgerow H1. NV
2	Start 04:26 – Finish 04:31				
3	Start 04:50 – Finish 04:55				
4	Start 05:09 – Finish 05:14				
	05:09	<i>Myotis</i> sp.	Foraging	Continuous	Hedgerow H4. NV
	05:11	<i>Nathusius</i> <i>Pipistrelle</i>	Commuting	1	Hedgerow H4. NV
5	Start 05:27 – Finish 05:32				
	05:31	<i>Soprano</i> <i>Pipistrelle</i>	Commuting	2	Hedgerow H4. NV
6	Start 05:43 – Finish 05:48				
	05:44	<i>Soprano</i> <i>Pipistrelle</i>	Commuting	1	Hedgerow H4. NV
	05:45	<i>Nathusius</i> <i>Pipistrelle</i>	Commuting	2	Hedgerow H4. NV
7	Start 06:00 – Finish 06:05				
8	Start 06:10 – Finish 06:15				
	06:11	<i>Soprano</i> <i>Pipistrelle</i>	Commuting	1	Hedgerow H6/Ditch margin. NV
9	Start 06:28 – Finish 06:33				
10	Start 06:38 – Finish 06:45				

NV = Non-Visual



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-  Survey Area
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-  Bat Contact with Reference
-  Hedgerow with Reference
-  Scattered Scrub
-  Treeline
-  Tall Ruderal
-  Dry Ditch
-  Running Water
-  Gate/Culvert
-  Semi-Improved Grassland
-  Arable
-  Field Margin

Hallam Management Ltd

Land West of Hook Lane, Pagham,
Bognor Regis

Bat Transect: 22nd September 2016

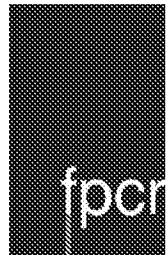
NTS @ A3 LC 10.10.16



Appendix J 6932-E-AJ

APPENDIX K: HSI Summary Data

Pond	SI -1		SI -2		SI-3		SI-4		SI-5		SI-6		SI-7		SI-8		SI-9		SI-10		HSI score	Pond suitability	Predicted presence
	geographical location		pond area		pond drying		water quality		shade (perimeter)		fowl		fish		ponds		terrestrial habitat		macrophytes				
	Field result (A,B,C)	SI score	Field result (m2)	SI score	Field result	SI score	Field result	SI score	Field result (% cover)	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score			
P1	A	1	270	0.5	Sometimes	0.5	Good	1	50	1	Minor	0.7	possible	0.7	10	0.9	Good	1	80	1	0.80	Good	79%
P4	A	1	240	0.4	Never	0.9	Moderate	0.7	15	1	Absent	1	Absent	1	9	0.9	Good	1	80	1	0.86	Excellent	93%
P5	A	1	400	0.8	Rarely	1	Moderate	0.7	50	1	Minor	0.7	possible	0.7	9	0.9	Good	1	10	0.4	0.78	Good	79%
D1	A	1	300	0.6	Sometimes	0.5	Moderate	0.7	50	1	Minor	0.7	Absent	1	10	0.9	Moderate	0.7	0	0.3	0.69	Average	55%
D5	A	1	40	0.1	Sometimes	0.5	Moderate	0.7	80	0.6	Minor	0.7	Minor	0.3	9	0.9	Moderate	0.7	70	1	0.52	Below Average	20%



Hallam Land Management Ltd

Land West of Hook Lane, Pagham, West Sussex

Appendix L - Winter Bird Survey 2015/16 Report

January 2017

FPCR Environment and Design Ltd

Registered Office: Lockington Hall, Lockington, Derby DE74 2RH

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Rev	Issue Status	Prepared / Date	Approved/Date
-	Draft	JEC / LC 11.2016	DAH / HES 02.12.16
	Final	LC 06.01.17	DAH / HES 06.01.17

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TABLES

Table 1: SPA and Winter Bird Survey Dates and Weather Conditions

Table 2: Evaluation Criteria

Table 3: NERC, LBAP, and/or BoCC Red- and Amber-Listed Bird Species Recorded at Hook Lane during Winter Bird Surveys 2015/16 and Their Recent Status in Sussex

Table 4: Habitat Requirements, Species Account, Nature Conservation Value and Impact Assessment of BoCC Red-listed, S41 NERC Act Priority Species and/or Local Biodiversity Action Plan Species Recorded during Winter Bird Surveys 2013/14 on Land West of Hook Lane, Pagham

FIGURES

Figure 1: Wintering Bird Species Plan: 16th October 2015

Figure 2: Wintering Bird Species Plan: 26th November 2015

Figure 3: Wintering Bird Species Plan: 8th December 2015

Figure 4: Wintering Bird Species Plan: 13th January 2016

Figure 5: Wintering Bird Species Plan: 15th February 2016

Figure 6: Wintering Bird Species Plan: 14th March 2016

Figure 7: Wintering Bird Species Plan: 29th November 2016

APPENDIX

Appendix A: Wintering Bird Species Data Table

1.0 INTRODUCTION

- 1.1 The following report has been prepared by FPCR Environment and Design Ltd on behalf of Hallam Land Management Ltd for Land West of Hook Lane, Pagham near Bognor Regis in Sussex (hereinafter called as 'the application site' or 'the site'). It provides results of winter bird and SPA species surveys undertaken on the site in the 2015/16 winter season.
- 1.2 The surveys also aimed to assess the current value of the site to species designated for the nearby Pagham Harbour Ramsar/SPA, situated approximately 1.6km and 1.9km west of the site, respectively.

2.0 LEGISLATION AND GUIDANCE

The Wildlife & Countryside Act 1981 (as amended)

2.1 The Wildlife and Countryside Act 1981 (as amended)¹ is the principal legislation affording protection to UK wild birds. Under this legislation all birds, their nests and eggs are protected by law and it is an offence, with certain exceptions to recklessly or intentionally:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while in use or being built;
- Take or destroy the egg of any wild bird.

2.2 Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) are specially protected at all times.

Natural Environment and Rural Communities (NERC) Act 2006

2.3 A number of birds feature on the Natural Environment and Rural Communities (NERC) Act 2006², Section 41 (S41) as species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

Non-Statutory Guidance

2.4 In addition to statutory protection, some bird species are classified according to their conservation status, such as their inclusion on the Red and Amber lists of Birds of Conservation Concern (BoCC) in the UK³:

- Red list (high conservation concern) species are those that are Globally Threatened according to IUCN criteria; those whose population has declined rapidly (50% or more) in recent years; and those that have declined historically and not shown a substantial recent recovery.
- Amber list (medium conservation concern) species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately (between 25% and 49%) in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.
- Green list (low conservation concern) species fulfil none of the above criteria.

¹ <http://www.legislation.gov.uk/ukpga/1981/69> All websites cited in this report were accessed in August 2016.

² <http://www.legislation.gov.uk/ukpga/2006/16/contents>

³ Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. & Gregory, R. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108 p 708-746

3.0 METHODOLOGY

Desk Study

- 3.1 In order to compile existing baseline information, relevant ornithological information was sought from both statutory and non-statutory organisations, including:
- Multi Agency Geographic Information for the Countryside (MAGIC)⁴;
 - Natural England; and
 - Sussex Bird Report No.67: 2014⁵.
- 3.2 The search area for ornithological data was related to the significance of the site, species and potential zones of influence, as follows;
- 15km from the survey area for sites of International Importance (i.e. Special Protection Area (SPA), Ramsar Site);
 - 2km for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSI)); and,
 - 1km for sites of County or Local Importance (e.g. Sites of Importance for Nature Conservation (SINC), Local Wildlife Sites (LWS) or Local Nature Reserves (LNR)) and species records (e.g. statutorily protected species, species of principal importance for the conservation of biodiversity in England as listed in Section 41 of the NERC Act (2006), Local Biodiversity Action Plan Species (LBAP) or otherwise notable species.

Field Survey Methodology

Winter Bird Survey (WBS)

- 3.3 The survey methodology employed was based on that recommended in standard literature e.g. Winter Farmland Bird Survey as used for the British Trust for Ornithology (BTO)^{6,7}. Standard BTO species codes and symbols for bird activities were used to identify birds and denote activity, sex and age where appropriate. During these surveys, the current value of the site was also assessed for species designated to the nearby Pagham Harbour SPA, approximately 1.9km west.

SPA-Designated Species Survey

- 3.4 The survey methods were based on those recommended in standard literature^{6,7}. Essentially, the surveyor walked a predefined transect with various point counts during each 3-4 hour visit, scheduled to cover a range of tidal states and moon phases. Any SPA-designated bird species seen or heard were marked on a plan using standard BTO notation.

⁴ www.magic.gov.uk

⁵ Sussex Ornithological Society: The Sussex Bird Report NO..67: Older annual reports were also consulted.

⁶ Bibby, C.J., N.D. Burgess & D.A. Hill (1992): Bird Census Techniques. London: Academic Press

⁷ Gilbert, G., Gibbons, D.W., and Evans, J. (1998). Bird Monitoring Methods: a manual of techniques for key UK species. RSPB, Sandy

- 3.5 To provide a reasonable level of accuracy for determining the population status of the wintering birds and SPA-designated species on the site, eight surveys were undertaken between 2015 and 2016 within suitable times and conditions.
- 3.6 A route was mapped out prior to the surveys being undertaken, paying particular attention to any linear features, such as hedgerows and tree lines, and natural features such as areas of scrub and waterbodies. The surveyor walked this predefined transect during each visit. All birds seen or heard were marked on a plan using standard BTO notation. Bird surveys were not undertaken in unfavourable conditions such as heavy rain or strong wind, which may negatively affect the results.
- 3.7 A scoping survey was undertaken in October 2015 to assess whether the habitats on-site provided suitable functionally linked land for qualifying bird species of Pagham Harbour SPA. During this survey all notable bird species were recorded. Since the site is located in close proximity to the Pagham Harbour SPA, it is possible the habitats may support SPA species, therefore following the initial scoping survey a specific SPA-designated species survey was undertaken in October 2015. On the 3rd November 2015 correspondence with Natural England advised that six winter bird surveys would be required and consequently WBS, specifically designed to incorporate survey techniques to identify the presence of SPA designated species were undertaken.
- 3.8 The survey dates and conditions are detailed in the table below:

Table 1: SPA and Winter Bird Survey Dates and Weather Conditions

Survey	Date	Cloud Cover (%)	Rain	Wind	Visibility
1	16 th October 2015	40	None	Gentle wind	Good
2	20 th October 2015	20	None	None	Good
3	25 th November 2015	100	None	Calm	Good
4	8 th December 2015	50	None	Moderate breeze	Good
5	13 th January 2016	10	None	Calm	Good
6	15 th February 2016	10	None	Light air	Good
7	14 th March 2016	0	None	Moderate breeze	Good
8	29 th November 2016	0	None	Light – gentle breeze	Excellent

Assessment Methodology

- 3.1 The conservation value of bird populations has been measured using two separate approaches: nature conservation value and conservation status. The CIEEM guidance on ecological impact assessment assesses nature conservation value within a geographical context. To attain each level of value, an ornithological resource or one of the features (species population or assemblage of species) should meet the criteria set out in Table 2 below. In some cases, professional judgement may be required to increase or decrease the allocation of specific value, based upon local knowledge.
- 3.2 Recent county annual bird report, The Sussex Bird Report 2014⁵ published by the Sussex Ornithological Society was consulted to inform the assessment.

Table 2: Evaluation Criteria

Nature Conservation Value	Selection Criteria
International	A species which is part of the cited interest of an SPA and which regularly occurs in internationally or nationally important numbers. A species present in internationally important numbers (>1% of international population).
National	A species which is part of the cited interest of a SSSI and which regularly occurs in nationally or regionally important numbers. A nationally important assemblage of breeding or over-wintering species. A species present in nationally important numbers (>1% UK population). Rare breeding species (<300 breeding pairs in the UK).
Regional	Species listed as Priority Species under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006), which are not covered above, and which regularly occurs in regionally important numbers. Species present in regionally important numbers (>1% of regional population). Sustainable populations of species that are rare or scarce within a region. Species on the BoCC Red List and which regularly occurs in regionally important numbers.
County	Species listed as Priority Species under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006), which are not covered above and which regularly occurs in county important numbers Species present in county important numbers (>1% of county population). Sustainable populations of species that are rare or scarce within a county, or listed as priority species for nature conservation under S41 of the NERC Act. A site designated for its county important assemblage of birds (e.g. a SINC Site). Species on the BoCC Red List and which regularly occur in county important numbers.
Local	Other species of conservation interest (e.g. all other species on the BoCC Red and Amber List or listed as Priority Species under Schedule 41 of the NERC Act (2006) which are not covered above) regularly occurring in locally sustainable populations. Sustainable populations of species which are rare or scarce within the locality.

Nature Conservation Value	Selection Criteria
Site	Species that are common and widespread

4.0 RESULTS

Desk Study

Statutory Sites of International Conservation Value

- 4.1 Two sites of international importance for birds lie within 15km of the application boundary, the closest of which is Pagham Harbour Ramsar/SPA situated approximately 1.6km and 1.9km west of site, respectively. Chichester and Langstone Harbours Ramsar/SPA is located approximately 6.4km north-west of the site, details of which are provided within the FPCR Ecological Appraisal dated November 2016.
- 4.2 Pagham Harbour is an estuarine basin that comprises an extensive central area of saltmarsh and intertidal mud-flats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mud-flats are rich in invertebrates and algae, and provide important feeding areas for birds. The lower saltmarsh is dominated by Common Cord-grass *Spartina anglica*, with patches of Glasswort *Salicornia spp.*

SPA Qualifying Species

- 4.3 This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

- Little Tern *Sterna albifrons*, 12 pairs representing 0.5% of the breeding population in Great Britain (Count as at 1995).

Over winter;

- Ruff *Philomachus pugnax*, 160 individuals representing at least 22.9% of the wintering population in Great Britain.

- 4.4 This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter;

- Pintail *Anas acuta*, 628 individuals representing at least 1.0% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6).

Ramsar Qualifying Species / Populations

- 4.5 Pagham Harbour qualifies as a Ramsar site under criterion 6 – species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation) include:

Species with peak counts in winter.

- Dark-bellied Brent goose, *Branta bernicla bernicla*, 2512 individuals, representing an average of 1.1% of the population.⁸

Natural England Consultation

- 4.6 Natural England advised via the DAS in October 2015, that consideration of increased recreational disturbance effects upon the bird interest of Pagham Harbour SPA be considered with the submission of a Habitats Regulations Assessment:

"In addition to the assessment for recreational disturbance Natural England advises an assessment of potential impacts on SPA supporting habitat is needed to inform the HRA. Arable land used by Brent geese in the vicinity of Pagham Harbour can be important supporting habitat which may have a functional link with the ecological integrity of the SPA. We advise that bird surveys should be carried out throughout the winter to establish whether Brent Geese are using the application site."

- 4.7 The Arun Local Plan's housing allocation has been challenged, which has led to a revised Objectively Assessed Need for Housing. This application site has been included in the 300 unit allocation.
- 4.8 Arun District Council commissioned Urban Edge Environmental Consulting (UE) to complete Habitats Regulations Assessment for the Arun Local Plan: Supplementary Work Stage 2 Report: Screening for Likely Significant Effects (June, 2016). This HRA concludes that for a 300-unit allocation in North Pagham (this application site) that there would be no significant effect on Pagham Harbour SPA/Ramsar alone, however, significant effects are possible in combination and lists disturbance, supporting habitat, and water pollution. This assessment now supersedes any advice previously given by Natural England in 2015, with regards to a specific HRA for the site.

Field Study

- 4.9 A total of 40 species were recorded within the application boundary during the surveys, including eighteen species that are listed as NERC species of principal importance, LBAP species and/or feature on the BoCC Red and Amber lists (Table 3). Full survey results are provided in Appendix A and illustrated within Figures 1 – 7 inclusive.
- 4.10 No brent geese or other Pagham Harbour SPA/Ramsar designated species were recorded on the application site during the surveys.

⁸ 5 year peak mean 1998/9-2002/3

Table 3: NERC, LBAP, and/or BoCC Red- and Amber-Listed Bird Species Recorded at Hook Lane during Winter Bird Surveys 2015/16 and Their Recent Status in Sussex

Species	Conservation Status	Recent Status in Sussex ⁶
Common shelduck	Amber	Fairly common winter visitor and scarce passage migrant
Mallard	Amber	Common resident and winter visitor
Curlew	NERC, LBAP, Red	Common passage migrant and winter visitor
Common snipe	Amber	Fairly common winter visitor
Black-headed gull	Amber	Very common to abundant passage migrant and winter visitor
Herring gull	NERC, LBAP, Red	Very common resident; status uncertain as passage migrant; and winter visitor
Great black-backed gull	Amber	Common winter visitor and passage migrant
Stock dove	Amber	Common resident and possible winter visitor
Kestrel	Amber	Fairly common resident and passage migrant
Skylark	NERC, LBAP, Red	Very common but declining resident, and probably common passage migrant and winter visitor
Starling	NERC, LBAP, Red	Common but declining resident and very common to abundant winter visitor
Song thrush	NERC, LBAP, Red	Very common but decreasing resident and partial migrant, common passage migrant and winter visitor
Dunnock	NERC, LBAP, Amber	Very common resident
House sparrow	NERC, LBAP, Red	Very common but possibly declining resident
Grey wagtail	Red	Scarce resident and fairly common passage migrant and winter visitor
Meadow pipit	Amber	Common but declining resident; very common passage migrant and winter visitor
Linnet	NERC, LBAP, Red	Fairly common but decreasing resident and partial migrant
Reed bunting	NERC, LBAP, Amber	Fairly common resident; passage and winter visitor

- 4.11 The remaining 22 recorded species comprised 21 Green-listed (low conservation concern) and one unlisted (no conservation concern) species.

5.0 DISCUSSION AND EVALUATION OF IMPACTS

Statutory Sites of International Conservation Value

- 5.1 As previously mentioned, Arun District Council had commissioned the undertaking of a HRA to screen for likely significant effects, which it summarised that the 300 units proposed within this application site would have no significant effect on Pagham Harbour SPA/Ramsar alone, but there are possible effects in combination with disturbance, supporting habitats and water pollution being the main features of detrimental effects.
- 5.2 The extent of the impacts on Pagham Harbour SPA/Ramsar and the screening conclusions taken from the HRA stage 2 screening, and the mitigation measures proposed within the application site have been summarised below, however more details are provided within the FPCR Ecological Appraisal dated November 2016.
- Disturbance – Sites will need to comply with Policy ENV DM2 through a financial contribution per unit and the provision of 6.65ha of Green Infrastructure (GI), which include opportunities for recreation activities. This results in no significant effects alone or in combination;
 - Supporting Habitat – Bird surveys undertaken within the application site recorded no SPA/Ramsar species, and those recorded during consultations in the surrounding were more closely associated with Pagham Rife. Site offers little potential as a supporting habitat for SPA species particularly brent geese, as surveys and consultations can verify. This results in no significant effects alone or in combination;
 - Water Pollution – Water discharge levels onsite will be controlled and managed by ditches, reprofiling and meandering of existing ditches and the inclusion of new waterbodies and a channel to the west. The site falls within the catchment area of the Pagham treatment works, which has confirmed capacity for this development. The management of water on site and the capacity for sewage at local facilities has confirmed that there will be no significant effect alone or in combination.

Bird Assemblage Value

- 5.3 The species recorded on site are largely typical of the main habitats available on site and are particularly characterised by notable species of open arable farmland (skylark, curlew, herring gull, black-headed gull, great black-backed gull, stock dove, linnet, reed bunting, kestrel, meadow pipit, shelduck and common snipe) as well as those that typically inhabit hedgerows (duncock and song thrush), wet features such as ditches (grey wagtail, mallard and shelduck) and the urban fringe (house sparrow and starling).
- 5.4 All recorded species are fairly common to abundant winter species in Sussex and no exceptional populations were recorded. The application site is assessed as being of **Local** nature conservation value to the eighteen notable species listed in Table 3, and of **Site** nature conservation value to the 21 Green-listed and one unlisted (introduced) species in winter.

Impacts of Habitat Loss/Change

- 5.5 The impact on wintering bird species arising from the potential effects of development is based upon an understanding of each species' ecological requirements, the type of development, number of birds recorded on site, their nature conservation criteria based on legislation and current guidance (e.g. Red and Amber listed Birds of Conservation Concern 4 (2015) and S41 NERC Act species of principal importance), their local status according to the Sussex Bird Report 2014 and professional judgement.
- 5.6 The species recorded on site that are arguably the most vulnerable to impacts are 14 of the 'notable' species that are LBAP species, and/or appear on the BoCC Red/Amber lists, and/or S41 of the NERC Act. The habitat requirements, species account, and nature conservation value of these species are summarised in Table 4. In addition, residual impacts arising from the proposed development in terms of habitat loss / change have been assessed against the development proposals set out in the current framework plan.
- 5.7 Those species discounted from the table have either been recorded in insignificant numbers and occasions, or are not expected to be impacted upon by proposals; these include mallard, stock dove, kestrel, and meadow pipit. The proposals are considered to have a **minor positive** residual impact at local level for these species.
- 5.8 The proposed development will result in the total loss of arable habitat from the site. This has potential to impact upon five open-farmland species in winter – curlew, herring gull, skylark, linnet and common snipe. All are likely to be displaced from the site post-development and residual impacts for each are predicted to be **minor negative**, significant at a local level.
- 5.9 A peak count of six curlew were recorded foraging within the application site during the January survey after heavy rainfall had caused areas of the site to flood. The county total WBS count for this species during January was 2221, with 465 birds recorded at Pagham Harbour. A large proportion of land between the application site and Pagham Harbour SPA consists of arable land, with further large expanses of arable land found to the north and west of the application site. With this in mind, the low number and low frequency of curlew recorded during the surveys indicates the application site to be of low value for this species during winter.
- 5.10 Herring gulls require open areas with long sight lines, in order to detect predators, in which to rest (loaf) between foraging forays, and are therefore likely to be displaced from the site post-development. Herring gulls, however, are a common resident in Sussex and are the most frequently recorded and widespread of all the gulls within the county, with a large number of counts exceeding 100 birds during the first winter period in 2014 (maximum recorded 10,500)⁵. The number of herring gulls recorded within the application site is therefore considered to be unexceptional.
- 5.11 During the November 2016 survey a maximum count of 40 skylark was recorded within the application site, however, flocks of 50 or more were recorded in 16 locations across Sussex and large counts of 190, 200 and 500 were recorded in the county during December 2014⁸. Winter numbers of skylark are also significantly boosted by migratory birds from Europe. Skylark forage on seeds and weedy stubbles in winter and are

therefore dependent upon crop types and management. In addition to the group of 40 skylark in November 2016, modest numbers were recorded on four other occasions (13 – 21 individuals). This species is very common (but declining) in Sussex and it is not considered that the loss of the arable habitat will significantly impact the local skylark population. It is likely that the large expanses of surrounding arable land provide wintering habitats for these birds, and birds using the site are likely to be displaced into these areas.

- 5.12 A peak count of 40 linnet was recorded within the application site during the January survey, however, larger counts of 100 and 120 birds were recorded within the county during the winter period⁹. Linnet are found on farmland where there is a plentiful supply of seeds throughout the year⁹, and as mentioned above, there are large expanses of arable land within the immediate surrounding area of the application site which will provide foraging opportunities for this species post-development.
- 5.13 Common snipe are a fairly common winter visitor to the county, however only low numbers of this species were recorded throughout the surveys, with the exception of January where no birds were recorded. Although it is likely this species will be displaced from the application site post-development, ample suitable habitat for this species can be found within the immediate surrounding area in the form of arable land and extensive ditch networks.
- 5.14 Grey wagtail, reed bunting, shelduck, black-headed gull, and great black-backed gull are also likely to be displaced. Single individuals of grey wagtail and reed bunting were recorded on two occasions (October 2015 / November 2016 and October 2015 / January 2016, respectively). Both are listed as fairly common species in Sussex, and due to the low numbers recorded during the surveys **negligible** residual impacts are predicted for grey wagtail and reed bunting. Two shelduck were recorded in association with flooded areas of the arable fields on one occasion (March), further to this they were also recorded in small numbers during the April breeding bird survey. Shelduck are wide ranging with a preference for coastal habitats such as estuaries, mudflats and sandbars, therefore, **negligible** residual impacts are predicted for shelduck. The development proposals will result in the loss of arable land, however the proposed GI set out in the current framework plan will include areas of open space, SuDS and wetland which may benefit black-headed gull and great black-backed gull and therefore **negligible** residual impacts are predicted for these species.
- 5.15 Starling, house sparrow, dunnock and song thrush are expected to benefit from the proposed GI within the current framework plan, which includes the retention of many of the existing hedgerows and trees and new woodland planting (important for all species) and the creation of open space (particularly important for foraging starlings). In addition, all four species show varying degrees of habituation to residential areas, particularly as gardens mature, and an ability to thrive in urban environments. Therefore, **minor positive** residual impacts for starling, house sparrow, dunnock and song thrush are predicted.

⁹RSPB [ONLINE] <http://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/details.aspx?id=203996> [Accessed on 1st December 2016]

- 5.16 The additional GI planting along with the retention and enhancement where possible of existing vegetation with native species will provide further compensation for any nesting and foraging habitat loss, provide connectivity with the wider landscape and support conservation and biodiversity enhancement.

Table 4: Habitat Requirements, Species Account, Nature Conservation Value and Impact Assessment of BoCC Red-listed, S41 NERC Act Priority Species and/or Local Biodiversity Action Plan Species Recorded during Winter Bird Surveys 2013/14 on Land West of Hook Lane, Pagham

Species	Habitat Requirements†	Species Account	Characterisation of Unmitigated Impact	Suggested Mitigation/ Compensation/Enhancements	Residual impact††
Common shelduck	Resident. Most numerous on sheltered coasts and estuaries with sandbars and mud flats. Has adopted some inland sites such as gravel works and reservoirs. Visits farmland near the coast.	Two birds were recorded during the March 2016 survey foraging / loafing in the middle of the site where flooding was evident.	Loss of wintering foraging / loafing habitat in the form of open flooded arable land	It is not possible to recreate the open flooded field that shelduck use to forage / loaf during winter within the development proposals Green Infrastructure (GI). These birds are wide ranging and the proposals will offer no value to wintering shelduck.	Negligible at Local level
Curlew	In winter curlews form flocks around the coast with some visiting inland sites. Birds from Russia, Scandinavia and western Europe arrive from late June each year to winter in the UK.	Recorded during 4 surveys with a peak of 6 birds foraging in the middle of the site during January, and a peak of 29 birds in November flying over site.	Loss of winter foraging habitat (open arable stubble)	It is not possible to recreate the open stubble field structure that curlews use to forage in during winter within the development proposals Green Infrastructure (GI). Post-development, the site will offer no value to wintering curlews.	Minor Negative at Local level
Common snipe	Resident. Breeds throughout Britain and Ireland on moorland bogs and wet pastures in upland areas and in fenland and marshes in low-lying areas. In winter is more widespread and feeds in almost any lowland marshy place, both around the coast and inland.	Recorded during 5 surveys with a peak count of 7 birds during the February survey. Birds were recorded throughout the surveys in the central ditch and in the southern extent of the site.	Loss of winter foraging / resting habitat (open arable stubble)	It is not possible to recreate the open wet stubble field structure that snipe use to forage / rest during winter within the development proposals Green Infrastructure (GI). Post-development, the site will offer no value to wintering snipe.	Minor negative at local level

Species	Habitat Requirements ¹	Species Account	Characterisation of Unmitigated Impact	Suggested Mitigation/ Compensation/Enhancements	Residual Impact ^{1†}
Black-headed gull	Resident species, the largest colonies are in north-west England, Scotland, north-west Ireland and Wales. Breeds both inland and near the sea on coastal marshes, sand dunes, freshwater marshes, lakes, flooded gravel pits, reservoirs and moorland pools. In winter, this species can be found almost anywhere in mainland Britain especially inland. Birds from Iceland, Scandinavia, northern Europe and Russia join wintering resident birds.	Recorded during 6 surveys. A peak count of 43 birds was recorded during the November survey. Birds were recorded foraging and loafing on-site.	Loss of winter loafing habitat (open areas)	It is not possible to recreate the open field structure that herring gulls use to loaf in during winter within the GI, however GI proposals include areas of open space, SuDS and wetland all of which may benefit black-headed gulls.	Negligible at Local level
Herring gull	Widespread outside breeding season, but still concentrated on the coasts. Feeds on urban rubbish tips, visits town parks during the day and roosts on playing fields and at night on reservoirs and estuaries.	Recorded foraging in the wetter central sections of the site from Nov-March, with a peak count of 38+juveniles in November.	Loss of winter loafing habitat (open areas)	It is not possible to recreate the open field structure that herring gulls use to loaf in during winter within the GI, however GI proposals include areas of open space, SuDS and wetland all of which may benefit herring gulls.	Minor Negative at Local level
Great black-backed gull	Resident/winter visitor. Breeds mainly on the western coasts of Britain and Ireland around rocky coasts and islands but sometimes on freshwater lakes or moorland. Birds from Norway arrive here to winter along with the resident birds. Can be found all around our coasts in winter and at some inland sites as well.	Birds were recorded during 3 surveys with a peak count of 2 (February and March). Mostly observed where flooding was evident.	Loss of winter loafing habitat (open areas)	It is not possible to recreate the open field structure that herring gulls use to loaf in during winter within the GI, however GI proposals include areas of open space, SuDS and wetland all of which may benefit great black-backed gulls.	Negligible at Local level

Species	Habitat Requirements ¹	Species Account	Characterisation of Unmitigated Impact	Suggested Mitigation/ Compensation/Enhancements	Residual Impact ^{1†}
Skylark	Ground nesting birds favouring open farmland habitats where short, grassy or sparse vegetation provides nesting cover and foraging opportunities. Stubble, cereal grain, leaves and weed seeds are important food stuffs in winter.	Winter flocks were recorded foraging in open habitat between Nov and Feb, with a peak count of 21 in Nov, 14 in Dec and Jan and 13 in Feb.	Loss of winter foraging habitat (open arable stubble)	Skylarks avoid areas of regular human disturbance. It is not possible to recreate the open arable stubble field structure that skylarks use to forage in during winter within the GI. Post-development, the site will offer no value to wintering skylarks.	Minor negative at Local level
Starling	Inhabits open grassland that may be garden lawns, farm fields, playing fields and parks. It is adaptable and exploits rubbish tips, the strand line and town centres. Forages mainly on the ground in open areas of short grass or sparse vegetation, e.g. cereal stubble, farmyards.	Small flocks of birds were recorded in Nov and Dec only, foraging in arable habitat. Mostly observed taking food off-site to residential areas beyond Hook Lane to the east.	Loss of foraging habitat (arable fields)	The inclusion of starling boxes within the built environment would present the species with new nesting opportunities. Areas of greenspace will continue to provide suitable foraging opportunities for the species. Starlings will also readily inhabit residential areas, particularly once established.	Minor Positive at Local level
Song thrush	Resident. Widespread in Britain and Ireland. Found in a variety of habitats where there are trees and bushes; gardens, parks, coniferous and deciduous woodlands and hedgerows. Often feeds under trees and bushes seldom far from cover.	A single individual was recorded during the March survey within the hedgerow along the western boundary, towards the southern extent of the site.	Minor loss of habitat through loss of some hedgerow sections	The provision of additional native planting and buffering along the north and western boundaries is likely to increase the overall useable habitat available to this species. Song thrushes will also readily inhabit residential areas, particularly once established.	Minor Positive at Local level
Dunnock	Commonly invades a wide variety of scrub grown situations. Has adapted to field hedgerows, farms, railway embankments, parks, gardens and vacant urban land. Feeds mainly on insects but small seeds are an important winter food.	Recorded on all surveys in hedgerows that surround the site. Max counts of 5 in Nov and January.	Minor loss of habitat through loss of some hedgerow sections	New planting along the north and western site boundaries will continue to provide sufficient winter habitat to this species. Dunnocks will also readily inhabit residential areas, particularly once established.	Minor Positive at Local level

Species	Habitat Requirements ¹	Species Account	Characterisation of Unmitigated Impact	Suggested Mitigation/ Compensation/Enhancements	Residual Impact ^{1†}
House Sparrow	Often associated with man, will avoid closed or dense vegetation, and except for seasonal foraging in corn fields and other crops, will usually avoid open terrain lacking in shrubs, trees, and other cover.	Two colonies were recorded on the site boundaries adjacent to existing residential areas along Hook Lane to the east.	Loss of some winter foraging habitat (hedgerow and field margins)	House sparrows will readily habituate to new residential areas. Strategic placement of house sparrow nest-box terraces around the development will provide new breeding sites. The retention of boundary trees and hedgerows combined with new residential gardens and buildings will increase roosting and foraging opportunities.	Minor Positive at Local level
Grey wagtail	Breeds in upland areas near fast-flowing water bordered by trees and where there are rocks and open ground such as shingle banks. In winter it retreats to the lowlands where it is found in a wide variety of habitats including water treatment works, farmyards, ornamental ponds, canals, lowland rivers and streams, coastal areas and even city centres close to water.	A single bird was recorded in a flooded part of the site in November fleetingly, before flying south and off-site. No other registrations in winter.	None anticipated	The individual recorded was likely to be exploiting the temporarily flooded field. Overall, the site is not considered to be of much value to grey wagtails in winter.	Negligible at Local level
Linnet	Nests in areas of dense scrub or hedgerows. Feeds on small to medium sized seeds. Particularly dependent on weeds of open country and waste ground. In winter linnets feed on farmland, wasteland and coastal mashes.	Winter flocks were recorded on all surveys foraging in open stubble areas, with a peak count of 40 in January.	Loss of winter foraging habitat (stubble fields)	Linnets generally avoid areas of regular human disturbance. It is not possible to recreate the open arable stubble field structure that linnets use to forage in during winter within the GI. Post-development, the site will offer no value to wintering linnets.	Minor Negative at Local level

Species	Habitat Requirements [†]	Species Account	Characterisation of Unmitigated Impact	Suggested Mitigation/ Compensation/Enhancements	Residual Impact ^{††}
Reed bunting	Traditionally a bird of wet places such as reedbeds, river margins, fens, marshes and coastal grazing marshes. More recently colonised drier habitats such as ditches, young forestry plantations and some farm crops, especially oilseed rape.	A single bird was recorded onsite in February only.	None anticipated	The single registration throughout winter strongly suggests that the site is not considered to be of much value to grey wagtails in winter.	Negligible at local level at Local level

[†] Based upon criteria set out in Table 2 and professional judgement. ^{††} Assumes that any suggested or proposed mitigation, compensation or enhancements are undertaken in full.

6.0 CONCLUSIONS

- 6.1 During winter bird surveys, 40 species were recorded on site, including eighteen notable species of medium or high conservation concern. All recorded species are fairly common to abundant birds in Sussex and the UK.
- 6.2 The application site is assessed as being of **Local** nature conservation value to the eighteen notable species, and of **Site** nature conservation value to the 21 Green-listed and one unlisted (introduced) species in winter.
- 6.3 Impacts of development were considered for the 18 most vulnerable species recorded on site. Minor negative residual impacts are predicted for curlew, herring gull, skylark, linnet and common snipe. The proposed development is expected to result in negligible residual impacts for common shelduck, black-headed gull, great black-backed gull, grey wagtail and reed bunting.
- 6.4 Other than in the short term, i.e. during the construction phase, the proposals and suggested compensation are expected to have a positive residual impact for four notable species currently using the site in winter - starling, house sparrow, dunnoek and song thrush.
- 6.5 No Pagham Harbour Ramsar/SPA designated species were recorded using the site and therefore, the application site is considered to have little value to any of the species, including Brent goose. The site will also have no significant effect on the Ramsar/SPA alone or in combination.
- 6.6 The proposed GI detailed in the current framework plan aims to retain the majority of existing hedgerows and trees on site, to enhance hedgerows with native species planting and to create new habitats including further woodland planting, waterbodies and green corridors throughout the site. The retention of existing vegetation and provision of these new areas, along with a new resource of residential gardens, will provide some compensation for the loss of suitable winter habitats for many of the recorded species. The GI will increase the degree of usable habitat across the site for a number of urban edge species, and provide corridors of movement across the site. Furthermore, the GI proposals have the potential to attract new species associated with areas of woodland edge and scrub, e.g. bullfinch *Pyrrhula pyrrhula* (Amber-listed / S41 NERC Act).
- 6.7 In addition, bird boxes, such as Schwegler 2m bird boxes, should be installed on trees around the site and sparrow terraces, similar to Schwegler 1SP should be installed on buildings in order to provide additional habitats for urban and woodland edge species.



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Key

Survey Area

BoCC Red Listed Species

- CU Curlew
- GL Grey Wagtail
- HG Herring Gull
- HS House Sparrow
- LS Lesser Spotted Woodpecker
- LI Linnet
- S Skylark
- SG Starling

BoCC Amber Listed Species

- BH Black-headed Gull
- GB Great Black-backed Gull
- K Kestrel
- MP Meadow Pipit
- RB Reed Bunting
- SN Snipe
- SD Stock Dove

NERC Species of Principal Importance

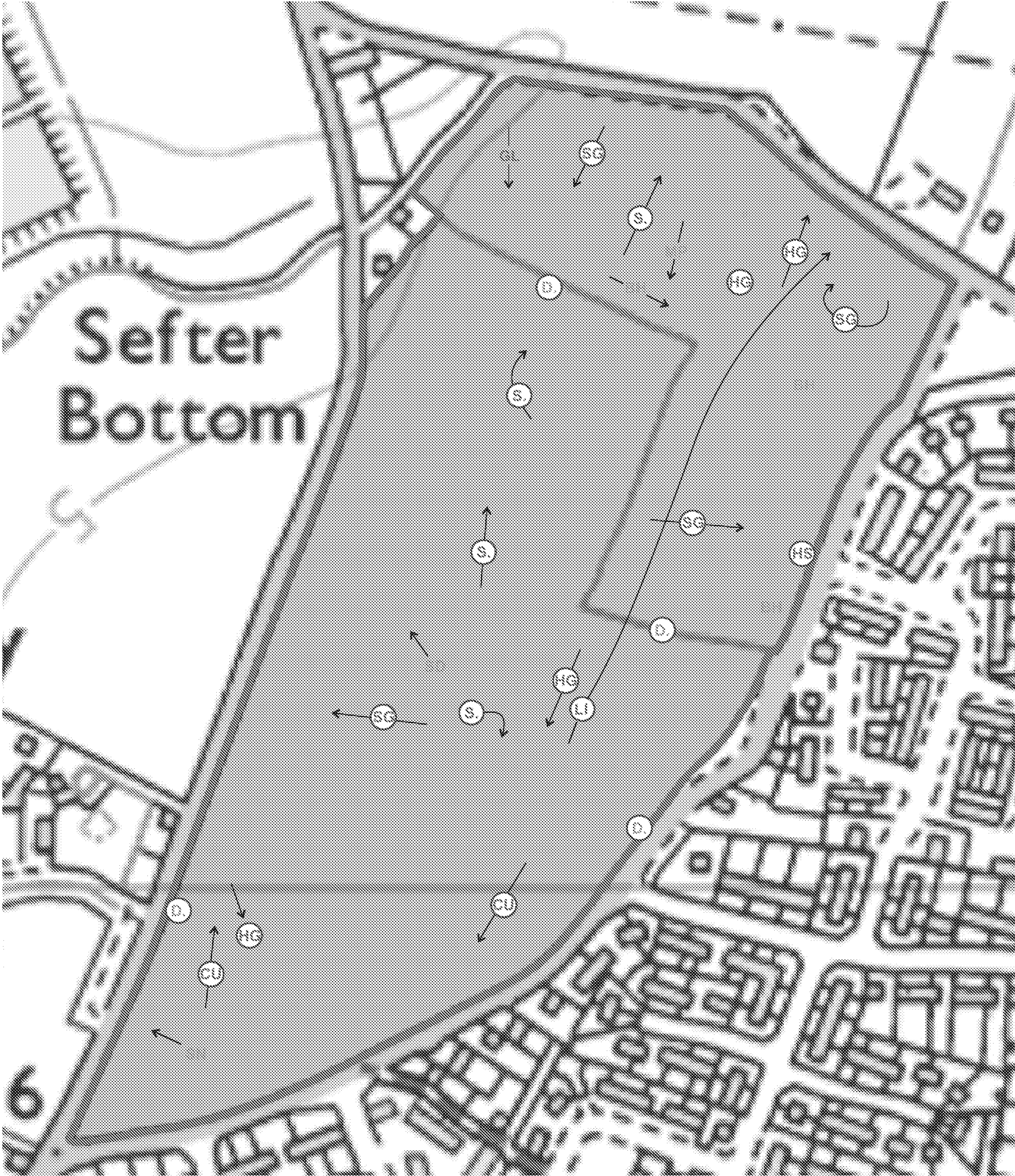
Schedule 1 Species

Species only seen to fly over this location

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100m
 Hallam Land Management Ltd
 Land West of Hook Lane, Pagham
 West Sussex
 WINTER BIRD SURVEY 16TH OCTOBER 2015
 DISTRIBUTION OF NOTABLE SPECIES
 NTS @ AS
 HET / LC
 6/1/2017
Figure 1 **6932-E-01**



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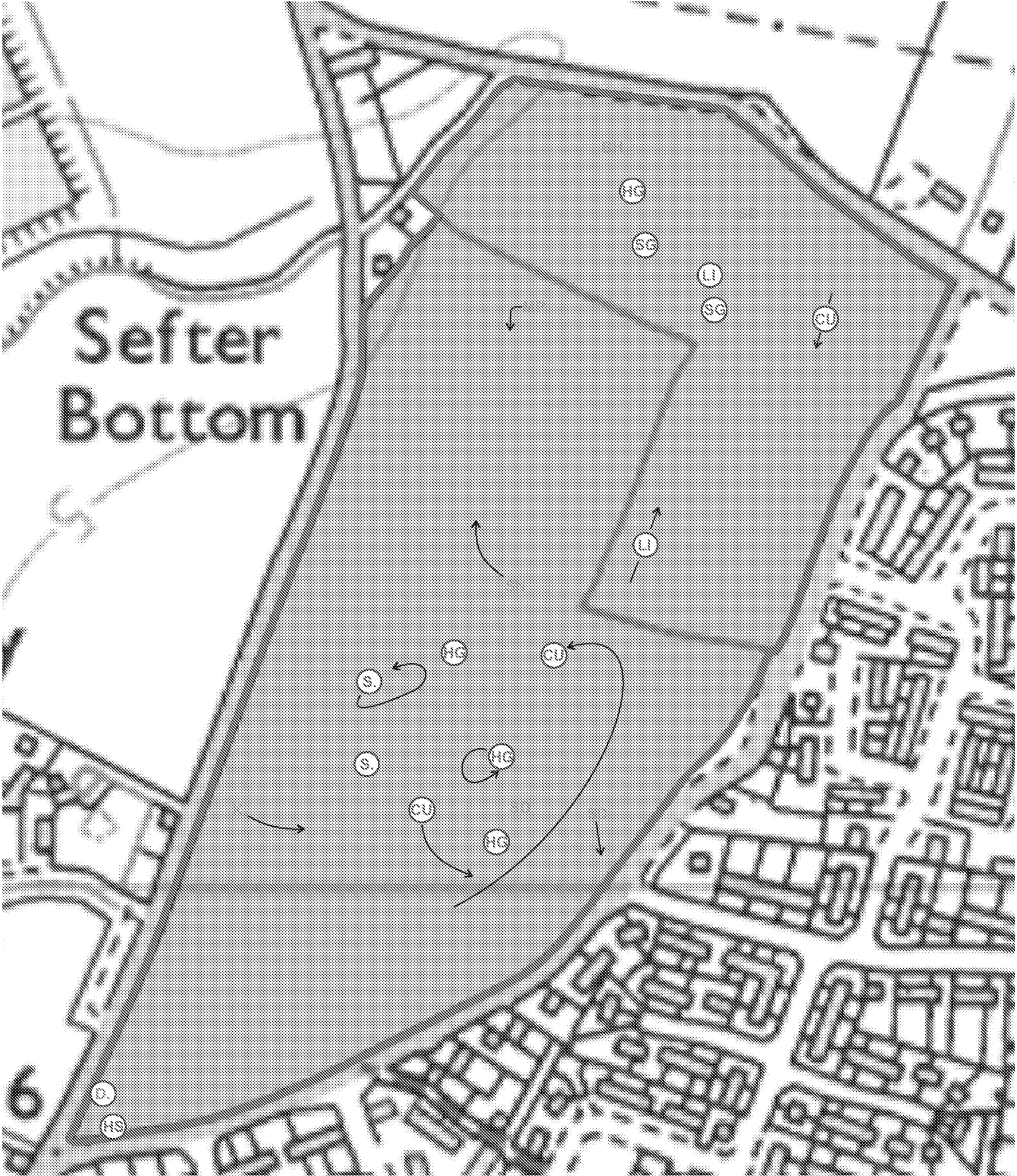
Land West of Hook Lane, Pagham, West Sussex

WINTER BIRD SURVEY: 26TH NOVEMBER 2015
DISTRIBUTION OF NOTABLE SPECIES



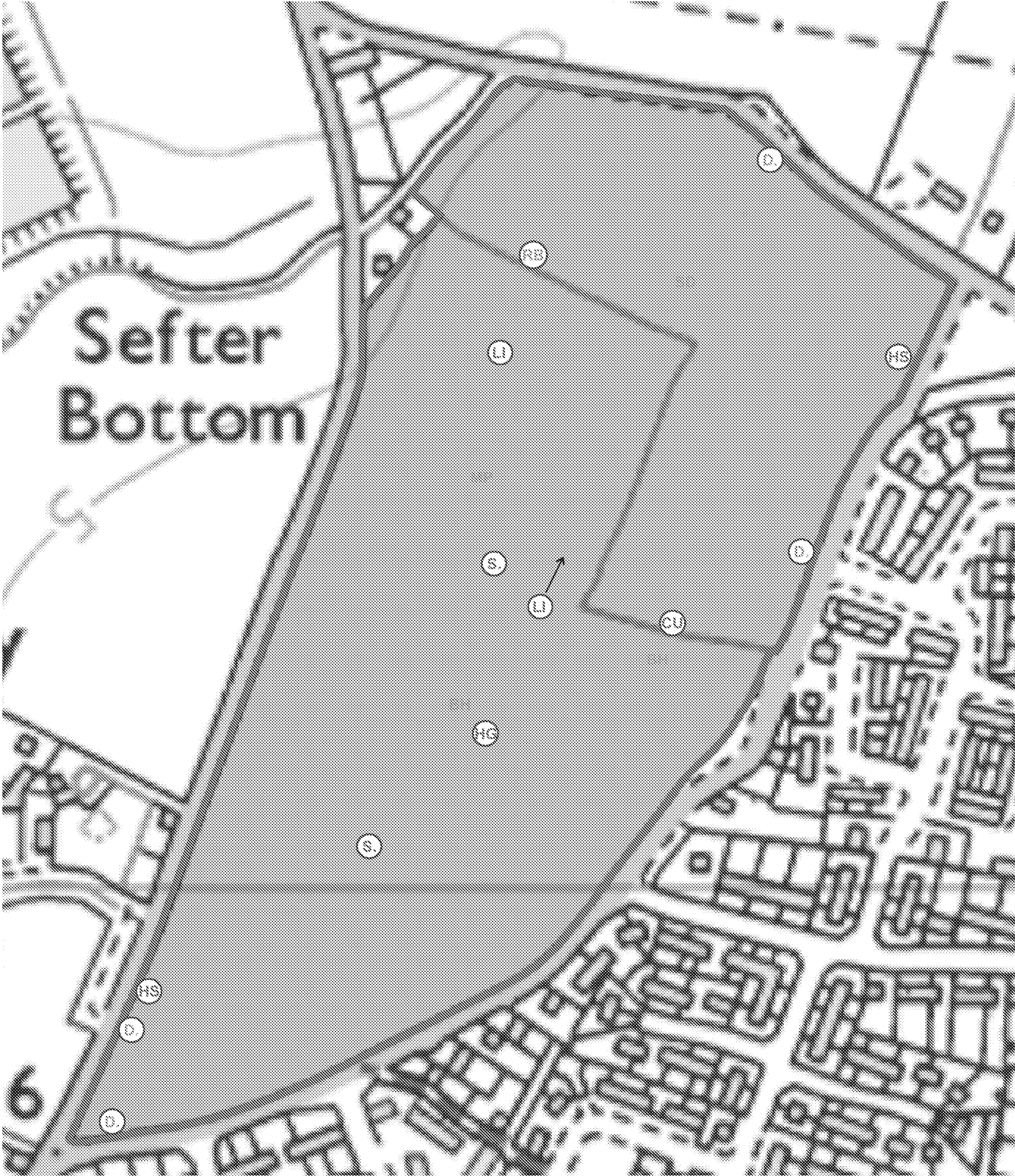
NTS @ A3 LC 24.10.2016

Figure 2 6932-E-02



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BoCC Red Listed Species			
CU	CURLEW	LI	LINNET
HG	HERRING GULL	S.	SKYLARK
HS	HOUSE SPARROW COLONY		

BoCC Amber Listed Species			
BH	BLACK-HEADED GULL	RS	REED BUNTING
G.	DUNNOCK	SD	STOCK DOVE
MP	MEADOW PIPIT		

	SURVEY AREA
	SCHEDULE 1 SPECIES
	S41 NERC ACT PRIORITY SPECIES
	BIRD SEEN TO FLY INTO SITE, STOP, THEN TAKE FLIGHT AGAIN AT THIS LOCATION
	BIRD SEEN TO FLY OVER SITE AT THIS LOCATION
	GROUNDING BIRD SEEN TO TAKE FLIGHT AT THIS LOCATION
	BIRD SEEN TO LAND WITHIN THE SITE AT THIS LOCATION



Hallam Land Management Ltd

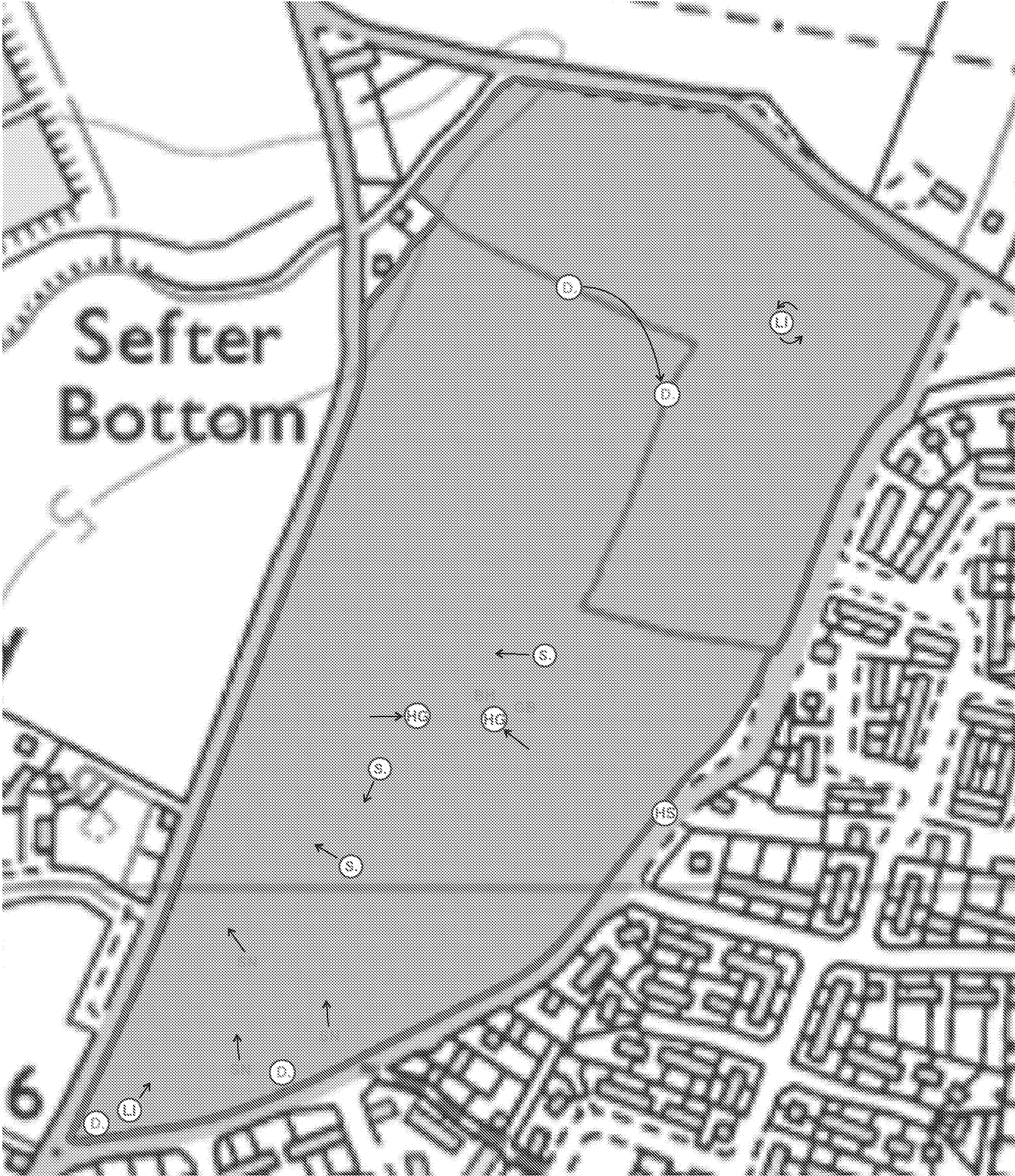
Land West of Hook Lane, Pagham, West Sussex

WINTER BIRD SURVEY: 13TH January 2016
DISTRIBUTION OF NOTABLE SPECIES

NTS @ A3 LC 02.03.2016

Figure 4

6932-E-04



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Hallam Land Management Ltd

Land West of Hook Lane, Pagham, West Sussex

WINTER BIRD SURVEY: 15TH FEBRUARY 2016
DISTRIBUTION OF NOTABLE SPECIES



NTS @ A3 LC 02.03.2016

Figure 5 6932-E-05



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BoCC Red Listed Species			
HG	HERRING GULL	LI	LINNET
HS	HOUSE SPARROW COLONY	ST	SONG THRUSH

BoCC Amber Listed Species			
BG	BLACK-HEADED GULL	GB	GREAT BLACK-BACKED GULL
D	DUNNOCK	SN	SNIPE
MA	MALLARD	SH	SHELDUCK

	SURVEY AREA
	SCHEDULE 1 SPECIES
	S41 NERC ACT PRIORITY SPECIES
	BIRD SEEN TO FLY INTO SITE, STOP, THEN TAKE FLIGHT AGAIN AT THIS LOCATION
	BIRD SEEN TO TAKE FLIGHT AND LAND AGAIN WITHIN SITE AT THIS LOCATION
	GROUNDING BIRD SEEN TO TAKE FLIGHT AT THIS LOCATION
	BIRD SEEN TO LAND WITHIN THE SITE AT THIS LOCATION



Hallam Land Management Ltd

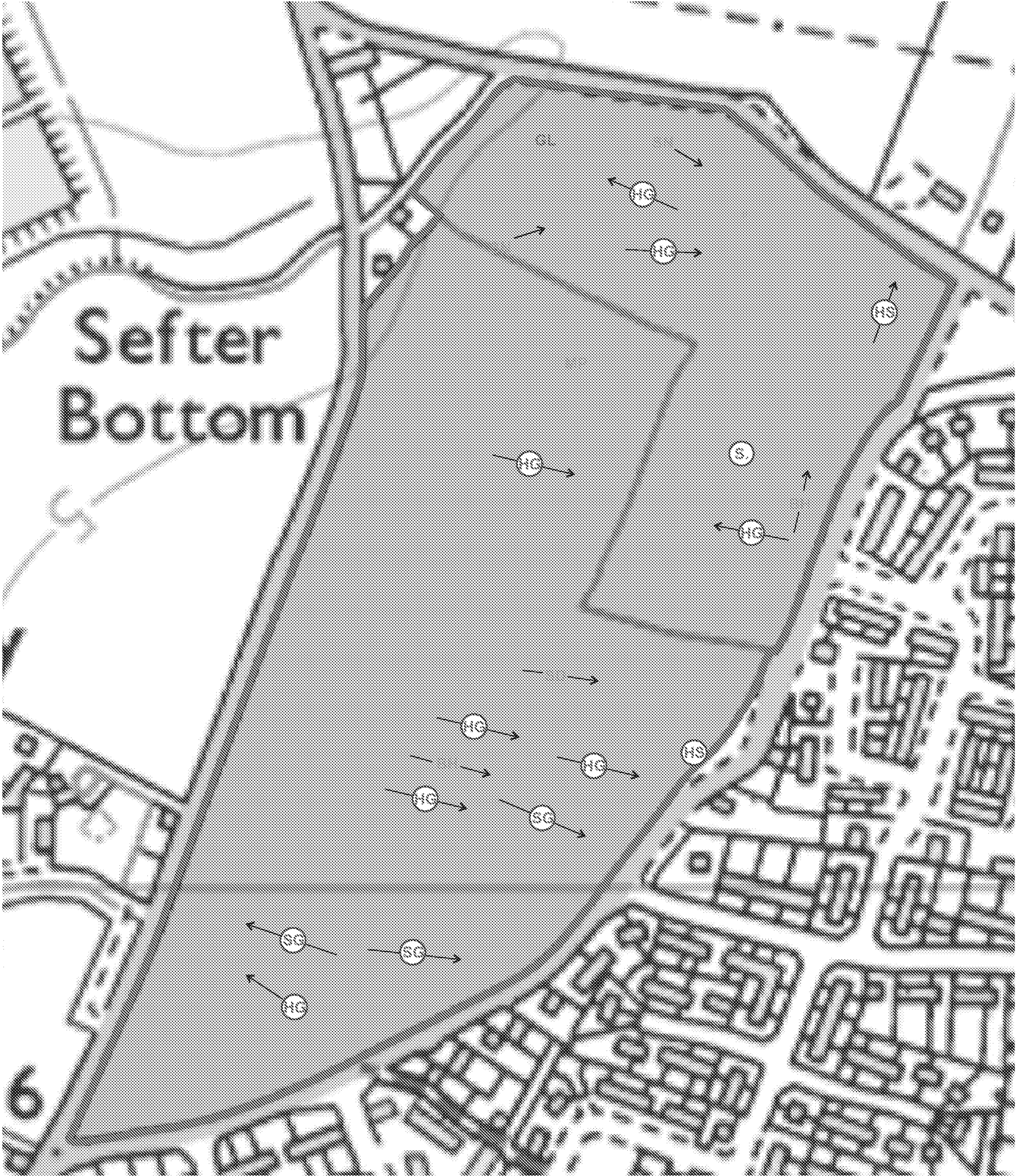
Land West of Hook Lane, Pagham, West Sussex

WINTER BIRD SURVEY: 14TH MARCH 2016
DISTRIBUTION OF NOTABLE SPECIES

NTS @ A3 LC 23.11.2016

Figure 6 **6932-E-06**





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BoCC Red Listed Species

GL	GREY WAGTAIL	S	SKYLARK
HG	HERRING GULL	SS	STARLING
HS	HOUSE SPARROW COLONY		

BoCC Amber Listed Species

BH	BLACK-HEADED GULL	SN	SNiPE
MP	MEADOW PIPIT	SD	STOCK DOVE

Legend:

- SURVEY AREA
- SCHEDULE 1 SPECIES
- S41 NERC ACT PRIORITY SPECIES
- BIRD SEEN TO FLY INTO SITE, STOP, THEN TAKE FLIGHT AGAIN AT THIS LOCATION
- BIRD SEEN TO FLY OVER SITE AT THIS LOCATION
- GROUNDED BIRD SEEN TO TAKE FLIGHT AT THIS LOCATION
- BIRD SEEN TO LAND WITHIN THE SITE AT THIS LOCATION

APPENDIX A: Hook Lane, Pagham 2015/16 Wintering Bird Survey Results

Species	Latin name	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5	Survey 6	Survey 7	Survey 8	Conservation Status & Protection
Canada goose	<i>Branta canadensis</i>	Scoping survey – only notable species recorded including: black-headed gull, herring gull, greater black-backed gull, curlew, stock dove, kestrel, skylark, starling, house sparrow, grey wagtail, meadow pipit, linnet, and reed bunting.	Pagham Harbour SPA designated species survey only – None recorded	2	-	-	-	-	-	Not listed
Common Shelduck	<i>Tadorna tadorna</i>			-	-	-	-	2	-	Amber list
Mallard	<i>Anas platyrhynchos</i>			-	-	-	-	4	-	Amber list
Cormorant	<i>Phalacrocorax carbo</i>			-	-	-	-	-	3	Green list
Grey heron	<i>Ardea cinerea</i>			-	-	1	-	-	-	Green list
Sparrowhawk	<i>Accipiter nisus</i>			-	-	-	-	-	1	Green list
Buzzard	<i>Buteo buteo</i>			-	-	-	-	-	1	Green list
Curlew	<i>Numenius arquata</i>			29	6	6	-	-	-	Red list NERC S.41
Snipe	<i>Gallinago gallinago</i>			1	1	-	7	4	2	Amber list
Black-headed gull	<i>Chroicocephalus ridibundus</i>			43	20	31	32	32	11	Amber list
Herring gull	<i>Larus argentatus</i>			38 + juvs	11	30	3	26 + juvs	20	Red list NERC S.41
Great black-backed gull	<i>Larus marinus</i>			-	-	-	2	2	-	Amber list

Species	Latin name	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5	Survey 6	Survey 7	Survey 8	Conservation Status & Protection
Stock dove	<i>Columba oenas</i>			1	3	1	-	-	4	Amber list
Woodpigeon	<i>Columba palumbus</i>			318	117	28	76	336	62	Green list
Collared dove	<i>Streptopelia decaocto</i>			-	1	1	-	-	-	Green list
Kestrel	<i>Falco tinnunculus</i>			-	1	-	-	-	-	Amber list
Magpie	<i>Pica pica</i>			2	1	-	-	2	9	Green list
Jackdaw	<i>Corvus monedula</i>			77	60	4	2	10	2	Green list
Rook	<i>Corvus frugilegus</i>			20	110	-	-	-	1	Green list
Carrion crow	<i>Corvus corone</i>			66	46	17	14	46	6	Green list
Goldcrest	<i>Regulus regulus</i>			-	-	-	1	-	-	Green list
Blue tit	<i>Cyanistes caeruleus</i>			2	2	1	2	-	-	Green list
Great tit	<i>Parus major</i>			1	2	-	-	1	2	Green list
Skylark	<i>Alauda arvensis</i>			21	14	14	13	-	40	Red list NERC S.41
Long-tailed tit	<i>Aegithalos caudatus</i>			-	1	-	-	2	-	Green list

Species	Latin name	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5	Survey 6	Survey 7	Survey 8	Conservation Status & Protection
Wren	<i>Troglodytes troglodytes</i>			3	-	-	3	3	5	Green list
Starling	<i>Sturnus vulgaris</i>			30	28	-	-	-	5	Red list NERC S.41
Blackbird	<i>Turdus merula</i>			1	1	1	3	1	3	Green list
Song Thrush	<i>Turdus philomelos</i>			-	-	-	-	1	-	Red list NERC S.41
Robin	<i>Erithacus rubecula</i>			3	2	2	4	2	3	Green list
Dunnock	<i>Prunella modularis</i>			5	1	5	3	1	-	Amber list NERC S.41
House sparrow	<i>Passer domesticus</i>			-	-	-	-	-	1	Red list NERC S.41
House sparrow colony	<i>Passer domesticus</i>			1	1	2	1	2	1	Red list NERC S.41
Grey wagtail	<i>Motacilla cinerea</i>			1	-	-	-	-	1	Red list
Pied wagtail	<i>Motacilla alba</i>			4	1	14	1	-	2	Green list
Meadow pipit	<i>Anthus pratensis</i>			4	1	4	-	-	1	Amber list
Chaffinch	<i>Fringilla coelebs</i>			-	2	1	1	-	-	Green list
Greenfinch	<i>Carduelis chloris</i>			4	3	-	1	1	4	Green list

Species	Latin name	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5	Survey 6	Survey 7	Survey 8	Conservation Status & Protection
Linnet	<i>Carduelis cannabina</i>			30	26	40	5	12	-	Red list NERC S.41
Goldfinch	<i>Carduelis carduelis</i>			18	15	1	-	40	9	Green list
Reed bunting	<i>Emberiza schoeniclus</i>			-	-	1	-	-	-	Amber list NERC S.41

APPENDIX M: Breeding Birds Survey Results

Species	Scientific Name	Survey 1 13.04.16	Survey 2 21.05.16	Survey 3 08.06.16	Conservation Status	Breeding Status on Site
Blackbird	<i>Turdus merula</i>	3	1	2	Green list	Probable
Blue tit	<i>Parus caeruleus</i>	1	2	7	Green list	Confirmed
Buzzard	<i>Buteo Buteo</i>			1	Green list	Non-breeder
Carrion crow	<i>Corvus corone</i>	8	33	7	Green list	Possible
Chaffinch	<i>Fringilla coelebs</i>	1	1	1	Green list	Possible
Chiffchaff	<i>Phylloscopus sibilatrix</i>	1		1	Green list	Possible
Cormorant	<i>Phalacrocorax carbo</i>		1		Green list	Non-breeder
Dunnock	<i>Prunella modularis</i>	6			Amber list NERC S41	Probable
Feral Pigeon	<i>Columba livia domestica</i>	15			Green list	Non-breeder
Goldcrest	<i>Regulus regulus</i>			1	Green list	Possible
Goldfinch	<i>Carduelis carduelis</i>			2	Green list	Possible
Greater Black-backed Gull	<i>Larus marinus</i>		1		Amber list	Non-breeder
Great tit	<i>Parus major</i>	3	1	1	Green list	Probable
Greenfinch	<i>Carduelis chloris</i>	4	1	1	Green list	Probable
Herring Gull	<i>Larus argentatus</i>	1	34	18	Red list NERC S41	Non-breeder
House sparrow	<i>Passer domesticus</i>	3 col + 4	3	Col + 3	Red list NERC S41	Confirmed
Jackdaw	<i>Corvus monedula</i>		1		Green list	Non-breeder
Lesser Black-backed Gull	<i>Larus fuscus</i>		6		Amber list	Non-breeder
Lesser Whitethroat	<i>Sylvia curruca</i>			1	Green list	Possible
Linnet	<i>Carduelis cannabina</i>	1	2	2	Red list NERC S41	Possible
Magpie	<i>Pica pica</i>		1	1	Green list	Possible

Species	Scientific Name	Survey 1 13.04.16	Survey 2 21.05.16	Survey 3 08.06.16	Conservation Status	Breeding Status on Site
Mallard	<i>Anas platyrhynchos</i>	1	2		Amber list	Non-breeder
Robin	<i>Erithacus rubecula</i>	3	1	3	Green list	Probable
Pied Wagtail	<i>Motacilla alba</i>	1			Green list	Non-breeder
Shelduck	<i>Tadorna tadorna</i>	5			Amber list	Non-breeder
Siskin	<i>Carduelis spinus</i>			1	Green list	Possible
Song thrush	<i>Turdus philomelos</i>			2	Red list NERC S41	Possible
Snipe	<i>Gallinago gallinago</i>	2			Amber list	Non-breeder
Starling	<i>Sturnus vulgaris</i>	1	1	2	Red list NERC S41	Possible
Stock Dove	<i>Columba oenas</i>		2		Amber list	Non-breeder
Swallow	<i>Hirundo rustica</i>		5		Green list	Non-breeder
Willow Warbler	<i>Phylloscopus trochilus</i>	1	1		Green list	Probable
Whitethroat	<i>Sylvia communis</i>		1	4	Green list	Probable
Woodpigeon	<i>Columba palumbus</i>	13	9	5	Green list	Confirmed
Wren	<i>Troglodytes troglodytes</i>	1	1	5	Green list	Probable
Yellowhammer	<i>Emberzia citrinella</i>		3		Red list NERC S41	Possible
Total Species (Total Confirmed and Probable Breeders)		20	24	22	36 (11)	