

# North Thames Estuary and Marshes Breeding Bird Survey

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# Foreword

The North Thames Estuary & Marshes area was surveyed in 2022 to determine the distribution and breeding status of target bird assemblages and collect evidence to assess the case for designation as a Site of Special Scientific Interest (SSSI). The report does not itself make a case for designation, rather it provides an objective record of survey findings to support Natural England's independent assessment of special interest. Natural England commission a range of reports from external contractors to provide evidence and advice to assist the delivery of its statutory duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.



# Executive summary

A breeding bird survey was commissioned by Natural England to investigate the breeding bird interest in land adjacent to the Mucking Flats and Marshes Site of Special Scientific Interest (SSSI). The existing SSSI offers a valuable resource for over wintering ducks and waders. Mucking Flats and Marsh Marshes form the largest intertidal feeding area for wintering wildfowl and waders, west of Canvey Island on the north bank of the Thames. The mudflats and saltmarshes also offer a valuable staging post for passage migrants (Natural England 1991).

Between April and July 2022, EMEC Ecology conducted a breeding bird survey to determine the distribution and breeding status of target assemblage species, associated with the habitats found within the survey area (lowland scrub, lowland farmland, lowland fen, lowland open water and lowland damp grassland). Seven surveys were conducted by up to three surveyors throughout the aforementioned survey season, comprising early morning visits for diurnal species and evening visits for crepuscular and nocturnal species.

The locations of the nesting sites have been redacted to protect them from disturbance.<sup>1</sup>

Throughout the survey, a total of 24 confirmed breeders were recorded from the survey, with an additional 16 probable breeders and four possible breeders, listed within the aforementioned habitat assemblages. Not listed within the breeding bird assemblages, black redstart was recorded as a probable breeder [REDACTED]

The survey area also supported populations of Cetti's warbler and pochard exceeding 1% of the UK's populations (66 singing males and 13 pairs, respectively).

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<sup>1</sup> Regulation 12(5)(g) of the Environmental Information Regulations 2004.

These species are afforded the highest level of legal protection available to wild birds, being listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended). They are at risk from disturbance. Nests are also sometimes targeted by criminals wishing to obtain eggs for their illegal collections. To release and subsequently place into the public domain the location details of schedule 1 species' nesting site would place this site at risk of disturbance or deliberate interference.

In applying this exception, we have had to balance the public interest in withholding the information against the public interest in disclosure. Whilst Natural England believes in openness and transparency, as a public body, Natural England has a duty to protect the nesting sites of species vulnerable to disturbance or persecution. It is not in the public interest for the location of nest sites of vulnerable species to be publicised as that could lead to these nesting sites being adversely affected.

We feel there is little public interest in releasing this information and we believe that these are legitimate reasons to allow Natural England to engage this exception and withhold the information.

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# 1 Introduction

## Brief

1.1. This report has been prepared by EMEC Ecology for Natural England. It provides details of a breeding bird survey of the land encompassing the Tilbury and Mucking corridor on the northern banks of the River Thames. The results will allow Natural England to consider the status of the breeding bird assemblages in this area.

1.2. EMEC Ecology's brief was to complete a breeding bird survey to determine the breeding status of all target assemblage species and make note of the non-target species associated with the survey area. Approximate locations of confirmed and probable breeding assemblage species were required. All breeding bird registrations were submitted in GIS format along with an Excel document detailing the complete species list, assemblage territories across each survey area compartment and the transect start and end points and maps detailing the transect routes were provided (Figures 3 – 6 Transect Routes).

## Habitats

1.3. The red line boundary (Figure 1 Survey Area 1 and Figure 2 Survey Area 2), comprised an array of different habitats along the Essex side of the Thames Estuary. Hereafter referred to as the 'survey area'. The survey area comprised large parcels of post-industrial habitats including restored landfill and quarries that had been capped and allowed to regenerate, flooded gravel pits and historic grazing marsh, with some arable farmland. Compartments of the survey area were under active management including Thurrock Thameside Nature Park owned by Essex Wildlife Trust (EWT) and active fisheries including Stanford Warren (Figure 1 Survey Area 1). Several large bodies of open water, including Gobions Lake, located to the north-west of the survey area were present comprising marginal vegetation, scrub and reedbed. Dense scrub and broadleaved woodland was found surrounding Area A and Bowaters a section of predominantly blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus monogyna*) scrub which bordered a public right of way to the east of the village of East Tilbury. Tilbury Fort and surrounding marshes were located to the very south-west of the survey area. Built in the 16th Century the fortress featured intertidal moats with grazed grassland and scattered scrub. The Port of Tilbury featured a large loading bay to the east of Tilbury Fort, comprising access ramps, pier, industrial buildings and seawall.

## Survey Areas

1.4. The survey area was split into two sections and then broken down into smaller compartments. Survey Area 1 was located to the north, starting from the south-east of the town of Stanford-le-Hope and finishing to the south of East Tilbury village (Figure 1 Survey Area 1) and Area 2 starting at Coalhouse Fort and finishing at Tilbury Fort to the west (Figure 2 Survey Area 2).



Figure 1: Survey Area 1. Map showing Survey Area 1, split into survey compartments by red boundary line. Contains Ordnance Survey data © Crown copyright and database rights 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



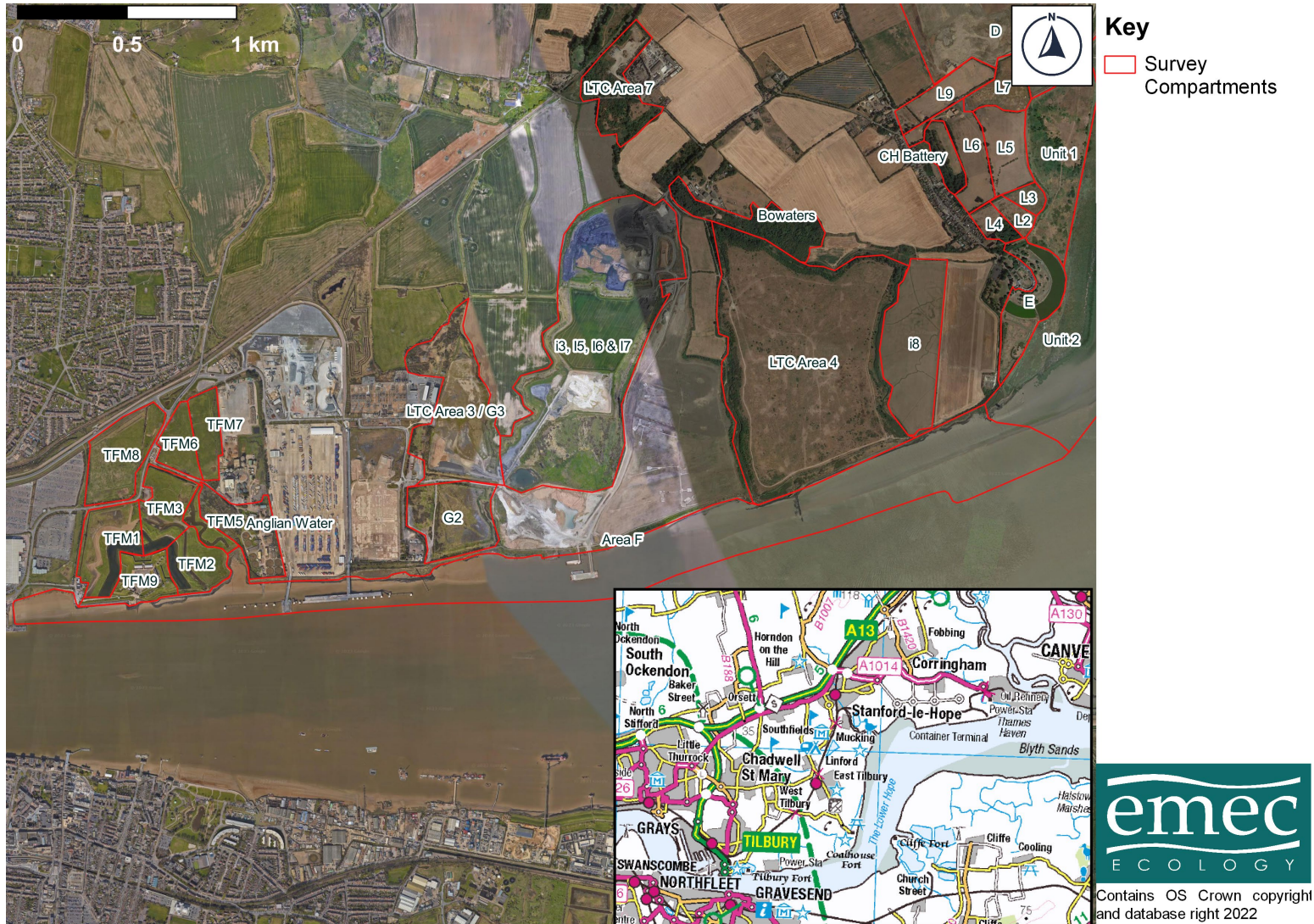


Figure 2: Survey Area 2. Map showing Survey Area 2. Survey compartments are defined by red boundary line. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#).





Figure 3: Transect routes Area A, B and C. Survey compartments are defined by red boundary line. Surveyor 1 is defined by white dashed line and Surveyor 2 defined by pink dashed line. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.ordnancesurvey.co.uk/permissions/open-street-map)





Figure 4: Transect Routes- Area A, L and CH Battery. Survey compartments are defined by red boundary line. Surveyor 1 is defined by white dashed line and Surveyor 2 defined by pink dashed line. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)





Figure 5: Transect Routes- Area i8, LTC 4, Bowaters and LTC 7. Survey compartments are defined by red boundary line. Surveyor 1 is defined by white dashed line and Surveyor 2 defined by pink dashed line. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)





Figure 6: Transect Routes – Area i3, i5, LTC 3, G2, G3, Anglian Water and TFM. Survey compartments are defined by red boundary line. Surveyor 1 is defined by white dashed line and Surveyor 2 defined by pink dashed line. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)

## Survey Area 1

### Area A

1.5. Area A was located immediately south of the town of Stanford-le-Hope and to the east of the hamlet of Mucking. Area A1 and A2 comprised an area of lowland fen with patches of scrub and grassland and a large expanse of intertidal mudflats (RSPB Stanford Wharf Nature Reserve), respectively. Unit 4 was located to the east of A2 and encompassed Mucking flats SSSI and the Thames Estuary Special Protection Area (SPA). This area of intertidal mudflats is internationally important for birds and featured valuable foraging for species of wader and wildfowl. A3 was positioned between an active industrial unit to the north and A2 to the south, encompassing a narrow strip of grassland, public footpath and drainage ditch with marginal vegetation. A small lake was located to the very north-east with marginal vegetation comprising common reed (*Phragmites australis*) and short grassland grazed by wildfowl. The very south-western section supported a sandy bank and a large rabbit warren, located within the existing SSSI, on the northern bank of Mucking Creek, this offered suitable nesting habitat for shelduck (*Tadorna tadorna*). Area A4, A5 and A6 encompassed the now flooded gravel pit know as Stanford Warren Nature Reserve and The Warren Fishery which featured a large expanse of lowland fen and lowland open water and marginal vegetation, respectively. Area A7 comprised a parcel of grazed lowland damp grassland fringed with reedbeds and A6 to the east and was bordered by hawthorn scrub to the west.

### Area B

1.6. Area B comprised Thurrock Thameside Nature Reserve which was actively managed by EWT. The site of a former landfill, Area B now featured grazed grassland to the north and a long strip of scattered scrub to the south, Mucking Creek (existing SSSI) filtered down through Mucking and Stanford Warren Nature Reserve and entered the estuary to the north of the visitor centre. Area B provided notable nesting and foraging habitat for a range of bird species including stonechat (*Saxicola rubicola*), starling (*Sturnus vulgaris*) and corn bunting (*Emberiza calandra*). Storage buildings were located on the border of the very north-western boundary which provided suitable nesting opportunities for pied wagtail (*Motacilla alba*).

### Area C

1.7. Area C, also known as Mucking Marshes featured a vast area of bare earth, rough grassland, scattered scrub and bodies of open fresh water. The former extraction site and subsequently landfill site was in the process of restoration for the purpose of handing over to the EWT. Area C1 was situated to the south and supported the largest area of scattered scrub and young scattered broadleaved trees. Two moderate sized waterbodies were located to the very south-eastern corner which were fringed by reedbed and an additional larger waterbody was bordered by semi-mature broadleaved woodland located to the south-west. Areas C2 and C4 were still in an actively managed state, comprising largely bare earth and sparse tall ruderal vegetation and patchy grassland of early pioneer floral species. C3 was located to the very north-west of Area C and featured largely unmanaged rough grassland and patchy scattered bramble (*Rubus fruticosus agg.*) scrub. Skylarks (*Alauda arvensis*) were abundant across this area which also offered optimum foraging suitability for barn owl (*Tyto alba*) and long-eared owl (*Asio otus*) and over wintering short-

eared owl (*Asio flammeus*). Area C5 comprised rough grassland with young plantation woodland and scrub, species included hawthorn, blackthorn, field maple (*Acer campestre*), dogrose (*Rosa canina*) and guelder rose (*Viburnum opulus*) and offered suitable nesting opportunities for nightingale (*Luscinia megarhynchos*) and lesser whitethroat (*Sylvia curruca*). Gobions Lake was located to the west of Area C and featured a large body of fresh water and marginal reedbed. Small islands were frequent across the southern section and an area of wet woodland was present on the southern bank. The large waterbody provided suitable breeding habitat for species such as greylag goose (*Anser anser*), tufted duck (*Aythya fuligula*) and pochard (*Aythya ferina*), whilst the marginal reedbeds offered reed warbler (*Acrocephalus scirpaceus*) nesting suitability.

## Area D

1.8. Also known as East Tilbury Marshes, Area D was a large former extraction and landfill site located to the south of Area C. The former workings were still present along the access track to the south and arable parcels were located to the west along Princess Margaret Road. A newly created scrape was located to the south-eastern corner which offered suitable nesting habitat for a range of waders and wildfowl. A large narrow fresh waterbody was located to the north-east of the compartment, fringed with reeds offering suitable nesting opportunities for little grebe (*Tachybaptus ruficollis*) and pochard. Management had only recently ceased and large areas of bare earth including mounds of chalk were abundant. Early colonising floral species offered high value habitat for pollinators including white melilot (*Melilotus albus*) and tufted vetch (*Vicia cracca*), although large areas of rye-grass (*Lolium sp.*) and annual beard grass (*Polypogon monspeliensis*) were present towards the highest point, to the south. The topography was undulating with the summit located towards the centre of the survey area towering above the estuary to the east. The land sloped away to the south and north with a flat area of grassland to the north. A small disused sewage works was located to the very north-east of the area and featured patchy scrub and rough grassland. A drain inundated with reeds ran north to south along the eastern boundary and east of this the seawall, saltmarsh, intertidal mudflats and Thames Estuary. This linear water body offered suitable nesting opportunities for shy, reclusive species such as water rail (*Rallus aquaticus*).

## Area L

1.9. Area L was split into several smaller compartments named L2 – L9. L2 – L4 comprised rough equestrian grazing paddocks and a small broadleaved woodland compartment to the south-east. A large unmanaged hedgerow and public footpath ran from the village of East Tilbury to Unit 1 and the estuary to the west. L6 and L5 featured cattle grazing pasture comprising a very short sward during the time of the survey, a line of mature oaks ran south to north through the middle of the two compartments. Coalhouse Battery was located to the west of L6 and comprised an old gun emplacement to support Coalhouse Fort just a short distance to the south. Dense overgrown scrub was dominant and offered suitable nesting habitat for scrub dwelling species. Areas L7 was used as a campsite, featuring rough grassland which had been cut in places to allow access. L8, located to the north-east was used for hay and offered suitable nesting habitat for species such as quail (*Coturnix coturnix*) and corn bunting. L9 comprised a grazing parcel and featured a short sward, dense scrubby hedgerows bordered this parcel and offered optimum foraging habitat for species such as lapwing (*Vanellus vanellus*), capitalising on the large number of invertebrates foraging within the cattle dung.

## Unit 1

1.10. Unit 1 comprised the SSSI grassland which ran from Coalhouse Fort to the top of L8 and was designated for its floral diversity. A raised bank was present along the eastern boundary which separated the area from the Thames Estuary. Rough grassland was present throughout with pockets of dense bramble scrub, reeds and willow (*Salix sp.*). Although small in comparison to Areas B, C and D, Unit 1 offered optimum habitat for whitethroat (*Sylvia communis*), grasshopper warbler (*Locustella naevia*) and stonechat.

## Units 2 - 4

1.11. Units 2 - 4 comprised the intertidal zone, located along the estuary from Coalhouse Fort to Stanford-le-Hope Marshes in the north. This linear strip to the east of the seawall featured saline plant communities, small saline pools and mudflats that offered valuable nesting opportunities for species such as stonechat, reed bunting (*Emberiza schoeniclus*) and meadow pipit (*Anthus pratensis*). The mudflats offered valuable foraging suitability for passage waders such as black-tailed godwit (*Limosa limosa*) and curlew (*Numenius arquata*).

## Survey Area 2

### Area E

1.12. This area encompassed Coalhouse Fort comprising a series of concrete structures used for its defensive position adjacent to the River Thames. The fort was built in the 19th century and featured a large brackish moat to the east, amenity grassland and scattered broadleaved trees. Coalhouse Point was located to the very southern tip of Area E and jutted out into the estuary. Area E1 featured rough damp grassland and was bordered by brackish drains. The fort and adjacent grassland supported foraging and nesting opportunities for species such as [REDACTED], pied wagtail and stock dove (*Columba oenas*). Due to the gabion un-vegetated banks, the moat offered limited foraging suitability to [REDACTED] including little grebe, tufted duck and little egret (*Egretta garzetta*).

### I8

1.13. Area I8 comprised a vast flat arable parcel with two drains that ran along the eastern and western boundaries. The present habitat offered suitable nesting and foraging suitability for species such as skylark.

### LTC Area 4

1.14. The above area comprised a large parcel of rough grassland which was lightly grazed by ponies. The light grazing and provision of dung provided optimum foraging and nesting suitability for corn bunting, stonechat, skylark and grasshopper warbler. Long-eared owl and barn owl were also likely to forage within the lightly managed grassland. A large drain ran along the eastern boundary and featured bankside vegetation comprising scattered scrub and reeds. This marginal habitat provided suitable nesting opportunities for wildfowl and reed, sedge (*Acrocephalus schoenobaenus*) and Cetti's warbler (*Cettia cetti*). Similarly, a drain ran along the western edge, this comprised pockets of dense scrub which provided suitable nesting habitat for nightingale.

## **Bowaters**

1.15. Bowaters was an area of dense overgrown scrub to the north of LTC Area 4 and to the south of Bowaters Farm. A public footpath and drain ran east to west along the southern edge and a number of small barns were located within the central compartment. The western section comprised largely patchy scattered scrub, which offered suitable nesting habitat for whitethroat and other common scrub species, whilst the eastern compartment featured dense, tall stands of blackthorn and hawthorn. [REDACTED] whilst the dense reeds within the drain offered suitable nesting habitat for reed, sedge and Cetti's warbler. Patchy scrub was found to the south-east of Bowaters and on the adjacent side of the drain (LTC 4) this habitat offered suitable nesting habitat for garden warbler (*Sylvia borin*) and lesser whitethroat. [REDACTED].

## **LTC Area 7**

1.16. The above area comprised an area of dense scrub adjacent to an active scrap yard to the north of Station Road and a disused extraction site to the south. The southern area featured scattered scrub, broadleaved trees and tall ruderal vegetation. A small pond was located to the eastern boundary with arable farmland to the east. The scattered scrub and damp areas provided suitable nesting habitat for nightingale and Cetti's warbler.

## **Ashfields (LTC Area 3, I3, I5 – I7)**

1.17. The ashfields to the north comprised large compartments of active workings, these areas comprised very little vegetation other than along the fringes, therefore offering very limited suitability to nesting birds. The areas to the south, including I3 and the southern end of I6 offered a mosaic of scattered scrub, rough grassland and marshy depressions. This unmanaged mosaic offered a range of habitats for species such as cuckoo (*Cuculus canorus*) and its host species such as reed warbler which will have utilised the reedy areas around the waterbody to the south. The patchy scrub offered suitable nesting opportunities for nightingale whilst the marshy areas provided suitable foraging habitat for marsh harrier (*Circus aeruginosus*).

## **LTC Area 3, G2 and G3**

1.18. The southern areas of these survey compartments comprised recently worked spoil heaps, that towered above the estuary to the south. Early pioneer vegetation had been surpassed and bramble scrub and grassland was dominant. The plateau of area G2 offered suitable nesting habitat for linnet (*Linaria cannabina*) and stonechat whilst the more established scattered scrub and rough grassland to the north provided dense tall stands that offered refuge for whitethroat and dunnoek (*Prunella modularis*). The northern area was located adjacent to Walton Common and West Tilbury Marshes, which featured an extensive arable hay meadow fringed with overgrown, defunct hawthorn hedgerows. A series of large electricity pylons criss-crossed this compartment and the scrub and arable grassland provided suitable nesting opportunities for yellowhammer (*Emberiza citrinella*).

## **Port of Tilbury, Disused Power Station and Anglian Water**

1.19. The above areas were not located within the survey area but were surveyed from the public right of way along the seawall to the south. The active industrial nature of these areas meant that much of the land was unsuitable for many target species. [REDACTED]

1.20. The above compartments comprised Tilbury Fort, adjacent damp grazing grassland and intertidal moats. The fort itself comprised a number of buildings and walls built in the 16th century to act as a defensive structure along the River Thames. The buildings (TFM 9) provided suitable nesting opportunities for pied wagtail and stock dove and the surrounding short grassland provided foraging suitability for said species. High numbers of ponies grazed the grassland surrounding the moat and very patchy scrub was present but was largely too exposed to offer suitable nesting opportunities. The large moats provided foraging suitability for wildfowl including great crested grebe (*Podiceps cristatus*) whilst the adjacent damp grassland (TFM 1, 2, 3 and 5) provided mute swan (*Cygnus olor*) foraging suitability. The grazing paddocks to the north of this area comprised area of patchy long grassland and ruderal vegetation and were bordered by overgrown hawthorn and blackthorn hedgerows. The drain along the west of TFM 8 provided dense scrubby hedgerows offering suitable nesting habitat for Cetti's warbler and whitethroat whilst the rough grassland of TFM 6 – 7 offered suitable foraging habitat for kestrel (*Falco tinnunculus*).



## 2 Methodology

### Breeding Bird Survey

2.1. An adapted version of the Common Bird Census (CBC) methodology (Gilbert and others. 1998; Bibby and others. 2000) was followed in which a surveyor walks a chosen transect route, and the identity and activity of all birds were noted on a GPS enabled device. The types of observations, using the British Trust for Ornithology (BTO) activity codes were used during the survey work and can be seen in Appendix 1 BTO Behaviour Codes.

2.2. Seven survey visits were carried out between April and July (inclusive), with a minimum of at least seven days between return visits. Surveys targeting diurnal species were undertaken no later than 30 minutes before sunrise and were completed no later than 11:00, i.e. when bird activity is high (Table 1 Survey Details and Weather Conditions). Surveys were restricted to days with suitable weather (e.g. wind force <3, good visibility and no periods of prolonged heavy rain). Evening visits were undertaken to target crepuscular and nocturnal species, these commenced in the last few hours of the day and extended two hours past sunset. A handheld GPS device was used to map the locations of all target bird species, recording exactly where the birds were holding territories and to follow pre-determined transect routes.

### Assemblage Species

2.3. Surveys focussed on targeting breeding bird assemblages, associated with the following habitats as set out in Chapter 17 of Joint Nature Conservation Committee (JNCC) SSSI Guidelines (Dewitt and others 2020). The assemblage habitats found within the survey area comprised; lowland scrub, lowland farmland, lowland fen (without open water), lowland open waters and their margins and lowland damp grassland (Tables 4 - 8 Habitat Assemblages). Exact numbers of breeding territories / pairs were recorded across the entirety of the survey area.

### Survey Details

2.4. EMEC Ecology carried out the above surveys on the dates provided in Table 1 Survey Details and Weather conditions, below. The surveys were carried out by Greg Gilmore BSc (Hons), Jake Hill BSc (Hons) and Adrian Dutton BSc (Hons), all of whom are experienced in undertaking breeding bird surveys professionally, through working as ecologists on a range of bird surveys for different projects and clients. The survey area was split between the aforementioned surveyors, with Area 1 and Area 2 surveyed on separate days, comprising a total of 12 surveyor hours per day to cover the predetermined transect routes.

Table 1 Survey Details and Weather Conditions

Survey	Visit no.	Date	Dawn / Dusk	Survey Time	Weather Conditions
Morning	1 / 7	28 <sup>th</sup> April	05:34	05:00 – 11:00	7°C, rising to 15°C by 11:00. Wind (NE) Beaufort:2 Cloud Okta: 6. Dry.
Morning	1 / 7	29 <sup>th</sup> April	05:32	05:00 – 11:00	5°C, rising to 9°C by 11:00. Wind (NE) Beaufort:2 Cloud Okta: 5. Dry.
Morning	2 / 7	12 <sup>th</sup> May	05:10	04:40 – 10:30	7°C, rising to 15°C by 11:00. Wind (SW) Beaufort: 3 Cloud Okta: 4. Dry.
Morning	2 / 7	13 <sup>th</sup> May	05:08	04:40 – 10:30	10°C, rising to 15°C by 11:00. Wind (SW) Beaufort: 2 Cloud Okta: 4. Dry.
Morning	3 / 7	26 <sup>th</sup> May	04:51	04:20 – 10:30	11°C, rising to 16°C by 11:00. Wind (SW) Beaufort:3 Cloud Okta: 4. Dry.
Morning	3 / 7	27 <sup>th</sup> May	04:50	04:20 – 10:30	11°C, rising to 16°C by 11:00. Wind (SW) Beaufort: 3 Cloud Okta: 4. Dry.
Morning	4 / 7	9 <sup>th</sup> June	04:41	04:10 – 10:30	11°C, rising to 18°C by 11:00. Wind (W) Beaufort:3 Cloud Okta: 3. Dry.
Morning	4 / 7	10 <sup>th</sup> June	04:41	04:10 – 10:30	16°C, rising to 20°C by 11:00. Wind (SW) Beaufort: 2 Cloud Okta: 2. Dry.
Evening	5 / 7	23 <sup>rd</sup> June	21:19	20:00 – 23:00	22°C, dropping to 18°C by 23:00. Wind (S) Beaufort:1 Cloud Okta: 1. Dry.
Evening	5 / 7	24 <sup>th</sup> June	21:19	20:00 – 23:00	18°C, dropping to 17°C by 23:00. Wind (S) Beaufort:2 Cloud Okta: 7. Light shower at 22:30.
Evening	6 / 7	30 <sup>th</sup> June	21:18	20:00 – 23:00	16°C, dropping to 13°C by 23:00. Wind (SW) Beaufort:2 Cloud Okta: 2. Dry.
Evening	6 / 7	1 <sup>st</sup> July	21:18	20:00 – 23:00	17°C, dropping to 15°C by 23:00. Wind

Survey	Visit no.	Date	Dawn / Dusk	Survey Time	Weather Conditions
					(SW) Beaufort:1 Cloud Okta: 2. Dry.
<b>Evening</b>	7 / 7	6 <sup>th</sup> July	21:16	20:00 – 23:00	22°C, rising to 18°C by 11:00. Wind (NW) Beaufort:3 Cloud Okta: 5. Dry.
<b>Evening</b>	7 / 7	7 <sup>th</sup> July	21:15	20:00 – 23:00	24°C, rising to 18°C by 11:00. Wind (NW) Beaufort:1 Cloud Okta: 1. Dry.

## Nocturnal Recording

2.5. An Olympus DM-670 and LS-12 digital audio recorders and a RODE VideoMic recorder were deployed within key areas to target specific cryptic species likely to be present and active prior and during the hours of darkness. Data was subsequently analysed through 'Audacity' a sound analysis software, which would allow the analysis of the data through sonograms of bird calls / songs. Species targeted and the areas where the recorders were placed are detailed in Table 2 Nocturnal Recording Survey, below. Due to the presence of optimum nesting habitat within the dense scrub, long-eared owl was targeted within the Bowaters area. Water rail was targeted within Area A6 as a previous registration was recorded during a prior visit. Quail were targeted within Areas C3 and D as previous registrations were recorded during a prior visit.

Table 2 Nocturnal Recording Survey

Recorder	Visit no.	Date	Target Species	Survey Time	Survey Area
DM-670	3 / 7	26 <sup>th</sup> May	LE, N.	20:00 – 05:00	Bowaters X: 567899 – y: 176993
DM-670	4 / 7	9 <sup>th</sup> June	WA	20:00 – 05:00	Area A6 x: 568710 - y: 181297
DM-670	5 / 7	22 <sup>nd</sup> June	WA	20:00 – 05:00	Area A6 x: 568844 – y: 181526
DM-670 and LS-12	6 / 7	30 <sup>th</sup> June	Q.	20:00 – 07:00	Area C (PRoW) x: 568313 – y: 180956 x: 568279 – y: 180811
DM-670 and LS-12	7 / 7	5 <sup>th</sup> July	Q.	20:00 – 07:00	Area D x: 568987 – y: 178762 x: 568520 – y: 177926
LS-12	7 / 7	6 <sup>th</sup> July	Q.	20:00 – 07:00	Area C (PRoW) x: 568313 – y: 180956

### Survey Limitations

2.6. Due to the scale of the survey area and cryptic behaviour of certain species of birds e.g. bittern (*Botaurus stellaris*) it was possible that some bird species were missed. However, since the majority of breeding birds are 'tied' to their nest sites for a number of weeks over the breeding season, the regular sightings of particular species showing breeding behaviour in certain areas is considered to provide reliable evidence of breeding bird status within the survey area.

2.7. The commencement of the surveys was towards the very end of April, which pushed the subsequent dates later into the season. Therefore, evidence of breeding likely diminished into the latter visits, such that early breeders (e.g. grasshopper warbler *Locustella naevia*) may have been under recorded.

2.8. Access was limited to certain compartments of the survey area during some of the visits, especially the area surrounding the active ash fields (Areas I5 – I7) and area LTC Area 7, as such notable target species were likely under recorded.

2.9. The dense stands of tall scrub within Bowaters meant that surveying this area was only achieved from the public right of way to the south and arable field boundary to the north, such that species within the centre of this compartment may have been under recorded.

## 3 Results

### Assemblage Species

3.1. A species list detailing all the assemblage species recorded during the survey is provided in Tables 3 Assemblage Species and territories within the survey area, which also gives scientific names; therefore, common names of these species are used in the text hereafter. An excel spreadsheet documenting the territories of possible, probable and confirmed assemblage species is provided with the report. Non-assemblage species recorded during the survey are detailed in Table 9 Non-Assemblage Species

Table 1 Assemblage Species and territories within the survey area, blank cells indicate where species were not present as confirmed or probable breeders. Some cells are left intentionally blank.

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<b>Avocet</b> <i>Recurvirostra avosetta</i>				Present		Probable - P	2 / 2		Pair foraging
<b>Barn owl</b> <i>Tyto alba</i>		Present				Confirmed - FF	2 / 3		Carrying food to nest site
<b>Buzzard</b> <i>Buteo buteo</i>		Present				Foraging / Possible - H	0 / 3	C & Gobions Lake	Foraging in a similar location on more than one occasion

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<b>Corn bunting</b> <i>Emberiza calandra</i>		Present				Probable - T	24 / 38	B, D, L, Unit 1, LTC 4 & i8	Singing in similar location on more than one occasion
<b>Cuckoo</b> <i>Cuculus canorus</i>	Present	Present	Present	Present	Present	Confirmed - FL	17 / 19	A, B, D, Unit 1, E, LTC 4, G3 & i3,	Juvenile observed and singing birds in similar locations on more than one occasion
<b>Common tern</b> <i>Sterna hirundo</i>				Present		Possible - H	0 / 1	D	Flying over suitable habitat
<b>Curlew</b> <i>Numenius arquata</i>		Present			Present	Non-breeder - M	0	Units 2 - 4	Foraging on mudflats
<b>Cetti's warbler</b> <i>Cettia cetti</i>			Present	Present		Probable - T	66 / 99	A, B, Gobions Lake, C, D, Unit 1, E, LTC 4, i3, G2 and G3 & Tilbury Fort	Singing in similar location on more than one occasion

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<b>Little egret</b> <i>Egretta garzetta</i>				Present	Present	Foraging / Possible - H	0 / 2	Gobions Lake	Communal roost within adjacent trees
<b>Gadwall</b> <i>Mareca strepera</i>				Present	Present	Confirmed - FL	10 / 14	A, D, E, LTC 4 & Tilbury Fort	Female with juveniles and pair
<b>Great crested grebe</b> <i>Podiceps cristatus</i>				Present		Confirmed - FL	6 / 7	Gobions Lake, C, D & Tilbury Fort	Family with juveniles and pair
<b>Grasshopper warbler</b> <i>Locustella naevia</i>	Present		Present	Present		Confirmed - FL	3 / 5	Unit 1 & LTC 4	Juvenile observed and singing in a similar location on more than one occasion
<b>Greylag goose</b> <i>Anser anser</i>				Present		Confirmed - FL	4 / 9	Gobions Lake & D	Family with juveniles
<b>Grey wagtail</b>				Present		Confirmed - FL	2 / 2	Anglian Water	Juveniles and carrying food

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<i>Motacilla cinerea</i>									
<b>Garden warbler</b> <i>Sylvia borin</i>	Present					Probable - T	1 / 1	Bowaters	Singing in a similar location on more than one occasion
<b>Heron</b> <i>Ardea cinerea</i>			Present	Present	Present	Possible - H	0 / 1	Gobions Lake	Roosting on island
<b>Kestrel</b> <i>Falco tinnunculus</i>		Present				Foraging / Confirmed - FL	3 / 4	A, C & Tilbury Fort	Carrying food and pair
<b>Kingfisher</b> <i>Alcedo atthis</i>				Present		Probable - D	1 / 2	A	Pair displaying
<b>Lapwing</b> <i>Vanellus vanellus</i>		Present			Present	Confirmed - DD	4 / 7	D & Unit 1	Diversionsary display
<b>Long-eared owl</b>	Present					Confirmed - FL	1 / 2	██████████	Juveniles



Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<i>Asio otus</i>									
<b>Little grebe</b> <i>Tachybaptus ruficollis</i>				Present		Confirmed - FL	7 / 11	A, C, D & E	Family with juveniles and pair
<b>Linnet</b> <i>Linaria cannabina</i>	Present	Present				Confirmed - FL	56 / 83	A, B, C, D, Unit 1, LTC 4, Ashfields and LTC Area 3, G2 & G3	Juveniles, Pairs and Singing in a similar location on more than one occasion
<b>Little ringed plover</b> <i>Charadrius dubius</i>				Present		Probable - P	4 / 5	██████████	Four pairs ██████████
<b>Long-tailed tit</b> <i>Aegithalos caudatus</i>	Present					Confirmed - FL	18 / 23	A, B, Gobions Lake, C, E, Bowaters, G3 & Tilbury Fort	Pair, agitated behaviour, nest, family with juveniles
<b>Lesser whitethroat</b>	Present					Probable - T	13 / 25	A, B, Gobions Lake, C, L, Unit 1, E & LTC 4	Singing in a similar location on more than one occasion

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<i>Sylvia curruca</i>									
<b>Magpie</b> <i>Pica pica</i>		Present				Confirmed - FL	27 / 43	A, B, C, D, L, E, i8, LTC 4, i3, G2 & Tilbury Fort	Calling / multiple birds in a similar location on more than one occasion, agitated behaviour, and juveniles
<b>Marsh harrier</b> <i>Circus aeruginosus</i>		Present	Present	Present	Present	Foraging	0 / 2	D, Unit 2 & i3 / LTC 3	Male and female observed foraging on separate occasions
<b>Mute swan</b> <i>Cygnus olor</i>				Present	Present	Confirmed - FL	6 / 8	A, Gobions Lake, C, D & Tilbury Fort	Nest and Family with juveniles
<b>Nightingale</b> <i>Luscinia megarhynchos</i>	Present					Confirmed - FL	21 / 28	A, Bowaters, LTC 4, LTC 7, i3 & Anglian Water	Juveniles, agitated behaviour and singing in a similar location on more than one occasion

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<b>Pochard</b> <i>Aythya ferina</i>				Present	Present	Confirmed - FL	13 / 15	A, Gobions Lake, C, D, LTC 3 & Tilbury Fort	Family with juveniles and pair
<b>Pied wagtail</b> <i>Motacilla alba</i>		Present				Confirmed - FL	9 / 12	A, B, L, E & Tilbury Fort	Juveniles, pair and singing in a similar location on more than one occasion
<b>Quail</b> <i>Coturnix coturnix</i>		Present				Possible - H	0 / 4	C, D & L	Singing on one occasion in suitable nesting habitat
<b>Reed bunting</b> <i>Emberiza schoeniclus</i>		Present	Present	Present	Present	Probable - P	11 / 27	A, Unit 4, Unit 1, E & G3	Pair and singing in a similar location on more than one occasion
<b>Redshank</b> <i>Tringa totanus</i>				Present	Present	Probable - A	3 / 4	D	Pair displaying agitated behaviour
<b>Rook</b>		Present				Confirmed - ON	90 nests	Gobions Lake	Rookery – c90 nests

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<i>Corvus frugilegus</i>						(Rookery – c90 nests)			
<b>Ringed plover</b> <i>Charadrius hiaticula</i>				Present		Confirmed - NE	3 / 3	D & LTC 3	Nest with eggs, diversionary display and pair
<b>Reed warbler</b> <i>Acrocephalus arundinaceus</i>			Present	Present		Confirmed - FL	39 / 78	A, Gobions Lake, C, D, Unit 1, LTC 4, G2 & G3	Family with juveniles, carrying food and singing in a similar location on more than one occasion
<b>Stock dove</b> <i>Columba oenas</i>		Present				Probable - T	12 / 18	A, Unit 3, Battery, E, Bowaters, i3, G2 & Tilbury Fort	Probable nest site, singing in a similar location on more than one occasion and pair
<b>Swallow</b> <i>Hirundo rustica</i>		Present				Confirmed - NY	3 / 3	A, E & Bowaters	Nest with juveniles, juveniles and pair

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<b>Snipe</b> <i>Gallinago gallinago</i>			Present	Present	Present	Non-breeder - M	0 / 1	C	Single bird flushed from day roost
<b>Shelduck</b> <i>Tadorna tadorna</i>				Present	Present	Confirmed - FL	5 / 20	I3, F & Tilbury Fort	Family with juveniles, agitated behaviour and pair displaying
<b>Shoveler</b> <i>Spatula clypeata</i>				Present	Present	Probable - P	2 / 3	Unit 2 & LTC 4	Pair
<b>Sedge warbler</b> <i>Acrocephalus schoenobaenus</i>			Present	Present	Present	Probable - T	10 / 31	A, D, Unit 1 & LTC 4	Singing in a similar location on more than one occasion
<b>Teal</b> <i>Anas crecca</i>				Present	Present	Probable - P	2 / 3	Unit 3 & D	Pair
<b>Tufted duck</b>				Present		Confirmed - FL	21 / 21	A, B, Gobions Lake, C, D, E,	Family with juveniles and pair

Species	Scrub	Lowland Farmland	Lowland Fen	Open Water	Damp Grassland	Breeding Status	Min / Max Breeding Territories	Survey Area	Evidence Indicating Breeding
<i>Aythya fuligula</i>								i3 & Tilbury Fort	
<b>Water rail</b> <i>Rallus aquaticus</i>			Present	Present		Probable - A	2 / 3	A & D	Agitated behaviour
<b>Yellowhammer</b> <i>Emberiza citrinella</i>	Present	Present				Probable - T	1 / 1	G3	Singing in a similar location on more than one occasion
<b>Yellow wagtail</b> <i>Motacilla flava</i>		Present		Present	Present	Confirmed - FL	7 / 9	D & LTC 3	Juveniles, agitated behaviour and pair

3.2. The number of territories for each species within the survey area was estimated according to standard BTO protocols (Appendix 1 BTO Behaviour Codes), these comprised evidence of possible, likely probable or confirmed breeding.

3.3. Territory maps for probable and confirmed breeding assemblage species can be found in the Appendices and a list detailing the number of breeding assemblage pairs and evidence for this can be found in Table 3 Assemblage Species and territories within the survey area, above. There was a certain level of cross-over between species found within the habitat assemblages, i.e. cuckoo was found on the all the aforementioned assemblage habitats, such that species was discussed once only.

## Breeding Bird Assemblages – Habitats and Species

3.4. A total of 24 confirmed assemblage breeders were recorded from the survey, with an additional 16 probable breeders and four possible breeders. All possible, probable and confirmed assemblage species are discussed within their assemblage habitats below, once a species was discussed it was not mentioned in the subsequent assemblage habitats, even if listed as a target species.

3.5. The possible breeders comprised, common tern, heron, little egret and quail. All said species were recorded utilising the survey area whether for foraging or roosting, although evidence was not conclusive that breeding was taking place. A small group of common tern were observed flying over the scrape on Area D, which offered highly suitable nesting habitat for this species. However, no other records of common tern were recorded within this area on subsequent visits. Both heron and little egret were observed communally roosting within the tall trees surrounding the margins of Gobions Lake and within the islands. The trees offered highly suitable nesting habitat for these species although no nests or nesting behaviour was recorded. Four quail territories were recorded from Area C1, D and L8, the latter of which was cut for hay following the initial singing quail record. Following nocturnal audio recordings and daytime surveys no subsequent records of singing quail were recorded in the previous locations. It was deemed that singing males may have fallen silent following the establishment of territories or that birds had simply passed through, such that this species was recorded as a possible breeder only.

### Scrub

3.6. The survey area featured substantial areas of dense and scattered patchy scrub, Bowaters comprised well established tall dense blocks of predominantly hawthorn and blackthorn scrub whilst Area LTC and Area A provided patchy and marginal areas offering a refuge for various scrub dwelling species. Six scrub assemblage species were recorded as confirmed breeders and three were probable breeders, within the scrub habitats of the survey area. The confirmed breeders comprised: cuckoo, grasshopper warbler, linnets, [REDACTED] long-tailed tit and nightingale. Probable breeders included garden warbler, lesser whitethroat and yellowhammer.

### Cuckoo

3.7. Cuckoo were found across the survey area with the highest number of territories found within Area A and B, likely due to the concentration of reed warbler (host species). Cuckoo were seen displaying and singing around the reedbed and scrub areas of Area A and a recently fledged juvenile was observed towards the south of the Warren Fishery and to the south of Area E. A scattering of territories for cuckoo were found along the eastern edge of Area D, down through Unit 1 and Area E, with territories recorded along the drains bordering LTC 4. A single territory was identified within the marshy area of i3 and the scrubby area of G3. Evidence of breeding largely came from territories identified through singing males recorded on more than one visit from a similar location. Displaying and courtship behaviour was also noted between male and female birds within Area A3, the north-eastern border of Area D and the south-eastern border of LTC 4. Cuckoo were found on all assemblage lists that related to the habitats found within the survey area, such that cuckoo will not be discussed further within the results sections below.

## **Grasshopper warbler**

3.8. Two grasshopper warbler territories were identified within the SSSI grassland (Unit 1) and LTC 4. The former record comprised a recently fledged juvenile that was foraging along scrub adjacent to the seawall, recorded on two occasions during the latter stages of the survey. The latter territory was identified through a singing bird noted on two separate visits, found singing within the same patch of bramble scrub located to the north-east of LTC 4. Two possible territories were recorded to the north-west of Unit 1 of a singing bird recorded within bramble scrub on one occasion and similarly a singing bird located to the north-east of Area D.

## **Linnet**

3.9. Linnet were widespread across the survey area, favouring rough grassland and scrub habitats, such that a minimum of 56 territories were recorded. The majority of recordings comprised pairs and territories identified through singing males across more than one visit. The highest concentration was found within the patchy scrub and rough grassland of Area B, favouring the southern edge which was not under rotational grazing. Other evidence of breeding was recorded along the east of the seawall in Unit 1, LTC 4 and the more vegetated areas of i3 and G3. These areas offered nesting suitability within patches of scrub and foraging within rough grassland.

## **Long-eared owl**

3.10. Long-eared owl were not recorded until later in the season, during which time chicks were more conspicuous as they begged loudly to nearby parent birds. A minimum of four recently fledged young were heard calling and seen moving [REDACTED]. An additional possible territory for this species was identified within Area [REDACTED]. An adult bird was observed flying purposefully and low [REDACTED] deemed to be foraging.

## **Long-tailed tit**

3.11. Long-tailed tit were found frequently within the areas of scrub and patchy woodland to the north of the survey area. Including the dense scrub surrounding Stanford Warren to the west of A5 and similarly within the wooded areas of Gobions Lake and the smaller waterbody to the south.

## **Nightingale**

3.12. Nightingale were recorded across the patches of dense scrub found within the survey area. Favouring the dense scrub found at Bowaters, twelve territories were identified within or adjacent to the public right of way that lead east to the village of East Tilbury and Coalhouse Fort. Other scattered territories were identified within a bank of scrub to the north of Area B, within the newly planted scrub and trees of Areas C1 and C5, with recently fledged young found along the seawall to the very south-east of C1 and singing within the scrubby marshy area of i3. A single territory was found within the Anglian Water plant, featuring dense unmanaged scrub to the east of Tilbury Fort. Additional possible territories were recorded around Stanford Warren (A5) favouring the scrub edges of the waterbodies. These records were identified during visit one, such that birds had likely passed through the area.



### **Lesser whitethroat**

3.13. Lesser whitethroat were found occasionally across the survey area with preference to the dense scrub on the northern boundary of LTC 4 and south-eastern boundary of Bowaters. Four territories were recorded from the northern and southern boundaries of Area L, the dense double hedgerow to the south of Area E and within the scattered scrub of Unit 1. Other territories for this species were identified within the marginal scrub surrounding Stanford Warren (Area A5), Area B and Gobions Lake.

### **Garden warbler and Yellowhammer**

3.14. A single garden warbler territory was recorded within a strip of patchy scrub along a drain between LTC 4 and Bowaters. Evidence of breeding comprised a singing male recorded on two separate visits. Similarly, a single yellowhammer territory was identified on the very northern boundary of G2, again evidence of breeding comprised a singing male observed within a stand of dense hawthorn scrub on the edge of an arable parcel.

### **Lowland Farmland**

3.15. The survey area featured areas of grazing pasture, horse paddocks and hay meadows, the variety of surrounding habitat and provision of invertebrate rich dung offered valuable habitat for a number of lowland farmland species as is discussed below. The light grazing from ponies of LTC 4 offered a mosaic of different vegetation structures from short sward grassland, rank grassland and patchy scrub. The scrub provided singing perches for species such as corn bunting whilst the grassland offered suitable foraging habitat for said species. Ten confirmed lowland farmland breeders were recorded across the survey area comprising [REDACTED] cuckoo, kestrel, lapwing, linnet, magpie, pied wagtail, rook, swallow and yellow wagtail. Four probable species were recorded, including corn bunting, reed bunting, stock dove and yellowhammer. Quail was a possible breeder, with four records across the grassland of Area C, D and L8, recorded singing males on one occasion only. Buzzard and marsh harrier were evidently using the habitats within the survey area to forage but could not be determined as breeding.

### **Barn owl**

3.16. A total of two confirmed territories and a single probable territory were recorded within the survey area. Evidence of breeding included adults carrying food (Area [REDACTED]) and a pair foraging together over the grassland of Area [REDACTED]. Both male and female barn owl were observed foraging within and around Area [REDACTED] then carrying food items back to a nest site located [REDACTED]. A male and female barn owl were also observed foraging over the grassland of Area [REDACTED], and due to the vast areas of optimum foraging habitat it was deemed likely that this was a separate pair. A barn owl was observed carrying prey back to a suspected nest, located [REDACTED]. A male bird was also observed carrying prey and displaying over Area [REDACTED] and was deemed to be the same bird that was deemed to be nesting [REDACTED]. A calling barn owl was noted during the nocturnal recording of [REDACTED] during visit three, although this was only documented on the one occasion and was therefore deemed a possible territory.

## **Buzzard**

3.17. Buzzard were not deemed to be breeding within the survey area, likely due to the lack of substantial blocks of mature woodland. However, this species was recorded foraging within the reedbeds of Area A6 and grassland of C3 on multiple occasions. An additional bird was observed perched on a telegraph pole on an evening visit, located to the south-west boundary of Gobions Lake. The survey area offered optimum foraging habitat buzzard, especially within the grassland of B and C, likely to support high numbers of small mammals, reptiles and other prey items for buzzard.

## **Corn bunting**

3.18. The survey area supported a minimum of 24 corn bunting territories, largely associated with the grassland and scattered scrub of Area B and LTC 4. Evidence of breeding comprised singing males recorded on multiple occasions within a similar location. Other territories were recorded within the hay meadow of L8 and the grassland and scattered scrub found within Unit 1. The highest point of Area D also supported two corn bunting territories where singing males were observed singing atop tall ruderal vegetation.

## **Marsh harrier**

3.19. A male and female marsh harrier were observed separately during visit two. The female was observed flying in-off the estuary, west over Unit 1 towards i8 and the male was observed foraging over the marshy grassland of i3. A male was again seen foraging along Unit 1 and Area E during visit four, it then headed south-west along the estuary. Another record of this species was a male foraging over Area D during visit six, the male then headed south-west.

## **Kestrel**

3.20. One confirmed kestrel territory was observed around Area A7 with the nest site identified within the tower of Mucking Church. The pair was observed foraging over the grassland of Area A and carrying food back to the church, begging calls from juveniles were noted. A pair was observed foraging over the grassland of Area C3 during visit four and individual foraging from both male and female was recorded across the other visits. Due to the large area of optimum foraging habitat it was determined that this was likely an additional pair to the confirmed breeders identified within Mucking Church and Area A. Both male and female kestrel were observed foraging over the grassland of i8 during visit 1 and similarly a pair were noted within the grassland to the north of Tilbury Fort (TFM 6 – 7). Kestrel were recorded breeding within buildings just outside of the survey area, however as kestrel were evidently foraging within the grassland and arable parcels of the survey area, kestrel scored towards the lowland farmland breeding bird assemblage.

## **Lapwing**

3.21. Lapwing were evidently using the site for both foraging and breeding. Key areas of habitat included the moats and inlets of Tilbury Fort, grazing pastures of Area L, Unit 1 grassland and the scrape on Area D. Four confirmed recorded were noted across the survey area, evidence of breeding comprised diversionary displays which were recorded within Area TFM 3, Unit 1 grassland and the scrape on Area D. Possible breeders were noted within the short grazed grassland of Area L9 and Area D, where a maximum of 43

adults and first year birds were recorded. This was assessed as evidence of possible breeding, as the first year birds may have flown from suitable breeding habitat outside of the survey area.

### **Magpie**

3.22. A total of 26 probable territories and one record of confirmed breeding for magpie were identified across the survey area. Evidence of breeding included a recently fledged juvenile located within scrub towards the northern border of i8. The majority of probable records comprising those of birds calling from similar locations noted on more than one visit or gatherings of several magpies. Territories centralised on any area with dense scrub and scattered trees with preference to areas with adjacent grassland for foraging. Highest concentrations were found in and around Area A to the north of the survey area and around the scrubby fringed grassland of Areas L, E and LTC 4.

### **Pied wagtail**

3.23. A total of nine pied wagtail territories were recorded throughout the survey area, of these five were confirmed breeders, including adults carrying food and recently fledged juveniles. Four were probable breeders recorded singing on more than one visit in a similar location and a pair seen in suitable nesting habitat. Key areas for this species were found within Area A and B, the grazing pasture of Area L and Tilbury Fort. Nesting sites were likely present within Coalhouse and Tilbury Fort whilst farm buildings adjacent to Area B provided nesting suitability.

### **Rook**

3.24. Evidence of breeding rook was confirmed within the survey area. Two rookeries with a total of 90 nests were identified within the tall trees bordering the southern and eastern banks of Gobions Lake to the north-west of the survey area. Adults were observed in the process of building nests and sitting on nests. Adult rooks were also seen foraging on the rough grassland of Area C3 and flying over Area B, headed north.

### **Swallow**

3.25. Three probable and confirmed records of swallow were recorded within the survey area. Of these; two were confirmed breeders and comprised a nest with eggs located within a disused concrete gun emplacement to the south of Coalhouse Fort and an additional recently fledged young on telegraph wires to the north of Bowaters. The probable breeder comprised a pair observed perched and flying to a likely nest site just outside of Area A5. Adult birds were observed foraging over the waterbodies of Stanford Warren (A5) with large congregations of observed interacting over Areas B and D. 60 birds were recorded during visit seven, deemed to be pre-migration gatherings. Swallow were evidently utilising the invertebrate rich grassland found within the survey area to forage, especially areas along the estuary such as Areas C, D, Unit 1 and LTC 4.

### **Yellow wagtail**

3.26. One confirmed and three probable yellow wagtail breeding records was identified within Area D of the survey area with an additional probable territory from an adult displaying agitated behaviour recorded to the east of i3. Recently fledged young were

observed towards the summit of Area D with pairs observed holding territory on the sparsely vegetated earth of the recently capped landfill. Area D provided suitable nesting habitat within the tall ruderal vegetation and foraging around the scrape to the east and large waterbody to the north of Area D.

### **Reed bunting**

3.27. Eleven probable reed bunting territories were recorded within the survey area. Evidence of breeding comprised singing birds recorded within suitable habitat on more than one occasion and a pair observed in suitable nesting habitat. Territories were present within the reedbed of A1 and A6 and intertidal salt marsh to the east of Area D, Unit 1 and Area E. A single probable territory was identified through a pair observed in suitable nesting habitat to the north of Area G3.

### **Stock dove**

3.28. Stock dove were found occasionally across the survey area, favouring wooded areas or industrial and disused buildings such as gantry cranes and Tilbury and Coalhouse Forts. Twelve probable territories were recorded and evidence of breeding comprised pairs in suitable nesting habitat, singing birds recorded in a similar location on more than one occasion and probable nest sites. Three territories were identified on the northern boundary of A3, favouring the line of mature oaks (*Quercus robur*) and dense scrub, a likely nest site was observed within one of the gantry cranes to the east of Area B / C4. Other probable stock dove territories were identified within the disused open buildings of Coalhouse and Tilbury Fort and port loading areas and were observed foraging within the Ashfields (i7).

### **Lowland Fen (without open water)**

3.29. The only substantial area of lowland fen within the survey was located to the west of Stanford Warren (Area A6) which filtered down into Area A1 via Mucking Creek. Other areas of reedbed and drains that were inundated with reeds offered characteristics that lowland fen species such as water rail require. Area A6 and A1 provided continuous reedbed cover interspersed with small hollows and ponds. These areas were utilised as nesting habitat by reed, sedge and Cetti's warbler whilst offering suitability for foraging little egret. A total of seven lowland fen assemblage species were recorded breeding within the survey area, of these three were confirmed breeding whilst four were probable breeders. The confirmed breeders comprised cuckoo, grasshopper warbler and reed warbler, the former two have been discussed above. The probable species comprised Cetti's warbler, sedge warbler, water rail and reed bunting, the latter has been discussed above. Marsh harrier was a species recorded foraging over the survey area but was not deemed to be breeding, again this species has been discussed above. Snipe was recorded during visit four only, where a single bird was flushed from the rough grassland of Area C3. This incidental record was deemed to be a bird on migration and not breeding within the survey area. No drumming snipe were recorded during the evening visits of this area. An anecdotal record from the Natural England's aquatic invertebrate survey team identified a Savi's warbler (*Locustella luscinioides*) singing within the reedbed to the south-east of Area C1, on one occasion only. This was deemed to be a bird moving through the area as no additional records were identified during subsequent survey visits.

### **Cetti's warbler**

3.30. The habitats within the survey area provided optimum suitability for Cetti's warbler. The patchy scrub and reed beds adjacent to waterbodies provided nesting and foraging suitability. 66 probable territories were recorded across the entirety of the survey area with another possible 33. Evidence of breeding comprised singing birds recorded within a similar location on more than one occasion. Cetti's warbler were generally found across much of the survey area but were not found within areas of open grassland that lacked a water source. The highest concentration was found within Area A, favouring the reedbed of Area A6. Four probable territories were found within the marginal vegetation of Gobions Lake, with eight probable records around the southern boundary of Area C1 which featured a drain fringed with patchy scrub and reeds. Cetti's warbler were found occasionally within survey area two, with preference to boundary drains and marginal scrub.

### **Reed warbler**

3.31. Reed warbler favoured habitats within the survey area with a slightly higher preference to reedbed over the more generalist requirements of Cetti's warbler. A total of 38 territories were recorded across the survey area with an additional 39 recorded as possible breeders. Evidence of breeding comprised fledged young, singing birds within similar locations on more than one occasion, whilst possible territories identified singing birds on one occasion only. Of the 38 breeders, four were confirmed through sightings of recently fledged juveniles. High concentrations were found within the dense reedbeds of Areas A1 and A6 and the drains and marginal reeds of A3. Several probable and

confirmed records were identified within the marginal vegetation surrounding Gobions Lake and along the drain to the south of A1. The open areas of survey area two provided less optimum suitability for reed warbler, such that this species was very occasionally found along boundary drains and localised to marginal pockets of reeds.

### **Sedge warbler**

3.32. Sedge warbler were found less frequently than reed warbler, with preference to scrub fringed waterbodies over reedbed. Ten probable territories were recorded with evidence of breeding comprising singing birds within a similar location on more than one occasion. An additional 21 possible territories were recorded from singing birds on one visit only. Two probable territories were recorded along Mucking Creek that bordered Areas A and B. Other sedge warbler probable territories, included the eastern boundary of Areas D and L, Unit 1 and the eastern drain bordering LTC 4.

### **Water rail**

3.33. The cryptic nature of water rail meant that surveying for this species was less productive, with only their call giving away their presence. Audio recording equipment was deployed in areas where water rail were thought to be present. This included the dense reedbed of A6, where a singing bird was recorded during visit three and a singing bird was again recorded within a similar location during the audio recording during visit five. An additional probable territory comprised a repeated agitated call within the boundary drain to the very north-east of Area D. A possible territory was identified to the very south-east of Area D within the boundary drain fringed with reeds, however this bird was only recorded singing on the one occasion.

## **Heron and Little egret**

3.34. Heron and little egret were recorded foraging and flying over the survey area on multiple occasions, with a higher number of little egret records than heron. Foraging of the aforementioned species was concentrated along boundary drains to the north and east of Area D and LTC 4 and the moats of Coalhouse and Tilbury Forts. Heron was rarely seen foraging or resting except within the tall trees located on the eastern islands of Gobions Lake. Several little egret and low numbers of heron were observed flying to roost and roosting on the aforementioned islands, recorded on more than one occasion. Although no breeding was considered probable or confirmed it was assessed that these species were possibly breeding within the marginal mature trees and islands of Gobions Lake.

3.35. Records of foraging little egret were noted most visits, largely within the damp and intertidal areas of the survey area.

## **Lowland Open Waters and their margins**

3.36. The survey area featured a number of open waterbodies, including Stanford Warren Nature Reserve, Gobions Lake, moderate sized lakes within Areas C, D and LTC 3 and the moats of Coalhouse and Tilbury Forts. As such the survey area provided suitable foraging and nesting habitat for a range of lowland open water species, including wildfowl, waders and passerines. Thirteen species were recorded as confirmed breeders whilst eleven were probable breeders and common tern was the only species noted as a possible breeder.

## **Avocet**

3.37. Two probable breeding avocet pairs were [REDACTED] This habitat was deemed to be highly suitable breeding [REDACTED] survey area also provided highly suitable foraging habitat along the mudflats of the Thames Estuary (Units 2 - 4) notified as an SPA for waders. Approximately 200 avocet were observed during visit seven foraging along the high-tide mark to the east of Unit 1. These birds were deemed to be on migration or overwintering.

## **Gadwall**

3.38. Ten records of breeding gadwall were identified within the waterbodies of the survey area, favouring the gravel pits with marginal vegetation used to conceal nesting sites. These included nine probable breeders and one confirmed territory comprising a female with recently fledged juveniles. Concentrations were located on the scrape and larger waterbody to the south-east and north-east of Area D, respectively. Two probable territories including pairs in suitable nesting habitat were recorded on the lake to the north-east of Area A3 and within the drain feeding this. A pair was recorded within the south-eastern moat of Tilbury Fort, eastern moat of Coalhouse Fort and within the large drain to the east of LTC 4.

## **Great crested grebe**

3.39. One confirmed and five probable great crested grebe territories were identified within the survey area. Pairs within suitable habitat were noted within Gobions Lake, the two larger waterbodies located within Area C1 and the large moat of Tilbury Fort. Confirmed



breeding comprising adults with juveniles was recorded within the larger lake to the north of Area D. An adult bird was recorded towards the northern compartment of Area A5 but no subsequent records were noted, such that this was regarded as a possible breeder.

### **Grey wagtail**

3.40. The largely undisturbed areas of the Anglian Water works offered highly suitable breeding habitat within crevices and holes in buildings, whilst the abundance of invertebrates provided optimum foraging suitability for grey wagtail. Grey wagtail were recorded breeding within the Anglian Water works located to the south-east of Tilbury Fort. Two confirmed territories comprising fledged juveniles and an adult carrying food to an additional nest site were recorded. Records of single birds were also noted flying over to the loading bay and disused brick building on the dock to the south-east of the water treatment plant. Breeding could not be determined as only single birds were noted foraging.

### **Greylag goose**

3.41. Area D offered the most suitable breeding habitat for greylag goose within the survey area. This was due to the shallow sloping gravel banks which offered suitable nesting habitat and foraging areas within the adjacent grassland. Large family groups with recently fledged juveniles were recorded on the scrape of area D, Gobions Lake and the lake to the north-east of Area A3.

### **Kingfisher**

3.42. The large lakes to the north of the survey area offered optimum foraging and nesting habitat for kingfisher. Probable breeders included a pair displaying over Area A5 whilst possible breeders included individual birds, recorded foraging over a small pond to the north of Area A3 and the western bank of Gobions Lake.

### **Little ringed plover**

3.43. [REDACTED] offered highly suitable breeding and foraging habitat for little ringed plover. [REDACTED] provided optimum nesting and foraging habitat due to their [REDACTED] respectively. Four probable territories comprising pairs in suitable habitat were recorded [REDACTED]. An additional single possible territory was identified within the [REDACTED] comprising calling birds flying over on two occasions.

### **Mute swan**

3.44. The large waterbodies with islands and marginal vegetation offered optimum mute swan foraging and nesting suitability. One confirmed record of adults with recently fledged juveniles was recorded on the scrape of Area D, with five probable territories comprising pairs in suitable nesting habitat, recorded within the lake to the north-east of Area A3, Gobions Lake and the moats of Tilbury Fort. Possible breeders were noted on the large waterbody of Area A5 and the northern moat of Tilbury Fort.

## **Pochard**

3.45. Similarly, to the aforementioned wildfowl species, the survey area provided optimum breeding habitat for pochard. Eight probable breeders comprising pairs noted in suitable nesting habitat and five confirmed breeders comprising adults with juveniles were found largely to the north of the survey area. Two confirmed territories were recorded within the lake to the east of Area A3, with one family group noted within Gobions Lake, the lake to the north of Area D and the scrape on Area D. Additional probable breeders were located again on the scrape of Area D, the southern waterbodies of Area C1, two within Gobions Lake and one within the small pond inundated with reeds to the south of Area A1. An adult male pochard was observed on the south-western compartment of Coalhouse Fort moat, such that this was deemed a possible breeder.

## **Redshank**

3.46. The intertidal saltmarsh provided suitable nesting habitat for redshank, featuring damp grassland and shallow pools for foraging and dense grass for nesting. Similarly, the scrape on Area D offered similar provision including secluded islands with ruderal vegetation to offer sheltered locations for nesting sites. The larger parcels of rough grassland including Area C and D were deemed to be too dry with a lack of nearby waterbodies, that provide vital foraging habitat during the breeding season. Two probable territories and one possible territory were identified within and adjacent to the scrape on Area D. The probable breeders comprised pairs displaying agitated behaviour and a pair within suitable nesting habitat, recorded on more than one occasion, within the scrape of Area D. Records of calling redshank were identified on several other visits on and around the scrape on Area D. The possible breeder comprised a single calling bird located within the intertidal vegetation of Unit 1.

## **Ringed plover**

3.47. Three confirmed and probable ringed plover territories were located within the survey area. The probable territory was recorded on the scrape of Area D, comprising a pair observed on a gravel island to the south of the scrape. The two confirmed territories comprised a nest with three eggs location on the bare earth and gravel to the north of Area D and a diversionary display of a pair adjacent to a small inundated depression and bare earth located within Area i3.

## **Shelduck**

3.48. Shelduck were found frequently across the survey area, favouring the mudflats of Units 2 – 4 for foraging. Large numbers of up to 100 birds could be seen foraging and commuting along the estuary on all visits. Evidence of breeding was observed less frequently with only three probable territories comprising pairs displaying agitated behaviour and two confirmed breeders comprising families with recently fledged juveniles. The confirmed records derived from the estuary to the south of i3 and the large moat to the west of Tilbury Fort, such that both families had bred nearby within the survey area. Of the probable records for this species, a pair was observed on the lake of LTC 3 / i3 and three pairs displaying agitated behaviour within suitable nesting habitat of i6. Fifteen possible territories were identified across the survey area, favouring the scrape on Area D and Tilbury Fort, a pair was flushed from Mucking Creek to the north of Area B where a large rabbit warren was identified. However, breeding could not be determined here as shelduck were evidently utilising the survey area for foraging only.

## Shoveler

3.49. Shovelers were found rarely within the survey area, with two probable pairs displaying agitated behaviour within suitable nesting habitat, identified within the large drain to the east of LTC 4 and within the intertidal vegetation to the east of Coalhouse Fort. The aforementioned drain offered dense margins of reeds, ideal for concealing a nest site. Similarly, the intertidal grassland to the east of Coalhouse Fort offered small pools and dense saltmarsh offering optimum nesting suitability for shoveler. Two pairs were observed on the scrape of Area D, recorded from one visit only. Deemed to be failed breeders during the mid-June visit.

## Teal

3.50. Similarly, to the above species teal was found rarely within the survey area. A conspicuous breeder, favouring shallow pools and densely vegetated banks, two probable territories, comprising pairs in suitable breeding habitat were recorded. One was located within Mucking Creek between Areas A and B, whilst the other was identified on the scrape of Area D. The bankside vegetation of Mucking Creek comprised dense saltmarsh vegetation and small pools and inlets, whilst the scrape offered ruderal vegetated gravel islands and shallow reed fringed banks, such that these areas were deemed to provide optimum nesting habitat for teal.

## Tufted duck

3.51. Tufted ducks were abundant across the survey area, with at least one pair recorded on all major waterbodies. 20 probable breeding pairs were noted, to the north of the survey area on the waterbodies of Gobions Lake, Area A, C and D. These waterbodies provided densely vegetated banksides offering optimum nesting suitability for tufted duck. A late breeder, with the young hatching generally in June, only one confirmed breeding record was identified within the lake to the north-east of Area A3. The highest concentration comprising seven pairs derived from Gobions Lake, its large size offering various inlets and islands which were likely used for nesting.

## Lowland Damp Grassland

3.52. The only continuous coverage of lowland damp grassland was found within Area A7 and Area L8, albeit the latter was cut for hay towards the later survey visits. Area A7 was intensively grazed by a herd of bullocks although patches of rushes (*Juncus sp*) were located to the southern section of this compartment. Due to a cross-over of habitat requirements, many of the lowland damp grassland assemblage species have been discussed within the aforementioned habitats above. Eight damp grassland assemblage species were confirmed breeders, including cuckoo, gadwall, grasshopper warbler, lapwing, mute swan, pochard, shelduck and yellow wagtail. Five probable breeders comprised redshank, reed bunting, sedge warbler, shoveler and teal. Possible breeders included heron and little egret, as breeding for these species could not be determined. Marsh harrier and little egret have been discussed above as utilising the habitat within the survey area for foraging, although again breeding could not be determined. Other species listed within the assemblage list but were either migrating or foraging, comprised curlew, black-tailed godwit and snipe. The former two were observed foraging along the mudflats of Unit 2- 4 and displayed no characteristics to indicate breeding for these species. The intertidal mudflats evidently offered valuable foraging opportunities, such that large

numbers of up to 100 black-tailed godwit were observed during the seventh visit, with smaller groups of curlew identified during the early stages of the survey.

## Non-Assemblage Species

### Black redstart

3.53. Black redstart is a rare breeding bird within England with only three probable territories recorded for Essex in 2017 (Rare Breeding Birds Panel and British Birds 2017). Moreover, the [REDACTED] provided suitable black redstart nesting habitat within [REDACTED]. The intertidal saltmarsh [REDACTED] provided a mosaic of highly suitable foraging habitat for said species.

3.54. Not noted on any breeding bird assemblage list, black redstart requires specific habitat requirements to replicate their natural breeding habitat comprising scree and montane areas with short ephemeral plant communities. Black redstart have been found to colonise industrial and post-industrial urban environments often favouring large cities that offer large expanses of disused and disturbed areas and mosaics of bare ground, aggregates and ephemeral plant species often favouring a site near water (Black Redstart Action Plan Working Group).

3.55. A probable territory comprising a first year male recorded initially singing [REDACTED] was then witnessed flying with a female [REDACTED]. Subsequently, the presumed same first year male was recorded singing at the same location [REDACTED]. The male was then observed to forage [REDACTED] before being lost to view, such that this species was recorded as a probable breeder within the survey area.

### Non-Assemblage Species

3.56. Non-Assemblage species were recorded during the survey, although exact locations of territories were not noted, instead a minimum and maximum number of territories was recorded for the whole survey area, detailed in Table 4 Non-Assemblage Species, below. An excel document detailing the numbers of territories of non-assemblage species, within survey compartments will be provided with this report.

Table 4 Non-Assemblage Species, blank cells indicate where species were not present as confirmed or probable breeders.

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding		
Bar-tailed godwit				1			7														8	Non-breeder - M	
Black redstart	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	Probable - T
Blackbird	8	1	5	4	4	2		3	7	1	3	5	1	2	2	2	2	5			55	Probable - T	
Blackcap	11	5	18	4	8	9		3	7		5	11	3	3	3	6	4	3			100	Confirmed - FL	

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding
Black-headed gull	18	7	8	32	6		64	8	22	18					4		8	10		205	Possible - H
Blue tit	11	8	7	4	12	4		6		10	2	4	7	2	2	6	3	4		92	Confirmed - FL
Canada goose	8																			8	Probable - P
Carrion crow	6		2				2			8								8		26	Probable - T
Chaffinch	5		4		3			2		3		2	2	1			2			24	Probable - T
Chiffchaff	9	2	7	2	3	3		3		4		2	6	2		2	4	1		50	Probable - T
Coal tit	1		1										1							3	Possible - H



BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
Collard dove	2		2		2			1					2								9	Probable - P
Common sandpiper							1		2												3	Non-breeder - M
Coot	1		4	4				5		11					3				12		53	Confirmed - FL
Cormorant	2		2	1			8	1	4	4									2		24	Possible - H
Duncock	6	4	1	4	3	6		2		5		4	6	3	3	4	3	5			69	Probable - T
Goldfinch	8	7	7	6	4	5		6		5		3	6	2	2	4	7	8			80	Confirmed - FL
Great black-							13		5												18	Possible - H

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
backed gull																						
Great spotted woodpecker	3		2					1		2			2								10	Confirmed - NE
Great tit	8	2	7	2	4	6		5		6		4	8	1			1				54	Probable - T
Green sandpiper				1																	1	Non-breeder - M
Green woodpecker	2							1		1											4	Confirmed - FL
Greenfinch	6	4	3		2			4		2											21	Probable - T

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
Greens hank							1														1	Non-breeder - M
Herring gull							24		18										2		44	Probable - T
House martin	7									4										11		Probable - H
House sparrow	7							4					8								19	Probable - T
Jay	2									2			1								5	Confirmed - FF
Jackdaw	5	9	4		4			7		17			4						2		52	Probable - N
Lesser black-			8																		8	Possible - H

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
backed gull																						
Little owl				1																	1	Possible - H
Mallard	11		15	9			22	6	12	17		4			5				19		120	Confirmed - FL
Meadow pipit				7			11														18	Probable-A
Mistle thrush	2							2													4	Probable - N
Moorhen	6	3	7	4				1		6									2		29	Confirmed - FL
Oystercatcher				4			7	2	5										2		20	Confirmed - NE
Peregrine falcon		2																			2	Probable - P

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
Robin	6	2	8	1	3	1		5		6		3	4	1			2				42	Probable - T
Raven						1						2									3	Possible - H
Ring-necked parakeet	7		5																		12	Probable - T
Sand martin										40											40	Possible - H
Sparrow hawk	1																				1	Confirmed - FF
Skylark		1	2	1		5					5	14									74	Probable - N
Stonechat		5	2			2	2									4					15	Confirmed - FL

BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
Song thrush	8	2	6	2	4			2		4		1	6	1			1	2			39	Probable - T
Starling	18	60	34	11	8	9	19	15		7	5	10			4	7	2	5			214	Possible - H
Swift	7	9	11	6	4	4	6	2		27	5	6						5			92	Non-breeder - F
Tawny owl	1												1								2	Possible - S
Whinchat			1																		1	Non-breeder - M
Whitethroat	11	23	10	4	5	14		3		5		12	6	2	3	3	1	4			106	Confirmed - FL



BTO Species Code	A	B	C	D	L	Unit 1	Units 2 - 4	E	F	Gobions Lake	i8	LTC 4	Bowaters	LTC 7	i3, i5-i7	G2, G3, LTC 3	Anglian Water	Tilbury Fort and Marshes	Tilbury Port	Total / Individuals	Evidence of Breeding	
Wheatear		1		1		1										3					6	Non-breeder - M
Wood pigeon	8	6	1	6	7	2	2	7													49	Probable - T
Wren	1	8	1	3	7	6		4		12		6	7	2	1	3	2	3			90	Probable - T

3.57. A total of 53 non-assemblage species were recorded across the survey area, some of which were listed within certain habitat assemblages that were not found within the survey area. The majority of which comprised widespread and common species found within urban, garden and woodland habitats.

3.58. The location of the survey area provided a suitable staging site for migrant species, notable waders comprised bar-tailed godwit (*Limosa lapponica*), common (*Actitis hypoleucos*) and green sandpiper (*Tringa ochropus*) and greenshank (*Tringa nebularia*). Whinchat (*Saxicola rubetra*) and wheatear (*Oenanthe oenanthe*) were recorded along the shoreline and marshes adjacent to the estuary whilst large numbers of hirundines were observed migrating inland whilst foraging over grassland and waterbodies such as Gobions Lake.

3.59. Several species of gull were observed foraging along the tideline, including great black-backed (*Larus marinus*), herring (*Larus argentatus*), lesser black-backed (*Larus fuscus*) and black-headed (*Chroicocephalus ridibundus*). Evidence of breeding was not recorded as these species were observed foraging or flying over the survey area.

3.60. Ring-necked parakeet (*Psittacula krameri*), a species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was recorded within the suitable nesting habitats of the survey area. Area A6, the woodland to the north of Area B and woodland surrounding Gobions Lake all featured possible breeding (Possible - H) from said species.

## Conclusion

3.61. During the spring and summer of 2022 EMEC Ecology conducted a breeding bird survey to determine the distribution and breeding status of target assemblage species within land adjacent to the Mucking flats and marshes SSSI in Essex. The survey area comprised a mix of habitats, such that species of lowland scrub, lowland farmland, lowland fen, lowland open water and lowland damp grassland breeding bird assemblages were targeted.

3.62. Seven visits were conducted, in which the surveyors walked pre-determined transect routes covering the survey area, to within 50m of suitable habitat. Evidence of target assemblage species was recorded to determine the total and range of species found within the survey area.

3.63. Limitations which may have affected the outcome of the survey results included the late start to the surveys (very end of April), which pushed the subsequent dates later into the season. Therefore, evidence of breeding likely diminished into the latter visits, such that early breeders (e.g. grasshopper warbler *Locustella naevia*) may have been under recorded. Additionally, access was limited to certain compartments of the survey area, especially the area surrounding the active ash fields (Areas 15 – 17) and area LTC Area 7, such that notable target species may have been under recorded.

3.64. The mosaic of different habitats and its location along the Thames Estuary meant the survey area provided a valuable resource for a variety of breeding bird species and additionally offered a staging post for passage migrants. A total of 24 confirmed breeders were recorded from the survey, with an additional 16 probable breeders and four possible breeders, listed within the aforementioned habitat assemblages. Not listed within the breeding bird assemblages, black redstart was recorded as a probable breeder within the Port of Tilbury land.

3.65. Additionally, the survey area also supported populations of Cetti's warbler and pochard exceeding 1% of the UK's populations (66 singing males and 13 pairs, respectively).

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# Appendices

## Appendix 1 BTO Behaviour Codes

Non-breeding	
<b>F</b>	Flying over
<b>M</b>	Species observed but suspected to be still on <b>M</b> igration
<b>U</b>	Species observed but suspected to be s <b>U</b> mmering non-breeder
Possible breeder	
<b>H</b>	Species observed in breeding season in suitable nesting <b>H</b> abitat
<b>S</b>	<b>S</b> inging male present (or breeding calls heard) in breeding season in suitable breeding habitat

Probable breeding	
<b>P</b>	Pair observed in suitable nesting habitat in breeding season
<b>T</b>	Permanent <b>T</b> erritory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more part at the same place or many individuals on one day
<b>D</b>	Courtship and <b>D</b> isplay (judged to be in or near potential breeding habitat; be cautious with wildfowl)
<b>N</b>	Visiting probable <b>N</b> est site
<b>A</b>	<b>A</b> gitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby
<b>I</b>	Brood patch on adult examined in the hand, suggesting <b>I</b> ncubation
<b>B</b>	Nest <b>B</b> uilding or excavating nest-hole
Confirmed breeding	
<b>DD</b>	<b>D</b> istractio <b>D</b> isplay or injury feigning
<b>UN</b>	<b>U</b> sed <b>N</b> est or eggshells found (occupied or laid within period of survey)
<b>FL</b>	Recently <b>F</b> ledged young (nidicolous species) or downy young (nidifugous species). Careful consideration should be given to the likely provenance of any fledged juvenile capable of significant geographical movement. Evidence of dependency on adults (e.g. feeding) is helpful. Be cautious, even if the record comes from suitable habitat.



**Confirmed breeding**

<b>ON</b>	Adults entering or leaving nest-site in circumstances indicating <b>O</b> ccupied <b>N</b> est (including high nests or nest holes, the contents of which can not be seen) or adults seen incubating
<b>FF</b>	Adult carrying <b>F</b> aecal sac or <b>F</b> ood for young
<b>NE</b>	<b>N</b> est containing <b>E</b> ggs
<b>NY</b>	<b>N</b> est with <b>Y</b> oung seen or heard

## Appendix 2

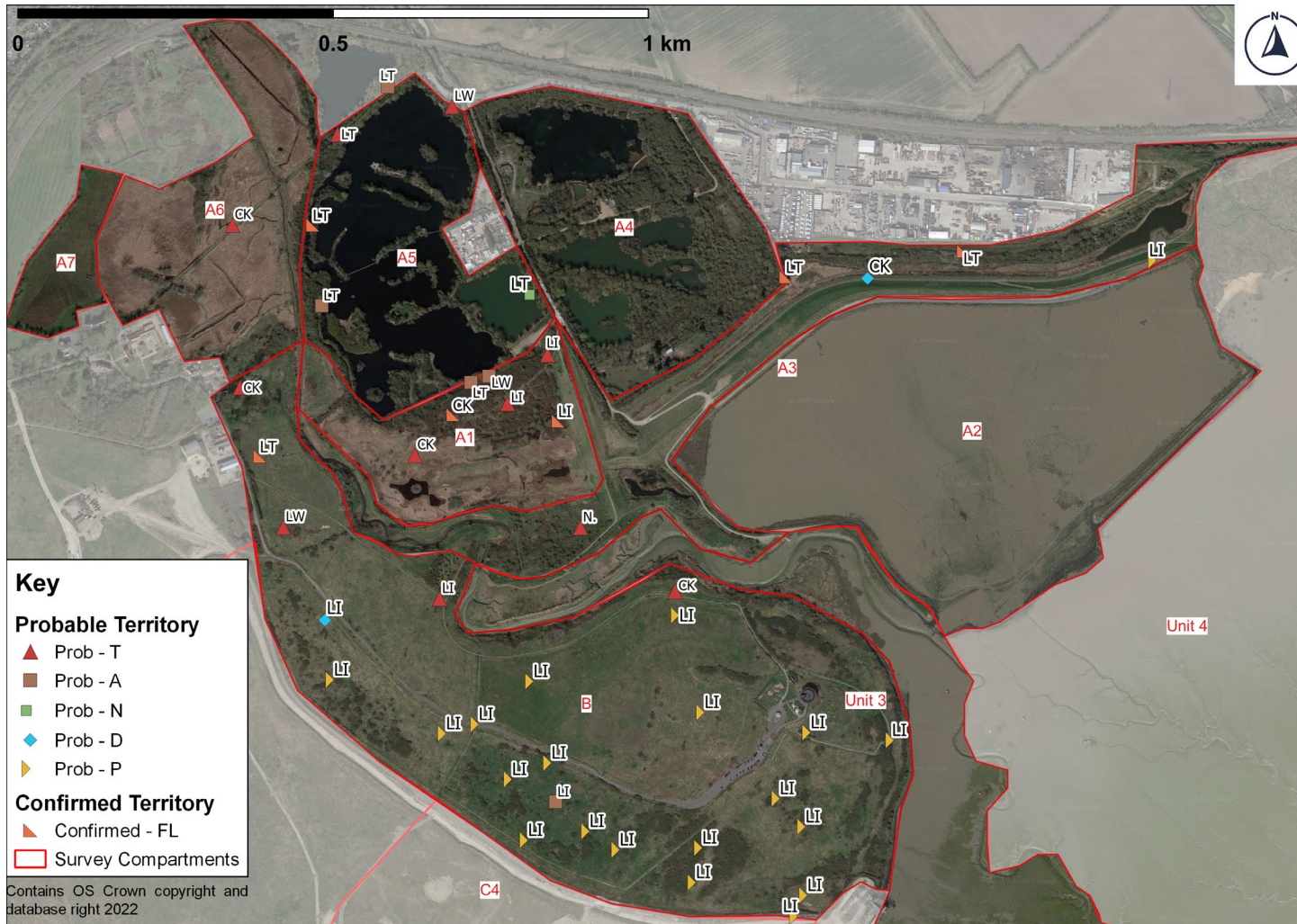


Figure 7. Probable and Confirmed Territories – Scrub Assemblages - Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 3



Figure 8. Probable and Confirmed Territories – Lowland Farmland Assemblage - Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 4

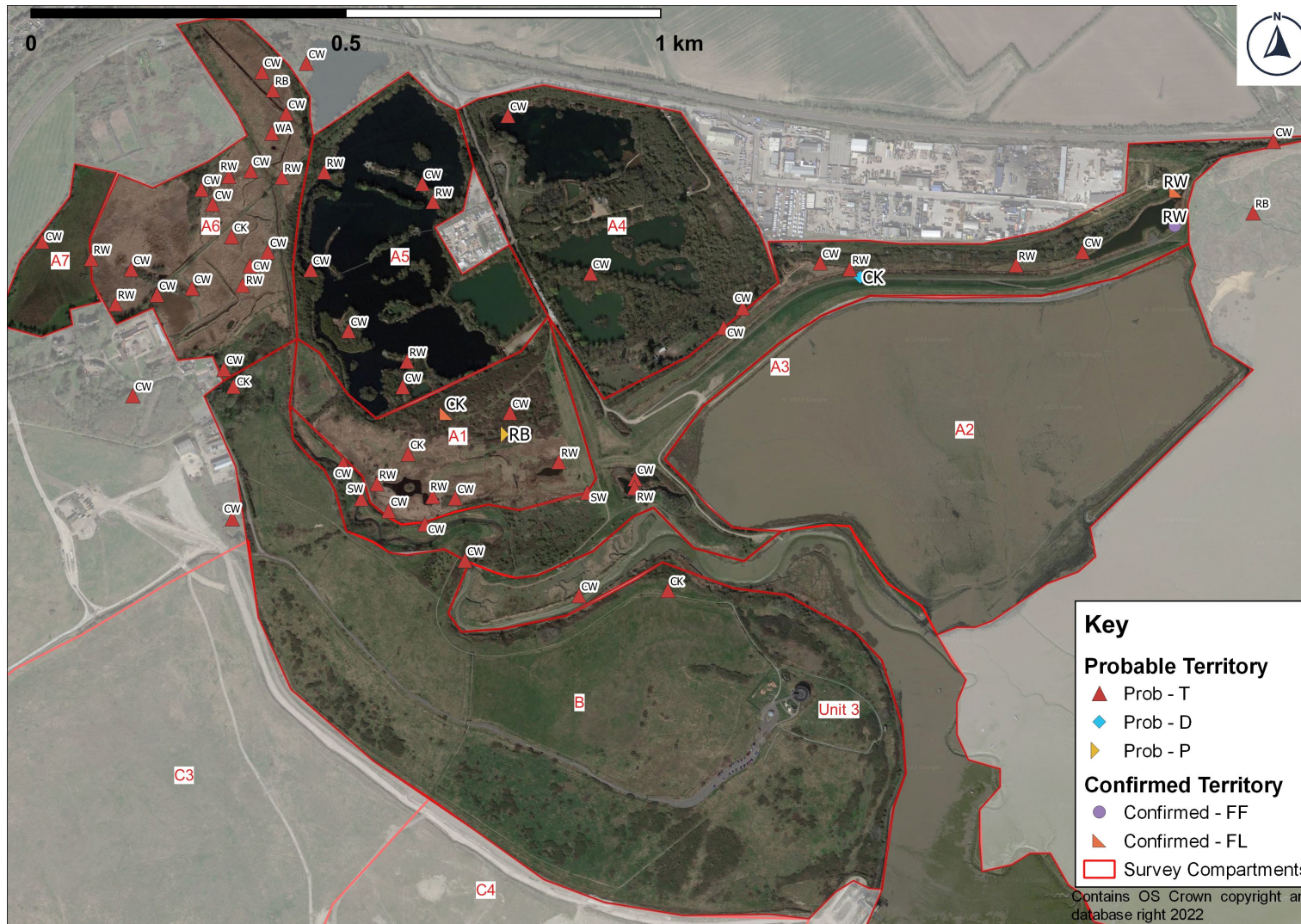


Figure 9. Probable and Confirmed Territories – Lowland Fen Assemblage - Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 5

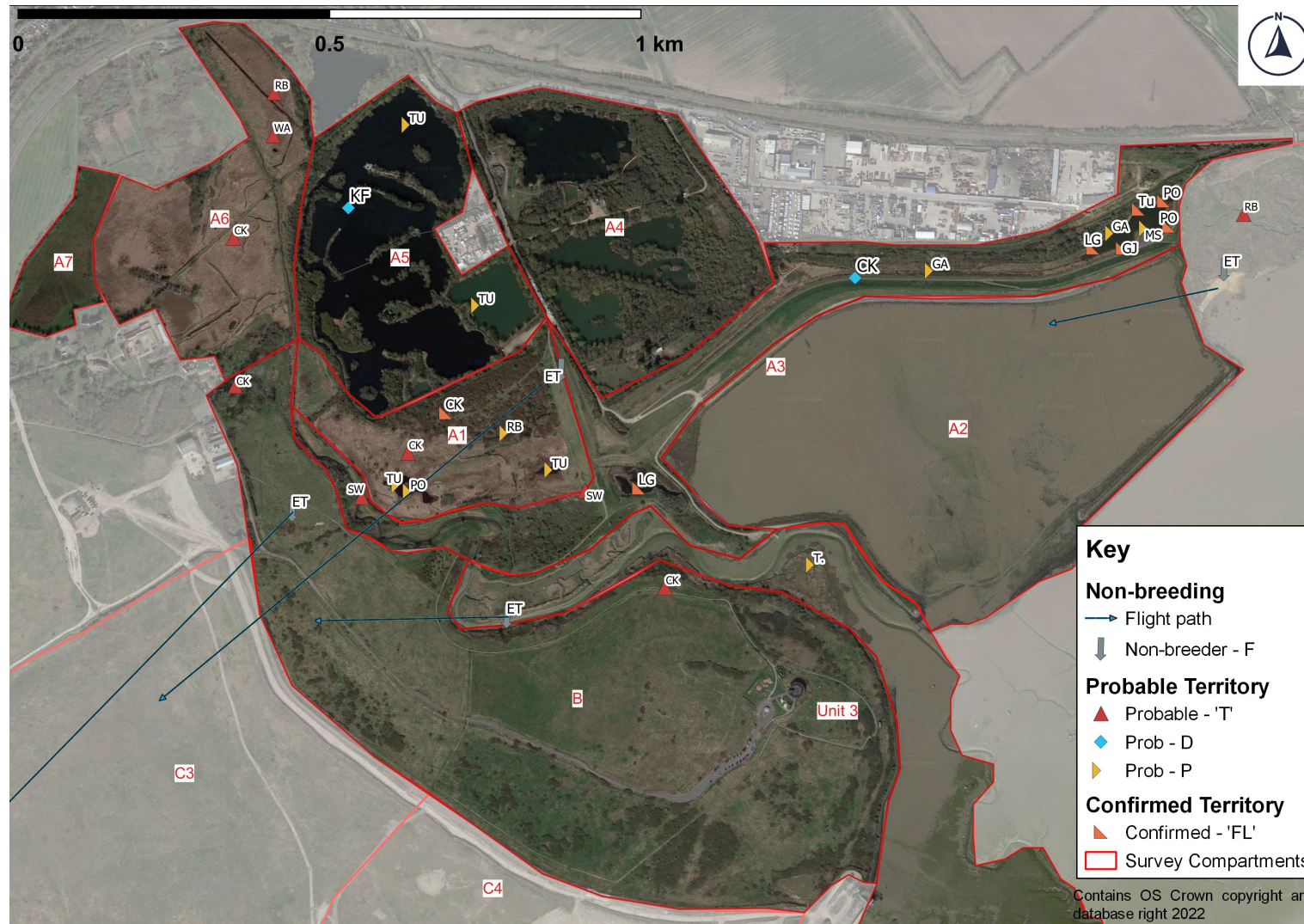


Figure 10. Probable and Confirmed Territories – Open water (excluding CW & RW) - Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 6

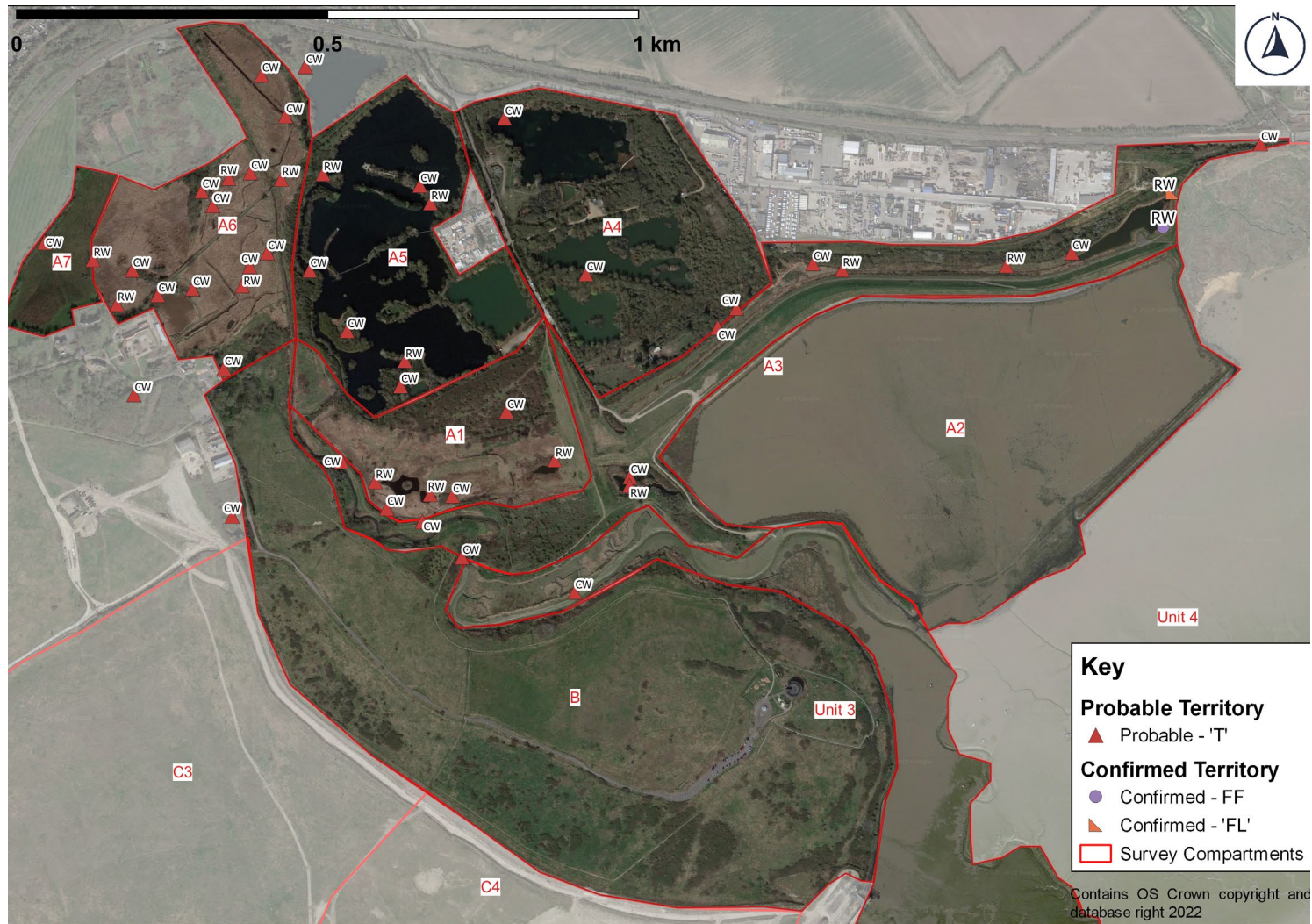


Figure 11. Probable and Confirmed Territories – Open water (excluding CW & RW) - Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 7



Figure 12. Probable and Confirmed Territories – Open water Assemblage (CW & RW only)– Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 8



Figure 13. Probable and Confirmed Territories – Lowland Damp Grassland Assemblage – Area A and B. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 9



Figure 14. Probable and Confirmed Territories – Lowland Scrub Assemblage – Area C and Gobions Lake. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 10



Figure 15. Probable and Confirmed Territories – Lowland Farmland Assemblage – Area C and Gobians Lake. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 11

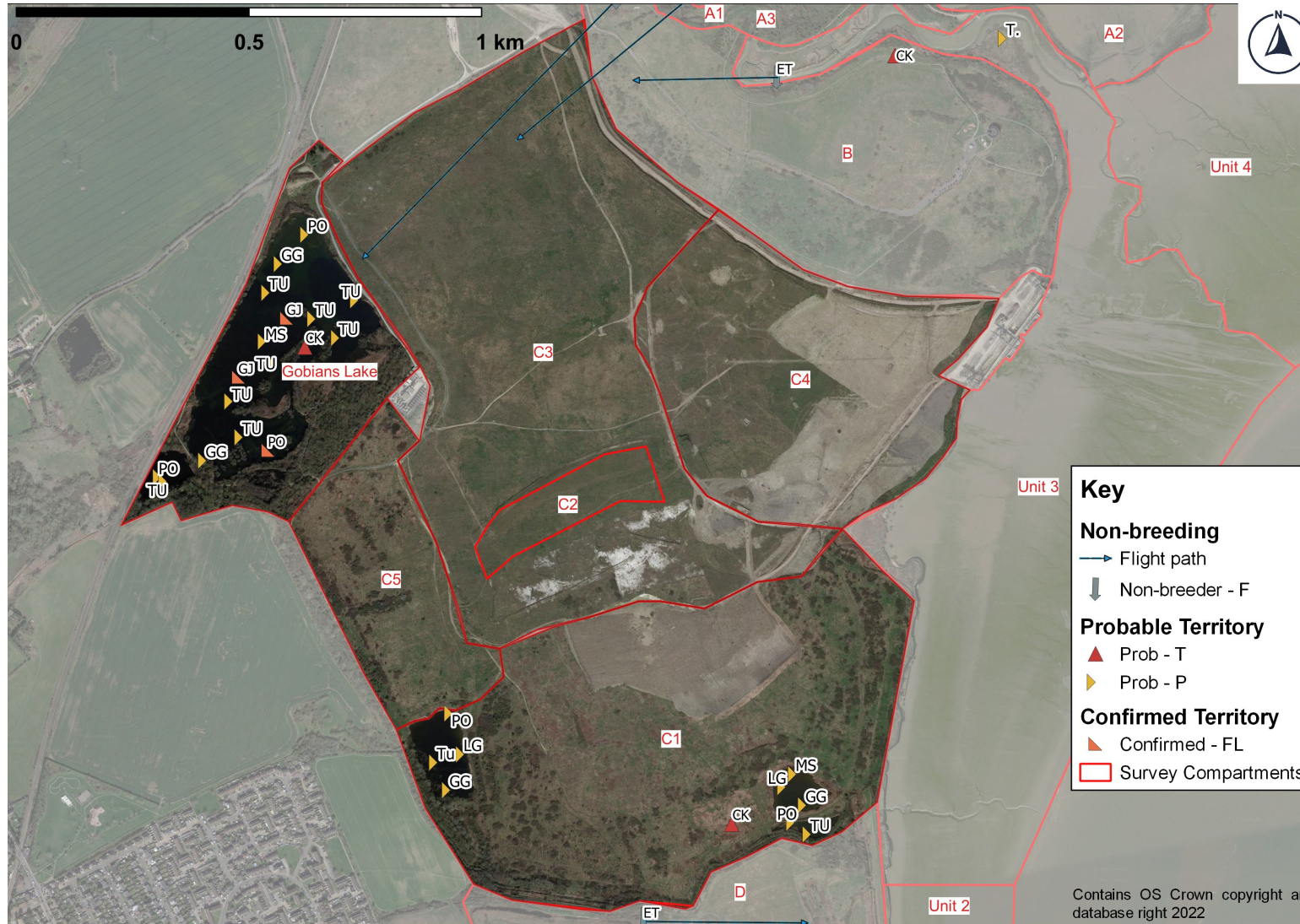


Figure 16. Probable and Confirmed Territories – Lowland Fen Assemblage – Area C and Gobions Lake. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 12

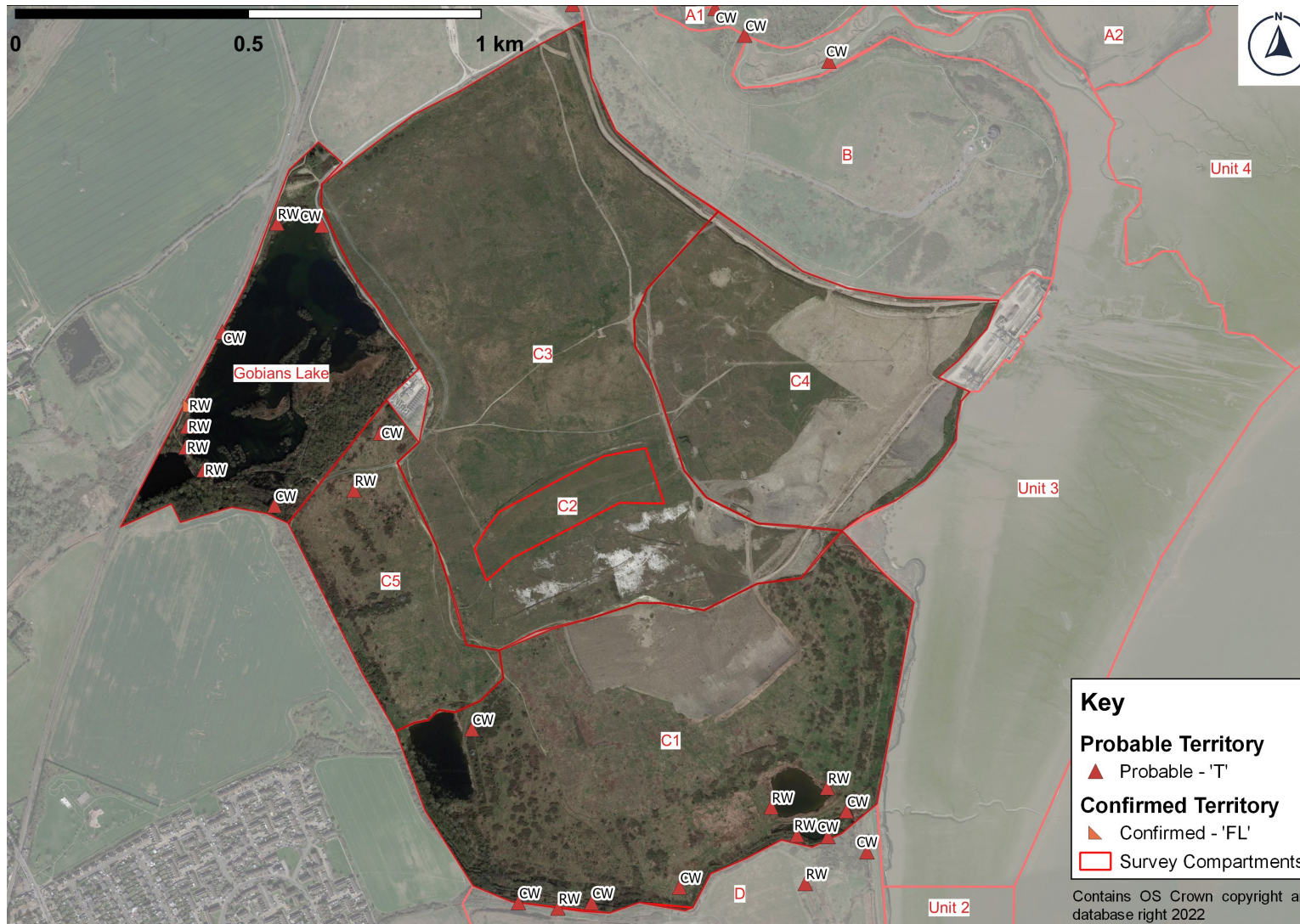


Figure 17. Probable and Confirmed Territories – Lowland Open Water Assemblage (excluding CW & RW) – Area C and Gobians Lake. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License.

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## Appendix 13



Figure 18. Probable and Confirmed Territories – Lowland Open Water Assemblage (CW & RW only) – Area C and Gobions Lake. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 13



Figure 19. Probable and Confirmed Territories – Lowland Damp Grassland Assemblage – Area C and Gobions Lake. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)

# Appendix 15



Figure 20. Probable and Confirmed Territories – Lowland Scrub Assemblage – Area D Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 16



Figure 21. Probable and Confirmed Territories – Lowland Farmland Assemblage – Area D. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 17



Figure 22. Probable and Confirmed Territories – Lowland Fen Assemblage – Area D. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



# Appendix 18



Figure 23. Probable and Confirmed Territories – Lowland Open Water Assemblage – Area D. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)

# Appendix 19



Figure 24. Probable and Confirmed Territories – Lowland Damp Grassland Assemblage – Area D. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 20



Figure 25. Probable and Confirmed Territories – Lowland Scrub Assemblage – Area L, Unit 1, E and Coalhouse Battery. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.ordnancesurvey.co.uk/open-data)

## Appendix 21



Figure 26. Probable and Confirmed Territories – Lowland Farmland Assemblage – Area L, Unit 1, E and Coalhouse Battery. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 22



Figure 27. Probable and Confirmed Territories – Lowland Fen Assemblage – Area L, Unit 1, E and Coalhouse Battery. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)

## Appendix 23



Figure 28. Probable and Confirmed Territories – Lowland Open Water Assemblage – Area L, Unit 1, E and Coalhouse Battery. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 24

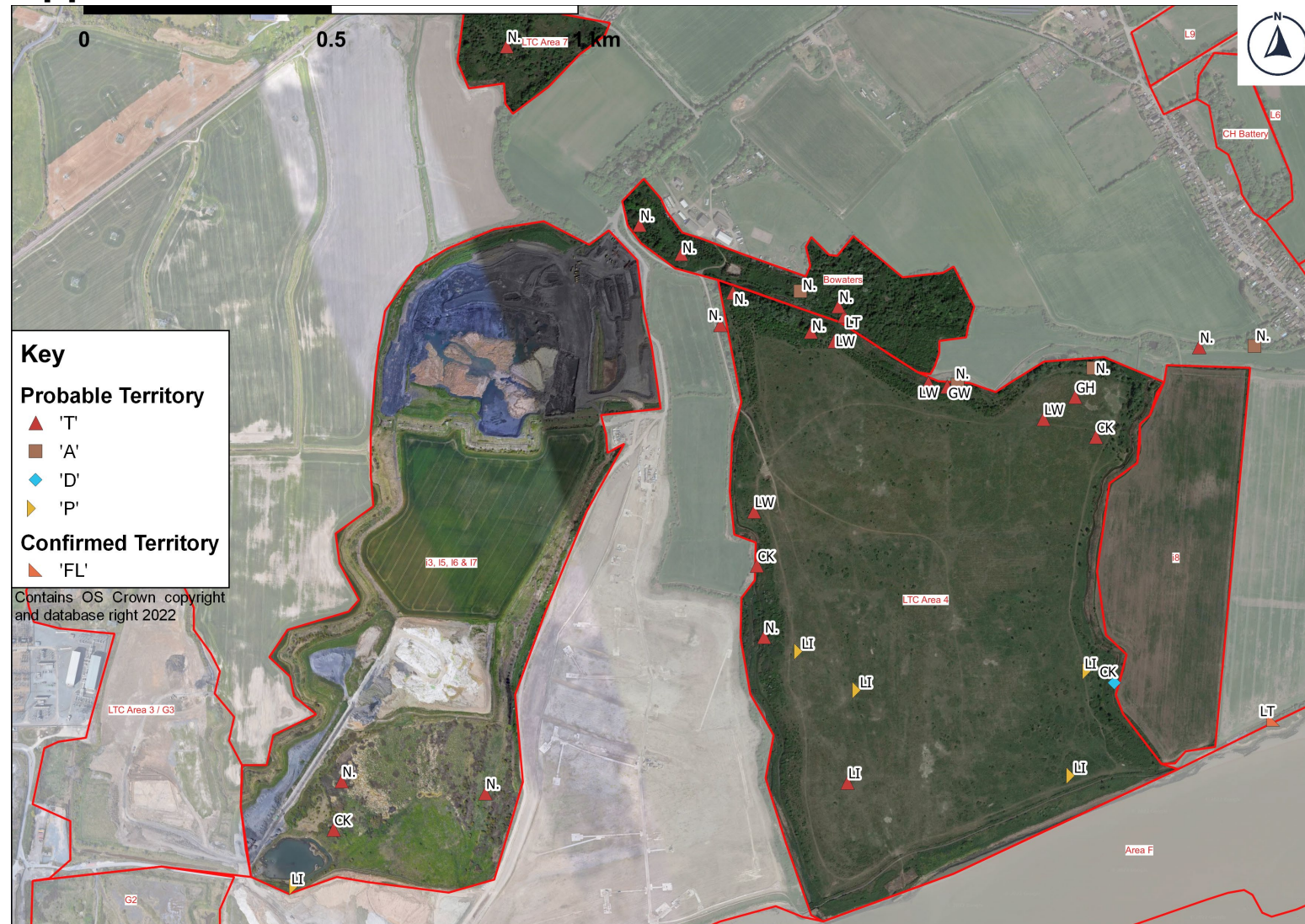


Figure 29. Probable and Confirmed Territories – Lowland Damp Grassland Assemblage – Area L, Unit 1, E and Coalhouse Battery. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)







## Appendix 26



Figure 31. Probable and Confirmed Territories – Lowland Farmland Assemblage – Area i8, Bowaters, LTC 4. i3 and i5 – i7. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at:

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## Appendix 27



Figure 32. Probable and Confirmed Territories – Lowland Fen Assemblage – Area i8, Bowaters, LTC 4. i3 and i5 – i7. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 28



Figure 33. Probable and Confirmed Territories – Lowland Open Water Assemblage – Area i8, Bowaters, LTC 4. i3 and i5 – i7. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](#)



## Appendix 29



Figure 34. Probable and Confirmed Territories – Lowland Damp Grassland Assemblage – Area i8, Bowaters, LTC 4. i3 and i5 – i7. Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.ordnancesurvey.co.uk/odl)



# Appendix 30



Figure 35. Probable and Confirmed Territories – Lowland Scrub Assemblage – Area LTC 3, G2, G3, Anglian Water and Tilbury Fort (TFM). Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.openstreetmap.org/copyright)



## Appendix 31



Figure 36. Probable and Confirmed Territories – Lowland Farmland Assemblage – Area LTC 3, G2, G3, Anglian Water and Tilbury Fort (TFM). Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.ordnancesurvey.co.uk/open-data)



## Appendix 32



Figure 37. Probable and Confirmed Territories – Lowland Fen Assemblage – Area LTC 3, G2, G3, Anglian Water and Tilbury Fort (TFM). Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.ordnancesurvey.co.uk/permissions)



## Appendix 33



Figure 38. Probable and Confirmed Territories – Lowland Open Water Assemblage – Area LTC 3, G2, G3, Anglian Water and Tilbury Fort (TFM). Contains Ordnance Survey data © Crown copyright and database right 2023. Data is available under the Open Database License. Available at: [Open Street Map copyright information](https://www.ordnancesurvey.co.uk/odl)



