# British Energy Group PLC
# Sizewell Marsh Harrier Survey Report 2008

## 1. Introduction

### 1.1 Background

British Energy (BE) is currently investigating the feasibility of building a new nuclear power station within their landholding at Sizewell, Suffolk. An area of land directly north of the Sizewell 'B' Power Station has been identified as having potential to accommodate nuclear new build. This area, which covers approximately 0.32km$^2$/33ha and has an approximate central grid reference of TM473640, is referred to in this document as 'the preliminary works area'. The proposed position of the new power station, the indicative access road and construction compound (accounting for a potential further 0.35km$^2$/35ha of land take) are shown in **Figure 1.1**. The position of the proposed access road and the construction compounds in particular are subject to change.

### 1.2 Preliminary Works Area Description and Context

The preliminary works area comprises open sheep grazed pasture, fringed by reinstated coastal dune vegetation, parts of which have been planted with trees and scrub. The hydrology and pedology of the preliminary works area were irreversibly altered as a result of works associated with the building of the Sizewell 'A' and 'B' Stations (adjacent to its southern boundary), and as a result the area has lost much of its botanical merit. Habitats adjoining or in close proximity to the preliminary works area are of considerable ecological interest however. These include wet meadows (and associated wetland habitats and ditch systems), dune systems, shingle plant communities and wet semi-natural woodland. The quality of the shingle, grazing marsh and associated wetland habitats have led to substantial areas of these in close proximity to the preliminary works area being designated for their ecological interest.

The likely route of any new access associated with the new build would pass through or over the north-east corner of the Sizewell Marshes, then through the extensive conifer plantation at Goose Hills / Dunwich Forest and along the northern edge of Kenton Hills before linking to the existing road network near the pocket of broad-leaved woodland known as Fiscal Policy. The location and extent of the construction compounds has not been fixed, but these are likely to take in areas of both Kenton and Goose Hills as well as adjacent arable land.

The Sizewell Estate lies within the Suffolk Coast and Heaths Natural Area. This covers the land extending as far as Great Yarmouth in the north, and Harwich in the south. The area is generally very flat with land-use dominated by arable farming, particularly for root crops, although cattle farming is common on the low-lying land adjacent to the coast. Whilst heathlands were extensive throughout the area in the eighteenth and nineteenth centuries, only a small fraction of these remain with most being taken over for arable and forestry. The estuary habitats present along the coastline are considered to be of international importance for nature conservation (Natural England, 2008).

## 1.3 Aim of the Survey

The First Interim Bird Report for the Sizewell Estate by Entec (Entec Doc. Reg. 19801cr080) identified that marsh harrier (*Circus aeruginosus*) used parts of the Estate with relative regularity. As marsh harrier has never been recorded breeding within the Estate boundary, it was considered likely that these birds were part of the nearby Minsmere – Walberswick Special Protection Area (SPA) population.

The aim of this survey work was therefore to characterise the nature and extent of use of the Sizewell Estate by marsh harriers breeding in the Minsmere-Walberswick SPA (and forming part of its cited interest). This was accomplished through a study of flight lines and foraging behaviour undertaken during the 2008 breeding season.

It is intended to use the information collected as a result of the surveys to inform the EcIA process, and to ensure that impacts on the SPA population are mitigated or minimised.

## 1.4 Species Information

### 1.4.1 Distribution and Status

Marsh harrier is an Amber Listed Species of Conservation Concern[1] as the population suffered a historic decline during the period from 1800 to 1995 but is recovering (the UK population has more than doubled over the last 25 years).

Marsh harrier became extinct in Britain early in the 20th century due to large scale loss of wetland habitat (Génsbøl, 2008), but re-colonisation had occurred by 1911 and the population slowly grew to around 15 known nests by 1958. A second sharp decline occurred as a result of the widespread use of organochlorine pesticides (Eaton *et al*., 2006), with the population reduced to a single known pair at Minsmere in 1971 (Underhill-Day, 1984, Piotrowski, 2003).

The mid-1970s saw a very rapid growth in marsh harrier numbers in many countries across its European range. This was due to decreased persecution and lower levels of pollution of the habitat preferred by this species (Génsbøl, 2008). In 2004 the European breeding population, was estimated at between 53,000 and 80,000 pairs (Robinson, 2005), while it is estimated that there are currently between 70,000 and 90,000 pairs in Europe, mainly in the eastern part of the continent (Génsbøl, 2008). The initial marked increase in numbers in Britain is likely to have been due to recruitment (e.g.) from the large population in the Netherlands (Underhill-Day, 1984).

The British marsh harrier population continues to increase: in 1995, Britain supported 156 breeding females (Ogilvie *et al*., 2001); by 2003, the UK population[2] had increased to between

[1] The background to the establishment of a 'traffic light system' of conservation concern for UK birds is discussed in Gregory et al (2002). 'Red listed' species include those that are globally threatened, have suffered an historical population decline (between 1800 and 1995) or which have experienced rapid declines in their UK breeding population or contractions in their UK range of more than 50% over the past twenty-five years. The criteria of Amber listed species include: the species has suffered moderate (25-49%) declines in its UK breeding population or range over the past 25 years, has an unfavourable conservation status in Europe (and is therefore of European concern), breeds in very low numbers (five year mean of 1-300 pairs), breeds at 10 or fewer UK sites, or occurs in relatively high numbers in the UK (exceeding 20% of the European breeding, migratory or non-breeding populations). Other species have 'green' status, as they do not fulfil these criteria. This implies that the population of a species is either stable or increasing or that too little is known about the population to allow the species to be included on the red or amber list.

[2] The Rare Breeding Birds Panel reports refer to the 'UK population' of marsh harrier, though this species does not occur in Northern Ireland (Clarke, 1995).

205 and 233 pairs; in 2004, this number rose to between 249 and 284 pairs. The marsh harrier population is centred on Eastern England[3], which was estimated to hold 72% of the UK population in 2003 and 76% of the UK total in 2004 (Holling & The Rare Breeding Birds Panel, 2007).

In 2005, a repeat of the 1995 survey was carried out by the RSPB. This estimated that 360 female[4] marsh harriers bred in Britain. This is thought to be the largest total in at least 200 years, with a minimum of 813 young being fledged. Although some range expansion was noted between 1995 and 2005, the majority of the population was found to be concentrated in eastern coastal counties of England, particularly Lincolnshire, Norfolk, Suffolk and Kent (Eaton *et al*., 2006). The colonisation of inland sites has been much slower with only occasional breeding recorded (Clarke, 1995).

Though there is no UK Biodiversity Action Plan (UK BAP) for marsh harrier, the species has benefited from the Priority Habitat Action Plan prepared for reedbed[5], which is both a UK and Suffolk BAP Priority Habitat. Details of UK BAP targets for reedbed are found in **Appendix A**.

### 1.4.2 Legislative Protection

Marsh harrier is afforded enhanced protection at European level under Annex 1 of the Birds Directive (1979)[6], and in the UK under Schedule 1 of the Wildlife and Countryside Act (1981), which makes it an offence to disturb or otherwise interfere with nesting birds.

### 1.4.3 Breeding Ecology

Marsh harrier generally breeds in large, dense reed beds with good habitat for foraging and little disturbance, usually around lake margins, river floodplains and margins or in fenland (Gènsbøl, 2008). This species is often monogamous, though bigamy is also common. On the east coast of England, males start holding territory from mid-March (Clarke, 1995). Courtship lasts from mid-March to early May. The eggs are laid between late April and mid-May and are incubated for between 30 and 38 days. After hatching, the dependent young usually remain in the nest for around 28 days until late July (Hardey *et al*., 2006).

Both parents provision the young and defend the area immediately adjacent to the nest (Snow & Perrins, 1998). However in the first 2 weeks after hatching, the females rarely ventures far from the nest with the male doing the majority of the hunting. Once the young have developed juvenile plumage (having moulted their down), the females will start to forage, and typically catch larger prey than the male (Clarke, 1995). The typical home range size of a male in East Anglia varies through the breeding cycle, from 569ha during the courtship stage to 1,407ha during the post-fledging period. Females generally have a smaller home range than the males, though this does increase from 100 to 1300ha when young are being provisioned (Hardey *et al*., 2006). The distances individuals travel from the nest to forage vary according to habitat types

[3] This comprises the following counties: Cambridgeshire, Lincolnshire, Norfolk and Suffolk.

[4] Given that this species is often polygynous, the number of nesting females provides a more accurate description of the breeding population than numbers of territorial males.

[5] The full Action Plan is available at:
http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf#R

[6] This obliges national governments to identify and designate areas of critical importance to the conservation of the species.

and food availability; although a maximum distance of 2.5km was recorded by a study which compared this species to other sympatric harriers (Schipper, 1977, in Simmons, 2000). Other studies in Holland and France have recorded maximum distances of 1.5km to 3.1km respectively (Clarke, 1995). Radio-tagging studies on birds in western France have shown maximum foraging distances of 5km (Simmons, 2000). Anecdotal evidence includes males recorded up to 7km from known nest site (John Underhill-Day, RSPB, *pers comm,* 2009) and over 12km from the nest site (Clarke, 1995). Therefore, although some studies have identified indicative maximum distances within which the majority of the foraging activity is carried out, these should be treated with caution.

As well as breeding individuals, non-breeding birds often occur around breeding sites. These birds include non breeding juveniles and adults, and failed breeders. The number of non breeding birds present in variable, though these have increased with a similar trend to the breeding population recorded (John Underhill-Day, *pers comm*., 2009). On average 6.8 non breeding birds where recorded in Britain between 1972 and 1982 inclusive, although the breeding population was relatively low at the time. A peak of 16 non-breeding birds was recorded in 1979, when the national breeding population stood at around 16 females and 11 males. The previous year however, the number of non-breeding individuals was as low as 4, with about 14 breeding males and 14 breeding females recorded (Underhill-Day, 1984). Therefore, the best available data indicates that non-breeding birds may represent between 12.5 and 37% of the total population. The total number of non-breeding birds is likely to have risen significantly, given the growth of the population as a whole (John Underhill-Day, pers comm., 2009).

Hunting habitat regularly includes reed beds, open water and any farmland adjoining the breeding territories. The hunting technique usually consists of low quartering flights and the prey items taken include small mammals and birds (Snow & Perrins, 1998). It has been shown that a difference exists in foraging habitat preference between male and female marsh harrier. While both sexes hunt over marginal habitats such as wet reedbeds, males tend to extend their foraging range to neighbouring habitats with shorter vegetation, including farmland and meadows, more often than females. A study at Titchwell showed that foraging on farmland areas adjacent to the main reedbed areas resulted in prey being caught in a shorter time than over marshes and that the prey item was usually heavier (young rabbits and pheasants as opposed to fledgling passerines) (Clarke, 1995). The level of use of farmland at other sites is likely to vary according to factors such as farmland type, cropping regime, time in the season and distance from the breeding site.

The frequency with which food is brought to the nest will depend both on prey availability and brood size. Studies have shown that around 11 and 12 prey items per day are provisioned to an active nest, though one study showed a range of between 3 and 20 items (studies cited in Clarke, 1995).

# 2. Methods

## 2.1 Desk Study

Contextual information regarding marsh harrier population trends and some aspects of ecology was obtained from the following individuals, groups and published sources:

Alan Miller, Suffolk Wildlife Trust (SWT)

Robin Harvey, RSPB (Minsmere).

John Underhill-Day, RSPB

ADAS & SWT via the Sizewell Land Management Annual Reviews;

ADAS (2006). Sizewell Estate – Integrated Land Management Plan.

Hall, M. A. (1984). An Ecological Survey of the Birdlife of Sizewell and its immediate surrounding area (1971 to 1984);

Hardey *et al*. (2006). Raptors a field guide to survey and monitoring;

Piotrowski, S. (2003). The Birds of Suffolk.

Suffolk Naturalists Society (2007). Suffolk Birds 2006. Suffolk Naturalist's Society, Ipswich; and

## 2.2 Field Surveys

The most likely effect of nuclear new build at Sizewell on marsh harrier is disturbance during the construction process. This could lead to displacement of birds from the footprint of the new plant, and from the vicinity of the plant access road and construction compounds. As such, surveys attempted to establish the frequency of foraging in these (indicative) areas, as well as the Sizewell Marshes which are adjacent to the proposed development footprint.

In order to determine the frequency with which marsh harrier were flying between the reedbeds of the Minsmere to Walberswick SPA and the Sizewell Estate, surveys were conducted using vantage-points overlooking land between the two areas. In addition, vantage-points within the Sizewell Estate were used to determine the nature and frequency of marsh harrier use of the marshes. On each survey day, 2 Entec surveyors stationed at complementary vantage-points undertook co-ordinated watches, communicating any observed flights to each other with walkie-talkies, and mapping any marsh harrier flight lines and flight characteristics as well as the age, sex and plumage characteristics of individual birds (where apparent).

Madders (in SNH, 2005), states that it is possible for an observer to effectively survey an arc of 180 degrees by 2km in width during a vantage-point watch[7,8], by scanning the target area continuously with binoculars. The selection of vantage-points for the marsh harrier survey was therefore based on this principle and aimed to allow maximum coverage of the meadows and marshes within the areas to the south of Goose Hill. In this area visibility is limited by the trees and scrub running along some sections of ditch, and a number of local vantage-points were used in order to achieve a snapshot of marsh harrier activity. **Table 2.1** lists the grid references for the vantage points used. These are also shown on **Figure 2.1**.

[7] This survey methodology has been developed for use at wind farms, where species of particular concern are raptors such as eagles, kites and harriers and migratory wildfowl, particularly geese and swans.

[8] Clearly the extent of land that can be surveyed effectively within this survey arc is dependent on topography, while built structures and planting can also create areas of dead ground.

**Table 2.1 Grid References of Vantage Points Used**

| Vantage Point Number | Grid Reference |
|---|---|
| 1 | TM 47313 65983 |
| 2 | TM 46500 66000 |
| 3 | TM 46862 64558 |
| 4 | TM 46089 65229 |
| 5 | TM 46183 63743 |
| 6 | TM 46656 63243 |
| 7 | TM 45709 63755 |

Two surveyors conducted 12 days (a combined total of 72 hours) of co-ordinated survey work between 5th May and 26th July 2008. The timing of these surveys was aimed to cover the provisioning period of nestlings by adult marsh harrier, which is likely to be between late May and late July. During the first two surveys in early May, VP 1 and 2 were used to establish whether one or both of these locations were suitable for recording rates of flight activity between the two areas. As VP1 was found to be suitable, as the survey work progressed a combination of this vantage point and a second vantage-point within the Sizewell Marshes was used.

Two watches were conducted at each point during each survey day, each being 3 hours in duration (the maximum duration of watch recommended by Madders). Between surveys the surveyors took between 15 minutes and an hour to rest their eyes and refocus. Dates, times and vantage points used during the surveys are included in **Table 2.2**.

**Table 2.2 Summary of Dates, Times and Vantage Points Used.**

| Date | Times | Vantage Point Number |
|---|---|---|
| 05/05/2008 | 8:30 - 11:30 | 1 & 2 |
| | 12:30 - 15:30 | |
| 11/05/2008 | 8:30 - 11:30 | 1 & 2 |
| | 12:30 - 15:30 | |
| 23/05/2008 | 8:10 - 11:10 | 1 & 3 |
| | 12:00 - 15:00 | |
| 01/06/2008 | 8:30 – 12:00 | 1 & 3 |
| | 12:30 - 15:00 | |
| 10/06/2008 | 7:30 - 10:30 | 1 & 3 |
| | 11:00 - 14:00 | |

**Table 2.2 (continued) Summary of Dates, Times and Vantage Points Used.**

| Date | Times | Vantage Point Number |
|---|---|---|
| 16/06/2008 | 8:40 - 11:40 | 1 & 3 |
| | 12:20 - 15:20 | |
| 24/06/2008 | 14:45 - 17:45 | 1 & 3 |
| | 18:15 – 21:15 | |
| 28/06/2008 | 07:00 - 10:00 | 1 & 3 |
| | 10:30 – 13:30 | |
| 07/07/2008 | 8:00 - 11:00 | 1 & 4 |
| | 11:45 - 14:45 | |
| 12/07/2008 | 8:05 - 11:05 | 1 & 5 |
| | 11:35 – 14:35 | |
| 19/07/2008 | 8:15 - 11:15 | 1 & 6 |
| | 11:45 - 14:45 | |
| 26/07/2008 | 7:00 – 10:00 | 1 & 7 |
| | 10:30 - 13:30 | |

### 2.3 Survey Limitations

Due to the enclosed nature of fields within the grazing marsh, a single vantage point could not accurately record all activity within the Sizewell Marshes. This may have resulted in some degree of under-recording of marsh harrier activity during low level flight or on the ground. There seems no reason to assume the data is unrepresentative, however, and encounter rates were remarkably similar between the VPs located outside of the Sizewell Marshes (where a filter had been applied to exclude birds recorded to the north of Goose Hills) and the marshes themselves.

# 3. Results

### 3.1 Desk Study

#### 3.1.1 Marsh Harrier on the Sizewell Estate

- Hall (1984) reported a total of 72 sightings of marsh harrier in freshwater marsh and reedbed habitats, as well as arable farmland and brackish marshland in the Leiston area between 1971 and 1984[9] (Hall, 1984). As no standardised methodology was used for data collection, frequency of occurrence cannot be

[9] Hall's report covered a roughly rectangular area of approximately 2,420ha: the northern edge of the area considered was formed by the Minsmere Level and the eastern edge by the Suffolk coast. The area covered extended to Thorpeness in the south-east and Knodishall in the south-west.

assessed. This report also states that 188 young were reared at Minsmere between 1955-1982;

- Two ornithological studies were undertaken by Henderson Ecological Consultants[10]; in 1992-93 and 1988-89. The winter and breeding bird surveys carried out in 1992-93 did not record marsh harrier, though a bird was recorded on the South Minsmere Levels during the 1988-89 winter surveys (Henderson Ecological Consultants, 1993);

- The Biological Survey of Abbey Farms conducted by Suffolk Wildlife Trust recorded marsh harrier regularly during the breeding season using the Lower Abbey Marshes, Retsoms Heath (immediately to the north of Goose Hill) and South Marsh, which lies to the east of Goose Hill and to the north of the preliminary works area. A female bird was also recorded at Retsoms Heath during the winter surveys in 1996/97 (Suffolk Wildlife Trust, 1996);

- Marsh harrier was regularly recorded on the Sizewell Estate during 1996 and 1997. Individuals were noted during three of the 7 Sizewell WeBS counts and on 1 of the 7 farmland winter bird counts at Upper Abbey Farm, Leiston in 2007/2008. (SWT / ADAS, 1998-2007);

- The frequency of marsh harrier observations in arable and marshland habitats on the Sizewell Estate is now such that the species is no longer considered notable, and not routinely reported in annual land management reports (Alan Miller [SWT], pers comm., 2009).

### 3.1.2 Marsh Harrier at Minsmere

Marsh harrier is a qualifying species of the Minsmere-Walberswick SPA. Upon designation the SPA supported 16 pairs of marsh harrier, representing at least 10.0% of the breeding population in Great Britain based on a 5 year mean between 1993 and 1997[11]. No change in the population was noted as part of the SPA Review (Stroud *et al.*, 2001). However in 2006, a total of 22 nests were recorded between the Minsmere Reserve and Walberswick NNR (Suffolk Naturalists' Society, 2007). This represents an increase of almost 30% in the numbers of breeding marsh harrier in the SPA since its designation (although inter-annual some fluctuation in numbers is expected to take place).

The Minsmere RSPB Reserve was considered to have supported up to 15 marsh harrier nests presenting 2008. From these, a total of 23 young were fledged successfully (Robin Harvey, *pers comm* 2008). The majority of the nests were located to the north of the Minsmere Old River, which runs west to east immediately to the north of the Minsmere Levels. A total of 4 nests were located within the Minsmere North Levels.

### 3.1.3 Marsh Harrier at County and Regional Level

In Suffolk, marsh harrier is a local breeder, summer visitor, uncommon passage migrant and winter visitor (34 wintering birds were counted in 2006-07 (Suffolk Naturalists' Society,

[10] This report covered an approximately rectangular area of 717ha: the northern edge was formed by the New Cut, the eastern edge by the coast, the southern boundary ran east-west just to the south of the existing Power Station and the western boundary ran north-south immediately to the west of Kenton Hills.

[11] Information gained from Minsmere-Walberswick SPA Natura 2000 Form. Available online: http://www.jncc.gov.uk/pdf/SPA/UK9009101.pdf.

2007)). The recent countrywide increase in numbers has been mirrored by a rise in the Suffolk population. In the early 1990s, 20-40 nests produced 50-70 young per year, with breeding sites concentrated along the coast and only one or two pairs breeding inland (Piotrowski, 2003). In 2003, marsh harrier bred in 13 sites in Suffolk and a total of 43 breeding pairs fledged at least 120 young. In 2004, 44 breeding pairs fledged at least 107 young from 11 sites (Holling & the Rare Breeding Birds Panel, 2007).

The east of England (Suffolk, Cambridgeshire, Lincolnshire and Norfolk) remains the stronghold for marsh harrier in the UK, with 147 pairs proved to have bred in 2003 and 190 in 2004 (Holling & the Rare Breeding Birds Panel, 2007).

## 3.2 Field Survey

Marsh harrier were recorded on 11 of the 12 survey dates (not recorded on 26th June 2007), and there were 119 sightings in total during the survey period. The majority of flights recorded were located within the Minsmere Levels, including the RSPB Reserve and the area immediately to the south of the New Cut. The number of sightings peaked in early May and mid-June. No marsh harrier sightings were recorded on the final survey day.

In order to obtain a detailed picture of usage of the preliminary works area and adjacent habitats, only sightings of marsh harriers to the south of Goose Hill have been considered in detail in this report. A total of 26 flights were identified that passed over the Goose Hills area. These are described in **Table 3.1** and shown on **Figure 3.1** (sightings 1 - 13) and **Figure 3.2** (sightings 14 – 26).

**Table 3.1 Marsh Harrier Flight Descriptions.**

| Flight Number | Date | Sex | Number of Individuals | Activity |
|---|---|---|---|---|
| 1 | 05/05/08 | Male | 1 | Low flight at first over Minsmere Levels, then flying high south along the Grove and over Goose Hill. |
| 2 | 11/05/08 | Male | 1 | Started hunting along ditches heading south from Minsmere Reserve. Was then mobbed by a crow and flew over The Grove then south over Goose Hill. |
| 3 | 11/05/08 | Male | 1 | Hunting in low flight over Minsmere Levels, with occasional stops before crossing Goose Hill. |
| 4 | 23/05/08 | Male | 2 | Slow, lazy flight by two males in open areas to the east of Nursery Covert. |
| 5 | 23/05/08 | Male | 1 | Initially cruising south at about 50m above the Grove, then dropped to 20m probably to hunt before rising again and passing south over Goose Hill. |
| 6 | 23/05/08 | Male | 1 | Slow flight over meadow to the east of Nursery Covert, apparently hunting. |
| 7 | 23/05/08 | Male | 1 | Male bird detected moving north over the south-east corner of Goose Hill in direct flight and carrying food. Landed in reeds within Minsmere Reserve to the north of the Old River |

**Table 3.1 (continued) Marsh Harrier Flight Descriptions.**

| Flight Number | Date | Sex | Number of Individuals | Activity |
|---|---|---|---|---|
| 8 | 23/05/08 | Male | 1 | Observed hunting south of Chapel then flew directly south along the sea wall passing to the east of Goose Hill. |
| 9 | 01/06/08 | Female | 1 | Direct flight at height moving south. |
| 10 | 01/06/08 | Male | 1 | High, direct flight heading north from sea wall east of Goose Hill to the Minsmere Reserve, with a brief display before landing in reed bed. |
| 11 | 10/06/08 | Male | 1 | This bird was detected high over the south-east corner of Goose Hill and continued to move south over Grimseys. |
| 12 | 10/06/08 | Male | 1 | Low flight detected over the meadow to the east of Nursery Covert and between trees then continued higher to the south to the Sizewell Marshes. |
| 13 | 16/06/08 | Male | 1 | Hunting along sea wall from the Sluice south past Goose Hill. |
| 14 | 16/06/08 | Male | 1 | Initially detected to the south of Goose Hill moving north, it was then noted hunting to the north of this woodland by the other surveyor. It then soared higher and moved back south of Goose Hill. |
| 15 | 16/06/08 | Male | 1 | Passing through the meadows to the east of Nursery Covert, probably hunting, then moved south over Grimseys. |
| 16 | 16/06/08 | Male | 1 | Swooped into scrub and landed to the south of Goose Hill, before patrolling the edges of the meadow east of Nursery Covert and moving north. |
| 17 | 28/06/08 | Male | 1 | Only seen briefly flying low north towards the south-east corner of Goose Hill |
| 18 | 28/06/08 | Male | 1 | Probably same bird as sighting 17, then seen circling high over meadow to the east of Nursery Covert, before moving north. Here it was recorded dropping to 10m over reed bed and continued north to the North Minsmere Level. |
| 19 | 28/06/08 | Male | 1 | This bird was observed flying low, before landing in trees on the eastern edge of Nursery Covert, after which it took off, circled the meadow to the east and moved south. |
| 20 | 07/07/08 | Male | 1 | This bird was observed moving south from the Minsmere Reserve and passed the western edge of Goose Hill. |
| 21 | 07/07/08 | Female | 1 | Observed hunting within the RSPB Reserve before moving south over Goose Hill. |
| 22 | 12/07/08 | Female | 1 | Observed hunting over Minsmere Level before landing for 3 minutes. It then continued hunting and moved south over Goose Hill. |

**Table 3.1 (continued) Marsh Harrier Flight Descriptions.**

| Flight Number | Date | Sex | Number of Individuals | Activity |
|---|---|---|---|---|
| 23 | 12/07/08 | Male | 1 | Direct, fast flight north from Sizewell Marshes to the New Cut on Minsmere Level, where it was met by a female. No food was seen to be carried by this bird and there was no prey pass observed. |
| 24 | 12/07/08 | Unknown | 1 | Only brief glimpses of this bird were possible during a direct flight heading north-west from Grimseys. |
| 25 | 12/07/08 | Male | 1 | Long hunting flights along the field boundaries within the Sizewell Marshes (generally moving west). |
| 26 | 19/07/08 | Male | 1 | Initially observed hunting and moving south along the sea wall and ditches, then occasionally flying into the eastern edge of Goose Hill woodlands. |

Marsh harrier was recorded throughout the entire survey period. Most birds noted were males (24), with only 3 females seen. The flights observed consisted of a combination of slow hunting flights and direct flights.

Several of the hunting flights started within or adjacent to the Minsmere Reserve with birds heading south and foraging over the western areas of the South Minsmere Levels and in the areas immediately to the north of Goose Hill (including Retsoms). Further foraging activity was recorded along the western edge of the sea wall, with birds quartering and moving south. Flights 8, 12 and 36 consisted of males hunting in this area, passing the eastern edge of Goose Hill along the sea wall and the eastern edge of the woodland. Hunting birds were recorded to the south of Goose Hill, where the majority of the foraging was concentrated around the meadows adjacent to the eastern edge of Nursery Covert. A male (Flight 25) was also recorded hunting along the ditches in the Sizewell Belts.

The direct commuting flights recorded were birds heading north to the Minsmere Reserve. Flights 7, 10, 18 and 23 all consisted of males moving north. The birds recorded as flights 7 and 10 were observed landing within the Reserve to the north of the Minsmere North Levels. The bird recorded as flight 7 was also observed carrying a food item. Flight 10 ended in a brief aerial display prior to landing. Flight 9 consisted of a female heading south from immediately to the south of the New Cut and was recorded flying to the west of Goose Hill as far as Kenton Hill.

# 4. Discussion

The 2008 survey recorded a total of 119 marsh harrier sightings of which 26 involved flights to the south of Goose Hill, and were therefore within the Sizewell Estate (for at least part of their observed flight). A minimum of one female and two male birds were recorded using the area. It was generally not possible to distinguish individual birds (particularly between survey days).

Observed activity included foraging flights in open habitats (during which birds generally moved south from the RSPB Reserve), foraging flights along woodland edges, and more direct

commuting flights of birds moving north. The frequency with which birds were encountered from the vantage points in the Sizewell Marshes was calculated at 1 sighting every 4.8 hours (approximately 0.2 sightings per hour). The encounter rate of birds seen moving to / from the areas to the south of Goose Hill from the remaining vantage points (1 and 2) was calculated as 1 sighting every 6 hours (approximately 0.16 sightings per hour)[12]. This provides some indication that few birds entering the marshes were missed. When compared to likely provisioning rates (approximately 11-12 prey items per day) and numbers of breeding (and likely numbers of non breeding) birds, this encounter rate would suggest that only a small percentage of the totalling foraging activity carried out by breeding individuals from within the Minsmere to Walberswick SPA[13] takes place south of Goose Hill.

The Sizewell Marshes lie within the published foraging distances of breeding marsh harriers involved in provisioning nest sites, being within 2.5km of the southernmost nests in the Minsmere RSPB Reserve and within 3.5km of the majority of the nests north of the Minsmere Old River. One sighting of a commuting male bird carrying prey in late May indicated the provisioning of a female or young nestlings inside the SPA boundary, while a second observed flight terminated in a display over the Minsmere Reserve. The likely number of breeding marsh harrier foraging south of Goose Hill is not possible to determine without a wing-tagging or radio tracking study, however, and any conclusions with regard to the importance of the Sizewell Marshes as a foraging resource for breeding SPA birds, must be made with caution. The best available data suggests that non-breeding birds may account for between approximately 12% and 35% of the total number of individuals within the SPA, and it would be reasonable to assume that as these birds are less tied to nest sites, they may range further and spend longer away from the breeding population.

# 5. Conclusions

The surveys have established that there is some use of the Sizewell Marshes by breeding marsh harrier from the Minsmere to Walberswick SPA. Overall, however, encounter rates were low, and given that a proportion of observed flights are likely to have been made by non breeding birds, there is no evidence to suggest that the Sizewell Marshes or other parts of the Sizewell Estate are of key importance to the breeding population of the SPA. The marshes and wider estate may represent an important secondary foraging resource given their distance from the SPA, particularly (perhaps) to non breeding birds, but as there will be no direct land take from the marshes as a result of development, the main effect that will need to be evaluated as part of any Environmental Impact Assessment will be localised disturbance leading to displacement. Given the extent of the marshes, the foraging potential of the wider Sizewell Estate and the areas in and adjacent to the SPA, this seems unlikely to be a key issue.

# 6. References

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[12] A filter was applied to the data, such that only birds passing over or to the south of Goose Hills were considered with regard to the encounter rate from VPs 1 & 2. Therefore flight activity restricted to the Minsmere South Levels has been excluded (93 flights). This allows a direct comparison between the northern VP and the VPs located in the Sizewell Marshes.

[13] More specifically, reed bed habitats within the SPA. The SPA extends almost as far as the Sizewell Marshes, but habitats suitable for supporting breeding marsh harrier are generally limited south of the Minsmere Level.

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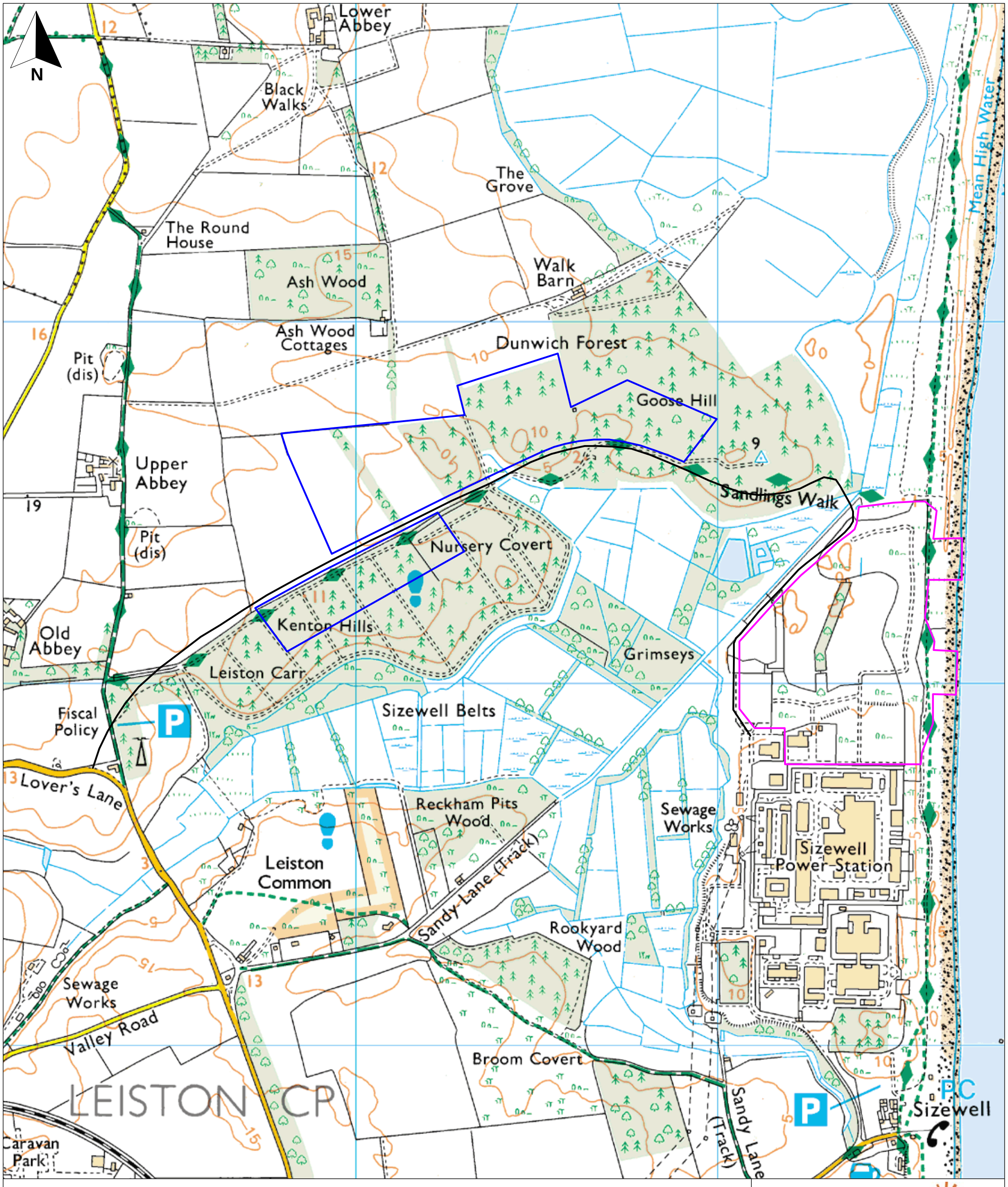


**Key:**

- Preliminary Works Area
- Indicative location of Construction Compounds
- Proposed Access Route

0 m — 500 m

British Energy

Sizewell Marsh Harrier Report 2008

**Figure 1.1**
**Site location**

January 2009
19801-R254.WOR tugwc

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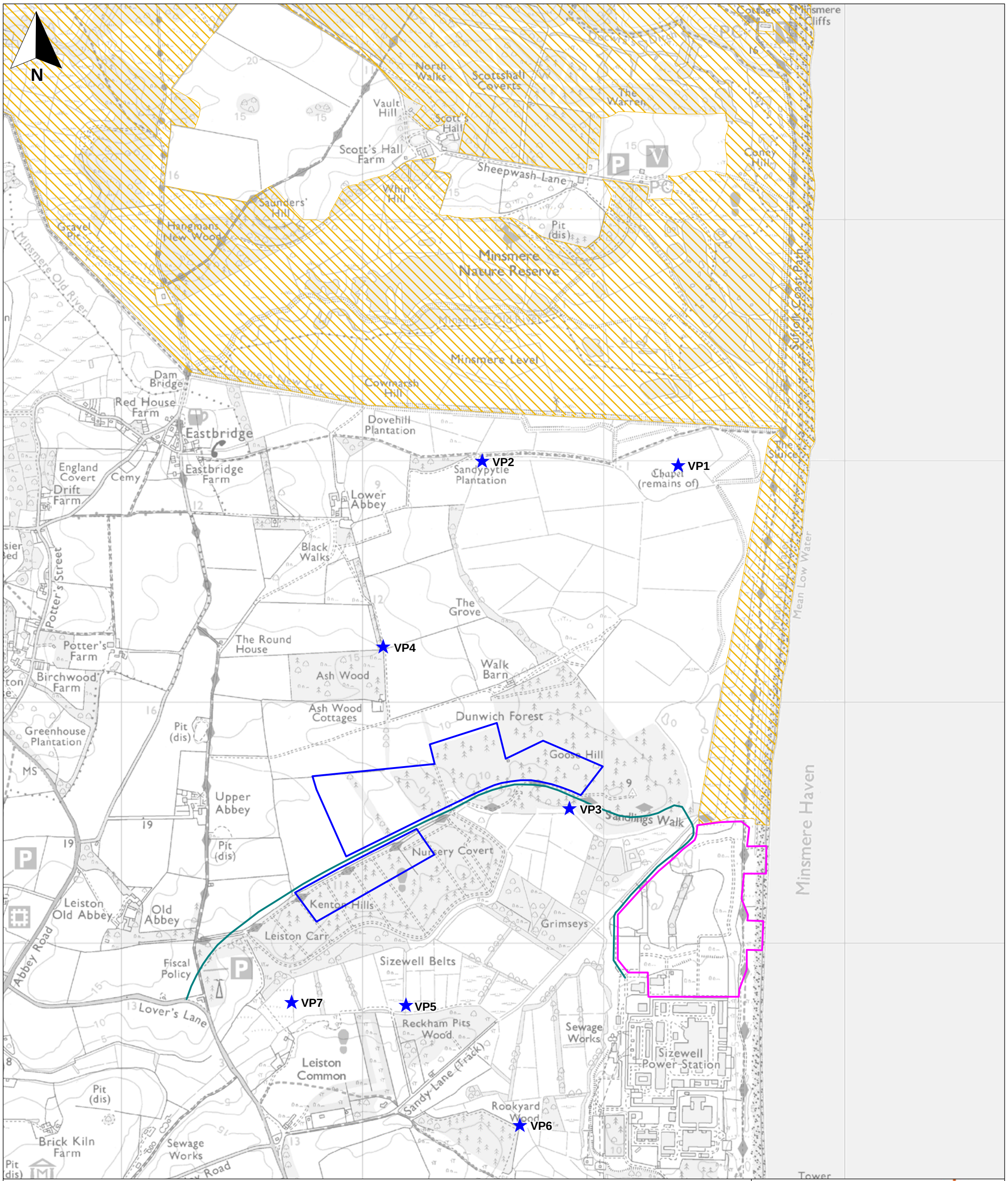



**Key:**

- Preliminary Works Area
- SPA
- Indicative location of construction compounds
- Proposed Access Road
- Vantage points

0 m — 500 m

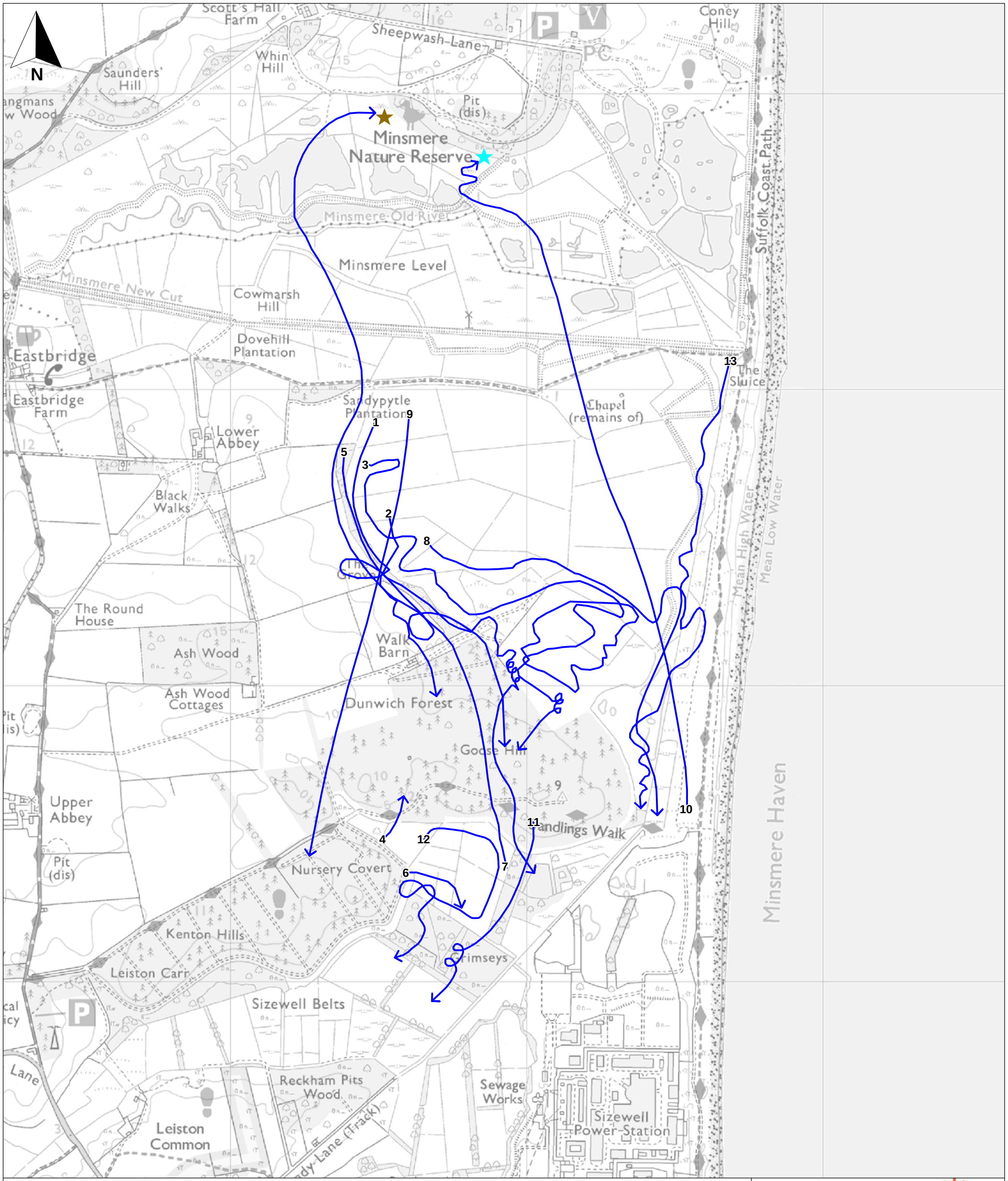
British Energy

Sizewell Marsh Harrier Report 2008

**Figure 2.1**
**Location of Vantage Points**

January 2009
19801-R255.WOR tugwc

Entec




**Key:**

- Marsh Harrier flight path
- Landing spot for flight 7
- Landing spot for flight 10

0 m 500 m

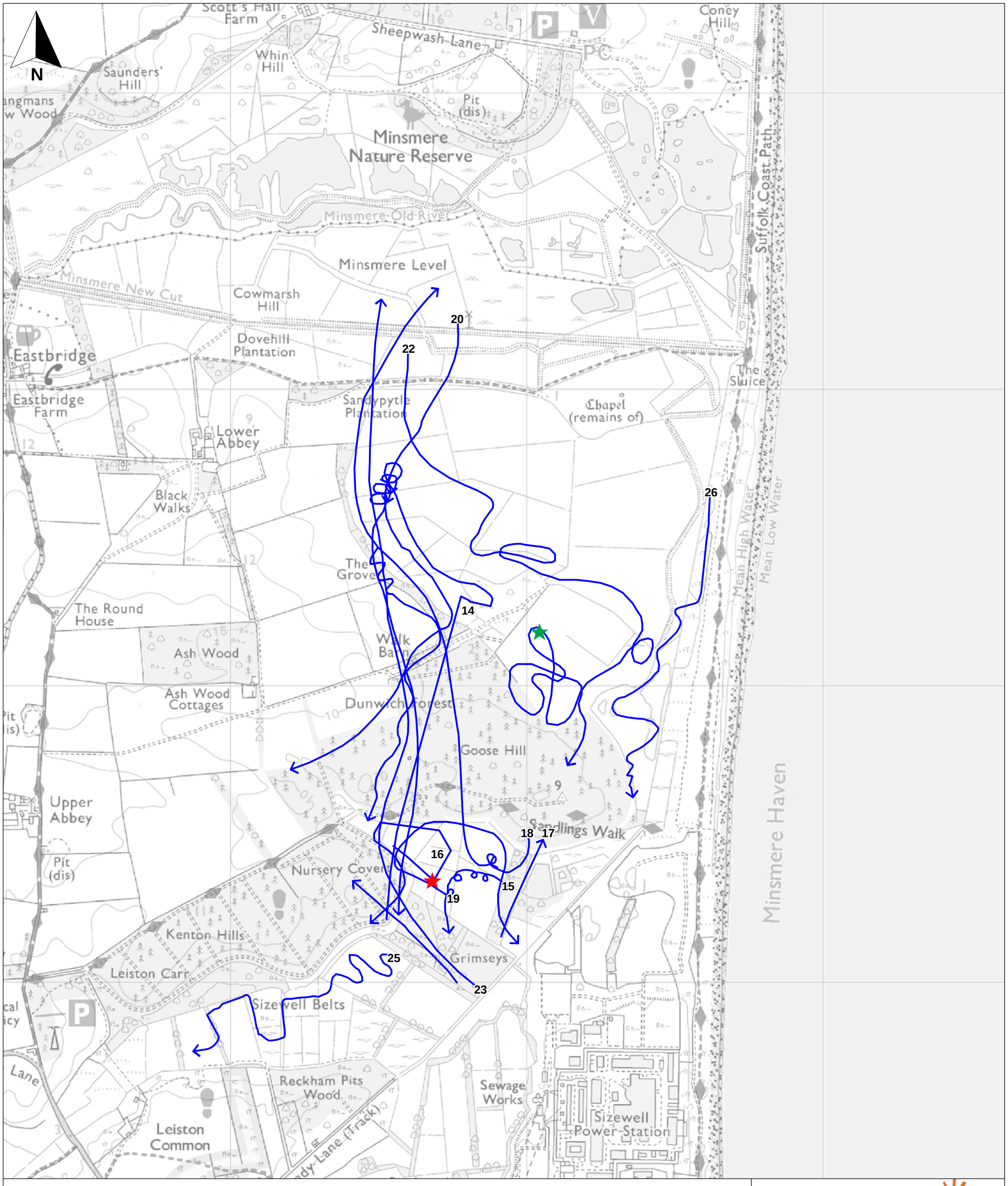
British Energy

Sizewell Marsh Harrier Report 2008

**Figure 3.1**
**Marsh harrier flights**
**Flights 1 - 13**

January 2009
19801-R219.WOR tugwc

Entec




**Key:**

Marsh Harrier flight path

Landing spot for flight 16

Landing spot for flight 22

0 m 500 m

British Energy

Sizewell Marsh Harrier Report 2008

**Figure 3.2**
**Marsh harrier flights**
**Flights 14 - 26**

January 2009
19801-R227.WOR tugwc

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# Appendix A
# Summary of UK BAP Targets and Initiatives for the Conservation of Reedbed

Marsh harrier has benefited from the Priority Habitat Action Plan prepared for reedbed[14], which is both a UK and Suffolk BAP Priority Habitat. The ornithological interest of reedbeds[15] is given as a major reason for the preparation of the national Habitat Action Plan. The targets published in 2006 for this plan are as follows:

i. Maintain the extent of the existing reedbed resource through active management and ensure no net loss (priority will be to maintain blocks of greater than 2ha, where appropriate);

ii. Maintain the condition of wet reedbed habitat where already favourable and establish (by 2010) management to secure favourable condition for all areas of targeted reedbed currently judged as unfavourable. The target condition for all such areas should be favourable or unfavourable recovering by 2020;

iii. Continue creating reedbed from land of low nature conservation interest with the objective of expanding the BAP resource by 3,000 ha across the UK by 2020;

iv. Establish 8 new landscape scale wetland complexes by 2020, at least 1 in each country in which reedbed is a major component along other wetland types.

Marsh harrier is also likely to have benefited from the Species Action Plan for bittern. The targets of this Plan include increasing the number of sites supporting booming male bittern in the UK to 32 by 2010 and increasing the number of booming male bittern on inland sites. To achieve this, the creation of new wet reedbed in blocks that average 80ha has been proposed.

[14] The full Action Plan is available at:
http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf#R

[15] The habitat supports a distinctive breeding bird assemblage including 6 nationally rare Red Data Birds: bittern (*Botaurus stellaris*), marsh harrier, crane (*Grus grus*), Cetti`s warbler (*Cettia cetti*), Savi`s warbler (*Locustella luscinioides*) and bearded tit (*Panurus biarmicus*). Reedbeds also provide roosting and feeding sites for migratory species (including the globally threatened aquatic warbler, *Acrocephalus paludicola*) and are used as roost sites for several raptor species in winter.