



CLEVE HILL SOLAR PARK

OTHER FINAL SUBMISSIONS WRITTEN REPRESENTATION BY THE APPLICANT ON MARSH HARRIER

November 2019
Revision B

Document Reference: 16.5.2
Submitted: Final Submission

www.clevehillsolar.com



CLEVE HILL
SOLAR PARK

TABLE OF CONTENTS

1	Introduction	1
2	Background	1
3	Natural England's Position	3
4	The Applicant's Position	4
5	Conclusions	8
	Appendix 1 - Supplementary Advice on Conservation Objectives	9
	Appendix 2 - Figures.....	18

1 INTRODUCTION

1. This document forms a written representation (WR) by Cleve Hill Solar Park Ltd ("the Applicant") in relation to the Development Consent Order ("DCO") application process for Nationally Significant Infrastructure Projects ("NSIPs") in support of its application for a DCO for the Cleve Hill Solar Park ("the Development"). This document has been prepared on behalf of the Applicant by RPS Group.
2. The Examining Authority published its Rule 17 letter on 23 October 2019 with requests for further information to the Examination. R17.2.4 of the letter requests:

"Using the context of the marsh harrier foraging habitat currently available within the Swale SPA designation together with the recognised functionally linked foraging habitat available to the Swale SPA population, can the Applicant provide two estimates of the proportion of the total foraging habitat that would be lost or affected to such an extent that it would effectively become unavailable as a result of the Proposed Development?"

The first estimate should assume that the Applicant's conclusion that the corridors of reedbed and grassland habitat between the solar array fields will be used post-construction by marsh harriers is correct. The second estimate should assume that marsh harriers do not use the corridors of reedbed and grassland habitat between the solar array fields post-construction for behavioural reasons, as postulated by some IPs.

Assumptions made regarding the suitability of the existing arable land that will be lost to the Proposed Development as favoured foraging habitat for marsh harrier should be clearly described and justified. Any assumptions about the current and predicted future use of the reedbeds and wetland habitats immediately to the south of the existing coastal defences by foraging marsh harriers should also be clear and justified.

Please can these estimates be communicated to Natural England and Kent Wildlife Trust sufficiently in advance of Deadline 7 to allow them to provide the ExA with a response to the following question (R17.2.5)?"

3. There has been some residual disagreement regarding the impact of the Development on marsh harrier associated with the Swale Special Protection Area (SPA). The Applicant believes it would assist Natural England, Kent Wildlife Trust (KWT) and the Examining Authority to set out the Applicant's position in this document and to provide the additional information requested in R17.2.4. This WR is submitted at Deadline 7.

2 BACKGROUND

4. The area comprising the built parts of the Development, including the solar PV arrays and electrical compound occupies land that has been identified as functionally linked to The Swale SPA; i.e., it is an area of land outside the boundary of the European Site that is used by its qualifying features, but does not occupy any habitat within the European Site.
5. The Swale SPA is designated for its important assemblages of wintering waterfowl and notable breeding bird populations: the SPA citation (1993) states that the site "*qualifies under Article 4.2 by virtue of regularly supporting diverse assemblages of the wintering and breeding migratory waterfowl of lowland wet grassland and other estuarine habitats*".
6. The 1993 SPA citation does not list marsh harrier as a qualifying interest or breeding assemblage species. It is not a species or assemblage feature for which the site has been classified. With regard to the qualifying interest features, the marsh harrier is included in the assessment (ES chapter 10: Ornithology [APP-039] and RIAA [APP-026]) as part of the breeding bird assemblage feature of the SPA, as it is considered to be a

- species characteristic of the SPA grazing marsh habitat, as advised by Natural England in pre-submission consultation.
7. Natural England Conservation Advice for Marine Protected Areas provides information on the status, features and objectives for those designated sites. For The Swale SPA¹:
"The Swale SPA's conservation objectives apply to the site and the individual species and/or assemblage of species for which the site has been classified."
 8. *The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*
 - *the extent and distribution of the habitats of the qualifying features;*
 - *the structure and function of the habitats of the qualifying features;*
 - *the supporting processes on which the habitats of the qualifying features rely;*
 - *the populations of each of the qualifying features; and*
 - *the distribution of qualifying features within the site."*
 9. Natural England also provide Supplementary Advice on Conservation Objectives (SACOs) which provides feature targets for the qualifying interest features of the SPA. For the breeding bird assemblage, these include maintenance of the size and diversity of the assemblage, reducing human disturbance, restricting predation and disturbance by native and non-native predators and maintaining various aspects of the supporting habitat within and outside the SPA. The full SACOs text from Natural England is provided in Appendix 1.
 10. An interested party, Bob Gomes, has provided written representation to the Examination which included a brief history of the status of marsh harriers locally and in Kent. This indicated that there were 5 pairs in Kent (on Sheppey) in 1991, increasing to 14 by 1994 and 21-24 by 1997. The JNCC 2001 SPA Review lists marsh harrier at The Swale SPA as having a population of 24 pairs of marsh harrier (Count as of 1995), representing 15.0% of the breeding population in Great Britain at that time. A national survey in 2005 revealed an estimated 55 nests in Kent. The latest Kent Breeding Bird Atlas 2008-13² indicates 80-100 breeding females with 40-50 of these on Sheppey (2008-13), although a later Kent Bird Report³ suggests this is an overestimate and that the population (in 2015) was in the order of no more than 70 breeding females.
 11. On the basis of this information, it is likely that there were between 5 and 14 pairs of marsh harrier within the SPA at the time of the 1993 citation and the population increased since then to at least 24 pairs in 1995. There does not appear to be a more recent population estimate specifically for the SPA; however, Natural England Commissioned Report NECR082 *What do we know about the birds and habitats of the North Kent Marshes* states that of the 55 nests identified in the 2005 survey, 42 were on Sheppey or the South Swale in, or adjoining The Swale SPA. It is therefore clear that there has been a positive trend of breeding marsh harriers in the SPA over the last 25 years, indicating a favourable population status. For the purposes of this WR, it is assumed that the SPA supports between 24-42 pairs of marsh harriers.
 12. Chapter 9: Ornithology of the ES [APP-039] provided information from confidential KWT reports on the local breeding attempts at the Development site: *"Marsh harriers have nested in most years between 2004 and 2017 (information from confidential KWT*

1

<https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK9012011&SiteName=the%20swale&countyCode=&responsiblePerson=&HasCA=1&NumMarineSeasonality=2&SiteNameDisplay=The%20Swale%20SPA#hlco>

² Kent Ornithological Society. Available at: <https://kentos.org.uk/kent-breeding-bird-atlas/> [accessed 21/10/2019]

³ Kent Ornithological Society 2016. *Kent Bird Report 2015*. Kent Ornithological Society.

reports) within the Development site, almost always within the KWT reserve [the reedbed and wetland immediately south of the sea wall to the north of the solar PV array fields] and occasionally in reedy ditches or crops close to the reserve. Breeding density was much higher between 2004 and 2012, with breeding attempts by three to eight pairs each year. However, since 2013, there has only been one nesting attempt each year."

13. The assessment of the potential impact of habitat loss/change concluded that the Development would result in a substantial increase in the amount of suitable foraging habitat available to be managed for the benefit of foraging marsh harriers. It was predicted that marsh harriers will continue to forage in the favourable habitat between the arrays, which will be larger in extent following installation of the Development than in the baseline condition. Due to the increased extent of suitable foraging habitat available with the Development, the conservation objectives for the breeding bird assemblage, of which marsh harriers form a part, would not be undermined with respect to the change of habitats for foraging marsh harriers within areas of functionally linked land.

3 NATURAL ENGLAND'S POSITION

14. The most recent submission by Natural England [REP5-050] states:

"Natural England's view is that there is still some remaining uncertainty surrounding the use of the application site by marsh harriers, such that it has not yet been established, beyond reasonable scientific doubt, that there will not be an adverse effect on the integrity of the site for marsh harriers. We will continue to work with the Applicant and the HMSG to resolve this issue."

15. The earlier section of the same submission under "Triggers and Remedial Actions for Marsh Harrier" sets out Natural England's position in greater detail:

"The triggers and remedial actions set out at Appendix A, paragraph 55, of the LBMP [REP4-007] relate to actions the Applicant can take within the application site boundary. However, there is a gap in that there is no remedial action in the event that marsh harriers are deterred from using the application site due to the presence of the solar panels.

*The approach taken by the Applicant has been to maximise the habitat within the solar park site for small mammals as a foraging resource for marsh harriers. **This is in line with Natural England advice that the presence of optimal foraging habitat is likely to encourage at least some individual marsh harriers to overcome any reticence about the presence of the panels, such that the overall population will be maintained** [Applicant's emphasis]. This advice has been given by Dr Richard Saunders, Senior Ornithologist for Natural England.*

However, as discussed at the last Biodiversity Hearing and at the HMSG meeting on 23 August, there is uncertainty over whether the landscape changes will prevent marsh harriers from accessing the habitat provided. No remedial action is currently set out in the LBMP [REP4-007] to address this eventuality. Natural England's view is that the situation for marsh harriers is different to that for wintering waterbirds, in that even if the habitat is in optimal condition, it might be the presence of the panels that prevent marsh harriers from using that habitat. In order to be certain an adverse effect on the integrity of the SPA will be avoided, there should be both no net loss of foraging habitat and no net loss of foraging opportunities.

Judgements in both the European Court of Justice and the UK courts have made it clear that a high level of certainty is required when assessing whether a plan or project is likely to adversely affect the integrity of a European site. The landmark

Waddenzee judgement in 2002 ruled that a high level of certainty is required 'where no reasonable scientific doubt remained as to the absence of such effects'.

Natural England guidance is that the best that can be achieved is for the competent authority to identify the reasonably foreseeable risks, in light of information that can be realistically obtained and put in place a legally enforceable framework aimed at preventing the risks. There is always going to be a certain level of uncertainty as we are making a prediction of the reactions of individual birds – there cannot be absolute certainty as the project has not been built yet. Therefore, the assessment of impacts has to be based on expert opinion, which is divided. Where scientific uncertainty is present then a precautionary approach should be adopted. Natural England's engagement in the Examination and through the HMSG has been to try and resolve the uncertainty as far as possible."

4 THE APPLICANT'S POSITION

16. It is the Applicant's position that the habitat management measures with the Development will provide suitable foraging habitat for marsh harriers, which is agreed with conservation parties⁴. It is also the Applicant's position that marsh harriers from the SPA and outside the SPA will continue to forage there, including between the solar PV array fields, which was agreed by Natural England's senior ornithological advisor during a meeting on 3 September 2018 (see page 62 of 63 of the Pre-Submission Statement of Common Ground between the Applicant and Natural England [APP-256]). The assessment in the Environmental Statement (ES) [APP-039] concluded that this would have a potentially positive effect but was unlikely to be significant. The RIAA [APP-026] concluded that due to the increased extent of suitable foraging habitat available with the Development, the conservation objectives would not be undermined with respect to the change of habitats for foraging marsh harriers in functionally linked land. The Outline LBMP (REP6-005) sets out the habitat management measures for the grassland areas between the solar arrays for the benefit of foraging marsh harriers and provides examples of remedial measures to alter the habitat management if the target habitats are not achieved, or marsh harriers are not observed using them. No robust evidence has been provided to suggest marsh harriers won't continue to use the developed site. The Applicant's position has not therefore changed during the course of the Examination.
17. As recognised by Natural England, the law requires consideration of best available evidence, but the requirement to reach conclusions beyond reasonable scientific doubt does not require removal of all uncertainty. However, to provide additional comfort, in this document, we provide additional information to put any contended residual uncertainty regarding the future use of the inter-array grassland areas between the fields containing the solar PV arrays in the operational Development site into proper context with respect to the implications for the conservation objectives of the SPA.
18. The Development envelope includes approximately 295 hectares of arable land representing the envelope around all of the fields that will contain the solar PV arrays and the electrical compound (including flood protection bund). This land within the Development envelope has been acknowledged in the assessment as providing functionally linked land with respect to foraging marsh harriers. This represents the potential maximum area from which marsh harriers could be displaced from foraging *if* they are dissuaded from foraging in the inter-array grasslands between the fields containing the solar PV arrays and is displayed in Figure 1 as the bold blue outline.

⁴ KWT Written Representation REP2-092, Paragraph 18; Natural England Written Summary of Oral Submission REP3-082, page 3 'Marsh Harriers'; Natural England SoCG REP4-039, pages 16 and 41; Natural England Written Summary of Oral Representation presented at ISH6 REP5-050, Page 3 'Triggers and remedial actions for marsh harriers'.

There is no empirical evidence that birds would be displaced from the South Swale Nature Reserve bordering the north of the Development site (the reedbeds and wetland habitats immediately to the south of the existing coastal defence), nor that they would be displaced from foraging in other areas outside the development envelope, such as within the 55.4 ha Arable Reversion Habitat Management Area (AR HMA; pale blue shaded area on Figure 1), 13.3 ha Lowland Grassland Meadow Habitat Management Area (LGM HMA; turquoise shaded area on Figure 1) or approximately 20.0 ha of other lowland meadow grassland habitat management outside the development envelope (yellow shaded area on Figure 1). Those areas will provide more suitable grassland habitat for foraging than in the current arable baseline and provide a positive net gain in suitable grassland foraging habitat. This is supported by the observation referred to in the assessment of a marsh harrier foraging along the edge of a solar farm on Sheppey; also, at the sustainable energy plant development at Kemsley Paper Mill, a reedbed near the access track (within 100 m) subject to frequent haulage disturbance has continued to support nesting marsh harriers⁵.

19. The Swale SPA extends over a total of 6,509.88 ha. The SPA's 2016 Standard Data Form provides the latest estimated breakdown of different habitats within the SPA. Those comprising suitable marsh harrier foraging habitat include 325.5 ha (5.0 %) of saltmarsh (SPA habitat code N03) and 3,059.6 ha (47.0 %) of 'other arable land' (SPA habitat code N015) that is assumed to be coastal grazing marsh, as there is no such substantial area of 'arable land' within the SPA. There is therefore approximately 3,385 ha of suitable foraging habitat within the SPA itself. Outside the SPA, the availability of other suitable (e.g. reedbed, grazing marsh and other wetland) and sub-optimal (e.g. arable land) foraging habitat for breeding marsh harriers from the SPA was estimated in a GIS, accounting for the area of these habitats within 1 km of the SPA boundary. The area of potential foraging habitat outside the SPA is substantial, particularly on Sheppey, where Eastchurch, Leysdown and Harty Marshes for example extend over approximately 2,000 ha. It is estimated that there are at least 4,175 ha of other available arable and grassland foraging habitat outside (within 1 km) the SPA (Appendix 2, Figure 2). When combined with the suitable saltmarsh and grazing marsh habitats within the SPA, there is a total estimated foraging range of approximately 7,560 ha for marsh harriers associated with the SPA.
20. If it is assumed [per R17.2.4] that marsh harrier are displaced from the areas between solar panels within arrays, but are not dissuaded from foraging in the inter-array grasslands between the fields containing the solar PV arrays (which is the basis of the Applicant's position), then there is effective loss of 256.5 ha of arable cropped habitat available to them for foraging (the purple shaded area in Figure 1). In the context of the total available foraging habitat in and around the SPA, this represents 3.4%. However, marsh harriers were observed during baseline surveys mainly foraging along the ditches between fields and in the reedbed and grassland habitat comprising the KWT reserve along the northern boundary; this habitat would still be available to marsh harriers under this scenario and the loss of sub-optimal arable land is mitigated in the design of the Development by the enhancement of approximately 39.0 ha of inter-array grasslands to provide optimal foraging conditions for marsh harriers, together with better foraging habitat being developed in the 55.4 ha AR HMA (during the breeding season)⁶ and the 13.3 ha LGM HMA in place of arable crops (Figure 1).
21. If it is assumed [per R17.2.4] that marsh harrier are dissuaded from foraging in the inter-array grasslands between the fields containing the solar PV arrays (Figure 1), the potential loss of approximately 292 ha of arable foraging habitat including its ditch

⁵ RPS 2017. Sustainable Energy Plant, Kemsley Paper Mill, Sittingbourne, Kent: Information for an Appropriate Assessment. https://wtikemsley.co.uk/site/assets/files/1376/appendix_6_8.pdf accessed 24/10/2019.

⁶ The AR HMA in the breeding season will be grazed but is likely to support ground nesting birds and small mammals, but in the winter will be short sward and less suitable as foraging habitat.

- network and associated 2 m grassland strips at the Development site (assuming marsh harriers are displaced entirely from the developed envelope at the site as described above) is therefore likely to represent a small area in relative terms, being approximately 3.9% of the potential foraging habitat of all types (saltmarsh, grazing marsh grassland and arable habitat within and outside the SPA) available to marsh harriers from the SPA population. If the same proportion is applied directly to the SPA marsh harrier population and if arable foraging habitat is a potentially limiting factor in their survival or productivity, then in that assumed scenario there would be effective loss of 1-2 pairs from the SPA population (3.9% of 24-42 pairs).
22. If such an impact were assumed to occur (which, as noted above, the Applicant considers unlikely), then the question is whether or not this represents an adverse effect on the integrity of the SPA. In terms of abundance, Natural England's SACOs state that the breeding bird assemblage, of which marsh harrier forms a part, should be maintained at a level above the baseline set by the Natural England Chief Scientist. The target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. The Applicant was unable to find a specific target value for the SPA marsh harrier population and Natural England has not provided specific advice in this respect. However, given the material increase in the SPA marsh harrier breeding population since the SPA citation in 1993, a small decrease of one or two pairs of marsh harrier supported by the SPA (from an estimated 24-42 pairs to 22-40 pairs if this scenario were to occur) would not undermine the conservation objective for the breeding bird assemblage. In the Applicant's opinion, the remaining area of foraging habitat at and around the SPA, including the enhanced habitats provided at the site that remain undeveloped, will maintain a population which continues to achieve the SPA's conservation aims – the SPA would continue to support a robust population of marsh harriers that contributes to the breeding bird assemblage feature.
23. The SACOs list disturbance caused by human activity as an attribute, with a target of reducing the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed. In the unlikely event that marsh harriers were to be displaced from the Development envelope and thus not make use of the inter-array grasslands between fields of solar panels, that scenario would constitute a level of disturbance because it would change local distribution on a continuing basis. However, even in that scenario the potential loss of an area of sub-optimal arable foraging habitat outside the SPA boundary would not affect the long-term viability of the SPA population. In a worst-case, the population could be slightly reduced, but would continue to contribute to a viable local, national and bio-geographic population.
24. With regards to the supporting habitat, the SACOs list two Attributes and Targets of key relevance in relation to the Development: maintaining the extent, distribution and availability of suitable habitat (either within or outside the Development site boundary) which supports the feature for all necessary stages of its breeding cycle; and maintaining the structure, function and availability of the habitats which support the assemblage feature for all stages of the breeding period. The SACO lists the supporting habitats as intertidal mud, intertidal sand and muddy sand, intertidal coarse sediment, intertidal mixed sediment, saltmarsh, coastal grazing marsh.
25. There is no specific mention of arable land as supporting habitat in the SACO. Natural England has highlighted that the Cleve Hill site, which is predominantly arable, provides functionally linked land for marsh harriers; the Applicant agrees that there is a functional link, though the fact that arable land is not identified as supporting habitat in the SACO is nonetheless considered to be significant as it suggests lesser importance. As a result, the Applicant has committed to managing areas of the site for the benefit of marsh harriers, specifically the estimated 39 ha of additional inter-array grasslands

between the solar PV array fields that improves upon the current narrow ditch margins at the edges of the arable crops. In these areas, arable land will be converted to coastal grazing marsh grassland, thus increasing the extent of this supporting habitat in relation to the SPA. In other areas outside the Development envelope within the Development site boundary, arable land will be converted to grassland in the AR HMA and LGM HMA and other lowland meadow grassland areas, which will benefit foraging marsh harriers, but is not the specific aim of the management of those areas.

26. None of the other target features for the SPA would be affected with regards to marsh harriers in the breeding bird assemblage:

- Breeding bird assemblage species diversity will be maintained;
- Risk of predation will remain unaffected;
- Air quality for supporting habitat will be unaffected;
- Conservation measures for supporting habitat will be unaffected; and
- Water quality in supporting habitat will be improved due to cessation of agricultural inputs to arable land.

5 CONCLUSIONS

27. This WR sets out clarification of the Applicant's position regarding the potential effects of the Development on the integrity of The Swale SPA with respect to marsh harriers, which are part of the breeding bird assemblage feature of the SPA. The WR provides the information requested in R17.2.4 of the Examining Authority's Rule 17 letter.
28. The Applicant concludes that:
- The breeding bird assemblage feature of the SPA includes marsh harrier as a component species of the assemblage because it is a species characteristic of grazing marsh, although it is not listed in the SPA citation;
 - The development envelope comprising the solar array fields and electrical compound is not within The Swale SPA, it is within functionally linked land with respect to foraging marsh harriers;
 - The SPA population of marsh harriers has increased considerably since citation to at least 24-42 breeding females and is in favourable conservation status;
 - Marsh harriers forage for some of the time over arable land at the site, but the focus of foraging activity was along the ditches and mainly along the KWT reserve along the northern boundary of the site, which will not be developed;
 - Marsh harriers are likely to continue to forage at the operational Development, making use of the grassland habitats within the Development site boundary that are outside the development envelope around all of the solar array fields, as well as the inter-array grassland areas between the solar array fields;
 - In the context of the contended residual uncertainty regarding future use of the inter-array grassland areas, the extent of arable land being developed on site is a very small proportion of the amount of saltmarsh, grassland and arable habitat in and around the SPA that is available to the SPA marsh harrier population;
 - Design mitigation plus adaptive management measures reduce residual uncertainty regarding foraging use of the operational site to an acceptable level;
 - The Habitats Regulations requires consideration of the best available evidence, which has been presented in the Examination, but does not require removal of all uncertainty. There is no robust evidence to conclude that marsh harriers will not use the operational site;
 - In view of the above, it can reasonably be concluded, beyond reasonable scientific doubt, that there will be no adverse effect on the integrity of The Swale SPA, nor any requirement for any further mitigation to make this conclusion in respect of marsh harrier as a component of the breeding bird assemblage. Regarding offsite mitigation land, that is not necessary, particularly given the existing c.7,500 ha of potential foraging habitat available in and around the SPA.

APPENDIX 1 - SUPPLEMENTARY ADVICE ON CONSERVATION OBJECTIVES

Breeding bird assemblage. Breeding	Assemblage of species: abundance	Maintain the size of the assemblage at a level which is above a baseline population approved by Natural England Chief Scientist, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Breeding (summer) season	<p> This will sustain the site's overall assemblage and contribute to a viable local, national and bio-geographic population. Due to the mobility of this feature and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is classified, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account. Unless otherwise stated, the population size will be that measured using standard methods such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available. </p> <p> Site-specifics: The target has been set due to a lack of evidence that the feature is being impacted by any anthropogenic </p>
---	----------------------------------	---	--------------------------	---

				activities.
Breeding bird assemblage, Breeding	Assemblage of species: diversity	Maintain the overall number of the main assemblage-component species and the average size of each of their populations in order to achieve a high degree of species diversity within the seabird assemblage.	Breeding (summer) season	<p>The overall variety or diversity of different species which make up the assemblage is an important attribute of the assemblage feature. This diversity is a product of both species richness (the overall number of different species represented in the assemblage) and the abundance of those species within the assemblage. Maintaining this overall diversity is considered an important element of achieving the SPA Conservation Objective.</p> <p>Site-specifics: At the time of classification the assemblage included shelduck (<i>Tadorna tadorna</i>), mallard (<i>Anas platyrhynchos</i>), moorhen (<i>Gallinula chloropus</i>), coot (<i>Fulica atra</i>), lapwing (<i>Vanellus vanellus</i>), redshank (<i>Tringa totanus</i>), reed warbler (<i>Acrocephalus scirpaceus</i>) and reed bunting (<i>Emberiza schoeniclus</i>) (English Nature, 1993).</p> <p>The target has been set due to a lack of evidence that the feature is being impacted by any anthropogenic activities.</p>
Breeding bird assemblage, Breeding	Disturbance caused by human activity	Reduce the frequency, duration and / or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.	Breeding (summer) season	<p>The nature, scale, timing and duration of some human activities can result in bird disturbance (defined as any human-induced activity sufficient to disrupt normal behaviours and / or distribution of birds in the absence of the activity) at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.</p> <p>'Significant' disturbance is defined by AEWA (The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), 2016): "Disturbance should be judged as</p>

				<p>significant if an action (alone or in combination with other effects) impacts on (water)birds in such a way as to be likely to cause impacts on populations of a species through either changed local distribution on a continuing basis; and/or changed local abundance on a sustained basis; and/or the reduction of ability of any significant group of birds to survive, breed, or rear their young.” (Fox and Madsen, 1997)</p> <p>Site-specifics: Disturbance has been identified as a potential cause of the decline in bird numbers across North Kent. Birds have been shown to change their behaviour in response to disturbance in local studies of the Swale, although these studies focused on the winter period. This includes flying more than 50m and major flight events as a result of being disturbed. Activities on the intertidal, especially involving dogs have been shown to be of particular concern. Disturbance has been shown to have more of an affect at high tide. (Liley and Fernley, 2011); (English Nature, 2003); (Liley et al., 2012); (Kirby, 2013)</p> <p>Set based on north Kent bird disturbance surveys, which have found evidence to suggest human activities such as dog walking provide a source of disturbance to the birds using the site.</p>
Breeding bird assemblage, Breeding	Predation - all habitats	Restrict predation and disturbance caused by native and non-native predators.	Breeding (summer) season	<p>This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, but also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing, scaring and direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features. Predation can influence distribution on a local scale (e.g. through abandonment) or at a wider population scale. (Smith et al., 2010), (Smith et al.,</p>

				<p>2011)</p> <p>Site-specifics:</p> <p>The target has been set due to a lack of evidence that the feature is being impacted by any anthropogenic activities.</p>
<p>Breeding bird assemblage. Breeding</p>	<p>Supporting habitat: air quality</p>	<p>Maintain concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System</p>	<p>Year round – to ensure the habitat remains suitable for when the feature is present</p>	<p>This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH₃), oxides of nitrogen (NO_x) and sulphur dioxide (SO₂), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. More information about site-relevant Critical Loads and Levels for this site is available by using the 'search by site' tool on the Air Pollution Information System (Centre for Ecology & Hydrology (CEH), 2014).</p> <p>It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.</p> <p>Site-specifics:</p> <p>Critical loads for air pollutants relevant to this feature at this site have been taken from APIS. At the time of drafting this packaging none of the critical loads given below were exceeded on the site.</p> <p>Nitrogen deposition: Pioneer, low-mid, mid-upper saltmarshes: Critical Loads (kg N/ha/yr): 20-30</p> <p>Ammonia : Littoral sediment: Critical</p>

				<p>Level ($\mu\text{g NH}_3/\text{m}^3$ annual mean): 3 (2-4 $\mu\text{g NH}_3 \text{ m}^{-3}$) (set for Higher Plants)</p> <p>Nox: Littoral sediment: Critical Level ($\mu\text{g Nox}/\text{m}^3$ annual mean): 30 (set for all vegetation). Critical Level ($\mu\text{g Nox}/\text{m}^3$ 24-hour mean): 75 (set for all vegetation)</p> <p>There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.</p>
Breeding bird assemblage. Breeding	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	Year round – to ensure the habitat remains suitable for when the feature is present	<p>This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and / or management agreements.</p> <p>Site-specifics:</p> <p>This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further information can be found within the Natura 2000 Site Improvement Plan for SPAs within the Greater Thames Complex (Thames Estuary and Marshes SPA, Medway Estuary and Marshes SPA and the Swale SPA and Benfleet and Southend Marshes SPA). For more information on management of the SSSIs that underpin the SPA please contact your local Natural England adviser (Natural England, 2014).</p> <p>There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.</p>

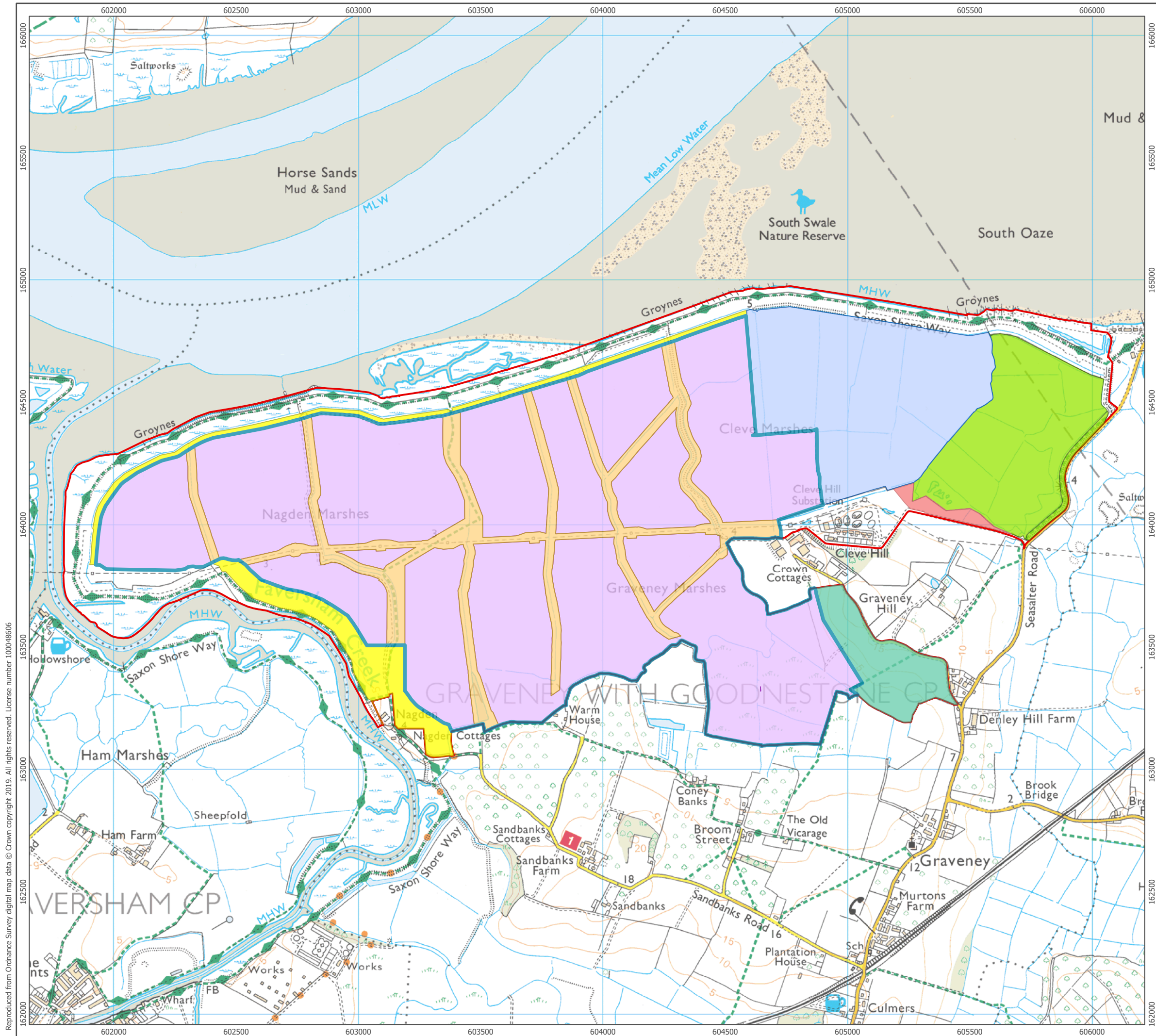
<p>Breeding bird assemblage Breeding</p>	<p>Supporting habitat: extent and distribution of supporting habitat for the breeding season</p>	<p>Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) at: Intertidal mud: 2411 ha, Intertidal sand and muddy sand: 0.01 ha, Intertidal coarse sediment (extent unknown), Intertidal mixed sediment (extent unknown), Saltmarsh : 915 ha, Freshwater and coastal grazing marsh : 2512 ha. NB saltmarsh extent may or may not contain the specific saltmarsh habitat types used by the feature.</p>	<p>Year round – to ensure the habitat remains suitable for when the feature is present</p>	<p>The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. Inappropriate management and direct or indirect impacts which may affect the extent and distribution of habitats may adversely affect the population and alter the distribution of birds. The principal habitats known or likely to support the assemblage feature at this SPA are:</p> <p>Site-specifics: Intertidal mud, intertidal sand and muddy sand, saltmarsh, and grazing marsh. Sea level rise has the potential to change the extent of supporting habitats (erosion and accretion). The shoreline management plan and associated Appropriate Assessment has specific details on the policies in place for specific areas within The Swale (Natural England, 2014), (Environment Agency, 2008). This target may apply to supporting habitat which also lies outside the boundary. Birds will not be nesting on habitat regularly flooded by the tide but they will be found in intertidal habitats above the Mean High Water Mark (which may not have been mapped). Intertidal mud (Hill et al., 1996), (English Nature, 2003), (The Kent Habitat Survey Partnership, 2004), (Natural England, 2010), (England, 2010), (English Nature, 2003), (Natural England, 2013), (Marine Nature Conservation Review, 1993), (National Rivers Authority, 1990), (National Rivers Authority, 1990), (Unknown, .), (Medway and Swale Estuarine Partnership, 2004), (Mott MacDonald Group, 1996); Intertidal sand and muddy sand (Hill et al., 1996), (Mott MacDonald Group, 1996), (Unknown, .), (Medway and Swale Estuarine Partnership, 2004), (Unknown, 2003), (Unknown, 2001); Saltmarsh (England, 2010), (Hill et al., 1996), (Blair-Myers, 2003), (Kent County Council (KCC), 2012); Freshwater and coastal grazing marsh (Unknown, Unknown), (Unknown, .), (The Kent Habitat Survey Partnership, 2003). Natural England, 2014 Natural England, 2014 Natural England, 2013 Kent County Council (KCC), 2012 Brown et al., 2013 Halcrow Group Limited, 2010</p>
--	--	--	--	--

				There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.
Breeding bird assemblage. Breeding	Supporting habitat: quality of supporting breeding habitat	Maintain the structure, function and availability of the following habitats which support the assemblage feature for all stages (breeding, moulting, roosting, loafing, feeding) of the breeding period; Intertidal mud, intertidal sand and muddy sand, saltmarsh, grazing marsh.	Year round – to ensure the habitat remains suitable for when the feature is present	<p>The site's ability to support and sustain an assemblage comprising a distinct or diverse mix of species will be reliant on the overall quality and diversity of the habitats that support them. The feeding and roosting habitats which support the assemblage will occur within, and in some cases outside, the site boundary. This target is applicable to both circumstances.</p> <p>Due to the large number of species and natural fluctuations in the overall composition of an assemblage, it is not practical to provide specific targets relating to each supporting habitat relevant to the assemblage. Generally speaking, the specific attributes of each supporting habitat may include vegetation characteristics and structure, surface water depth, water quality, air quality, food availability, connectivity between nesting, roosting and feeding areas both within and outside the SPA. Further advice will be provided by Natural England on a case by case basis. The main component-species of the assemblage at this SPA include:</p> <p>Site-specifics: Shelduck (<i>Tadorna tadorna</i>), mallard (<i>Anas platyrhynchos</i>), moorhen (<i>Gallinula chloropus</i>), coot (<i>Fulica atra</i>), lapwing (<i>Vanellus vanellus</i>), redshank (<i>Tringa totanus</i>), reed warbler (<i>Acrocephalus scirpaceus</i>) and reed bunting (<i>Emberiza schoeniclus</i>) (Natural England, 2014).</p> <p>There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.</p>
Breeding bird assemblage. Breeding	Supporting habitat: water quality - contaminants	Reduce aqueous contaminants to levels equating to Good/High status according to the Water Framework Directive, avoiding deterioration from existing levels.	Year-round	Contaminants may have a range of biological effects on different species within the supporting habitat, depending on the nature of the contaminant (Joint Nature Conservation Committee (JNCC), 2004), (UK Technical Advisory Group on the Water Framework Directive (UKTAG), 2008), (Environment Agency, 2014). This in turn can adversely affect the availability of bird breeding, rearing, feeding and roosting habitats, and potentially bird

				<p>survival.</p> <p>Site-specifics: There are high levels of the priority hazardous substance tributyl tin and its compounds in the Swale Water Framework Directive waterbody.</p> <p>Evidence from monitoring.</p>
<p>Breeding bird assemblage. Breeding</p>	<p>Supporting habitat: water quality - dissolved oxygen</p>	<p>Maintain the dissolved oxygen (DO) concentration at levels equating to High Ecological Status, avoiding deterioration from existing levels.</p>	<p>Year-round</p>	<p>Dissolved Oxygen (DO) levels affect the condition and health of supporting habitats. Excessive nutrients and/or high turbidity can lead to a drop in DO, especially in warmer months. Low DO can have sub-lethal and lethal impacts on fish and infauna and epifauna communities (Best et al., 2007) and hence can adversely affect the availability and suitability of bird breeding, rearing, feeding and roosting habitats. However, there is a significant amount of natural variation that should be considered.</p> <p>Site-specifics: There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.</p>
<p>Breeding bird assemblage. Breeding</p>	<p>Supporting habitat: water quality - nutrients</p>	<p>Maintain water quality at mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features, avoiding deterioration from existing levels.</p>	<p>Year-round</p>	<p>High concentrations of nutrients in the water column can cause phytoplankton and opportunistic macroalgae blooms, leading to reduced dissolved oxygen availability. This can impact sensitive fish, epifauna and infauna communities (Devlin et al., 2007), (Best, 2014) and hence adversely affect the availability and suitability of bird breeding, rearing, feeding and roosting habitats. The aim is to seek no further deterioration or improve water quality.</p> <p>Site-specifics: The risk of eutrophication across the site has been assessed as low using the Environment Agency's Weight of Evidence approach. This takes into account assessments of the Water Framework Directive opportunistic macroalgae and phytoplankton quality elements using the respective assessment tools. Adverse effects to integrity should be avoided. Therefore opportunistic macroalgal levels should be maintained so there is no adverse effect to the feature through limited algal cover (<15%) and low biomass (< 500 g m²) of macroalgal blooms in the available intertidal habitat, with area of available intertidal habitat</p>

				<p>affected by opportunistic macroalgae less than 15 %. There should also be limited (<5%) entrainment of algae in the underlying sediment (all accounting for seasonal variations and fluctuations in growth). Phytoplankton levels should be maintained above a WFD assessment tool score of 0.6, where there is only a minor (a) decline in species richness, and (b) disturbance to the diatom-dinoflagellate succession in the spring bloom compared to reference conditions.</p> <p>There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.</p>
Breeding bird assemblage. Breeding	Supporting habitat: water quality - turbidity	Maintain natural levels of turbidity (e.g. concentrations of suspended sediment, plankton and other material) across the habitat.	Year-round	<p>Water turbidity is a result of material suspended in the water, including sediment, plankton, pollution or other matter from land sources. Turbidity levels can rise and fall rapidly as a result of biological (eg plankton blooms), physical (eg storm events) or human (eg development) factors. Prolonged changes in turbidity may influence the amount of light reaching supporting habitats, affecting the primary production and nutrient levels of the habitat's associated communities. Changes in turbidity may also have a range of biological effects on different species within the habitat, eg affecting their abilities to feed or breathe.</p> <p>A prolonged increase in turbidity is indicative of an increase in suspended particulates. This has a number of implications for the aquatic / marine environment, such as affecting fish health, clogging the filtering organs of suspension feeding animals and affecting sedimentation rates. This in turn can adversely affect the availability and suitability of bird breeding, rearing, feeding and roosting habitats.</p> <p>Site-specifics:</p> <p>The target has been set due to a lack of evidence that the feature is being impacted by any anthropogenic activities.</p>


APPENDIX 2 - FIGURES



-  Site Boundary
-  Arable Reversion Habitat Management Area (55.44 Ha)
-  Cleve Hill Substation Habitat Management Area (2.06 Ha)
-  Ditch and Grassland Habitat (within theoretical displacement area if deterred) (39.04 Ha)
-  Freshwater Grazing Marsh Habitat Management Area (34.97 Ha)
-  Lowland Grassland Meadow Habitat Management Area (13.27 Ha)
-  Theoretical Marsh Harrier Displacement Area (if deterred from interarray areas) (295.32 Ha)
-  Ditch and Grassland Habitat (outside theoretical displacement area) (19.97 Ha)
-  Marsh Harrier Displacement Area (256.51 Ha)

1:15,000 Scale @ A3

0 0.25 0.5 km

 NORTH

Produced By: SC	Ref: 2238-REP-348
Checked By: MB	Date: 21/11/2019





Theoretical Marsh Harrier Displacement Areas
Figure 1

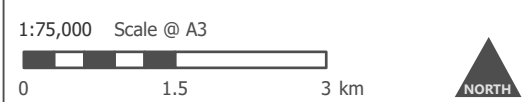
**Cleve Hill Solar Park
WR on Marsh Harrier**

Reproduced from Ordnance Survey digital map data © Crown copyright 2019. All rights reserved. License number 100048606



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

-  Site Boundary
-  The Swale SPA (6,510 ha)
-  Arable land and Pasture (4,175 ha)
-  1 km buffer of the Swale SPA



Produced By: EL	Ref: 2238-REP-349
Checked By: SC	Date: 13/11/2019

The Swale SPA-Functionally Linked Foraging Habitats for Marsh Harriers
Figure 2

**Cleve Hill Solar Park
WR on Marsh Harrier**