



AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement – Volume 3 – Appendix 16.4 Non-Statutory Designated Sites Report - Low Resolution Part 1

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WSP

WSP House

70 Chancery Lane

London

WC2A 1AF

+44 20 7314 5000

www.wsp.com

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CONTENTS

EXECUTIVE SUMMARY	1
1. APPENDIX 16.4 NON-STATUTORY DESIGNATED SITES REPORT 1-1	
<hr/>	
1.1. INTRODUCTION	1
2. METHODOLOGY	10
<hr/>	
2.1. PHASE 1 HABITAT SURVEY	10
2.2. NATIONAL VEGETATION CLASSIFICATION SURVEY	10
2.3. NOTES AND LIMITATIONS	13
3. PHASE 1 HABITAT SURVEY RESULTS	15
<hr/>	
3.1. EASTNEY BEACH SINC (PO0011)	15
3.2. LAND WEST OF FORT CUMBERLAND SINC (PO0013)	15
3.3. MELVILLE ROAD VERGE SINC AND RVEI (PO0012 / RV192)	15
3.4. MILTON LOCKS SINC (PO0017)	16
3.5. MILTON COMMON SINC (PO0007)	16
3.6. GREAT SALTERNS LAKE SINC (PO0008)	17
3.7. GOLF COURSE NORTH OF BURRFIELDS ROAD SINC (PO0016)	17
3.8. FARLINGTON MARSHES SINC (PO0027)	18
3.9. ADJACENT TO FARLINGTON PLAYING FIELDS (PO0010)	18
3.10. EAST AND WEST OF GILLMAN ROAD (PO0019)	18
3.11. FARLINGTON AVENUE SINC AND RVEI (PO0026 / RV279)	19
3.12. MEADOW WEST OF FARLINGTON AVENUE SINC (PO0006)	19
3.13. LAND SOUTH OF PORTSDOWN HILL ROAD SINC (PO0004)	20
3.14. LONDON ROAD FIELD SINC (HV0001)	20
3.15. DENMEAD MEADOWS / KINGS POND MEADOW SINC (WC0642)	20
3.16. CRABDENS COPSE SINC (EH0066)	21
<hr/>	

3.17.	CRABDENS ROW SINC (EH0072)	21
4.	NVC SURVEY RESULTS	23
4.1.	OVERVIEW	23
4.2.	DENMEAD MEADOWS / KINGS POND MEADOW SINC	23
4.3.	MILTON COMMON SINC	28
5.	DISCUSSION	32

REFERENCES

TABLES

Table 1 - SINC^s and RVEI^s within 100m Proposed Development (this information is sourced from data provided by the Hampshire Biodiversity Information Centre) 4

APPENDICES

Appendix 1 – Species Lists

Appendix 2 – Figures

Appendix 3 - Photographs

EXECUTIVE SUMMARY

This report has been prepared on behalf of AQUIND Limited (the ‘Applicant’) to support an application (the ‘Application’) for a Development Consent Order (‘DCO’). AQUIND Interconnector is a proposed electricity Interconnector between France and the UK. The Application for the DCO is made in respect of the UK elements of AQUIND Interconnector (referred to as the ‘Proposed Development’).

The Proposed Development is described in detail in Chapter 3 (Description of the Proposed Development) of the Environmental Statement (‘ES’) Volume 1 (document reference 6.1.3)

The report reviews ecological features that comprise 17 non-statutory designated sites that were identified by the Proposed Development’s Preliminary Ecological Appraisal (‘PEA’), including Sites of Importance for Nature Conservation (‘SINCs’) and Road Verges of Ecological Importance (‘RVEIs’) Appendix 16.2 (PEA / Phase 1 Habitat Survey Report) of the ES Volume 3 (document reference 6.3.16.2). Desk study information, including that provided by the Hampshire Biodiversity Information Centre (‘HBIC’), along with observations made during visits to each site have been used to describe the ecological features of each.

Two sites were further investigated with detailed botanical surveys as they would be fall within the Order Limits; Denmead Meadows including Kings Pond Meadow SINC and Milton Common SINC. Milton Locks SINC and Eastney Beach SINC also fall within the Proposed Development’s Order Limits, but their ecological features will not be affected. Milton Locks will be avoided by horizontal directional drilling underneath it, and Eastney Beach comprises unvegetated sand and shingle at the cable landing site. Thus, no detailed botanical surveys were required at these two sites.

Denmead Meadows and Kings Pond Meadow SINC support ecologically important habitat MG5a grassland habitat, which qualifies as a Habitat of Principal Importance (‘HPI’) in England. Other grasslands found within the meadows do not qualify as HPI but add botanical diversity to the site. Green winged orchid and strawberry clover, both important botanical species, were identified and are of ecological importance.

Milton Common comprised a more disturbed set of habitats composed of common and widespread grassland types, grassland influenced by the proximity of Langstone Harbour and scrub. MG5 grassland is also present (an HPI as identified above), but this has resulted from artificial re-seeding work following recent sea defence strengthening work.

APPENDIX 16.4 NON-STATUTORY DESIGNATED SITES REPORT

1.1. INTRODUCTION

1.1.1. PROJECT AND ECOLOGICAL BACKGROUND

- 1.1.1.1. This report has been prepared on behalf of AQUIND Limited (the ‘Applicant’) to support an application (the ‘Application’) for a Development Consent Order (‘DCO’). AQUIND Interconnector is a proposed electricity Interconnector between France and the UK. The Application for the DCO is made in respect of the UK elements of AQUIND Interconnector (referred to as the ‘Proposed Development’).
- 1.1.1.2. The Proposed Development is described in detail in Chapter 3 (Description of the Proposed Development) of the Environmental Statement Volume 1 (document reference 6.1.3).
- 1.1.1.3. Preliminary Ecological Appraisal (‘PEA’) of the Proposed Development was undertaken in August 2017 and updated in June 2019, Appendix 16.2 (PEA / Phase 1 Habitat Survey Report) of the ES Volume 3 (document reference 6.3.16.2). The PEA identified 17 non-statutory designated sites within 100m of the Proposed Development’s Order Limits, the details of which are summarised within Table 1. Site locations and descriptions were provided by Hampshire Biodiversity Information Centre (‘HBIC’) as part of a desk study undertaken in December 2018 to update data within the PEA. Detailed reports describing the sites, including information on notable habitats or species associated with them, were also requested where available.
- 1.1.1.4. Further ecological survey and assessment was recommended by the PEA with respect to the 17 non-statutory sites to provide information to inform the Proposed Development’s Ecological Impact Assessment (‘EclA’); this report presents the results of this assessment work.
- 1.1.1.5. The study area used to select non-statutory designated sites comprises the distance where effect pathways potentially exist between the Proposed Development and such sites. At distances further than 100 m, effect pathways between the Proposed Development and non-statutory sites are limited by barriers (residential and commercial development, roads), or the distance itself would negate the potential for an effect. However, it should be noted that potential effects would be limited further by the scale and location of proposed work in many locations, which in many areas is localised to public roads and urbanised, developed land.

1.1.2. NON-STATUTORY SITE DESIGNATIONS

1.1.2.1. Within Hampshire, two non-statutory wildlife site designations are recognised by the Local Planning Authorities and local wildlife trusts;

- Sites of Importance for Nature Conservation ('SINCs') - These sites are designated for important and distinctive habitats and species on sites that fall outside the scope of European or national conservation designations such as Special Areas of Conservation ('SACs') or Sites of Special Scientific Interest ('SSSIs'); and
- Road Verges of Ecological Importance ('RVEIs'). These sites are designated to identify the location and management requirements of ecologically important road verges in Hampshire. This information allows Hampshire County Council Highways and their contractors to ensure that the correct management practices are implemented to maintain the ecological interest of the verges.

1.1.2.2. Sites comprise 17 SINCs and two RVEIs, the latter having identical boundaries with SINCs of the same name. The sites can be broadly described as follows:

- Four SINCs and one RVEI located within the Proposed Development: Eastney Beach SINC, Milton Locks SINC, Milton Common SINC, and Denmead Meadows (including Kings Pond Meadows SINC);
- Twelve SINCSs located immediately adjacent to the Proposed Development: Land West of Fort Cumberland SINC, Melville Road Verge SINC and RVEI, Great Salterns Lake SINC, Golf Course North of Burrfields Road SINC, Adjacent to Farlington Playing fields SINC, East and West of Gilman Road SINC, Farlington Avenue SINC and RVEI, Meadow West of Farlington Avenue SINC, Land to the South of Portsdown Hill Road SINC, London Road Fen SINC, Crabdens Copse SINC and Crabdens Row SINC; and
- Farlington Marshes SINC located 43 m east of the Proposed Development.

1.1.2.3. The locations of SINCs and RVEIs in relation to the Proposed Development are shown in Figure 1.

1.1.3. SCOPE OF ASSESSMENT

1.1.3.1. The aim of this study is to describe habitats at each of the 17 designated sites within the zone of influence of the Proposed Development. To achieve this aim, the following objectives were set:

- Determine the features (e.g. habitats or species) for which each site has been designated;
- Describe and map habitats within each site using the Phase 1 habitat survey methodology;
- For sites that have the potential to be subject to significant effects as a result of the Proposed Development (such those directed affected by works), undertake detailed botanical surveys using the National Vegetation Classification ('NVC') to classify plant communities within sites likely to be directly affected by the Proposed Development; and
- Determine whether there are any 'features of interest' with respect to each site's designation which are within the area likely to be affected by the Proposed Development, for example, the presence of rare or notable plants.

1.1.3.2.

This information has been used to assess the likely effect of the Proposed Development on each designated site and to inform mitigation proposals, where appropriate.

Table 1 - SINC and RVEIs within 100m Proposed Development (this information is sourced from data provided by the Hampshire Biodiversity Information Centre)

Site Ref. ¹	Site Name	Central OSNGR	Distance and Direction ²	Habitats Present	Notable Species ³
PO0011	Eastney Beach SINC	SZ 6769 989	Within the Proposed Development	Semi-natural coastal and estuarine habitats, including saltmarsh, intertidal mudflats, sand dunes, shingle, brackish ponds, grazing marsh and maritime grasslands.	Sea Bindweed (<i>Calystegia soldanella</i>) [UK RDB V]; Sea Sandwort (<i>Honckenya peploides</i>) [CS]; Sea Radish (<i>Raphanus raphanistrum</i> subsp. <i>Maritimus</i>) [CS]; Burnet Rose (<i>Rosa spinosissima</i>) [CS].
PO0013	Land North and West of Fort Cumberland SINC	SZ 6800 9920	Immediately adjacent	The site supports a range of grassland habitats as well as extensive stands of scrub. Much of the grassland is rough or fairly rough, but it still	Rest Harrow (<i>Aplasta ononaria</i>) [s41]; Harbell (<i>Campanula rotundifolia</i>) [IUCN NT]; Sheep's-bit (<i>Jasione montana</i>) [IUCN V]; Sea Radish; Burnet

¹ Site reference taken from Hampshire Biodiversity Information Centre data search (December,2018).

² For the purpose of this assessment, the distance and direction is taken from the closest point of the non-statutory designated sites from the Proposed Development Boundary (July,2019).

³ Notable species include species listed under section 41 of the Natural Environment and Rural Communities Act 2006 [s41], species covered under Schedule 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended) [WCA Sch 1,5 or 8], IUCN and UK Red Data Book species [Near Threatened (NT), Vulnerable (V)], Nationally Scarce species [NS], species covered under Schedule 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended), Annex 1 of the EC Bird Directive 79/409 and Annex II & 1V of the EC Directive 92/43/EEC 'The Habitats Directive', and those covered by the Bern, Bonn and Ramsar Conventions. Notable species also include species which are considered 'Country Rare' [CR] or 'Country Scarce' [CS]. Country Rare = those species recorded in 1% or less tetrads in Hampshire or either of the two-vice countries (11&12) separately. Country Scarce = 4% or less tetrads.

Site Ref. ¹	Site Name	Central OSNGR	Distance and Direction ²	Habitats Present	Notable Species ³
				possesses a species-rich sward. This rough grassland habitat rates as semi-improved and has an unusual composition of species, thanks to a high degree of coastal influence on the vegetation.	Rose, Suffocated Clover (<i>Trifolium suffocatum</i>) [NS].
PO0012 / RV192	Melville Road Verge SINC and RVEI	SZ 6774 9907	Immediately adjacent	A mixture of grassland types, that support a notable species along a narrow roadside verge	Sea Radish.
PO0017	Milton Locks SINC	SZ 6768 9979	Within the Proposed Development	A small block of intertidal habitat and associated rank grassland and coastal scrub that is unmanaged. There is also a small block of woodland present.	Sea Radish.
PO0007	Milton Common SINC		Within the Proposed Development	Relatively extensive area of semi-improved grassland and scrub criss-crossed by paths and frequently disturbed by dog	Yellow Vetchling (<i>Lathyrus aphaca</i>) [NR]; Toothed Medick (<i>Medicago polymorpha</i>) [NS]; Slender Hair's Ear (<i>Bupleurum</i>

Site Ref. ¹	Site Name	Central OSNGR	Distance and Direction ²	Habitats Present	Notable Species ³
				walkers and others using it for leisure. Brackish ponds are present along its eastern side and amenity grassland, managed as part of roadside and seawall soft estate is also present.	<i>tenuissimum</i>) [s41] and Purple Small-Reed (<i>Calamagrostis canescens</i>) [CR].
PO0008	Great Salterns Lake SINC	SU 6742 0175	Immediately adjacent	Great Salterns Lake is a large coastal lake. The site is structurally diverse and supports a large area of Biodiversity Action Plan (BAP) Reedbed.	Wild Celery (<i>Apium graveolens</i>).
PO0016	Golf Course North of Burrfields Road SINC	SU 6716 0251	Immediately adjacent	The site is part of a golf course, and support a range of grassland habitats. The fairways and greens are amenity swards and many of the 'roughs' are improved and species-poor. However, there are many 'roughs' that support	Quaking-grass (<i>Briza media</i>); Chamomile (<i>Chamaemelum nobile</i>) [s41]; Dyer's Greenweed (<i>Genista tinctoria</i>) [IUCN NT]; Spiny Restharrow (<i>Ononis spinosa</i>) [CS]; Butcher's-broom (<i>Ruscus aculeatus</i>) [EU Dir Annex 5]; Corn Spurrey (<i>Spergula arvensis</i>) [IUCN NT]

Site Ref. ¹	Site Name	Central OSNGR	Distance and Direction ²	Habitats Present	Notable Species ³
				semi-improved grassland and coastal habitats.	and Strawberry Clover (<i>Trifolium fragiferum</i>) [IUCN V].
PO0027	Farlington Marshes SINC	SU 6850 0430	43 m east	Area of reclaimed land comprising a mixture of coastal scrub, scattered trees and grassland adjacent to freshwater and brackish marsh within the north of Langstone Harbour.	Parsley-leaved water-dropwort (<i>Oenanthe lachenalia</i>) [CS]; Divided sedge (<i>Carex divisa</i>) [s41, NS]; Strawberry clover; nettle-leaved goosefoot (<i>Chenopodium murale</i>) [CS, IUCN EN].
PO0010	Adjacent to Farlington Playing Fields SINC	SU 6810 0480	Immediately adjacent	Land between the A27 and London-Portsmouth railway line supporting ruderal habitats and scrub, and frequently used for dog walking.	Golden Samphire (<i>Inula crithmoides</i>) [NS]; Annual Beard-grass (<i>Polypogon monspeliensis</i>) [NS]; Stiff Saltmarsh-grass (<i>Puccinellia rupestris</i>) [NS].
PO0019	East and West of Gilman Road SINC	SU 6830 0618	Immediately adjacent	The site comprises of a series of grasslands along Portsdown Hill. The majority of the site supports semi-improved chalk grassland. Majority of the grassland is herb-rich and	Crosswort (<i>Cruciata laevipes</i>) [IUCN NT]; Dwarf Spurge (<i>Euphorbia exigua</i>) [IUCN V]; Wild Strawberry (<i>Fragaria vesca</i>) [IUCN NT]; Field Scabious (<i>Knautia arvensis</i>)

Site Ref. ¹	Site Name	Central OSNGR	Distance and Direction ²	Habitats Present	Notable Species ³
				diverse in chalk flora – with a total of 24 calcareous grassland indicator species noted.	[IUCN NT]; Sainfoin (<i>Onobrychis viciifolia</i>) [IUCN V]; Hoary Plantain (<i>Plantago media</i>) [IUCN NT]; Autumn Lady's-tresses (<i>Spiranthes spiralis</i>) [IUCN NT].
PO0026 / RV279	Farlington Avenue SINC and RVEI	SU 6761 0622	Immediately adjacent	Semi-improved grasslands which retain a significant element of unimproved grassland. High herb presence and 18 chalk grassland indicators, some at high frequency.	Harebell (<i>Campanula rotundifolia</i>) [IUCN NT].
PO0006	Meadow West of Farlington Avenue SINC	SU 6720 0633	Immediately adjacent	Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery.	Crosswort; Field Scabious and Hoary Plantain.
PO0004	Land south-east of the	SU 6680 0638	Immediately adjacent	Area of semi-improved calcareous grassland bordered	Quaking-grass; Harebell; Wild Strawberry, Autumn Gentian

Site Ref. ¹	Site Name	Central OSNGR	Distance and Direction ²	Habitats Present	Notable Species ³
	George Inn, Portsdown Hill SINC			by roads. A total of 24 calcareous grassland indicators were noted.	(<i>Gentianella amarella</i>) [IUCN NT]; Hoary Plantain.
HV0001	London Road Fen SINC	SU 6707 0763	Immediately adjacent	An area of wet broadleaved woodland and tall swamp/fen along a shallow valley between arable fields and allotments.	Marsh Valerian (<i>Valeriana dioica</i>) [IUCN NT].
WC0642	Denmead Meadows (inc. Kings Pond Meadow SINC)	SU 6670 1170	Within the Proposed Development	Semi-improved grasslands which retains a significant element of unimproved grassland.	Green-winged Orchid (<i>Anacamptis morio</i>) [UK RDB NT]; Adder's-tongue (<i>Ophioglossum vulgatum</i>)
EH0066	Crabden's Copse SINC	SU 6750 1350	Immediately adjacent	Ancient semi-natural woodland.	None cited.
EH0072	Crabden's Row SINC	SU 6770 1360	Immediately adjacent	Ancient semi-natural woodland.	None cited.

2. METHODOLOGY

2.1. PHASE 1 HABITAT SURVEY

- 2.1.1.1. SINC and RVEs were surveyed to map and classify habitats within using standard Phase 1 habitat classes. The Phase 1 survey method followed the JNCC methodology (JNCC, 2010). Areas of habitat were mapped as well as linear features such as hedgerows and ditches, although fences, walls and other built structures were ignored as not relevant to the ecological conditions at each site.
- 2.1.1.2. Field surveys were initially undertaken between in November 2017 to support preliminary design of the Proposed Development, with 12 SINC and the two RVEs visited. Following the refinement of the Proposed Development's design the remaining five sites were surveyed in June and August 2019.
- 2.1.1.3. At each site, land was walked and notes and sketches were made of the extent of habitats present. Photographs of the different habitat types were taken, along with photographs of important features found to be present at each site.

2.2. NATIONAL VEGETATION CLASSIFICATION SURVEY

2.2.1. APPROACH

- 2.2.1.1. Where sites could be subject to significant effects as a result of the Proposed Development (such those directed affected by works), NVC surveys were undertaken to describe the botanical communities present in detail. This was carried out in accordance with the following best practice survey guidance:
- National Vegetation Classification: Users' Handbook;
 - British Plant Communities: Volume 1 – Woodland and scrub communities;
 - British Plant Communities: Volume 3 – Grasslands and montane communities; and
 - Review of coverage of the National Vegetation Classification. Joint Nature Conservation Committee Report No. 302.
- 2.2.1.2. Names of vascular plants in this report follows Stace (2010) with bryophytes following Hill *et al.* (2008).

2.2.2. IDENTIFICATION OF HOMOGENOUS STANDS AND QUADRAT SAMPLING

2.2.2.1. Surveyors carried out an initial walk-over to identify homogeneous stands⁴ of vegetation. The following approach was then adopted:

- Where a homogeneous stand could be identified, up to five quadrat⁵ samples were taken and resulting data recorded. Quadrat samples were selected to ensure representative spatial coverage of each grassland and to ensure constant and frequent species were adequately represented in the samples. A quadrat size of 2 metres x 2 metres was selected as appropriate to sample the range of variation present in each stand of grassland. This quadrat size accords with the National Vegetation Classification Survey Users Handbook guidance;
- Use of five quadrat samples was used as a sampling standard, but if the vegetation could be characterised as comprising commonplace and widespread species, unlikely to meet Habitat of Principal Importance quality, or if stands of vegetation were dominated by a single species, fewer quadrat samples were used and/or a single species list was compiled by a walking across them, with indicative frequency estimates using the DAFOR scale (see below). This information was then used to undertake a NVC classification.

2.2.2.2. The presence and cover/abundance for each plant species was estimated within each quadrat using the Domin scale (Table 1) or the DAFOR scale (see below). Plant species cover/abundance is a measure of the vertical projection on to the ground of the extent of the living parts of a species.

2.2.2.3. Plant species encountered incidentally in each grassland, but not falling within a quadrat, were also recorded but this data was kept separate from quadrat data for the purpose of NVC analysis.

Table 2 - Percentage cover and Domin scale

Cover	Domin
91-100%	10
76–90%	9
51–75%	8

⁴ A 'homogeneous stand' is a National Vegetation Classification Survey term used to mean a uniform area of habitat.

⁵ A quadrat is a sampling technique used to collect NVC data in a standardised way. It comprises a frame which is typically 2 m x 2 m or another size as dictated by best practice guidance for the habitat type in question. All plant species occurring inside that frame are recorded.

Cover	Domin
34–50%	7
26–33%	6
11–25%	5
4–10%	4
<4% (many individuals)	3
<4% (several individuals)	2
<4% (few individuals)	1

2.2.2.4. The DAFOR scale is as follows:

D – Dominant (75% or more)

- A – Abundant (51-75%)
- F – Frequent (26-50%)
- O – Occasional (11-25%)
- R – Rare (1-10%)
- There are additional categories of LD, LA and LF, where L = locally

2.2.2.5. Survey results were tabulated to provide figures for cover expressed as a percentage cover. Where five samples were obtained species information was further analysed to determine, range and frequency of occurrence across the quadrats samples taken (e.g. one of five quadrats; two of three quadrats etc.). Frequency information was summarised using the Roman numerals I-V and referred to in descriptions of vegetation types using the terms listed in Table 3.

Table 3 - Vegetation frequency class

Table 3	Range of frequency class	Terms used to describe frequency class
I	1-20% (i.e. appears in 1 quadrat sample in 5)	Scarce
II	21-40%	Occasional
III	41-60%	Frequent

Table 3	Range of frequency class	Terms used to describe frequency class
IV	61-80%	Constant
V	81-100%	Constant

2.2.3. DATA ANALYSIS

- 2.2.3.1. Quadrat data was classified using the keys in the relevant volumes of the British Plant Communities to assign the most closely corresponding NVC community type based on the abundance and frequency of plant species within each vegetation stand.
- 2.2.3.2. The computer software MAVIS (Modular Analysis of Vegetation Information System) by the Centre for Ecology and Hydrology was used, where necessary, to produce 'matching coefficients' indicating the confidence level by which field data matches data published in British Plant Communities. MAVIS was only used where multiple quadrats were collected in the same stand of vegetation as it is generally only reliable based on multiple samples.
- 2.2.3.3. As a result of the variation in natural plant communities and the fact that NVC communities are based on average species composition considering numerous samples from across the UK; it is rare, in practice, for a computer generated matching coefficient for any individual stand of vegetation to exceed 0.6 (60% similarity to the published NVC communities). For this reason, MAVIS analysis was not treated as definitive and the final decision as to which NVC community a stand of vegetation relates was made using the results of MAVIS analysis alongside published community descriptions in British Plant Communities and surveyor experience.
- 2.2.3.4. Computer analysis of plant species data was not undertaken where a small number of samples of vegetation was collected, where the vegetation was species-poor and for small areas of grassland

2.3. NOTES AND LIMITATIONS

- 2.3.1.1. Phase 1 survey data from 2017 was collected in November, which is a sub-optimal time for botanical surveys. Despite this the majority of species present at the sites were still able to be identified through vegetative features.
- 2.3.1.2. There are likely to be species which appear early in the year and do not persist, particularly within woodland and on coastal habitats, which will be missing from this survey. Despite this it is considered that the majority of species present at each site were observed during the site visits. Therefore, the survey timing does not constitute a significant constraint to the objectives of the survey.

- 2.3.1.3. Access to London Road Fen SINC was not granted in order to undertake surveys. This woodland site lies mainly behind grassland adjacent to the A3, with a small block of woodland approximately 30 m x 30 m at the north-east of the SINC adjoining the Proposed Development. This section of woodland is directly adjacent to the A3 (London Road) and observations were made from the public footpath there.
- 2.3.1.4. The communities described in British Plant Communities have been defined based on a national sample of numerous stands of vegetation. Although sampling five quadrats in any homogeneous stand is the minimum number required to assign species to percentage frequency classes (1 to 5), it is acknowledged that this is not the same as the national data set where frequency classes are based a national data set considering numerous samples.

3. PHASE 1 HABITAT SURVEY RESULTS

3.1. EASTNEY BEACH SINC (PO0011)

- 3.1.1.1. Eastney Beach SINC is approximately 2.5 km long but only a small section of the SINC, near the eastern end of the site, is within the Proposed Developments Order Limits. This area of the SINC consists of bare, un-vegetated shingle). The beach is un-vegetated from the east of an access path, leading to the beach, up to its eastern end (Photograph 1 and 2).
- 3.1.1.2. This SINC lies within the Proposed Development's Order Limits. However, as only unvegetated shingle exists at this location, no effects on the SINC are anticipated, and no further detailed botanical work was undertaken.

3.2. LAND WEST OF FORT CUMBERLAND SINC (PO0013)

- 3.2.1.1. This SINC is located to the north of a caravan park, which is situated adjacent to Eastney Beach. It is a large open space consisting mostly of grassland (Photograph 3), with patches of scrub. The interpretation board at the site states that this open space is the largest area of natural coastal heathland in Portsmouth, which developed on a large stable shingle bank. The land has, however, been subject to considerable disturbance over the years due to human activity. Notable floral species that are previously known from the site include sea radish, dittander *Lepidium latifolium* and autumn lady's-tresses *Spiranthes spiralis*. Notable faunal species include Dartford warbler *Sylvia undata* and stonechat *Saxicola rubicola*.
- 3.2.1.2. Dittander and autumn lady's-tresses were not found during the survey but sea radish was found to be frequent throughout the site.

3.3. MELVILLE ROAD VERGE SINC AND RVEI (PO0012 / RV192)

- 3.3.1.1. This SINC/RVEI comprises verges along the northern and southern sides of Melville Road. The site is designated as supporting one or more notable species. In this case the notable species is sea radish *Raphanus raphanistrum* subsp. *maritimus*, which is County Scarce within Hampshire.
- 3.3.1.2. The verges along the northern side of Melville Road consist of closely mown amenity grassland, with no sea radish evident. The verges along the southern side of the road are heavily shaded by lines of conifers (Photograph 4) resulting in sparse grass growth, predominantly sea couch. Sea radish is frequent along the northern verges, along with sea beet.

3.4. MILTON LOCKS SINC (PO0017)

- 3.4.1.1. This small SINC lies beside Langstone Harbour and comprises woodland, and an adjacent patch of scrub, separated from one another by the entrance to the Thatched House public house. There is also scattered scrub and semi-improved grassland beyond the woodland.
- 3.4.1.2. Horizontal Directional Drilling ('HDD') will be used to avoid this SINC, and therefore despite it being within the Proposed Development's Order Limits, it would not be affected and has not been subject to further detailed botanical work to characterise habitats.

3.5. MILTON COMMON SINC (PO0007)

- 3.5.1.1. Milton Common is located to the south and west of the A2030 Eastern Road. It consists of a wide range of habitats including grasslands, scrub, semi-natural coastal habitats and seasonally or permanently waterlogged areas.
- 3.5.1.2. On the sea wall side of the site habitat comprises closely-mown amenity grassland (Photograph 5) where there is a well-used public footpath frequently disturbed by dog walkers. There are more natural and diverse habitats further to the east, including semi-improved grassland, scrub and occasional mature trees (Photograph 6). Opposite the entrance to Hayling Avenue there is a patch of immature woodland (Photograph 7) with the canopy dominated by small-leaved elm *Ulmus minor*. Also present were Norway maple *Acer platanoides*, guelder rose, hazel and hawthorn. The ground layer was sparse, consisting mostly of ivy, with occasional ash and pedunculate oak seedlings and one clump of stinking iris *Iris foetidissima*.
- 3.5.1.3. At its northern end of the SINC consists of a narrow strip of amenity grassland, managed as part of the roadside/seawall soft estate (Photograph 8). The most frequent species along this section is sea-purslane *Atriplex portulacoides*, with other frequent species including grass-leaved orache *Atriplex littoralis*, spear-leaved orache, sea beet and sea couch.
- 3.5.1.4. An area of re-seeded grassland runs north-south through the SINC supporting a diverse mix of lowland meadow grasses and forbs. This artificial seeding has taken place following coastal defence repair and enhancement work in the area.
- 3.5.1.5. Milton Common SINC was subject to further detailed botanical surveys to characterise its botanical communities, as the site is concurrent with the Proposed Development's Order Limits. Data from these surveys and detailed descriptions of botanical communities identified is presented Section 4.2.5.1.

3.6. GREAT SALTERNS LAKE SINC (PO0008)

- 3.6.1.1. Great Salterns Lake SINC comprises a large expanse of open water, surrounded by extensive fringing reed beds (Photograph 9) of common reed *Phragmites australis*.
- 3.6.1.2. A small section at the eastern end of the lake is adjacent to the Order Limits of the Proposed Development. This section consists of an area of open water within the middle of the section, with reed beds to the north, south and along the eastern edge of the lake which forms a thin strip of reeds linking the northern and southern sections of reed bed. Within the southern section of the reed bed there is a small, isolated section of saltmarsh vegetation. This area is dominated by common saltmarsh-grass *Puccinellia maritima*, glasswort *Salicornia* sp. and sea aster *Aster tripolium*. This small patch shows strong affinities with the National Vegetation Classification (NVC) SM11 *Aster tripolium* var. *discoideus* salt-marsh community, which includes *Aster tripolium* var. *discoideus*, *Puccinellia maritima* and *Salicornia* agg. as its three constant species. This area is separated from the main body of the reed bed by a wide fringe of sea couch and red fescue.
- 3.6.1.3. To the east of the lake and reed beds there is a narrow non-metalled footpath. Beyond the footpath there is a pumping station, with gabion baskets either side and a line of hawthorn-dominated scrub either side of the gabions. Sea beet is frequent on the rocks within the gabion baskets. Land to the east of the open water and reed beds is not within the SINC boundary.
- 3.6.1.4. The citation for the site states that wild celery *Apium graveolens* occurs around the lake. This species is classed as County Scarce within Hampshire and is characteristically found in brackish meadows, marshes, ditches and riversides by tidal water or near the sea. Wild celery was present along the southern edge of the lake.

3.7. GOLF COURSE NORTH OF BURRFIELDS ROAD SINC (PO0016)

- 3.7.1.1. The Proposed Development's Order Limits runs along the length of the eastern edge of this SINC, directly to the west of the A2030 Eastern Road.
- 3.7.1.2. Habitat adjacent to the Order Limits consists of screening woody vegetation along the boundary with the A2030. Towards the south of the site there are small stands of mixed deciduous and coniferous planting. There are some larger areas of broad-leaved plantation woodland, dominated by semi-mature and immature field maple and pedunculate oak. Within these areas there is frequent natural re-generation of field maple, with seedlings covering large sections of the woodland floor. Towards the north of the site, the screening vegetation consists of dense scrub dominated by blackthorn *Prunus spinosa*, gorse *Ulex europaeus* and bramble.
- 3.7.1.3. Beneath and between the mixed and broad-leaved plantation woodland there are areas of tussocky semi-improved neutral grassland, dominated by red fescue

Festuca rubra and common couch *Elytrigia repens* (Photograph 10), with sea plantain *Plantago maritima* being prominent within sections of the turf. Further west, beyond the extent of the screening vegetation, the habitat consists of closely mown amenity grassland, comprising the golf course fairway.

3.8. FARLINGTON MARSHES SINC (PO0027)

3.8.1.1. This extensive site consists of an area of reclaimed land close to the Proposed Development's Order Limit comprising terrestrial habitat, and intertidal freshwater and brackish marsh habitat, along with intertidal mud and sand, within Langstone Harbour beyond this. The latter was not subject to survey due to its distance from the red boundary, with observations focussed on terrestrial habitats. A concrete seawall separates the reclaimed land from those within the harbour.

3.8.1.2. The terrestrial habitats consist of a mixture of scrub and semi-improved grassland. The scrub was composed of bramble *Rubus fruticosus* agg., hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. Semi-improved grassland is dominated by Yorkshire fog *Holcus lanatus*, with abundant common bent *Agrostis capillaris*, and creeping cinquefoil *Potentilla reptans*. In addition, tall ruderal species are present including abundant ragwort *Senecio jacobea*, spear thistle *Cirsium vulgare*, common nettle *Urtica dioica*.

3.9. ADJACENT TO FARLINGTON PLAYING FIELDS (PO0010)

3.9.1.1. This SINC consists of an area of un-developed land supporting semi-natural habitats to the east of Farlington Playing Fields. Informal paths show its frequent use by dog walkers. It is found between the A27 to the south and London-Portsmouth railway to the north.

3.9.1.2. The site consists of a mixture of tall ruderal vegetation, semi-improved neutral grassland and scrub (Photographs 11 and 12). Tall ruderal species include abundant ragwort, spear thistle, common nettle. Semi-improved grassland is dominated by Yorkshire fog, with abundant common bent, wild parsnip *Pastinaca sativa* and creeping cinquefoil. Extensive stands of scrub are present, composed primarily of bramble, and particularly dense along the interface with the A27 soft estate. Semi-improved grassland shows evidence of horse and rabbit grazing.

3.9.1.3. There is a field drain which runs east-west along the northern part of the site where rosebay willowherb *Chamaenerion angustifolium* is abundant along with species of rush and other common plants of wet ground. In addition, a reedbed of common reed is present in the north-east of the site.

3.10. EAST AND WEST OF GILLMAN ROAD (PO0019)

3.10.1.1. Access to this site could not be arranged for surveys during 2017 nor 2019. Observations from adjacent roads and public footpaths showed it comprises semi-

improved grassland and amenity grassland at Farlington Water Works. Some of the semi-improved grassland is likely species-poor due to frequent moving and management by the water works.

3.11. FARLINGTON AVENUE SINC AND RVEI (PO0026 / RV279)

3.11.1.1. Farlington Avenue SINC / RVEI consists of very steep roadside grass verges running along the northern side of Farlington Avenue and Burnham Road (Photograph 13 and 14). They have been designated as semi-improved grasslands which retain a significant element of unimproved grassland. During previous surveys a high herb presence was recorded, including eighteen chalk grassland indicator species.

3.11.1.2. Despite survey being undertaken November there were still several chalk grassland indicator species evident including harebell *Campanula rotundifolia*, glaucous sedge *Carex flacca*, yellow feather-moss *Homalothecium lutescens*, mouse-ear hawkweed *Pilosella officinarum*, burnet-saxifrage *Pimpinella saxifraga*, hoary plantain *Plantago media*, bulbous buttercup and salad burnet *Sanguisorba minor*.

3.12. MEADOW WEST OF FARLINGTON AVENUE SINC (PO0006)

3.12.1.1. The western site boundary consists of a line of small trees and dense scrub including field maple, guelder rose, dogwood *Cornus sanguinea* and bramble (Photograph 15) with frequent traveller's-joy *Clematis vitalba* scrambling over the scrub. Scrub along the northern site boundary is dominated by bramble, with a dense covering of traveller's-joy. Along the eastern site boundary there are more mature trees growing including frequent yew *Taxus baccata*, field maple and wayfaring tree *Viburnum lantana*.

3.12.1.2. The main part of the site consists of open grassland, which has been closely mown. The most frequent herbs include bulbous buttercup *Ranunculus bulbosus*, hedge bedstraw *Galium mollugo*, cat's-ear *Hypochaeris radicata* and yarrow *Achillea millefolium*. As well as the bulbous buttercup, which is abundant throughout the turf, there were several other herbs present which are indicative of calcareous conditions including wild basil *Clinopodium vulgare*, greater knapweed *Centaurea scabiosa*, common gromwell *Lithospermum officinale* and weld *Reseda luteola*.

3.12.1.3. Mouse-ear hawkweed is dominant throughout the turf, in some places being more abundant than the grasses. This species is likely to be present at such a high frequency due to the management of the verges, which are closely mown. The mouse-ear hawkweed has a prostrate habit, which means that it largely avoids being cut and creates large patches of rosettes, lying flat against the ground. Another species at this site which is favoured due to its prostrate habit is wall cotoneaster *Cotoneaster horizontalis*. This Wildlife & Countryside Act 1981 (as amended) Schedule 9 invasive species is also able to avoid the mower blades and exists as numerous small patches within the turf.

3.13. LAND SOUTH OF PORTSDOWN HILL ROAD SINC (PO0004)

- 3.13.1.1. Enclosed by the junction of Portsdown Hill Road and London Road this site is primarily composed of a homogenous area of semi-improved calcareous grassland (Photograph 16 and 17). The grassland is dominated by upright brome *Bromus erectus*, with other species present including hedge bedstraw and quaking grass and common restharrow *Ononis repens*.
- 3.13.1.2. On the western side of the site is a footpath separating the calcareous grassland from a patch of dense scrub on the side of the London Road cutting.

3.14. LONDON ROAD FIELD SINC (HV0001)

- 3.14.1.1. The section adjacent to the Proposed Development's Order Limits was observed from the footpath along London Road (Photograph 18). This section of the woodland includes field maple, pedunculate oak, ash, Italian alder *Alnus cordata*, guelder rose *Viburnum opulus*, hawthorn, holly, bramble. and hazel within the canopy.
- 3.14.1.2. This section of the woodland is very dense, with thick bramble growing up through the trees, resulting in a very impoverished ground layer including cleavers and common nettle. The woodland floor is dry around this area and it is assumed that any elements of wet woodland within the SINC are located further south and nearer to the centre of the site behind several paddocks and allotments.

3.15. DENMEAD MEADOWS / KINGS POND MEADOW SINC (WC0642)

- 3.15.1.1. Access permission was not granted to visit Kings Pond Meadow SINC during the 2017 survey period, and were updated by a detailed survey undertaken during July 2019. The SINC comprises an area of pasture with Kings Pond and Anmore Road to the north, and a wider area of pasture to the south; Denmead Meadows. Survey and characterisation of the site was extended into Denmead Meadows as this area is continuous with Kings Pond Meadows SINC, supports similar high-quality habitat and was highlighted as potential important during the consultation process. Thus, Denmead Meadows, including Kings Pond Meadow SINC, has been described. The overall area of habitat is approximately 24.5 ha.
- 3.15.1.2. To the north of the SINC there is a large pond (Kings Pond) surrounded by a mature pedunculate oak, several mature osiers *Salix viminalis* and silver birches around the outside of the pond (Photograph 19). Marshy grassland surrounds the pond with plant species present including fool's-water-cress *Apium nodiflorum*, branched bur-reed *Sparganium erectum*, floating sweet-grass *Glyceria fluitans* and great willowherb *Epilobium hirsutum*.
- 3.15.1.3. The SINC supports two grassland habitat types, semi-improved neutral grassland and unimproved neutral grassland, comprising the eastern and western halves of the SINC respectively. The eastern semi-improved grassland is under grazing by horses

resulting in a short sward (Photograph 20). Unimproved grassland is present within the western half which had been left ungrazed. Fields to the south within Denmead Meadows were found to be ungrazed and with a diverse forb community, being classified as unimproved neutral grassland (Photographs 21 and 22).

- 3.15.1.4. Kings Pond Meadows SINC and Denmead Meadows were subject to further detailed botanical surveys to characterise their botanical communities, as they are concurrent with the Proposed Development's Order Limits. Data from these surveys and detailed descriptions of botanical communities identified is presented Section 4.2.

3.16. CRABDENS COPSE SINC (EH0066)

- 3.16.1.1. Crabdens Copse SINC is area of ancient semi-natural woodland located to the south-west of Lovedean Substation. The woodland canopy is again predominantly composed of beech and ash, with companion species including silver birch *Betula pendula*, pedunculate oak, red oak *Quercus rubra*, hornbeam *Carpinus betulus*, wych elm *Ulmus glabra*, wild cherry *Prunus avium* and whitebeam *Sorbus aria*. The understorey layer includes field maple, holly, hawthorn, yew *Taxus baccata* and elder *Sambucus nigra* but with the most frequent understorey species being hazel as is the case at Crabdens Row.

- 3.16.1.2. The ground layer is also dominated by ivy, and has a small coppiced area which increases species diversity (Photograph 23). Bluebell *Hyacinthoides non-scripta* was recorded and was identified from the dried remains of the flower/seed heads, as well as wood anemone *Anemone nemorosa* and ramsons *Allium ursinum*.

3.17. CRABDENS ROW SINC (EH0072)

- 3.17.1.1. Crabdens Row SINC consists of a stand of ancient semi-natural woodland, located to the north-east of Lovedean substation. The woodland comprises a large area of broad-leaved semi-natural woodland, with an adjoining small area of recently cleared woodland to the north-west.

- 3.17.1.2. The wooded section of the SINC includes a canopy layer with the most frequent tree species being pedunculate oak *Quercus robur*, ash *Fraxinus excelsior* and beech *Fagus sylvatica*. Beech is particularly prominent within the canopy towards the east of the site. The understorey layer includes field maple *Acer campestre*, holly *Ilex aquifolium* and hawthorn *Crataegus monogyna* but the most frequent understorey species is hazel *Corylus avellana*, which is abundant throughout the woodland.

- 3.17.1.3. The ground layer is dominated by ivy *Hedera helix*, with large sections of the woodland floor covered in ivy, with few other ground-layer species evident (Photograph 24). The ivy coverage extends up into the canopy, growing up many of the tree trunks. There are also some more diverse patches of ground layer vegetation, including ferns (broad buckler-fern *Dryopteris dilatata*, male fern *Dryopteris filix-mas* and soft shield-fern *Polystichum setiferum*, red currant *Ribes*

rubrum, wood sedge *Carex sylvatica*, woodruff *Galium odoratum* and some extensive patches of dog's-mercury *Mercurialis perennis*.

3.17.1.4. There is a recently felled area to the north-west with frequent coppiced hazel stools. The increase in light reaching the ground has caused the ivy to decrease, with increased competition from more light-demanding species including common hemp-nettle *Galeopsis tetrahit*, foxglove *Digitalis purpurea* and cleavers *Galium aparine*. This area, however, is dominated by wood spurge *Euphorbia amygdaloides*.

3.17.1.5. Bluebells, wood anemone and ramson were recorded within Crabdens Copse SINC, and are assumed to be present within Crabdens Row earlier in the year.

4. NVC SURVEY RESULTS

4.1. OVERVIEW

4.1.1.1. Detailed NVC surveys in 2019 were undertaken for the two non-statutory sites that lie within the Proposed Development; Denmead Meadows / Kings Pond Meadows SINC and Milton Common SINC. Descriptions of plant species present and NVC communities identified are given below, with accompanying maps as Figures 2 and 3 (Appendix 2) for each site respectively, and species lists within Appendix 1.

4.2. DENMEAD MEADOWS / KINGS POND MEADOW SINC

4.2.1. SITE NOTATION

4.2.1.1. Kings Pond Meadow SINC and fields comprising the Denmead Meadows comprised the area surveyed. The meadows are a collection of fields which have been numbered to aid identification of areas within this 21 ha site, from 1 to 13. "Field 1" is the area around Kings Pond adjacent to Anmore Road and has been included in maps for reference, and its botanical community is described in Section 3.15. Field numbers are shown in Figure 2, alongside quadrat locations and the NVC communities identified.

4.2.2. BOTANICAL COMMUNITY 1 - MG5A GRASSLAND

- **Quadrat references and locations:** DEN06 (SU 6670 1130), DEN07 (SU 6673 1138), DEN08 (SU 6666 1144), DEN09 (SU 6663 1155), DEN11 (SU 6667 1168), DEN12 (SU 6670 1176)
- **Area:** 21.7 ha
- **Species:** 46 in quadrats, 11 incidentals (57 total)
- **MAVIS NVC Coefficients:** MG5 = 55.60, MG5a = 55.12, MG4b = 54.94, MG4v2 = 53.86, MG8v2 = 53.01

4.2.2.1. Denmead meadows contained a single homogenous stand of unimproved neutral grassland distributed across Fields 2, 3, 4, 5, 6, 7, 8 (west), 9, 10, 11 and 12. This was classified as **MG5a *Cynosurus cristatus-Centaurea nigra* grassland, *Lathyrus pratensis* sub-community**. This community type is consistent with those that qualify as Lowland Meadow Habitats of Principal Importance for Nature conservation under Section 41 of the NERC Act 2006.

4.2.2.2. Samples DEN06, DEN07, DEN08, DEN09, DEN11 and DEN12 were quadrat samples and were further analysed using MAVIS software. Samples DEN01 to DEN05 were not collected within quadrats by opportunistically by surveyors across

the homogenous grassland stand using the DAFOR scale for recording plant abundance. Use of the DAFOR scale/non-quadrat based approach was to confirm the presence of MG5a grassland in additional fields, and supplement and reinforce quadrat sampling.

- 4.2.2.3. The vegetation was either of two types – relatively long (approximate sward height 40 cm) grassland managed to collect a hay crop⁶ (Fields 2, 3, 4, 5, 6, 7, 9, 10, 11, and 12); or grassland tightly grazed by horses with a sward height of less than 5 cm (Field 8 west only). Despite differences in management, broadly the same composition of species was present.
- 4.2.2.4. The grasses sweet vernal-grass, meadow foxtail, red fescue and common bent were frequent and Yorkshire fog, cock’s-foot and false-oat grass were occasional to locally frequent. Crested dogs-tail was occasional; however, its abundance is likely to have been under estimated as the survey was conducted prior to the main flowering of this species⁷.
- 4.2.2.5. A range of broad-leaved herbs were occasional to frequent or locally abundant including red clover, white clover, bird’s-foot trefoil, germander speedwell, field wood-rush, common sorrel, meadow buttercup, ribwort plantain and lesser stitchwort. Autumn hawkbit and cat’s ear were occasional throughout and lesser hawkbit was present in Field 8 (west) only.
- 4.2.2.6. In all fields, the high abundant of black knapweed was a distinctive feature of this grassland and the presence of green-winged orchid, ragged robin, corky-fruited water-dropwort and crosswort (all present at rare levels of abundance) also distinguish this grassland from more commonplace examples of MG5. These species are typically restricted to highly unimproved conditions and are localised.
- 4.2.2.7. The meadows were not consistently species-rich. Approximately 30 – 40 % of each field was grass dominated with the aforementioned broad-leaved herbs only occasional to rare. More and less species-rich swards were intermixed with one-another. This small-scale variation does not make the grassland a different NVC community and is within the natural variation of MG5 grassland. It occurs in response to factors operating locally such as management and soil type. There is anecdotal evidence that fertiliser is applied to these meadows annually⁸, which may account for the patchy occurrence of less species-rich MG5 grassland in mosaic with more species-rich areas.

⁶ Discussion with the site owner confirmed that these meadows are cut annually for hay.

⁷ Many plants of crested dog-tail were just unfurling their inflorescence when recorded, making it more difficult to distinguish from other vegetative (those not in flower) grasses.

⁸ The land owner confirmed that occasional applications of fertiliser are undertaken.

4.2.3. BOTANICAL COMMUNITY 2 - MG6B / MG13 GRASSLAND

- **Quadrat references and locations:** DEN10 (SU 6669 1163), DEN14 (SU 6674 1169), DEN15 (SU 6665 1159)
- **Area:** 2.7 ha
- **Species:** 23 in quadrats, 10 incidentals (33 total)
- **MAVIS NVC Coefficients:** OV23 = 29.43, MG7F = 27.97, MG1 = 27.82, OV23c = 27.60, = MG7 27.17

4.2.3.1. Field 8 (east) comprised the northern most field within the Denmead Meadows complex. It was very short, horse-grazed semi-improved neutral, damp grassland and was separated by Field 8 (east) by a shallow, dry ditch and a length of linear scrub. There was no barrier to horse movement between the two halves of the field to account for the difference in plant communities.

4.2.3.2. MAVIS analysis of the three quadrat samples taken in this grassland show a weak match coefficient to OV23 *Lolium perenne-Dactylis glomerata* community. This is a plausible match given the relatively high abundance of perennial rye grass, yarrow, dandelion and other amenity lawn type species. However, the OV23 community is more typical of urban and sub-urban, weedy, re-seeded grasslands and does not typically occur in open countryside adjacent to more semi-natural vegetation like MG5.

4.2.3.3. The next closest match in MAVIS is for MG7f *Lolium perenne* leys and related grasslands, *Lolium perenne-Poa pratensis* grassland. Again, this is a weedy, sown grassland often found in amenity grasslands and is not considered an adequate match for the grassland in Field 8. It is possible that the presence of perennial rye grass, annual meadow grass and other species in the sample are confounding variables adding to this MAVIS output.

4.2.3.4. Given its context, in close proximity between an area of unimproved MG5 grassland and situation, next to a shallow ditch/depression a classification more suited to the ecological content of this grassland is a grassland somewhere **intermediate between NVC type MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community and MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland.** The vegetation present is dominated by perennial rye-grass with occasional white clover but contains frequent crested dogstail and occasional to rare lesser hawkbit, red bartsia, bird's-foot trefoil, selfheal and other indicators that suggest it may have once been unimproved. The intermediary with NVC MG13 is linked to the presence of creeping bent, marsh foxtail, hairy sedge which are all indicative of seasonal waterlogged conditions. However, the dominance of perennial rye-grass is not in accord with a close match to MG13 and demonstrates the grassland is likely to have been improved (possibly by horse dung or grazing).

4.2.3.5. MG6b/MG13 grassland is a semi-improved grassland occurring on semi-natural floodplains, river banks and the margins of ponds. It does not qualify as a habitat of Principal Importance but adds diversity to the meadow complex at Denmead.

4.2.3.6. Strawberry clover was rare in this vegetation and is listed as Vulnerable on the England Plant Red Data List.

4.2.4. BOTANICAL COMMUNITY 3 – MG6B / MG11 GRASSLAND

- **Quadrat references and locations:** DEN13 (SU 6680 1161), DEN16 (SU 6692 1156), DEN17 (SU 6677 1158), DEN18 (SU 6684 1162), DEN19 (SU 6692 1162)
- **Area:** 2.0 ha
- **Species:** 36 in quadrats, 11 incidentals (47 total)
- **MAVIS NVC Coefficients:** OV21 = 54.50, OV21b = 52.35, OV21c = 49.90, MG11a = 47.62, OV23c = 47.32

4.2.4.1. The vegetation comprising Field 13 was a very short, horse-grazed, semi-improved grassland with occasional bare soil, animal dung and poaching. The sward was dominated by perennial rye-grass and white clover with the distinctive addition of strawberry clover which was almost constant across the grassland at occasional levels of abundance.

4.2.4.2. MAVIS analysis suggests a weak match coefficient to NVY type OV21 *Poa annua-Plantago major* community. However, this is not considered an adequate classification given that greater plantain and annual meadow grass are only present at low abundance and are not constants of this grassland.

4.2.4.3. The second closest matching community (again a weak match coefficient) is MG11a *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland, *Lolium perenne* sub-community. The high cover of creeping bent supports this classification. However, the dominance of perennial rye-grass and only rare occurrence of silverweed suggest that this only a part satisfactory match.

4.2.4.4. The presence of broad-leave herb species (all rare to occasional in the sward) that have an affinity to unimproved grassland such as lesser hawkbit, red bartsia, meadow buttercup and crocky-fruited water dropwort, yellow rattle and hairy sedge possibly suggest some relationship to the surrounding MG5 grassland in the wider Denmead site.

4.2.4.5. The association of grassland containing both strawberry clover (frequent but not at high cover) and hairy buttercup (at rare abundance) is an association of species not observed by the surveyor outside of coastal sites such as those in the Thames Estuary.

4.2.4.6. The grassland contained a high frequency of common fleabane at low abundance which is not indicative of any particular NVC community.

- 4.2.4.7. Field 13 is not considered a strong match to any single NVC community and is best described as **intermediate between MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community and MG11 *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland**. The link to MG6b relates this grassland to presence of meadow species at low cover and the unimproved neutral grassland from which it may have been derived in the wider Denmead context. The link to MG11 suggests a damp/seasonally waterlogged grassland which may be consistent with its location not far from a ditch in the adjacent Field 8.
- 4.2.4.8. MG6b/MG11 grassland is a semi-improved grassland occurring in semi-natural floodplains, river banks and the margins of ponds. It does not qualify as a habitat of Principal Importance but adds diversity to the meadow complex at Denmead.
- 4.2.4.9. Strawberry clover was rare in this vegetation and is listed as Vulnerable on the England Plant Red Data List.

4.2.5. **BOTANICAL COMMUNITY 4 – MG6B/MG10 GRASSLAND**

- **Quadrat references and locations:** Survey by walkover only
 - **Area:** 6 ha
 - **Species:** 27 recorded during walkover
 - **MAVIS NVC Coefficients:** N/A, botanical walkover undertaken and community determined from notes.
- 4.2.5.1. Land south of Hambledon Road was subject to a botanical walkover without detailed analysis. The land here is intensively used agricultural pasture. Parts of the area are developed or have been used to support agricultural practices including gravel road-plainings forming hardstanding, piles of wood, old trailers, several derelict cars, hay bales and buildings/outhouses. Part of the area is also used as a scrap yard.
- 4.2.5.2. Such areas support nettle beds and ruderal vegetation around their perimeters.
- 4.2.5.3. Grassland comprises grazed horse paddock with areas of marshy grassland to the northern parts of the fields, beyond stock proof fencing. Sward height is 30 - 50 cm where not being grazed, 5 – 10cm where horses are grazing it. Paddocks are dominated by rushes and Yorkshire fog with locally abundant nettle, bramble and frequent thistles indicating a lack of grazing and possible nutrient enrichment.
- 4.2.5.4. **NVC community likely to be a mixture of MG10b *Holcus lanatus-Juncus effusus* rush-pasture, *Juncus inflexus* sub-community and a wet variant of MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community.**

4.3. MILTON COMMON SINC

4.3.1. SITE NOTATION

4.3.1.1. A large area of grassland interspersed with scrub, with freshwater aquatic and aquatic habitats present to the eastern edge of the site. The survey focused on those areas of the SINC that fall within and immediately adjacent to the Order Limits of the Proposed Development.

4.3.1.2. Habitats present within the Order Limits of the Proposed Development were broken into four broadly homogenous vegetation communities. Four homogenous habitat types were found to be present and subject to survey.

4.3.2. BOTANICAL COMMUNITY 1 – OV23A OPEN VEGETATION

- **Quadrat references and locations:** A1, A2, A4, A5
- **Area:** 29.1 ha
- **Species:** 10 in quadrats, 13 incidentals (23 total)
- **MAVIS NVC Coefficients:** OV23a = 42.1, OV23 = 41.24, MG7A = 38.61, OV23c = 38.05, OV21 = 36.75.

4.3.2.1. This is a heavily managed and species poor amenity grassland, predominating on the western part of the SINC. The sward is dominated by perennial rye-grass with creeping cinquefoil, white clover and field bindweed also relatively frequent within the sward. Sward height is very low, typically around 5cm.

4.3.2.2. The sampled vegetation showed the strongest affinity for **OV23 *Lolium perenne-Dactylis glomerata* community**. This is described in the Rodwell volumes as 'characteristic of resown areas recreation areas like verges, playing fields and where there is only occasional summer mowing, continuing disturbance or a measure of neglect'. This broadly matches the nature of the sampled vegetation, though is likely to undergo more frequent mowing. OV23a is the typical sub-community, which includes frequent records of lesser trefoil and wall barley. Wall barley was encountered occasionally, though lesser trefoil was not encountered. The constant species of OV23a are perennial rye-grass, cock's foot, ribwort plantain and dandelion. These species were all recorded but only perennial rye grass was constant in the sample. MG7 *Lolium perenne- Trifolium repens* leys is also a candidate classification. This is typically a community of intensive grasslands with perennial rye grass the only constant species. Whilst the sampled vegetation has affinities to this community, overall OV23a is considered to be a more appropriate classification.

4.3.2.3. This grassland is generally of little biodiversity interest, however there are occasional records of suffocated clover *Trifolium suffocatum*, which is a nationally scarce plant species, characteristic of trampled and disturbed ground.

4.3.2.4. Scattered and patches of dense scrub are frequent throughout this habitat type. Large dense patches have been illustrated on Figure 3.

4.3.3. **BOTANICAL COMMUNITY 2 – MG1 GRASSLAND**

- **Quadrat references and locations:** B1, B2, B3, B4
- **Area:** 2.5 ha
- **Species:** 23 in quadrats, 18 incidentals (41 total)
- **MAVIS NVC Coefficients:** MG1b = 41.36, MG1a = 40.08, OV24b = 37.08, MG1c = 35.32, OV24 = 33.3.

4.3.3.1. MAVIS analysis indicates that the sampled vegetation best fits **MG1 *Arrhenatherum elatius* grassland**. This is an appropriate classification for this vegetation, although cock's foot was recorded less frequently than would be expected in a typical example, as detailed within the Rodwell floristic tables. Conversely, sea couch *Agropyron pungens* is not recorded with the Rodwell MG1 community, and this is indicative of the coastal influence present at this site. MAVIS indicates that the sampled vegetation is closest to the *Urtica dioica* sub community, though given that this species (common nettle) was not encountered in the sample, it is not considered appropriate to classify it to this sub-community. The prevalence of field bindweed and barren brome has contributed to an affinity to the OV24 *Urtica dioica*- *Galium aparine* community. The presence of these species is perhaps indicative of historical disturbance at the site, which is understood to comprise reclaimed coastal land. However, OV24 is not considered to be appropriate given the dominance of false oat-grass in the stand and the lack of prominent cleavers or nettle.

4.3.3.2. Large parts of the wider site, though relatively smaller areas of the Order Limits, are dominated by this unmanaged coarse/ species poor semi-improved grassland. The sward, which in places exceeds 1 metre, is dense and dominated by false oat grass. A range of non-graminoids were recorded, including species characteristic of waste ground (such as horseradish), species characteristic of meadows (such as knapweed) and ruderal species such as common ragwort, but these never occur at high cover. Quadrat diversity was typically low with between two and five species recorded within a quadrat. Whilst no notable species were recorded during the recent surveys, it should be noted that there previous HBIC survey did note a notable plant species amongst this vegetation, namely yellow vetchling, a species which is Nationally Scarce and listed as Vulnerable on the GB redlist.

4.3.4. BOTANICAL COMMUNITY 3 – MG11 GRASSLAND

- **Quadrat references and locations:** D1, D2, D3⁹
- **Area:** 0.7 ha
- **Species:** 14 in quadrats, 4 incidentals (18 total)
- MAVIS NVC Coefficients: MG13 = 34.19, MG11 = 29.48, MG11a = 28.81, MG1a = 28.45, OV23 = 28.38.

4.3.4.1. The grassland is relatively heterogenous in nature. MAVIS analysis of the three samples collected indicates relatively weak affinities for MG13 *Agrostis stolonifera*-*Alopecurus geniculatus* grassland, **MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland** and MG1 *Arrhenatherum elatius* grassland. MG1 is not a strong fit given the absence of false-oat grass from the sampled vegetation. The community does not strongly fit either MG11 or MG13, but overall MG11 is considered to be a closer fit, given that MG11 constant species creeping bent, red fescue and silver weed are more prominent in the sward than meadow foxtail (a constant species of MG13). The herb-rich nature of the grassland also has some affinities to MG5 meadow, though many of the constant species of that community are lacking. The data do not indicate any affinity to a particular sub-community.

4.3.4.2. This grassland has reasonably herb-rich stand including species such as ox-eye daisy, corky-fruited water dropwort, knapweed and grass vetchling. A range of grasses were recorded of which none were dominant, including creeping bent, common bent, marsh foxtail, meadow foxtail and red fescue. This grassland may be considered to qualify as an example of the Lowland Meadow priority habitat type/ Habitat of Principal Importance.

4.3.5. BOTANICAL COMMUNITY 4 – MG5 GRASSLAND

- **Quadrat references and locations:** F1, F2, F3, F4
- **Area:** 1.8 ha
- **Species:** 25 in quadrats, 15 incidentals (40 total)
- MAVIS NVC Coefficients: MG5b = 43.72, MG5 = 42.9, MG5a = 41.9, MG1 = 41.31, MG4v2 = 41.13

4.3.5.1. This grassland is considered to be a relatively good fit for the **MG5 *Cynosurus cristatus* - *Centaurea nigra* grassland** community. The majority of constant species

⁹ This stand comprises a relatively small area of vegetation, adjacent to but apparently not within the Proposed Development. It was included within the survey as the HBIC survey had flagged them as valuable habitat stands.

of that community were recorded (excluding sweet-vernal grass), although not all at a constant level. It is not considered that the sampled vegetation has strong affinities to any of the sub-community level and therefore is not assigned as such. MAVIS analysis indicates a slightly stronger affinity to the *Galium verum* sub-community, but given that species was only recorded in one quadrat and was not prevalent in the sward, it is not considered appropriate to classify it to that sub-community.

4.3.5.2.

This grassland exhibits relatively high diversity and a high cover of forbs, particularly bird's foot trefoil and clover and ox-eye daisy. This grassland is located largely adjacent to footways traversing the eastern side of Milton Common. Review of aerial imagery demonstrates that the extent of this habitat type largely coincides with the extent of habitat disturbed by recent flood defence works, indicating that these habitats potentially are of relatively recent origin and potentially the result of reseeded following those works with a diverse seed mix. Notwithstanding this, the habitat is considered to qualify as an example of the Lowland Meadow priority habitat type/ HPI. Great burnet, a county scarce species was recorded in the within this vegetation on site, in the northern end of the surveyed area.

5. DISCUSSION

- 5.1.1.1. Surveys characterised all 17 SINC/RVEI sites as to their component habitats, although visits were hampered by lack of access to several sites, necessitating observations from public rights of way. Sufficient information has been gained on all sites however to provide an evaluation of their importance as part of the Proposed Development's Environmental Impact Assessment (EIA).
- 5.1.1.2. Thirteen of the sites lie outside of the Proposed Development's Order Limits and will not be directly affected. Two further sites (Milton Locks SINC and Eastney Beach SINC) are within the Order Limits but will not receive direct effects due to HDD method of construction. Indirect effects are possible, and will be assessed within the Ecology and Nature Conservation chapter of the Proposed Development's Environmental Statement (ES) where they may occur. The remaining two sites (Denmead Meadows / Kings Pond Meadow SINC and Milton Common SINC) lie within the Proposed Development's Order Limits and could be subject to direct effects as a result of works. Further survey work was undertaken to characterise these sites and inform their evaluation as part of the EIA process.
- 5.1.1.3. Detailed botanical survey work undertaken at Denmead Meadows and within Kings Pond Meadow SINC identified ecologically important habitat in the form of MG5a grassland communities which qualify as Habitats of Principal Importance (HPI) in England. Other grasslands found within the meadows do not qualify as HPI but are important by adding diversity to the wider Denmead Meadows/Kings Pond Meadow SINC site. In addition, species such as green winged orchid and strawberry clover both rare species found in abundance at the site, supports the conclusion these grasslands are of ecological importance.
- 5.1.1.4. Milton Common was also studied using detailed botanical survey work revealing a more disturbed set of habitats composed of common and widespread grassland types, grassland influenced by the proximity of Langstone Harbour and scrub. MG5 grassland is also present (an HPI as identified above), but this has resulted from artificial re-seeding work following recent sea defence strengthening work.
- 5.1.1.5. Both Denmead Meadows / Kings Pond Meadow SINC and Milton Common SINC have been subject to impact assessment, with appropriate avoidance, mitigation and compensation measures identified where necessary, which is described in the Chapter 16 of the ES.

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Appendix 1 – Species Lists

SPECIES LISTS

Denmead Meadows and Kings Pond Meadow SINCC Species List

Date update: 01/08/2019

Table with columns for DAFOR, DENOM, and DENOMIN. Includes sub-columns for DEN01-DEN19 and DENOM1-DENOM19. Rows list various species and their counts across different sites.

Main species list table with columns: Layer, Status, Scientific name, Common name, MAVIS Species Name, Species Notes, and COUNTA. Lists numerous plant species such as Acer campestre, Agrostis stolonifera, and various grasses.

Land south of Hambledon Road Botanical Species List

Common Name	Scientific Name
Bramble	<i>Rubus fruticosus agg.</i>
Common Bent	<i>Agrostis capillaris</i>
Common Fleabane	<i>Pulicaria dysenterica</i>
Common Mouse-ear	<i>Cerastium fontanum</i>
Common Nettle	<i>Urtica dioica</i>
Creeping Bent	<i>Agrostis stolonifera</i>
Creeping Buttercup	<i>Ranunculus repens</i>
Creeping Thistle	<i>Cirsium arvense</i>
Crested Dog's-tail	<i>Cynosurus cristatus</i>
Fool's-water-cress	<i>Apium nodiflorum</i>
Great Willowherb	<i>Epilobium hirsutum</i>
Greater Bird's-foot-trefoil	<i>Lotus pedunculatus</i>
Greater Plantain	<i>Plantago major</i>
Hairy Sedge	<i>Carex hirta</i>
Hard Rush	<i>Juncus inflexus</i>
Lesser Spearwort	<i>Ranunculus flammula</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Marsh Thistle	<i>Cirsium palustre</i>
Meadow Barley	<i>Hordeum secalinum</i>
Perennial Rye-grass	<i>Lolium perenne</i>
Ragged-Robin	<i>Lychnis flos-cuculi</i>
Remote Sedge	<i>Carex remota</i>
Soft-rush	<i>Juncus effusus</i>
Spear Thistle	<i>Cirsium vulgare</i>
White Clover	<i>Trifolium repens</i>
Yorkshire-fog	<i>Holcus lanatus</i>

Milton Common SINC Species List

