



**HODBARROW NATURE RESERVE**

**For**

**COPELAND BOROUGH COUNCIL**

# **PRELIMINARY ECOLOGICAL APPRAISAL (SUMMARY)**

**DECEMBER 2021**

**Landscape  
Institute**  
Registered practice

📍 17 Chorley Old Road,  
Bolton,  
Lancashire  
BL1 3AD

📞 **Tel:** 01204 393 006

📠 **Fax:** 01204 388 792

✉ **E-mail:** [info@appletons.uk.com](mailto:info@appletons.uk.com)

[www.appletons.uk.com](http://www.appletons.uk.com)  [@Appletons\\_LArch](https://twitter.com/Appletons_LArch)

Landscape Architecture • Ecology • Environmental Planning & Assessment • Arboriculture

**appletons**



# appletons

17 Chorley Old Road  
Bolton  
Lancashire  
BL1 3AD

**Tel:** 01204 393006

**Email:** [info@appletons.uk.com](mailto:info@appletons.uk.com)

**Web:** [www.appletons.uk.com](http://www.appletons.uk.com)

### Copyright and Non-Disclosure Notice

The contents and layout of this report are subject to copyright owned by Appleton Deeley Limited trading as Appletons save to the extent that copyright has been legally assigned by Appletons to another party or is used by Appletons under license. To the extent that Appletons own the copyright to this report, it may not be used without written agreement from Appletons for any purpose other than that indicated in this report.

The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without prior written agreement of Appletons. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to third party disclaimer set out below.

---

### Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Appletons at the instruction of, and for the use by our client on the front of this report. It does not in any way constitute advice to any third party who is liable to access it by any means. Appletons excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. Appletons does not however, exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud, or any other matter in relation to which we cannot legally exclude liability.

## DOCUMENT CONTROL

**TITLE:** PRELIMINARY ECOLOGICAL APPRAISAL (SUMMARY)  
**PROJECT:** HODBARROW NATURE RESERVE  
**JOB NO:** 2363-E1  
**CLIENT:** COPELAND BOROUGH COUNCIL

<b>Prepared by:</b> Lorraine McKee	<b>Date:</b> June – October 2021
<b>Surveyors:</b> Lucy Gibson, Paula Bateson & Lorraine McKee	<b>Date:</b> May – August 2021
<b>Checked by:</b> Lucy Gibson	<b>Date:</b> June – October 2021
<b>Approved for distribution by:</b> Lucy Gibson	<b>Date:</b> 21/02/2022

### Document

Status	Description	Rev date	By	Approved by	Issued to	Issue date	Comments
Final	Preliminary Ecological Appraisal		LM & LG	LG		17/12/21	
Final v2	As Above		LM & LG	LG		21/02/22	

### Revisions to Final Document

Rev	Description	Rev date	By	Approved by	Issued to	Issue date	Comments

## CONTENTS:

---

- 1.0 Introduction**
- 2.0 Methodologies**
- 3.0 Summary of PEA Data**

APPENDIX 1: Phase 1 Habitat Survey Data

APPENDIX 2: Compartments Map & Constraints Plan

APPENDIX 3: Photographs

APPENDIX 4: Relevant Planning Policy and Wildlife Legislation



## 1.0 INTRODUCTION

### Project background

1.1 In May 2021, Appletons was commissioned by Copeland Borough Council to carry out an initial ecological appraisal at Hodbarrow Nature Reserve. This survey is required to inform the design, construction and improvement of paths within the reserve for a project known as the Iron Line. To fulfil this brief a Preliminary Ecological Assessment was undertaken during summer 2021.

1.2 To date, the following additional surveys have been undertaken at the site in 2021 in association with the Iron Line project:

- Natterjack Toad and Great Crested Newt Survey – Tyrer Ecological Consultants Ltd, August 2021
- Invertebrate Survey – Stenecology, August 2021
- Phase 2 Habitat Survey (NVC) – Joshua Styles, August 2021

### Site description and context

1.3 The land-based habitats of the site measure approximately 65.57ha and are centred at Ordnance Survey Grid Reference SD 17592 78500. The centre of the site features a large lagoon which is enclosed by a sea wall with an artificial island to the south. To the west of the site is a caravan park and to the east lie fields used for pasture. To the north lies the access road and a network of fields, along with a recycling centre and a large waterbody, which forms part of a disused quarry (Redhills). The Duddon estuary is adjacent to the south and south-east of the site. The site lies in a rural context, with Millom town situated approximately 540m to the north of the survey site, beyond fields.

## 2.0 METHODOLOGIES

### Extended Phase 1 Habitat survey

- 2.1 As part of the Preliminary Ecological Assessment (PEA), a Phase 1 Habitat Survey was conducted following the methodology of the Joint Nature Conservation Committee (JNCC, 2010) and the Institute of Environmental Assessment (IEA, 1995). The Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats. The aim is to provide a record of habitats that are present on site. Data recorded during the field survey and a full description of the Phase 1 methodologies used are discussed in Appendix 1 *Phase 1 Habitat Survey Data*.
- 2.2 As part of the PEA undertaken at Hodbarrow, the Phase 1 Habitat Survey scope was extended to search the site for field signs indicating the presence of protected/notable species and for habitat with the potential to support protected/notable species, including badgers, reptiles, bats, nesting birds, amphibians, otters, etc. These searches were undertaken during the daytime survey visits to record the botanical species and broad habitats present for the Phase 1 Habitat Survey, which were undertaken between May and August 2021. Signs of protected/notable species that were found, such as footprints, hairs, droppings, likely setts/roosts/nests, feeding remains, were noted during the surveys, and locations were annotated on a map along with GPS coordinates wherever possible.
- 2.3 Although the whole site was subject to survey by surveyors for the PEA, the survey work focussed mainly on the areas of the reserve likely to be affected by the proposed works i.e. along the main existing routes and within c.30m either side of the routes. It should be noted, however, that a constraint to the survey was a number of habitats that were inaccessible to surveyors, as detailed below.
- 2.4 Constraints to the PEA include, but are not limited to, the presence of inaccessible dense and extensive scrub habitat in many areas, and health and safety issues, such as deep water, steep cliffs, and hazardous ground conditions that precluded access to these habitats. Therefore, it is possible that some of these habitats contained evidence of protected/notable species, but they could not be accessed to be recorded by surveyors. This is of particular relevance to finding signs of species that may be more elusive and prefer dense cover in which to shelter/nest, for example badgers, otters and some bird species. However, it is likely that frequent signs of badger activity indicating the presence of a sett would have been found in other, more accessible areas of the survey site, such as along site boundaries and the edges of woodland/scrub habitats, where badgers often leave territorial signs, such as latrines, and trails through vegetation and under fences. It is also likely that mammal trails would have been relatively obvious through dense vegetation on site, should larger mammals, such as badger, regularly move across the site. Additionally, it is unlikely that the majority of the dense scrub habitat will be affected by the proposed works. Therefore, these access constraints are considered to be relatively minor in nature.
- 2.5 As part of the PEA, records of protected and notable species from within 2km of the survey site were obtained from the local records centre, Cumbria Biodiversity Data Centre (CBDC). The records were analysed to identify those from the survey site itself, and to provide a wider ecological context to the survey site.

### 3.0 SUMMARY OF PEA DATA & RECOMMENDATIONS

#### Survey Findings and Recommendations

- 3.1 A general summary of the findings and recommendations as a result of the PEA survey is provided in Table 3.1 below, including records returned from the local records centre, of protected/notable species from the survey site or from within 2km of the site (7065 records in total). Detailed findings of the Phase 1 Habitat Survey, with lists of the plant species and habitats identified in each compartment, can be found in the main document. Refer to the Constraints Plan in Appendix 2.

Species/Group	Likely presence on Hodbarrow Reserve	Records within 2km of site	Survey work recommended?
Birds	<p>Yes. The site is an RSPB reserve and is designated as part of the Duddon Estuary SSSI and Ramsar site, the Morecambe Bay SAC and the Duddon Estuary and Morecambe Bay SPA, with designated features inclusive of important populations of wintering birds and breeding birds.</p> <p>During surveys, numerous nests were seen in trees/scrub on site and breeding bird activity was observed during PEA visits. Numerous pairs of nesting little terns and sandwich terns were observed on the island at the south end of the lagoon during PEA visits. Birds seen/heard during PEA visits include: wren, swallow, magpie, goldcrest, herring gull, chaffinch, blackbird, dunnock, bullfinch, goldfinch, oystercatcher, kestrel, black-headed gull, mute swan, robin, woodpigeon, crow, great tit, blue tit, lesser whitethroat, chiff chaff, willow warbler, common tern, little tern, sandwich tern, cormorant, eider duck, little plover, greenfinch, song thrush, blackcap, greylag goose, magpie, long-tailed tit, skylark, lapwing, reed warbler, moorhen, tufted duck, sand martin, linnet, swift.</p>	<p>Yes - there are 5692 records of birds included in the data from within 2km of the site.</p>	<p>No, but timing of the works is critical to avoid disturbance of nesting birds/destruction of nests, particularly with the significant populations of terns nesting on the islands in the lagoon.</p>
Bats	<p>Yes – likely foraging and commuting along scrub edge habitat, over grassland and waterbodies where not too exposed. Majority of trees on site are likely to be small and lacking in potential roost features and/or too densely growing for suitable bat roosting habitat. However, potential roosting features are present among some of the mature trees on site.</p> <p>Stone structures and cliffs on site have some potential for roosting bats (crevices could provide summer and/or winter roosting opportunities); however, the disused windmill and lighthouse are likely to be too exposed for roosting bats, being situated on the top of small hills on the coast. The stone wall in the proposed by-way route (Compartment G) is less exposed than much of the site and potential roosting features such as crevices and cavities were present here.</p>	<p>Yes - three records of bats (unidentified bat and common pipistrelles) are included in the data. Nearest record is of common pipistrelle from c.1km north of survey site.</p>	<p>When the full extent of tree/scrub/hedgerow/wall removal is known the trees/walls should be examined in more detail for potential roost features by an experienced and licensed ecologist before any works are undertaken.</p>
Amphibians	<p>Yes – likely present in waterbodies, and across wetland, scrub and grassland habitats across the site. Common frog, froglets and toadlets were seen during PEA visits in rough grass/rush habitat along the proposed by-way route (Compartment</p>	<p>Yes – 523 records of amphibians are included in data from CBDC. 74 records of common frog, 81</p>	<p>Yes – additional NJT survey work is being undertaken in early 2022 to ensure the whole survey season has been covered. Mitigation for NJT is likely to be necessary due to their</p>

	<p>G), and an adult common frog was seen in wet scrub in Compartment H.</p> <p>Survey work has been undertaken in 2021 for great crested newts and natterjack toads; on this basis both species are likely absent from site (refer to amphibian survey report for details). However, further survey work for natterjack toads (NJT) will be undertaken in 2022 to cover the early part of the season.</p>	<p>records of common toad, 2 records of great crested newt (from Sandscale and Haverigg), 315 records of NJT (many of which are from Hodbarrow reserve), 7 records of palmate newt, 44 records of smooth newt.</p>	<p>presence very close to the site, on land adjacent to the east and to previous records of this species on the site.</p>
Reptiles	<p>Yes (records of common lizard) – no reptiles were seen during PEA visits (but no detailed searching was undertaken); however, there are large areas of suitable habitat across the site, mainly in more open tussocky grassland areas, or in mosaics of grassland, bracken, scrub etc. Many suitable reptile refugia are also present on site, e.g. log piles, rubble piles etc. There is potential for common lizard, slow-worm and grass snake on site.</p>	<p>Yes - Seven records of common lizard are included in CBDC data, from near paths/tracks on Hodbarrow Reserve, in compartments A (end of sea wall near caravan site), B along eastern coastline, and F (either side of the footpath near the northern end). Most recent records are from 2017.</p>	<p>Yes – reptile presence/likely absence survey work will be undertaken in 2022 in suitable habitat near areas of proposed works on the survey site, and on the car park site.</p>
Botany	<p>Notable plant species and habitats of importance are present on site, identified during the PEA and the NVC survey undertaken in 2021. Refer to Phase 1 Habitat survey findings and the NVC survey report for more details.</p>	<p>Yes – 55 records of notable botanical species are included in data from CBDC, 24 of which are labelled 'Hodbarrow'.</p>	<p>Yes – Phase 3 botanical survey work will be undertaken in certain areas of the site in 2022, with additional NVC survey work undertaken where required (i.e. on the car park site and towards the west and south-west of the main site; areas which were not included in the original NVC survey in 2021).</p>
Badger	<p>A partially excavated (likely badger) hole was noted in a large rubble bank near the electricity substation in Compartment G during a PEA visit.</p> <p>A badger pawprint was also seen along the northernmost fence-line within Compartment I.</p>	<p>No – there are no records of badger within 2km included in the data from CBDC.</p>	<p>No - there is no evidence of an active sett on site on the basis of the PEA visits, and relatively low evidence of badger activity was found during the PEA visits (detailed badger survey work was not undertaken, however).</p>
Otter	<p>Possible – no signs of otter were seen during the PEA visits (a detailed otter survey was not undertaken, however). If present in the locality of the survey site, otter may visit the site to forage in the waterbodies for fish and amphibians, and it is possible that they may shelter in dense scrub habitats on site. However, disturbance levels across much of the site are high due to the number of visitors, many of whom allow their dogs to roam off the lead, which may deter otters from visiting the site and/or seeking shelter on the site.</p>	<p>Yes - one record of otter located ~1.5km north of the survey site is included in the data from CBDC.</p>	<p>No – no evidence of otter activity was found to be present on site during PEA visits, although a detailed otter survey was not undertaken. Suitable foraging and sheltering habitat is present on site for otter; however, the levels of disturbance from people and dogs are generally high and are likely to deter otter from seeking shelter on site. However, otter may occasionally visit the site when foraging/dispersing in the locality.</p>
Invertebrates	<p>Numerous invertebrates were observed during PEA survey work, including blue damselflies, cinnabar moths and their caterpillars, orange-tip butterfly, meadow brown butterfly, speckled wood butterfly, anthills in grassland.</p> <p>Invertebrate survey work undertaken in 2021 found notable species present on site; refer to the invertebrate survey report for details.</p>	<p>Yes – 732 records of protected/notable invertebrates are included in the data from CBDC.</p>	<p>Yes – invertebrate survey work will be undertaken in 2022 of car park site.</p>

Other	Rabbit evidence was present in many grassland areas during PEA visits, comprising droppings and burrows.	<p>Three records of weasel, two from Hodbarrow reserve.</p> <p>Four records of red squirrel (nearest record from c.700m north of survey site).</p> <p>Two records of grey squirrel (nearest record from c.1.5km north of survey site).</p> <p>Six records of hedgehog (nearest record from c.1.3km north-west of survey site).</p>	
-------	--	--	--

**Table 3.1: Summary table providing general results and recommendations from the Hodbarrow PEA**



**HODBARROW NATURE RESERVE**

**For**

**COPELAND BOROUGH COUNCIL**

**PHASE 1 HABITAT SURVEY DATA**

**METHODOLOGIES AND RESULTS ONLY**

**MAY – AUGUST 2021**

📍 17 Chorley Old Road,  
Bolton,  
Lancashire  
BL1 3AD

☎ **Tel:** 01204 393 006

☎ **Fax:** 01204 388 792

✉ **E-mail:** [info@appletons.uk.com](mailto:info@appletons.uk.com)

[www.appletons.uk.com](http://www.appletons.uk.com)  [@Appletons\\_LArch](https://twitter.com/Appletons_LArch)

Landscape Architecture • Ecology • Environmental Planning & Assessment • Arboriculture

**appletons**



# appletons

17 Chorley Old Road

Bolton

Lancashire

BL1 3AD

**Tel:** 01204 393006

**Email:** [info@appletons.uk.com](mailto:info@appletons.uk.com)

**Web:** [www.appletons.uk.com](http://www.appletons.uk.com)

### Copyright and Non-Disclosure Notice

The contents and layout of this report are subject to copyright owned by Appleton Deeley Limited trading as Appletons save to the extent that copyright has been legally assigned by Appletons to another party or is used by Appletons under license. To the extent that Appletons own the copyright to this report, it may not be used without written agreement from Appletons for any purpose other than that indicated in this report.

The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without prior written agreement of Appletons. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to third party disclaimer set out below.

---

### Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Appletons at the instruction of, and for the use by our client on the front of this report. It does not in any way constitute advice to any third party who is liable to access it by any means. Appletons excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. Appletons does not however, exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud, or any other matter in relation to which we cannot legally exclude liability.

## DOCUMENT CONTROL

**TITLE:** PHASE 1 HABITAT SURVEY DATA

**PROJECT:** HODBARROW NATURE RESERVE

**JOB NO:** 2363-E1

**CLIENT:** COPELAND BOROUGH COUNCIL

<b>Prepared by:</b> Lorraine McKee	<b>Date:</b> June – October 2021
<b>Surveyors:</b> Lucy Gibson, Paula Bateson & Lorraine McKee	<b>Date:</b> May – August 2021
<b>Checked by:</b> Lucy Gibson	<b>Date:</b> June – October 2021
<b>Approved for distribution by:</b> Lucy Gibson	<b>Date:</b> 21/02/2022

### Document

Status	Description	Rev date	By	Approved by	Issue date	Comments
DRAFT	Phase 1 habitat surveys (results & methodology only)		LM	LG	15/10/2021	
Final	As above		LM	LG	21/02/2021	

### Revisions to Final Document

Rev	Description	Rev date	By	Approved by	Issued to	Issue date	Comments



## CONTENTS:

---

1. **Methodologies**
2. **Results: Compartment A**
3. **Results: Compartment B**
4. **Results: Compartment C**
5. **Results: Compartment D**
6. **Results: Compartment E**
7. **Results: Compartment F**
8. **Results: Compartment G**
9. **Results: Compartment H**
10. **Results: Compartment I**
11. **References**

### APPENDIX 1:

Drawing 2363-E1-A to -I

### APPENDIX 2:

Survey Photographs

**The current report comprises the methodologies and survey data of Phase 1 Habitat Survey work only.**

## 1.0 METHODOLOGIES

- 1.1 As part of the Preliminary Ecological Assessment, a Phase 1 Habitat Survey was conducted following the methodology of the Joint Nature Conservation Committee (JNCC, 2010) and the Institute of Environmental Assessment (IEA, 1995). The Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats. The aim is to provide a record of habitats that are present on site. Data recorded during the field survey are discussed in Chapter 2.
- 1.2 Whilst every effort has been made to identify and map any invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act (1981, as amended), it should be noted that this was not a specific survey for these species and therefore invasive individuals may have been missed.
- 1.3 Due to the size of the site, the site was split into compartments for purposes of surveying and mapping as detailed within this report. These compartments generally followed path or habitat boundaries and usually ranged between 4-10ha in size.
- 1.4 Recorded vegetation was given an abundance score following DAFOR (Dominant, Abundant, Frequent, Occasional, or Rare). Where appropriate, these values were prefixed by very or locally to provide more detailed biogeographical data. Full species lists and abundance scores are provided in Chapter 2, with Chapter 2 providing a brief summary of all habitats within the site. Maps are included as Appendix 1. Please note that the species lists included in the report are not exhaustive for each compartment; a Phase 1 Habitat Survey identifies broad habitats according to their general species composition. Detailed botanical survey work usually follows on from Phase 1 Habitat Surveys, as National Vegetation Classification (NVC) surveys.
- 1.5 A Phase 1 Habitat Survey map is provided as Appendix 1 (Drawing 2363-E1-J), which illustrates the location and extent of all broad habitat types recorded within the site area. Chapter 2 should be consulted for habitat descriptions, species lists and target notes. Photographs taken during the field survey are presented in Appendix 2.
- 1.6 The survey was carried out between May 2021 and August 2021. Weather conditions were generally dry at the time of survey, although some surveys were undertaken during periods of intermittent rain or after periods of heavy rain. Survey temperatures ranged from 14-31°C.
- 1.7 For ease of surveying and writing, the site was broken down into nine compartments as well as boundary features and ponds. These are presented in Drawings 2363-E1-A to -J, Appendix 1, however, figures are also provided within the text for each compartment for ease of reference. Photographs are presented within Appendix 3.

### Survey constraints

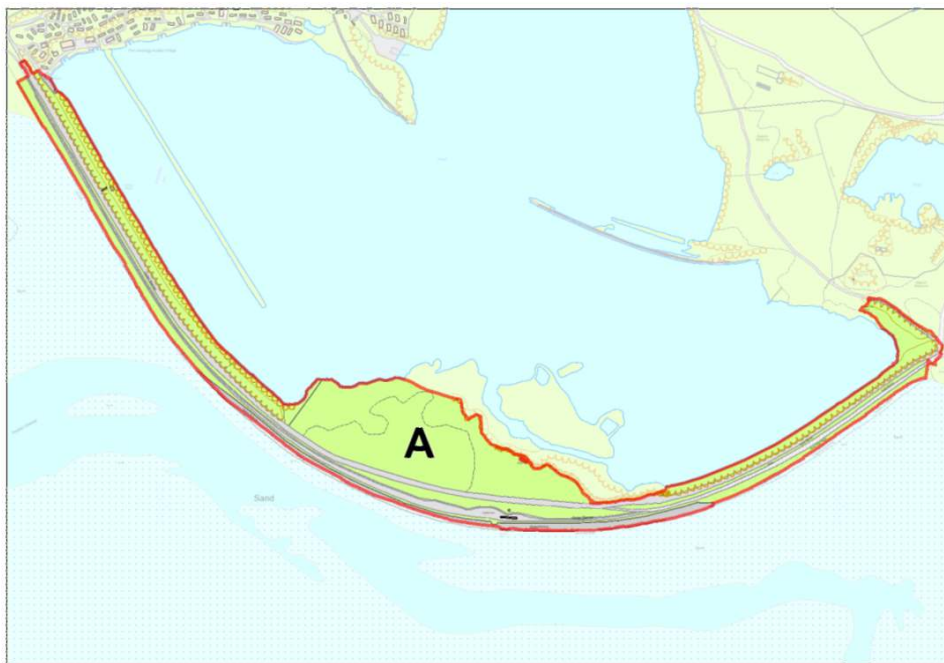
- 1.8 The survey was undertaken between May and August 2021; whilst this does have the benefit of allowing for repeated site visits and assessment of some areas of the site, this is a relatively long period of time where some plants may be in or out of flower depending on the month of survey of that part of the site. In addition, the compartments with dense scrub that were surveyed early on in May were more accessible

than those with dense scrub that were surveyed later in the survey period due to vegetation growth; this temporal variance between compartment surveys has therefore affected the length/diversity of the species lists for such compartments.

- 1.9 Some areas of the site were too densely vegetated to be examined closely; these areas are detailed within the habitat description.

## 2.0 RESULTS: COMPARTMENT A

2.1 Compartment A comprised habitats along the seawall that was constructed between 1890 and 1905. This sea wall includes a central landmass of limestone rubble brought from the quarries to the north. These habitats were generally disturbed due to a combination of human activity and natural conditions. This area is highlighted in Figure 1, below:



**Figure 1: Compartment A, in light green, shown inside the compartment boundary in red**

2.2 Compartment-level habitat data can be found within Drawings 2363-E1-A, 2363-E1-A1 and 2363-E1-A2. Habitats found within Compartment A are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/Hard-standing (J4)
- Boulders/rocks above high tide mark (H4)
- Bracken (C1.1)
- Buildings (J3.6)
- Dense scrub (A2.1)
- Quarry (I1.2)
- Scattered scrub (A2.2)
- Semi-improved neutral grassland (B2.2)
- Unimproved calcareous grassland (B3.1)
- Mosaic habitat: Sand dune grassland (H6.5) and Sand dune scrub (H6.7)

*Bare ground/Hard-standing (J4)*

2.3 Areas of bare ground/hard standing were primarily characterised as a track that was present along the entire length of the sea wall. Paths were also present throughout the semi-improved grassland habitats.

2.4 Bare ground was also present along the edge of the lagoon to the far east of the compartment.

*Boulders/rocks above high tide mark (H4)*

2.5 The southern edge of the sea wall comprised large rectangular blocks of concrete on the sea wall slope with irregularly shaped concrete aggregate atop the blocks at the top of the slope. Vegetation was sparse in this area, although thrift *Armeria maritima* was noted to be present rarely along the south-eastern edge of this habitat adjacent to the semi-improved neutral grassland.

*Bracken (C1.1)*

2.6 A small patch of bracken was present to the far east of the compartment, bounded by a track and dense scrub habitats.

*Buildings/structures (J3.6)*

2.7 Buildings and structures within this area comprised a lighthouse and wall to the middle of the seawall at the southern-most point. The lighthouse was metal clad with a metal roof and extremely exposed although this structure was not inspected in detail for bats. However, it is considered highly unlikely that the lighthouse provides suitable roosting locations for bats due to the highly exposed nature of this structure coupled with the metal construction, which would not allow for much purchase for roosting bats.

2.8 An approximately 2m high wall of concrete construction with a ceremonial stone was present adjacent to the lighthouse. This structure provided negligible potential to roosting bats due to a lack of features and the exposed nature of this structure.

2.9 A bird watching hide of concrete construction with a sloping roof was also present, although this was not inspected in any great detail. Due to the extremely exposed nature of this location, however, it is considered unlikely to provide suitable roosting locations for bats.

*Dense scrub (A2.1)*

2.10 Dense scrub habitats were present along the northern edge of the sea wall. These dense scrub habitats were variable in character through this habitat type. To the west of the central landmass (see Drawing 2363-E1-A1), dense scrub habitat was present along a steep embankment, most of which was inaccessible but could be viewed well from the bottom of the slope. Dense scrub habitat in this area graded into grassland ecotones and a path at the bottom of the embankment. Occasional stands of bracken were found throughout this habitat, but were not so dense as to overtake the scrub where it colonised. Table 1A, below, provides the species assemblage for this area.

Common name	Scientific name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	A, LD
Bramble	<i>Rubus fruticosus agg. sp.</i>	A, LD
Sweet vernal grass	<i>Anthoxanthum odoratum</i>	F
Crested dog's tail	<i>Cynosurus cristatus</i>	F
Cock's foot grass	<i>Dactylis glomerata</i>	F

Gorse	<i>Ulex europaeus</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	O
Oxeye daisy	<i>Leucanthemum vulgare</i>	O
Common nettle	<i>Urtica dioica</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Dog rose	<i>Rosa canina</i>	O
False oat grass	<i>Arrhenatherum elatius</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Daisy	<i>Bellis perennis</i>	O
Great willowherb	<i>Epilobium hirsutum</i>	O
Sycamore	<i>Acer pseudoplatanus</i>	O
Goosegrass	<i>Galium aparine</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Bird's foot trefoil	<i>Lotus corniculatus</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O
Bracken	<i>Pteridium aquilinum</i>	O, LA
Large bindweed	<i>Calystegia silvatica</i>	O, LA
Honeysuckle	<i>Lonicera periclyclamen</i>	O, LD
Meadowsweet	<i>Filipendula ulmaria</i>	O, LF
Curly dock	<i>Rumex crispus</i>	R
Perfoliate St. John's wort	<i>Hypericum perforatum</i>	R
Meadow vetchling	<i>Lathyrus pratensis</i>	R
Elder	<i>Sambucus nigra</i>	R
Coltsfoot	<i>Tussilago farfara</i>	R
Field horsetail	<i>Equisetum arvense</i>	R
Red clover	<i>Trifolium pratense</i>	R, LF

**Table 1A: Species assemblage within dense scrub habitats to the west of the landmass within Compartment A**

- 2.11 Two immature and likely dead individual sea buckthorn shrubs were present in this area. See *Invasive species* for more information.
- 2.12 Dense scrub habitat to the east of the landmass within this compartment (See Drawing 2363-E1-A2) was present along an embankment, much of which was directly inaccessible, but could be viewed well from the top of the slope. This habitat was predominantly dense scrub but occasional breaks in this habitat gave way to tall ruderal ecotones. The species assemblage for this area is provided in Table 2A, below.

Common name	Scientific name	Frequency
Gorse	<i>Ulex europaeus</i>	A, LD
Cock's foot grass	<i>Dactylis glomerata</i>	F
Common couch	<i>Elymus repens</i>	F
Grey willow	<i>Salix cinerea</i>	O
Goat willow	<i>Salix capraea</i>	O
Dog rose	<i>Rosa canina</i>	O
Red fescue	<i>Festuca rubra</i>	O

Yorkshire fog	<i>Holcus lanatus</i>	O, LF
Meadow buttercup	<i>Ranunculus acris</i>	O
Common nettle	<i>Urtica dioica</i>	O
Woody nightshade	<i>Solanum dulcamara</i>	O
Hawthorn	<i>Crataegus monogyna</i>	O to east; D to west
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	O, LA
Bracken	<i>Pteridium aquilinum</i>	O, LA
Bramble	<i>Rubus fruticosus agg. sp.</i>	O, LD
Wood sage	<i>Teucrium scorodonia</i>	O, LA

**Table 2A: Species assemblage within dense scrub habitats to the east of the landmass within Compartment A**

2.13 Dense scrub habitats present within the central landmass on the seawall (see Drawing 2363-E1-A1) comprised a mosaic dominated by dense scrub (75%) with tall ruderal habitats (25%) featuring as ecotones. Tall ruderal species such as rosebay willowherb *Chamaenerion angustifolium* usually occurred within these ecotones with only occasional ingress into the dense scrub areas. Table 3A, below, provides the species assemblage for dense scrub habitats within the central landmass.

Common name	Scientific name	Frequency
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	F, LD
Dog rose	<i>Rosa canina</i>	F
Hawthorn	<i>Crataegus monogyna</i>	F
Common ragwort	<i>Jacobaea vulgaris</i>	F
Bramble	<i>Rubus fruticosus agg. sp.</i>	F, LD
Grey willow	<i>Salix cinerea</i>	F, LD
Goat willow	<i>Salix capraea</i>	F, LD
Grey x Goat willow	<i>Salix cinerea x salix capraea</i>	F, LD
Tufted vetch	<i>Vicia cracca</i>	O
Cock's foot grass	<i>Dactylis glomerata</i>	O
Perfoliate St. John's wort	<i>Hypericum perforatum</i>	O
False oat grass	<i>Arrhenatherum elatius</i>	O
Wild strawberry	<i>Fragaria vesca</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Bird's foot trefoil	<i>Lotus corniculatus</i>	O
Mouse-eared hawkweed	<i>Pilosella officinarum</i>	O
Carlina thistle	<i>Carlina vulgaris</i>	O
Yarrow	<i>Achillea millefolium</i>	O
Red fescue	<i>Festuca rubra</i>	O
Sheep's fescue	<i>Festuca ovina</i>	O
Kidney vetch	<i>Anthyllis vulneraria</i>	O
Wood small-reed	<i>Calamagrostis epigejos</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O, LA
Common knapweed	<i>Centaurea nigra</i>	O, LF
Spear thistle	<i>Cirsium vulgare</i>	O, LF
Red currant	<i>Ribes rubrum</i>	R
Field horsetail	<i>Equisetum arvense</i>	R

**Table 3A: Species assemblage within dense scrub habitats within the central landmass within Compartment A**

2.14 TNA1 refers to a localised scrub/grassland mosaic within the dense scrub habitat. The species assemblage is provided in Table 4A below.

Common name	Scientific name	Frequency
Gorse	<i>Ulex europaeus</i>	A, LD
Bramble	<i>Rubus fruticosus</i> agg. sp.	F
Sweet vernal grass	<i>Anthoxanthum odoratum</i>	F
Grey willow	<i>Salix cinerea</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F, LA
Common knapweed	<i>Centaurea nigra</i>	O
Yarrow	<i>Achillea millefolium</i>	O
Wild thyme	<i>Thymus polytrichus</i>	O
Rough hawkbit	<i>Leontodon hipidus</i>	O
Restharrow	<i>Ononis repens</i>	O
Quaking-grass	<i>Briza media</i>	O
Wall cotoneaster	<i>Cotoneaster horizontalis</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Dog rose	<i>Rosa canina</i>	O
Harebell	<i>Campanula rotundifolia</i>	R
Common centaury	<i>Centaureum erthraea</i>	R
Biting stonecrop	<i>Sedum acre</i>	R
Perfoliate St. John's wort	<i>Hypericum perforatum</i>	R
Common figwort	<i>Scrophularia nodosa</i>	R
Common hogweed	<i>Heracleum sphondylium</i>	R
Wood sage	<i>Teucrium scorodonia</i>	R
Elder	<i>Sambucus nigra</i>	R
Wild mignonette	<i>Reseda lutea</i>	R

**Table 4A: Species assemblage of localised grassland/scrub mosaic within Compartment A at TNA1**

2.15 Montbretia and sea buckthorn were both present within the dense scrub habitats within this compartment. See *Invasive species* for further information.

*Quarry (11.2)*

2.16 Whilst this habitat was not strictly a quarry, this area is part of a man-made landmass that utilised materials from the quarry area to the north, and therefore had a very similar species assemblage to those found within Compartment I (see Section 10). This area was calcareous in nature and sparsely vegetated. It should be noted that embankments were present to protect a nesting tern colony; therefore the survey did not enter any areas that were signposted as no entry and strictly followed the map outline provided to the north of this area. The presence of wall cotoneaster is discussed further within *Invasive Species*. Table 5A below provides the species assemblage for this habitat in this area.

Common name	Scientific name	Frequency
Ploughman's spikenard	<i>Inula conyzae</i>	O



Cat's ear	<i>Hypochaeris radicata</i>	O
Common centaury	<i>Centaureum erythraea</i>	O
Wall cotoneaster	<i>Cotoneaster horizontalis</i>	O
Scarlet pimpernel	<i>Anagallis arvensis</i>	O
Wild strawberry	<i>Fragaria vesca</i>	O
Carline thistle	<i>Carlina vulgaris</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Sheep's fescue	<i>Festuca ovina</i>	O, LA
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	O, LA
Glaucous sedge	<i>Carex flacca</i>	O, LA
Eyebright	<i>Euphrasia sp.</i>	O, LF
Bird's foot trefoil	<i>Lotus corniculatus</i>	O, LF
Spear thistle	<i>Cirsium vulgare</i>	R
Ribwort plantain	<i>Plantago lanceolata</i>	R
Bramble	<i>Rubus fruticosus agg. sp</i>	R
Wild thyme	<i>Thymus polytrichus</i>	R
Gorse	<i>Ulex europaeus</i>	R
Hop trefoil	<i>Trifolium campestre</i>	R
Creeping willow	<i>Salix repens</i>	R
Creeping thistle	<i>Cirsium arvense</i>	R
Self heal	<i>Prunella vulgaris</i>	R
Daisy	<i>Bellis perennis</i>	R
Perfoliate St. John's wort	<i>Hypericum perforatum</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R
Wild carrot	<i>Daucus carota</i>	R
Common ragwort	<i>Jacobaea vulgaris</i>	R
Reindeer moss	<i>Cladonia rangiferina</i>	R
Woody nightshade	<i>Solanum dulcamara</i>	R
Greater willowherb	<i>Epilobium hirsutum</i>	R
Ivy-leaved toadflax	<i>Cymbalaria muralis</i>	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	R
Northern marsh orchid	<i>Dactylorhiza purpurella</i>	R, LF
Fairy flax	<i>Linum catharticum</i>	R, LO

**Table 5A: Species assemblage within quarry habitats within the landmass of Compartment A**

- 2.17 Areas adjacent to the embankments and adjacent to dense scrub habitats were generally more diverse. Where dense scrub habitats were separated by this habitat, additional species such as cock's foot *Dactylis glomerata* and sweet vernal grass *Anthoxanthum odoratum* were occasionally present.

*Scattered scrub (A2.2)*

- 2.18 Scattered scrub was primarily present to the eastern end of the sea wall and within the unimproved calcareous grassland. Scattered scrub species at the eastern end of the sea wall were characterised by occasional hawthorn *Crataegus monogyna*, bramble *Rubus fruticosus agg. sp.*, ivy *Hedera helix*, male fern *Dryopteris felix-mas*, hart's tongue fern *Asplenium scolopendrium* with elder *Sambuca nigra* featuring rarely.

- 2.19 Scattered scrub within the unimproved calcareous grassland frequently comprised gorse *Ulex europaeus* and occasionally bramble.

*Semi-improved neutral grassland (B2.2)*

- 2.20 Semi-improved neutral grassland was present as disturbed habitats along the sea wall with paths frequently present and in active use. As such, the grassland varied between long strips of fairly rank habitat to areas that were shorter and less rank due to constant disturbance. Species present within the ranker areas of this habitat are presented in Table 6A below:

Common Name	Scientific Name	Frequency
False oat grass	<i>Arrhenatherum elatius</i>	F
Perennial ryegrass	<i>Lolium perenne</i>	F
Rough meadow grass	<i>Poa trivialis</i>	F
Bramble	<i>Rubus fruticosus</i> agg. sp.	F, LA
Red fescue	<i>Festuca rubra</i>	F, LA
Perfoliate St. John's Wort	<i>Hypericum perforatum</i>	O
Woody nightshade	<i>Solanum dulcamara</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Curled dock	<i>Rumex crispus</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Goosegrass	<i>Galium aparine</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	O
Cow parsley	<i>Anthriscus sylvestris</i>	O
Dandelion	<i>Taraxacum officinale</i> agg. sp.	O
White clover	<i>Trifolium repens</i>	O
Red clover	<i>Trifolium pratense</i>	O
Dog rose	<i>Rosa canina</i>	O
Spear thistle	<i>Cirsium vulgare</i>	O
Broad-leaved dock	<i>Rumex obtusifolius</i>	O
Common couch	<i>Elymus repens</i>	O
Crested dog's tail	<i>Cynosurus cristatus</i>	O
Chickweed	<i>Stellaria media</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O, LA
Field horsetail	<i>Equisetum arvense</i>	O, LD
Ribwort plantain	<i>Plantago lanceolata</i>	O, LF
Common hogweed	<i>Heracleum sphondylium</i>	O, LF
Common nettle	<i>Urtica dioica</i>	O, LF
Meadow vetchling	<i>Lathyrus pratensis</i>	O, LF
Meadowsweet	<i>Filipendula ulmaria</i>	O, LF (north-western area only)
Creeping thistle	<i>Cirsium arvense</i>	R
Large bindweed	<i>Calystegia silvatica</i>	R
Teasel	<i>Dipsacus fullonum</i>	R

Honeysuckle	<i>Lonicera periclyclamen</i>	R
Goat x Grey willow	<i>Salix caprea x salix cinerea</i>	R
Nipplewort	<i>Lapsana communis</i>	R
Sycamore sapling	<i>Acer pseudoplatanus</i>	R
Common figwort	<i>Scrophularia nodosa</i>	R
Hoary willowherb	<i>Epilobium parviflorum</i>	R
Yarrow	<i>Achillea millifolium</i>	R
False brome	<i>Brachypodium sylvaticum</i>	R
Sow thistle	<i>Sonchus arvensis</i>	R
Burdock	<i>Arctium lappa</i>	R
Common centaury	<i>Centaurium erythraea</i>	R
Daisy	<i>Bellis perennis</i>	R
Oak sapling	<i>Quercus sp.</i>	R
Lesser trefoil	<i>Trifolium dubium</i>	R
Smooth meadow grass	<i>Poa pratensis</i>	R
Zig-zag clover	<i>Trifolium medium</i>	R
Hare's foot clover	<i>Trifolium arvense</i>	R
Rosebay willowherb	<i>Chamerion angustifolium</i>	R
Comfrey	<i>Symphytum officinale</i>	R
Wild turnip	<i>Brassica rapa</i>	R
Timothy	<i>Phleum pratense</i>	R
Coltsfoot	<i>Tussilago farfara</i>	R
Agrimony	<i>Agrimonia eupatoria</i>	R
Rough hawkbit	<i>Leontodon hispidus</i>	R
Bloody cranesbill	<i>Geranium sanguineum</i>	R
Sorrel	<i>Rumex acetosa</i>	R
Harebell	<i>Campanula rotundifolia</i>	R
Hedge woundwort	<i>Stachys sylvatica</i>	R

**Table 6A: Species present within the ranker areas of the semi-improved neutral grassland**

2.21 Where the ground was more disturbed and species growth was therefore shorter and less rank, in addition to the more common species found above, the following species, presented in Table 7A were found to be present:

Common name	Scientific name	Frequency
Crested dog's tail	<i>Cynosurus cristatus</i>	F
White clover	<i>Trifolium repens</i>	F
Red clover	<i>Trifolium pratense</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Lesser trefoil	<i>Trifolium dubius</i>	O
Daisy	<i>Bellis perennis</i>	O
Coltsfoot	<i>Tussilago farfara</i>	O
Carlina thistle	<i>Carlina vulgaris</i>	O
Greater plantain	<i>Plantago major</i>	O

Cat's ear	<i>Hypochaeris radicata</i>	O
Wood sage	<i>Teucrium scorodonia</i>	O
Restharrow	<i>Ononis repens</i>	O, LA
Tall fescue	<i>Schedonorus arundinaceus</i>	R
Buck's horn plantain	<i>Plantago coronopus</i>	R
Wild thyme	<i>Thymus polytrichus</i>	R
Lady's bedstraw	<i>Galium verum</i>	R
Hop trefoil	<i>Trifolium campestre</i>	R
Wild strawberry	<i>Fragaria vesca</i>	R
Eyebright	<i>Euphrasia nemora</i>	R
Common centaury	<i>Centaurium erythraea</i>	R, LO

**Table 7A: Species present in the more open and disturbed areas of the semi-improved neutral grassland**

- 2.22 It is acknowledged that some species that prefer calcareous growing conditions were present within these areas, however, the more prevalent species were those that preferred neutral growing conditions. It is considered that the ground conditions in these habitats was somewhat variable with localised areas of eutrophication.

*Unimproved calcareous grassland (B3.1)*

- 2.23 Unimproved calcareous grassland was present to the far east of the central landmass (see Drawing 2363-E1-A1). The grassland was very short in this area with no evidence of grazing; as such it was concluded that disturbance from walkers as well as the general environmental exposure in this area likely kept the sward short. Areas of sea buckthorn were also present, as described within *Invasive Species*. Species present within this habitat are presented in Table 8A below:

Common Name	Scientific Name	Frequency
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Red fescue	<i>Festuca rubra</i>	F
Kidney vetch	<i>Anthyllis vulneraria</i>	F
Hop trefoil	<i>Trifolium campestre</i>	O
Common centaury	<i>Centaurium erythraea</i>	O
Wild thyme	<i>Thymus polytrichus</i>	O
Cock's foot grass	<i>Dactylis glomerata</i>	O
Harebell	<i>Campanula rotundifolia</i>	O
Violet	<i>Viola spp.</i>	O
Reindeer moss	<i>Cladonia rangiferina</i>	O, LF
Common knapweed	<i>Centaurea nigra</i>	O, LF
Carlina thistle	<i>Carlina vulgaris</i>	R
Dandelion	<i>Taraxacum officinale agg. sp.</i>	R

**Table 8A: Species present within the Unimproved calcareous grassland habitat within Compartment A**

*Mosaic habitat: Sand dune grassland (H6.5) and Sand dune scrub (H6.7)*

- 2.24 This habitat was a large and complex area comprising approximately 50% sand dune scrub and 50% sand dune grassland. Some areas were very open with others impassable due to the levels of vegetation and uncertainty of conditions underfoot. Sand dunes were present throughout, however, with occasional rocky features where rubble had been left; as such the habitat undulated between localised peaks and troughs. Table 9A, below, provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Marram grass	<i>Ammophila arenaria</i>	A, LD
Gorse	<i>Ulex europaeus</i>	A, LD
Field horsetail	<i>Equisetum arvense</i>	O
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	O
Rough hawkbit	<i>Leontodon hispidus</i>	O
Self-heal	<i>Prunella vulgaris</i>	O
Perfoliate St. John's Wort	<i>Hypericum perforatum</i>	O
Eyebright	<i>Euphrasia sp.</i>	O
Cat's ear	<i>Hypochaeris radicata</i>	O
Yarrow	<i>Achillea millifolium</i>	O
Grey willow	<i>Salix cinerea</i>	O to west only
Goat willow	<i>Salix caprea</i>	O to west only
Bramble	<i>Rubus fruticosus agg. sp.</i>	O, LF
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O, LF
Common knapweed	<i>Centaurea nigra</i>	O, LF
Restharrow	<i>Ononis repens</i>	O, LF (found to edge only)
Carlina thistle	<i>Carlina vulgaris</i>	R
Small scabious	<i>Scabiosa columbaria</i>	R
Reindeer moss	<i>Cladonia rangiferina</i>	R
Woody nightshade	<i>Solanum dulcamara</i>	R
Goat's beard	<i>Tragopogon pratensis</i>	R
Hawthorn	<i>Crataegus monogyna</i>	R
Lyme grass	<i>Leymus arenarius</i>	R, LF (found to edge only)
Harebell	<i>Campanula rotundiflora</i>	R

**Table 9A: Species present within the sand dune grassland/sand dune scrub mosaic**

- 2.25 TNA2 refers to a stand of bracken establishing within the sand dune grassland/sand dune scrub mosaic. Whilst the grasses in this area remained the same, it was noted that common hogweed *Heracleum sphondylium* and Goat's beard *Tragopogon pratensis* were also occasionally present.

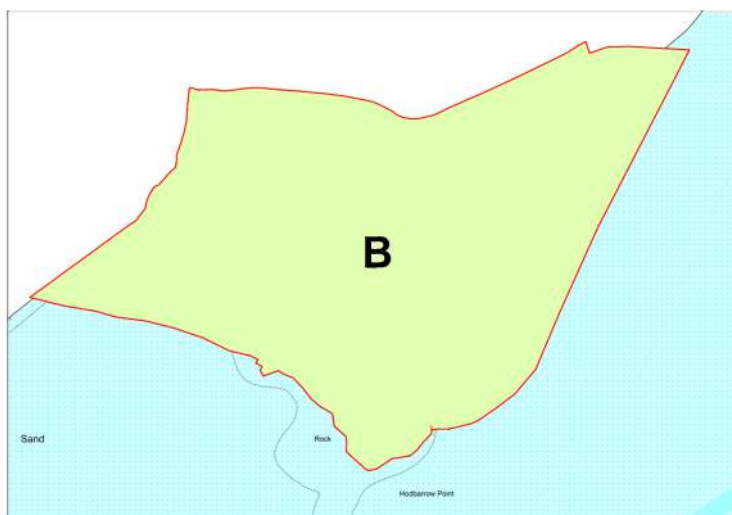
#### *Invasive Species*

- 2.26 Whilst sea buckthorn *Hippophae rhamnoides* is not an invasive species as per Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), it is considered to be an invasive species in the northwest of England. As such, it is included within this document as an invasive species. Several mature individuals were found within the central landmass on the sea wall (see Drawing 2363-E1-A1).
- 2.27 Two small, immature, and likely dead individual sea buckthorn shrubs were present along the western seawall. It is considered that they were likely treated with herbicide as part of a management plan.

- 2.28 A stand of dense and mature sea buckthorn (approximately 20m x 15m) was present within the central landmass on the sea wall. This area showed no sign of recent management. Smaller individuals that showed signs of treatment were present to the east. Two dense stands of sea buckthorn were also present near TNA2. These stands were dense, but immature at the time of survey.
- 2.29 Two stands of dense and immature sea buckthorn shrubs were present within the unimproved calcareous grassland habitat. These stands appeared to have undergone treatment as their vitality was questionable.
- 2.30 Wall cotoneaster was occasionally present throughout the quarry-type habitat within this compartment. Individuals were usually low growing and sprawling although some were quite well established. Wall cotoneaster was also found to be present where dense scrub habitats gave way to grassland ecotones, such as at TNA1.
- 2.31 Montbretia was present within the dense scrub habitat and the mosaic of sand dune scrub and grassland. These stands were well established and appeared to have not been subject to management.

### 3 RESULTS: COMPARTMENT B

3.1 Compartment B comprised a complex and roughly triangular area of the reserve that included Hodbarrow point. Coastal habitats were present along two boundaries, with the rest of the reserve adjacent to the north. A mosaic of habitats was present including those associated with the disused Hodbarrow Quarries, which is also located in this compartment. This area is highlighted in Figure 2, below:



**Figure 2: Compartment B, in light green, shown inside the site boundary in red**

3.2 Compartment-level habitat data can be found within Drawing 2363-E1-B. Habitats found within Compartment B are listed in alphabetical order below, not in order of ecological importance.

- Boulder/rocks above high tide mark (H4)
- Bracken (C1.1)
- Buildings/structures (J3.6)
- Dense Scrub (A2.1)
- Ephemeral/short perennial (J1.3)
- Intertidal sand (H1)
- Maritime cliff and slope, hard cliff & crevice ledge vegetation (H8.1 & H8.3)
- Maritime coastal grassland (H8.4)
- Open sand dune (H6.8)
- Quarry (I2.1)
- Sand dune grassland (H6.5)
- Sand dune scrub (H6.7)
- Scattered scrub (A2.2)
- Shingle/gravel above high tide (H3)
- Strandline vegetation (H5)

- Tall ruderal herb (C3.1)
- Unimproved calcareous grassland (B3.1)
- Unimproved neutral grassland (B2.1)

*Boulder/rocks above high tide mark (H4)*

3.3 In this compartment, this habitat was characterised by natural limestone rock formations in the far south of the compartment at Hodbarrow point. This habitat was sparsely vegetated with rare occurrences of curled dock *Rumex crispus* and sea plantain *Plantago maritima*.

*Bracken (C1.1)*

3.4 A vast area of bracken *Pteridium aquilinum* with scattered scrub species was present in the north part of this compartment and adjoined a similar habitat within Compartment C. Table 1B below provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Bracken	<i>Pteridium aquilinum</i>	D
False oat-grass	<i>Arrhenatherum elatius</i>	A
Common knapweed	<i>Centaurea nigra</i>	F
Creeping thistle	<i>Cirsium repens</i>	F
Common ragwort	<i>Jacobaea vulgaris</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O

**Table 1B: Species assemblage within Bracken habitats within Compartment B**

3.5 A derelict windmill was present within the approximate centre of this stand. TNB1 relates to a relatively open area where disturbance/trampling had been caused by visitors to the structure, a greater species diversity was present than within the rest of the habitat. In addition to the species presented in Table 1B above, additional species in this area included montbretia *Crososmia x crocosmiiflora*, Yorkshire fog *Holcus lanatus*, common bent *Agrostis capillaris*, sweet vernal grass *Anthoxanthum odoratum*, common cat's-ear *Hypochaeris radicata*, eyebright *Euphrasia nemorosa*, rosebay willowherb *Chamaenerion angustifolium*, and cock's foot *Dactylis glomerata*.

*Buildings/structures (J3.6)*

3.6 A disused stone windmill was present to the middle of this compartment. This structure had partially collapsed and had no roof enclosing the structure. The stone walls were mainly well pointed with mortar, with very few crevices present internally and externally. The few crevices that were accessible from ground level were inspected with a torch and no bats or signs of bats were seen. The structure is extremely exposed to the weather, being situated in an open location on top of a hill on the coast. This, in combination with the lack of roof and very limited number of crevices present in the stone walls, is likely to create sub-optimal roosting conditions for bats during both summer and winter. During the survey of the compartment, a group of teenagers were seen sitting in the base of the windmill, smoking. The windmill is also therefore likely to be subject to fairly regular disturbance.



*Dense scrub (A2.1)*

- 3.7 Dense scrub was present in the east part of this compartment, largely adjacent to maritime habitats. Hawthorn was dominant in this habitat, with blackthorn *Prunus spinosa* being abundant. Bracken *Pteridium aquilinum*, creeping thistle *Cirsium arvense* and common knapweed *Centaurea nigra* were all frequent. Target Note TNB2 refers to a localised area where hazel *Corylus avellana* was found to be present.

*Ephemeral/short perennial (J1.3)*

- 3.8 An area of low diversity short perennial species was associated with the disused quarry area. Eyebright species *Euphrasia nemorosa/confusa* were abundant, with grasses such as Yorkshire fog and common bent frequent. Sea rush *Juncus maritimus* was rarely present. Sea buckthorn was also present within this habitat, with several bushes growing along the base of the quarry cliffs (see: *Invasive Species* below). Sea buckthorn was at its most dense in this habitat within this compartment.

*Intertidal sand (H1)*

- 3.9 The south-western corner of this compartment was characterised by the intertidal sand habitats of Duddon Sands, comprising bare sand.

*Maritime cliff and slope, hard cliff & crevice ledge vegetation (H8.1 & H8.3)*

- 3.10 This habitat comprised limestone cliffs bounded by dense scrub and shingle/gravel above high tide habitats. This area was generally sparsely vegetated, with one area of dense vegetation to the south. TNB3 refers to an area where sea thrift occurred frequently along with sheep's fescue *Festuca ovina*. Table 2B below provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Common couch	<i>Elymus repens</i>	A
False oat-grass	<i>Arrhenatherum elatius</i>	A
Bracken	<i>Pteridium aquilinum</i>	F
Ivy	<i>Hedera helix</i>	F
Barren brome	<i>Anisantha sterilis</i>	F
Coltsfoot	<i>Tussilago farfara</i>	F
Creeping thistle	<i>Cirsium repens</i>	O
Bramble	<i>Rubus fruticosus</i>	O
Spear thistle	<i>Cirsium vulgare</i>	O
Sheep's fescue	<i>Festuca ovina</i>	O
Curled dock	<i>Rumex crispus</i>	O
Sea plantain	<i>Plantago maritima</i>	O
Dog rose	<i>Rosa canina</i>	R

**Table 2B: Species assemblage within maritime cliff and slope & crevice ledge vegetation habitats within Compartment B**

*Maritime coastal grassland (H8.4)*

- 3.11 A small area of maritime coastal grassland was present in the far south of this compartment on cliff tops, bounded by boulder/rocks above high tide and maritime cliff to the south and east, sand dune grassland and unimproved calcareous grassland to the west, with dense scrub to the north. This area was species

poor and characterised by frequently occurring sea thrift, with Yorkshire fog, common bent, and sheep's fescue also frequent, and lesser burdock *Arctium minus* rarely occurring.

*Open sand dune (H6.8)*

- 3.12 Open sand dune habitats bound shingle/gravel and boulder/rocks above high tide habitats to the north and are part of a larger and more successional mosaic of dune habitats. Whilst dune specialist species are present in this area, with marram grass dominating the habitat, more generalised species are also present. Table 3B below provides the species assemblage data for the habitat.

Common Name	Scientific Name	Frequency
Marram grass	<i>Ammophila arenaria</i>	D
Lyme-grass	<i>Leymus arenarius</i>	A
Cock's-foot	<i>Dactylis glomerata</i>	F
Common cat's-ear	<i>Hypochaeris radicata</i>	F
Horsetail	<i>Equisetum spp.</i>	F
Common knapweed	<i>Centaurea nigra</i>	F
Sheep's fescue	<i>Festuca ovina</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	O
Coltsfoot	<i>Tussilago farfara</i>	O
Sea thrift	<i>Armeria maritima</i>	O
Creeping thyme	<i>Thymus praecox</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	O
Rough hawkbit	<i>Leontodon hispidus</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Lady's bedstraw	<i>Galium verum</i>	O
Creeping thistle	<i>Cirsium repens</i>	O
Sea mayweed	<i>Tripleurospermum maritimum</i>	O
Ivy	<i>Hedera helix</i>	O
Elder	<i>Sambucus nigra</i>	R
Bramble	<i>Rubus fruticosus</i>	R

**Table 3B: Species assemblage within open sand dune habitats within Compartment B**

*Quarry (I2.1)*

- 3.13 These areas formed a rough horse-shoe shape within the disused quarries, and comprise mainly exposed, bare limestone rock. Where vegetation is present, it consists of scattered scrub dominated by hawthorn along the northern ridge/cliffs, and species characteristic of unimproved calcareous grassland growing sparsely along the eastern and western exposures. TNB4 relates to localised areas of sparsely growing calcareous grassland within the quarry.

*Sand dune grassland (H6.5)*

- 3.14 Sand dune grassland was present through the centre of this habitat, frequently bounded by dune scrub, open dune, quarry and bracken habitats, forming a mosaic of successional habitats in this area. Whilst dune specialist species are present in this area, more generalised species are also present and more abundant than in open dune habitat. Where scattered scrub was present in this area, it consisted solely of gorse *Ulex europaeus*. Table 4B below provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Lyme-grass	<i>Leymus arenarius</i>	A
Cock's-foot	<i>Dactylis glomerata</i>	F
Coltsfoot	<i>Tussilago farfara</i>	F
Sea thrift	<i>Armeria maritima</i>	F
Creeping thyme	<i>Thymus praecox</i>	F
Common cat's-ear	<i>Hypochaeris radicata</i>	F
Common couch	<i>Elymus repens</i>	F
Marram grass	<i>Ammophila arenaria</i>	O
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	O
Centaury	<i>Centaureum spp.</i>	O
Common Sedge	<i>Carex nigra</i>	O
Eyebright sp	<i>Euphrasia nemorosa/confusa</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O

**Table 4B: Species assemblage within sand dune grassland habitats within Compartment B**

*Sand dune scrub (H6.7)*

- 3.15 Sand dune scrub was present in the north-western corner and in the centre of Compartment B as part of a larger successional mosaic of open dune and sand dune grassland. Sea buckthorn was present in the far north-western corner (see *Invasive species*, below). Table 5B below provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Bramble	<i>Rubus fruticosus</i>	F
Gorse	<i>Ulex europaeus</i>	F
False oat-grass	<i>Arrhenatherum elatius</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Bracken	<i>Pteridium aquilinum</i>	F
Lyme-grass	<i>Leymus arenarius</i>	F
Marram grass	<i>Ammophila arenaria</i>	F
Hawthorn	<i>Crataegus monogyna</i>	O
Grey willow	<i>Salix cineria</i>	O
Dog rose	<i>Rosa canina</i>	
Horsetail	<i>Equisetum spp.</i>	

**Table 5B: Species assemblage within sand dune scrub habitats within Compartment B**

*Scattered scrub (A2.2)*

- 3.16 Scattered scrub habitats within compartment B were generally dominated by hawthorn, with frequent occurrences of bramble and occasional elder. Within areas of sand dune grassland, where scattered scrub was present, it was characterised solely by gorse. Within this compartment scattered scrub was found in conjunction with bracken (C1.1), tall ruderal (C3.1), semi-improved calcareous grassland (B3.2), artificial exposures, quarry (I2.1) and sand dune grassland (H6.5).

*Strandline vegetation (H5)*

- 3.17 Strandline vegetation was present in the south-western corner of the compartment, adjacent to intertidal sands, shingle/gravel and boulder habitats. Small patches of vegetation were present, characterised by frequent occurrences of sea sandwort *Honckenya peploides*, with occasional occurrences of sea rocket *Cakile maritima* and sand couch *Elymus factus*.

*Shingle/gravel above high tide mark (H3)*

- 3.18 This habitat was characterised by a mix of medium and small sized rocks and shingle, comprised mainly of bare rocks and stones of a similar composition to the naturally occurring boulders and maritime cliff.

*Tall Ruderal (C3.1)*

- 3.19 Tall ruderal habitat was present in the north-eastern corner of the compartment, bounded by dense scrub habitat inland and shingle/gravel above high tide mark habitats. The species present were reflective of a localised enrichment of the soil in this area. It is also of note that a dense stand of Japanese knotweed was present within this habitat (detailed within *Invasive species*, below). Table 6B below provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Common nettle	<i>Urtica dioica</i>	A
Tufted vetch	<i>Vicia cracca</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Hogweed	<i>Heracleum sphondylium</i>	F
Common couch	<i>Elymus repens</i>	F
False oat-grass	<i>Arrhenatherum elatius</i>	F
Cleavers	<i>Galium aparine</i>	O
Horsetail	<i>Equisetum spp.</i>	O
Creeping thistle	<i>Cirsium repens</i>	O
False brome	<i>Brachypodium sylvaticum</i>	O

**Table 6B: Species assemblage within tall ruderal habitats within Compartment B**

*Unimproved calcareous grassland (B3.1)*

- 3.20 Unimproved calcareous grassland was associated with the disused quarry area within this compartment. Within this compartment, unimproved calcareous grassland was bounded by dense scrub, quarry and ephemeral habitats and appeared to be part of a larger successional mosaic. Sparse calcareous grassland was also present on some areas of the exposed rock in the quarry.

Common Name	Scientific Name	Frequency
Bloody crane's-bill	<i>Geranium sanguineum</i>	A
Yorkshire fog	<i>Holcus lanatus</i>	F
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
Quaking-grass	<i>Briza media</i>	F
Yarrow	<i>Achillea millefolium</i>	F
Common cat's-ear	<i>Hypochaeris radicata</i>	F

Red clover	<i>Trifolium pratense</i>	F
Eyebright sp	<i>Euphrasia nemorosa/confusa</i>	F
Common knapweed	<i>Centaurea nigra</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
False oat-grass	<i>Arrhenatherum elatius</i>	O
Smooth meadow-grass	<i>Poa pratensis</i>	O
Centaurium	<i>Centaurium spp.</i>	O
Harebell	<i>Campanula rotundifolia</i>	O
St John's wort	<i>Hypericum spp.</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	R

**Table 7B: Species assemblage within the unimproved calcareous grassland (Compartment B)**

*Unimproved neutral grassland (B2.1)*

- 3.21 Two small areas of unimproved neutral grassland were present along the northern edge of the compartment, adjacent to an informal path. These areas were characterised by frequent cock's-foot *Dactylis glomerata*, meadow foxtail *Alopecurus pratensis* and false oat-grass *Arrhenatherum elatius*.

Common Name	Scientific Name	Frequency
Cock's-foot	<i>Dactylis glomerata</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
False oat-grass	<i>Arrhenatherum elatius</i>	F
Common cat's-ear	<i>Hypochaeris radicata</i>	F
Red clover	<i>Trifolium pratense</i>	F
Eyebright sp	<i>Euphrasia nemorosa/confusa</i>	F
Common knapweed	<i>Centaurea nigra</i>	F
Meadow Foxtail	<i>Alopecurus pratensis</i>	F
White clover	<i>Trifolium repens</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	R
Common bent	<i>Agrostis capillaris</i>	R

**Table 8B: Species assemblage within unimproved neutral grassland habitats within Compartment B**

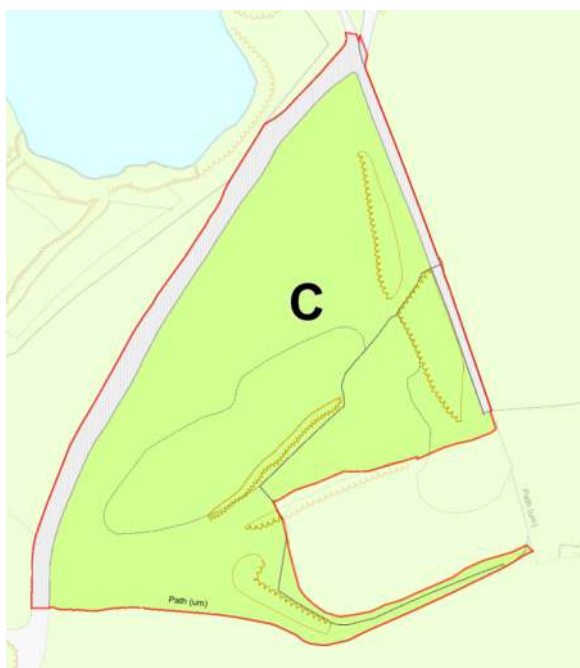
*Invasive species*

- 3.22 Montbretia was found to be present near the windmill within a localised break in the bracken habitat present at TNB1. Montbretia is a Schedule 9 species as per the Wildlife and Countryside Act 1981 (as amended).
- 3.23 A dense and mature stand of Japanese knotweed *Fallopia japonica* was found to be present within the far north-eastern corner near tall ruderal and scrub habitats.
- 3.24 Sea buckthorn bushes ranging in maturity levels were present within the following habitats: ephemeral habitats associated with the disused quarry, dune grassland to the south of the quarry, and dune scrub to the north-west of this compartment. Whilst sea buckthorn is not an invasive species as listed within Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), it is recognised as being invasive to habitats in

the north-west of England, and it is understood that control of this species within RSPB Hodbarrow has taken place in the past.

## 4 RESULTS: COMPARTMENT C

4.1 Compartment level habitat data can be found within Drawing 2363-E1-C. This compartment lies within the southern area of the reserve and consists largely of grassland and scrub habitats, with no waterbody present. The compartment includes a field of overgrown grassland in the southern part, which was inaccessible during the survey due to the presence of dense scrub/vegetation and fencing bounding the area. It is likely that this field was grazed in the recent past due to the presence of boundary fencing. Compartment C is highlighted in Figure 3, below:



**Figure 3: Compartment C, in light green, shown inside the site boundary in red**

4.2 Habitats found within Compartment C are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/hard standing (J4)
- Bracken (C1.1)
- Dense scrub (A2.1)
- Ephemeral/short perennial (J1.3)
- Scattered scrub (A2.2)
- Semi-improved calcareous grassland (B3.2)
- Unimproved calcareous grassland (B3.1)

### *Bare ground/hard standing (J4)*

4.3 Bare ground/hard standing habitats in this compartment relate to tracks along the western and eastern boundaries of the compartment.

#### *Bracken (C1.1)*

- 4.4 Bracken habitats were present in the far south and the north-east of this compartment. The area in the south was dominated by bracken *Pteridium aquilinum* with scattered scrub (dominated by hawthorn) present throughout and was a continuation of the bracken habitat in the north of Compartment B. The stand of bracken to the north was dominated solely by bracken.

#### *Dense Scrub (A2.1)*

- 4.5 Dense scrub habitats were present in the middle of this compartment and along the south-western boundary, although it should be noted that as this habitat was particularly dense, it was not possible to access these areas for direct survey. Therefore, any data collected for these areas was undertaken when walking along the edges of the areas of dense scrub. Table 1C, below, provides the species assemblage (as far as possible) for dense scrub in this compartment.

Common Name	Scientific Name	Frequency
Bramble	<i>Rubus fruticosus</i> agg. sp.	D
Grey willow	<i>Salix cinerea</i>	A
Hawthorn	<i>Crataegus monogyna</i>	F
Common nettles	<i>Urtica dioica</i>	F
Gorse	<i>Ulex europaeus</i>	O
Bracken	<i>Pteridium aquilinum</i>	O
Dog rose	<i>Rosa canina</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
False brome	<i>Brachypodium sylvaticum</i>	O
Osier	<i>Salix viminalis</i>	R
Elder	<i>Sambucus nigra</i>	R

**Table 1C: Species assemblage within dense scrub habitats within Compartment C**

- 4.6 TNC1 relates to a row of planted hawthorn on the edge of this habitat which may have formed a hedgerow along the northern field boundary in the past. It was also not possible to directly access this area for survey.

#### *Ephemeral/short perennial (J1.3)*

- 4.7 Ephemeral/short perennial habitat was present in the west and centre of this compartment, bounded by a track to the west. Scattered scrub was present throughout. Wall cotoneaster *Cotoneaster horizontalis* was noted as present in this area, growing adjacent to a localised growth of creeping willow *Salix repens*. Numerous, relatively established sea buckthorn bushes were also present in an area near the eastern edge of the area. Ephemeral/short perennial species present within this habitat are presented within Table 2C, below.

Common Name	Scientific Name	Frequency
Lesser hawkbit	<i>Leontodon saxatilis</i>	F
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F



False oat-grass	<i>Arrhenatherum elatius</i>	F
Restharrow	<i>Ononis repens</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	O
Creeping thistle	<i>Cirsium repens</i>	O
Great willowherb	<i>Epilobium hirsutum</i>	O
Quaking-grass	<i>Briza media</i>	O
Common sedge	<i>Carex nigra</i>	O
Harebell	<i>Campanula rotundifolia</i>	R

**Table 2C: Species assemblage within ephemeral/short perennial habitats within Compartment C**

*Scattered scrub (A2.2)*

- 4.8 Scattered scrub was present within the bracken, ephemeral/short perennial, semi-improved and unimproved calcareous grassland habitats. Some areas were dominated by hawthorn, represented by a species code within Drawing 2363-E1-C. Scattered scrub species are presented in Table 3C, below.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	A
Bramble	<i>Rubus fruticosus</i>	F
Gorse	<i>Ulex europaeus</i>	F
Grey willow	<i>Salix cinerea</i>	O
Ash	<i>Fraxinus excelsior</i>	O
Dog rose	<i>Rosa canina</i>	O

**Table 3C: Species assemblage within scattered scrub habitats within Compartment C**

*Semi-improved calcareous grassland (B3.2)*

- 4.9 This habitat was present in the south-eastern corner of this habitat, with scattered scrub present within one pocket of this habitat as per Drawing 2363-E1-C.

Common Name	Scientific Name	Frequency
False oat-grass	<i>Arrhenatherum elatius</i>	D
Creeping thistle	<i>Cirsium arvense</i>	A
Red clover	<i>Trifolium pratense</i>	F
White clover	<i>Trifolium repens</i>	F
Common nettles	<i>Urtica dioica</i>	F
Bramble	<i>Rubus fruticosus</i>	O

**Table 4C: Species assemblage within semi-improved calcareous grassland within Compartment C**

*Unimproved calcareous grassland (B3.1)*

- 4.10 This habitat was present in the far north and south of this compartment. Whilst the species assemblage presented in Table 5C, below, is more reflective of neutral disturbed grassland, the soil was notably calcareous in nature in this area and an abundance of false brome indicates a more calcareous habitat.

Common Name	Scientific Name	Frequency
False brome	<i>Brachypodium sylvaticum</i>	A

False oat-grass	<i>Arrhenatherum elatius</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	O
White clover	<i>Trifolium repens</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Gorse	<i>Ulex europaeus</i>	O
Dog rose	<i>Rosa canina</i>	O
Hawthorn	<i>Crataegus monogyna</i>	O
Perforate St John's Wort	<i>Hypericum perforatum</i>	R
Bramble	<i>Rubus fruticosus</i> agg. sp.	R
Common spotted orchid	<i>Dactylorhiza fuchsia</i>	R

**Table 5C: Species assemblage within unimproved calcareous grassland habitats within Compartment C**

4.11 Sea buckthorn was present within the south-western area of this habitat type, growing near to common spotted orchid *Dactylorhiza fuchsia*.

*Invasive Species*

4.12 It was noted that one very large and mature sea buckthorn was present outside of, but adjacent to the site boundary to the far south-east of this compartment. It is listed here as a vector for spread into the site due to its proximity.

4.13 Young sea buckthorn was also present within the south-western area of the compartment, within an area of unimproved calcareous grassland. More established sea buckthorn bushes were present in the northern area of the compartment also.

4.14 Wall cotoneaster was present in low densities within the ephemeral/short perennial habitat. These plants were low growing and stunted but well rooted.

## 5 RESULTS: COMPARTMENT D

5.1 Compartment D lies to the south of a large waterbody created via historic quarrying activity and extends southwards towards the lagoon. This compartment comprises mostly dense scrub habitat with areas of grassland and exposed rock. The disused Hodbarrow Lighthouse is included within this compartment. This area is highlighted in Figure 4, below:



**Figure 4: Compartment D, in light green with red border**

5.2 Compartment level habitat data can be found within Drawing 2363-E1-D. Habitats found within Compartment D are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/hard standing (J4)
- Basic natural inland cliff (I1.1.2)
- Building/structure (J3.6)
- Dense scrub (A2.1)
- Ephemeral/short perennial (J1.3)
- Open standing water (G1)
- Exposed rock (I1.4)
- Scattered Scrub (A2.2)
- Tall ruderal (C3.1)
- Unimproved calcareous grassland (B3.1)
- Unimproved neutral grassland (B2.1)
- Mosaic: Scattered scrub (A2.2) and scattered bracken (C1.2)

*Bare ground/hard standing (J4)*

- 5.3 Bare ground/hard standing habitats in this compartment relate to tracks along the eastern boundary and through the southern part of the compartment.

*Basic natural inland cliff (I1.1.2)*

- 5.4 It is assumed that quarrying activities in the past have created the steep, inland limestone cliffs that are present around the south-east boundary of the large waterbody, where scattered scrub is growing, including mainly hawthorn and gorse.

*Building/structure (J3.6)*

- 5.5 The disused Hodbarrow lighthouse was a tall, stone building situated in a prominent, exposed location on top of a hill in the southern part of the compartment. The walls of the lighthouse were largely intact and with uncovered windows present. The roof was missing and a metal look-out balcony encircled the lighthouse near the top of the structure, which was accessible via an internal staircase. The structure had a locked metal gate across the doorway in order to prevent public access for health and safety reasons. Externally, the stone walls had few, if any crevices, as the stone work was well-pointed with mortar. For this reason, and due to its extremely exposed location on the coast, the structure was considered to be unlikely to afford good nesting and roosting opportunities for wildlife, such as bats.

*Dense Scrub (A2.1)*

- 5.6 This compartment was dominated by a large swathe of dense scrub habitat, which was only partially directly accessible. Whilst this habitat was comprised of scrub species, it had the functionality of a woodland, with hawthorn and willow species comprising the canopy. Table 1D below details the species assemblage:

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	D
Grey willow	<i>Salix cinerea</i>	D
Bracken	<i>Pteridium aquilinum</i>	A
Bramble	<i>Rubus fruticosus</i> agg. sp.	F
False brome	<i>Brachypodium sylvaticum</i>	F
Rosebay willowherb	<i>Chamerion angustifolium</i>	F
Honeysuckle	<i>Lonicera periclymenum</i>	O
Gorse	<i>Ulex europaeus</i>	O
Dog rose	<i>Rosa canina</i>	O
Horsetail	<i>Equisetum</i> spp.	O
Osier	<i>Salix viminalis</i>	O
Nettles	<i>Urtica dioica</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
Broom	<i>Cytisus scoparius</i>	O
Goat willow	<i>Salix caprea</i>	O
Ash	<i>Fraxinus excelsior</i>	R
Scots pine	<i>Pinus sylvestris</i>	R, LO

**Table 1D: Species assemblage within dense scrub habitats within Compartment D**

5.7 As this habitat covered a relatively large area, it was variable in parts and therefore several target notes describe the localised differences from the overarching habitat as described below:

- TND1 relates to areas of localised Scots pine *Pinus sylvestris* present adjacent to the waterbody.
- TND2 relates to an area of open scrub with primrose *Primula vulgaris*, hart's tongue fern *Asplenium scolopendrium*, herb Robert *Geranium robertianum*, and bracken.
- TND3 relates to a damp area with tall grey willow, occasional hawthorn, and frequent common spotted orchid. Additional species in this area included creeping soft grass *Holcus mollis*, soft rush *Juncus effusus*, hart's tongue fern and glaucous sedge *Carex flacca*.
- TND4 relates to a damp area with tall tree-form shrubs including osier *Salix viminalis* and grey willow where nutrient enrichment was evident in the species assemblage. The following species were present in this area: glyceria spp., Yorkshire fog, elder, soft rush, common nettle *Urtica dioica*, broad-buckler fern *Dryopteris dilatata*, yellow flag iris *Iris pseudacacorus*, and water figwort *Scrophularia auriculata*. The area was noticeably dense with moss with fallen dead wood frequent.
- TND5 relates to areas that were more dominated by gorse than by hawthorn or willow species.
- TND6 relates to an area along the bank of the waterbody that comprised exposed rock with dense grey/goat willow scrub vegetation.

#### *Ephemeral/short perennial (J1.3)*

5.8 This habitat was adjacent to a track that bounded this compartment to the far east. This was a continuation of a similar habitat present within the neighbouring Compartment C (see paragraph 4.7, above). Variations away from that habitat are presented in Table 2D, below.

Common Name	Scientific Name	Frequency
Rough hawkbit	<i>Leontodon hispidus</i>	O
Mouse ear hawkweed	<i>Pilosella officinarum</i>	O
Common restharrow	<i>Ononis repens</i>	O
Coltsfoot	<i>Tussilago farfara</i>	O
Harebell	<i>Campanula rotundifolia</i>	R

**Table 2D: Species assemblage within scattered scrub habitats within Compartment D**

#### *Open Standing Water (G1)*

5.9 This habitat comprised two bodies of water within this compartment, with the larger waterbody to the south and the smaller to the north-east of this area. The southern and larger waterbody was approximately 2.6ha in size and was man-made in origin as part of the old quarry works. The water body could only be accessed from the open area on the south-east margin, which was used by the public to swim in during the survey. Items, including numerous old tyres were noted to be present under water near the south-eastern shore, dating from when it was used as a tip. This habitat is also discussed within Compartment E.

#### *Exposed rock (I1.4)*

5.10 These areas formed a rough horse-shoe shape within the disused quarries, and comprise mainly exposed, bare limestone rock. Where vegetation was present, it consisted of scattered scrub and tall ruderal species

characterised by frequent false brome, rosebay willowherb and greater willowherb. Occasionally hawthorn was present along the northern ridge/cliffs, along with cotoneaster species, quaking grass, bramble, dog rose and hart's tongue fern, with rare occurrences of sea buckthorn. Species characteristic of unimproved calcareous grassland grew sparsely along the eastern and western exposures. TNB4 relates to localised areas of sparsely growing calcareous grassland within this habitat.

#### Scattered Scrub (A2.2)

- 5.11 Patches of scattered scrub were present throughout unimproved calcareous grassland habitats and also the ephemeral/short perennial habitat (where gorse was dominant) within this compartment. Table 3D, below, presents species assemblage data for this habitat type.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	D
Gorse	<i>Ulex europaeus</i>	A
Bramble	<i>Rubus fruticosus</i>	F
Bracken	<i>Pteridium aquilinum</i>	F
Grey willow	<i>Salix cinerea</i>	O
Teasel	<i>Dipsacus fullonum</i>	O
Dog rose	<i>Rosa canina</i>	O
Sweet briar	<i>Rosa rubiginosa</i>	R

**Table 3D: Species assemblage within scattered scrub habitats within Compartment D**

- 5.12 TND7 relates to a grassy verge with anthills where false brome *Brachypodium sylvaticum*, false oat grass, and hedge bedstraw *Galium album* with occasional bramble/hawthorn scrub and frequent coltsfoot *Tussilago farfara*.
- 5.13 TND8 relates to an area where gorse and grasses were frequent, with many of the species associated with calcareous grassland. Additional species in this area included quaking grass *Briza media*, sweet vernal grass *Anthoxanthum odoratum*, glaucous sedge, common sedge *Carex nigra* and false brome.

#### Tall Ruderal (C3.1)

- 5.14 A patch of tall ruderal was present in the south-west of this compartment, situated on the hill behind the lighthouse and bordering as an ecotone between dense scrub and unimproved calcareous grassland habitat. Table 4D (below) details the species assemblage of the tall ruderal habitats in this habitat.

Common Name	Scientific Name	Frequency
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	F
Great willowherb	<i>Epilobium hirsutum</i>	F
Hogweed	<i>Heracleum sphondylium</i>	F
Dock	<i>Rumex Spp.</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Creeping thistle	<i>Cirsium repens</i>	F
False brome	<i>Brachypodium sylvaticum</i>	O
Quaking-grass	<i>Briza media</i>	O

Harts-tongue fern	<i>Phyllitis scolopendrium</i>	O
Meadow vetchling	<i>Lathyrus pratensis</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Mullein	<i>Verbascum spp.</i>	O
Cleavers	<i>Galium aparine</i>	O
Common bent	<i>Agrostis capillaris</i>	O
Hedge woundwort	<i>Stachys sylvatica</i>	R

**Table 4D: Species assemblage within tall ruderal habitats within Compartment D**

*Unimproved Calcareous Grassland (B3.1)*

- 5.15 This habitat was predominantly present to the south of this compartment, with further areas of unimproved calcareous grassland to the edges of the dense scrub habitat to the east and west. Table 5D, below, provides the species assemblage for this habitat.

Common Name	Scientific Name	Frequency
Yorkshire fog	<i>Holcus lanatus</i>	F
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
Yarrow	<i>Achillea millefolium</i>	F
Red clover	<i>Trifolium pratense</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
White clover	<i>Trifolium repens</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
Common bent	<i>Agrostis capillaris</i>	F
Rough hawkbit	<i>Leontodon hispidus</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	O
Eyebright sp	<i>Euphrasia nemorosa/confusa</i>	O
Downy oat grass	<i>Avenula pubescens</i>	O
Wild thyme	<i>Thymus polytrichus</i>	O
Common mouse-ear	<i>Cerastium fontanum</i>	O
Bramble	<i>Rubus fruticosus</i>	O
Hawkweed	<i>Hieracium spp.</i>	O
Goat's-beard	<i>Tragopogon pratensis</i>	O
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Germander speedwell	<i>Veronica chamaedrys</i>	O
False oat-grass	<i>Arrhenatherum elatius</i>	O
Quaking-grass	<i>Briza media</i>	O, LA
Spear thistle	<i>Cirsium vulgare</i>	O
Perforate St John's wort	<i>Hypericum perforatum</i>	O
Silverweed	<i>Potentilla anserina</i>	O
Tufted vetch	<i>Vicia cracca</i>	O

Soft rush	<i>Juncus effusus</i>	O
Ragwort	<i>Senecio jacobea</i>	O
Wood sage	<i>Teucrium scorodonia</i>	O
Gorse	<i>Ulex europaeus</i>	R
Common spotted orchid	<i>Dactylorhiza fuchsia</i>	R, LF
Creeping willow	<i>Salix repens</i>	R, LO
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	R, LF
Heather	<i>Calluna vulgaris</i>	R, O
Wild strawberry	<i>Fragaria vesca</i>	R, LF
Compact rush	<i>Juncus conglomeratus</i>	R, LF
Blood red geranium	<i>Geranium sanguineum</i>	R, LO

**Table 5D: Species assemblage within unimproved calcareous grassland habitats within Compartment D**

5.16 Successional changes from grassland to scrub were observed to be taking place within the south-western corner of this habitat, where unimproved calcareous grassland bordered scrub habitat. Colonising scrub species included frequent dog rose *Rosa canina* and occasionally young hawthorn.

5.17 This habitat was variable in parts and therefore several target notes describe the localised differences from the overarching habitat as described below:

- TND9 relates to an area where frequent wild strawberry and occasional heather *Calluna vulgaris* were present
- TND10 relates to an area where pyramidal orchids *Anacamptis pyramidalis* were frequent
- TND11 relates to an area where quaking grass was abundant, with common spotted orchid being frequent and creeping willow occasional. The presence of the latter two species could be indicators of localised dune slack habitat (H6.4) in this area.
- TND12 relates to an area where compact rush *Juncus conglomeratus* was frequent with common spotted orchid and blood red geranium *Geranium sanguineum* occurring occasionally.
- TND13 relates to a localised area of disturbance with a large proportion of forbs and lichens growing on rocks and rubble on the south-west slope up to and around the base of the lighthouse. The following species were present: Wild thyme *Thymus polytrichus*, common ragwort *Jacobaea vulgaris*, ribwort plantain *Plantago lanceolata*, dog rose, yarrow *Achillea millefolium*, white clover *Trifolium repens*, perforate St. John's wort *Hypericum perforatum*, common knapweed *Centaurea nigra*, Lady's bedstraw *Galium verum*, tufted vetch *Vicia cracca*, and red clover *Trifolium pratense*.

#### *Unimproved Neutral Grassland (B2.1)*

5.18 A small pocket of unimproved neutral grassland was present to the west of this compartment. This pocket was almost entirely surrounded by dense scrub habitat, although it was linked to unimproved calcareous grassland to the west. Species in this area indicated a level of nutrient enrichment with succession to willow scrub taking place. Table 6D, below, provides the assemblage data for this habitat.



Common Name	Scientific Name	Frequency
Cock's-foot	<i>Dactylis glomerata</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
False oat-grass	<i>Arrhenatherum elatius</i>	F
Red clover	<i>Trifolium pratense</i>	F
White clover	<i>Trifolium repens</i>	F
Tufted vetch	<i>Vicia cracca</i>	F
Agrimony	<i>Agrimonia eupatoria</i>	F
Hedge bedstraw	<i>Galium album</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Common bent	<i>Agrostis capillaris</i>	O
Grey willow (re-growth)	<i>Salix cinerea</i>	O
Dog rose	<i>Rosa canina</i>	O
Common sedge	<i>Carex nigra</i>	O
Soft rush	<i>Juncus effusus</i>	O
Marsh thistle	<i>Cirsium palustre</i>	O
Sheep's sorrel	<i>Rumex acetosella</i>	O
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	O

**Table 6D: Species assemblage within scattered unimproved neutral grassland habitats within Compartment D**

*Mosaic habitat: Scattered scrub (A2.2) & Scattered bracken (C1.2)*

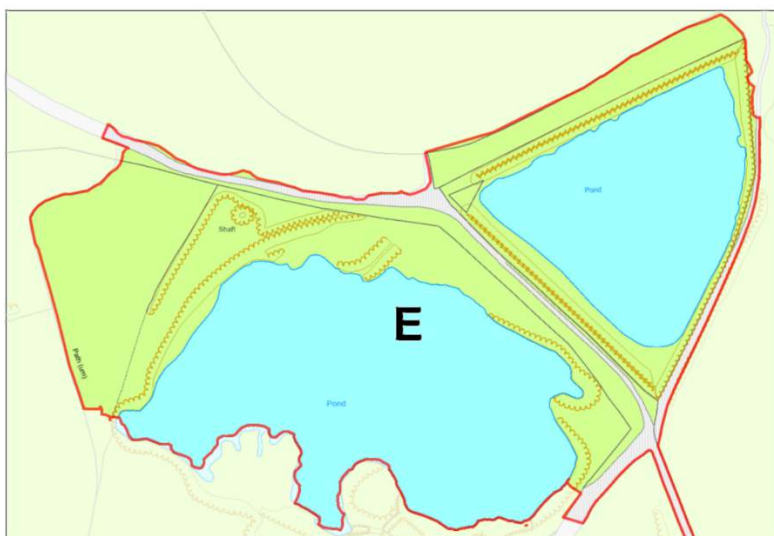
- 5.19 This area comprised mainly bracken, hawthorn, gorse and bramble, with hawthorn dominating the scattered scrub in the south-east part of the area, and gorse dominating the scattered scrub in the northern part. The mosaic was approximately 50:50 scattered scrub:scattered bracken.

*Invasive species*

- 5.20 Invasive species were present in the ephemeral and quarry habitats within this compartment. Invasive species comprised low growing wall cotoneaster and immature/previously treated sea buckthorn individuals.

## 6 RESULTS: COMPARTMENT E

6.1 Compartment level habitat data can be found within Drawing 2363-E1-E. Compartment E comprised mainly two large waterbodies with dense scrub along the margins of both. In the far west of this compartment was an open area comprising grassland, ruderal and scattered scrub habitats. In the north-eastern area, a narrow pasture was present. This compartment is highlighted in Figure 5, below:



**Figure 5: Compartment E, in light green, shown inside the compartment boundary in red**

6.2 Habitats found within Compartment F are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/Hard-standing (J4)
- Bracken (C1.1)
- Dense scrub (A2.1)
- Open Standing Water (G1)
- Scattered Scrub (A2.2)
- Semi-improved calcareous grassland (B3.2)
- Semi-improved neutral grassland (B2.2)
- Species poor defunct hedgerow (J2.2)
- Swamp (F1)
- Tall Ruderal herb (C3.1)
- Unimproved calcareous grassland (B3.1)
- Mosaic habitat: Unimproved neutral grassland (B2.1) & tall ruderal (C3.1)

### *Bare ground/Hard-standing (J4)*

6.3 Areas of bare ground/hard standing were characterised by tracks along the northern and eastern boundaries of this compartment, with one track going between the two waterbodies.

*Bracken (C1.1)*

- 6.4 One small area of bracken was present to the north of the larger waterbody, surrounded to the south, east and west by dense scrub habitat and bounded by a track to the north.

*Dense Scrub (A2.1)*

- 6.5 Dense scrub habitats dominated the dry land habitats of this compartment, with dense scrub surrounding both waterbodies and being of a similar character to each other and that of the dense scrub within Compartment D (See Table 1D). These habitats, whilst scrub, had a similar functionality to that of woodland, with both areas showing a level of nutrient enrichment in the soil due to the abundance of nutrient-loving species. TNE1 indicates an area where hawthorn was dominant in scrub along the northern margins of the southern waterbody. Tables 1E and 2E (below) provide the species assemblages for these dense scrub habitats.

Common Name	Scientific Name	Frequency
Grey willow	<i>Salix cinerea</i>	D
Hawthorn	<i>Crataegus monogyna</i>	A
Bramble	<i>Rubus fruticosus</i>	A
Common nettle	<i>Urtica dioica</i>	A
Gorse	<i>Ulex europaeus</i>	F
Bracken	<i>Pteridium aquilinum</i>	O
Dog rose	<i>Rosa canina</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O
Cleavers	<i>Galium aparine</i>	O
Broad-leaved dock	<i>Rumex obtusifolius</i>	O
Herb-robert	<i>Geranium robertianum</i>	O
Meadow buttercup	<i>Ranunculus acris</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Great willowherb	<i>Epilobium hirsutum</i>	O
Water figwort	<i>Scrophularia auriculata</i>	R
Clustered dock	<i>Rumex conglomeratus</i>	R

**Table 1E: Species assemblage within dense scrub habitats surrounding the southern waterbody within Compartment E**

Common Name	Scientific Name	Frequency
Grey willow	<i>Salix cinerea</i>	D
Hawthorn	<i>Crataegus monogyna</i>	A
Bramble	<i>Rubus fruticosus</i>	A
Common nettle	<i>Urtica dioica</i>	A
False brome	<i>Brachypodium sylvaticum</i>	A
Goat willow	<i>Salix caprea</i>	O
Elder	<i>Sambucus nigra</i>	O
Gorse	<i>Ulex europaeus</i>	O
Harts-tongue fern	<i>Phyllitis scolopendrium</i>	O
Horsetail	<i>Equisetum spp.</i>	O

Creeping buttercup	<i>Ranunculus repens</i>	O
--------------------	--------------------------	---

**Table 2E: Species assemblage within dense scrub habitats surrounding the north-eastern waterbody within Compartment E**

*Open Standing Water (G1)*

- 6.6 This habitat comprised two bodies of water within this compartment, with the larger waterbody to the south and the smaller to the north-east of this area. The southern and larger waterbody was approximately 2.6ha in size and was man-made in origin as part of the old quarry works. The water body could only be accessed from the open area on the south-east margin, which was used by the public to swim in during the survey. Items, including numerous old tyres were noted to be present under water near the south-eastern shore, dating from when it was used as a tip. This habitat is also discussed within Compartment D.
- 6.7 The waterbody in the north-east of the compartment was roughly triangular in shape, approximately 1.5ha in size and was likely to be man-made, although its origin is unknown. The waterbody was inaccessible due to the presence of dense scrub along two of its margins, and fencing along the eastern margin. It can only be viewed from the eastern margin, where the habitat was more open. There were substantial areas of swamp habitat present, mainly along the northern and eastern margins.

*Scattered Scrub (A2.2)*

- 6.8 Patches of scattered scrub were present within tall ruderal habitats in this compartment. Scattered scrub in the area to the west of the southern-most waterbody had frequent bramble and gorse, with occasional hawthorn and dog rose. Patches of scattered scrub within the tall ruderal habitats surrounding the north-eastern waterbody were slightly different in assemblage, with the patch to the north of the waterbody being dominated by bramble and the patch to the east being dominated by bramble and elder with hawthorn occurring rarely and gorse absent in these areas.

*Semi-improved calcareous grassland (B3.2)*

- 6.9 Semi-improved calcareous grassland was present to the north of this compartment, above the north-eastern waterbody, as a strip of pasture that was grazed by sheep. A very small area of this habitat was also present next to the track and the eastern boundary of the compartment where species diversity was slightly greater than in the paster to the north. Table 3E below provides the species assemblage for this habitat type within this compartment.

Common Name	Scientific Name	Frequency
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
White clover	<i>Trifolium repens</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Small-flowered crane's-bill	<i>Geranium pusillum</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Daisy	<i>Bellis perennis</i>	O
Smooth hawk's-beard	<i>Crepis capillaris</i>	O
Ragwort	<i>Jacobaea vulgaris</i>	O

Soft rush	<i>Juncus effusus</i>	O
Horsetail	<i>Equisetum spp.</i>	O
Common mouse-ear	<i>Cerastium fontanum</i>	O
Creeping thistle	<i>Cirsium repens</i>	O
Spear thistle	<i>Cirsium arvense</i>	O
Nettles	<i>Urtica dioica</i>	O
Heath-grass	<i>Danthonia decumbens</i>	R
Foxglove	<i>Purpurea digitalis</i>	R

**Table 3E: Species assemblage within semi-improved calcareous grassland habitat within Compartment E**

*Semi-improved neutral grassland (B2.2)*

- 6.10 A small patch of semi-improved neutral grassland was present in the east of this compartment, bordering a track and swamp habitat. Table 4E, below, provides the species assemblage for this habitat.

Common Name	Scientific Name	Frequency
Cock's-foot	<i>Dactylis glomerata</i>	F
White clover	<i>Trifolium repens</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
Meadowsweet	<i>Filipendula ulmaria</i>	O
Creeping thistle	<i>Cirsium repens</i>	O
Common sorrel	<i>Rumex acetosa</i>	O
Common mouse-ear	<i>Cerastium fontanum</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Germander speedwell	<i>Veronica chamaedrys</i>	R
Bramble	<i>Rubus fruticosus</i>	R

**Table 4E: Species assemblage within semi-improved neutral grassland habitat within Compartment E**

*Species poor defunct hedgerow (J2.2.2)*

- 6.11 This habitat was present in the north of this compartment, bounding semi-improved calcareous grassland. This habitat comprised hawthorn and gorse. A fence ran along the length of this feature.

*Swamp (F1)*

- 6.12 Swamp habitats were present along the edges of the smaller waterbody to the north-east of this compartment. Swamp habitats were dominated by common reed *Phragmites australis*, with abundances of rushes *Juncus* spp. and bulrush *Typha latifolia*. It was not possible to directly access the swamp areas to identify the reeds to species level. Additionally, one stand of swamp habitat could only be viewed at distance (see Drawing 2363-E1-E).

*Tall Ruderal (C3.1)*

- 6.13 Tall ruderal habitat was present in three areas in this compartment in conjunction with scattered scrub in the west, north and east. These areas were indicative of local enrichment of the soil as well as successional changes. Table 5E below provides species assemblage data for this habitat within the far west of this compartment:

Common Name	Scientific Name	Frequency
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	A
Nettles	<i>Urtica dioica</i>	F
Bracken	<i>Pteridium aquilinum</i>	F
Bramble	<i>Rubus fruticosus</i>	O
Dog rose	<i>Rosa canina</i>	O

**Table 5E: Species assemblage within tall ruderal habitat to the west of Compartment E**

- 6.14 Tall ruderal habitat present in the north-east had a greater species diversity than the tall ruderal habitat in the far west. Table 5F, below provides species assemblage data for this habitat within the north-east of this compartment.

Common Name	Scientific Name	Frequency
Nettles	<i>Urtica dioica</i>	F
Tufted vetch	<i>Vicia cracca</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Cleavers	<i>Galium aparine</i>	F
Bramble	<i>Rubus fruticosus</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	O
Herb-robert	<i>Geranium robertianum</i>	O
Red fescue	<i>Festuca rubra</i>	O
Great willowherb	<i>Epilobium hirsutum</i>	O
Horsetail	<i>Equisetum spp.</i>	O
Dock	<i>Rumex spp.</i>	O
Water figwort	<i>Scrophularia auriculata</i>	R

**Table 6E: Species assemblage within tall ruderal habitat to the north-east of Compartment E**

*Unimproved Calcareous Grassland (B3.1)*

- 6.15 A large area of unimproved calcareous grassland was present in the western part of the compartment, bounded by dense scrub to the east and unimproved neutral grassland/tall ruderal mosaic habitat to the north-east. Tall ruderal habitat and scattered scrub was present in the middle of the unimproved calcareous grassland, indicating localised eutrophication and successional changes. TNE2 relates to an area where additional species such as male fern *Dryopteris felix-mas*, rosebay willowherb, tufted vetch *Vicia cracca*, gorse, horsetail *Equisetum sp.* and bracken were present. A second smaller patch of unimproved calcareous grassland was present in the eastern part of the compartment, adjacent to the track. This was similar in character to the larger area, with the exception of a lack of bloody crane's-bill. Table 7E, below, provides the species assemblage for this habitat.

Common Name	Scientific Name	Frequency
False brome	<i>Brachypodium sylvaticum</i>	A
False oat-grass	<i>Arrhenatherum elatius</i>	A
Bloody crane's-bill	<i>Geranium sanguineum</i>	A
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
Heath-grass	<i>Danthonia decumbens</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Rough hawkbit	<i>Leontodon hispidus</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Glaucous sedge	<i>Carex flacca</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
White clover	<i>Trifolium repens</i>	O
Germander speedwell	<i>Veronica chamaedrys</i>	O
Goat's-beard	<i>Tragopogon pratensis</i>	O
Meadow buttercup	<i>Ranunculus acris</i>	O
Quaking-grass	<i>Briza media</i>	O
Red clover	<i>Trifolium pratense</i>	O
Hedge bedstraw	<i>Galium mollugo</i>	O

**Table 7E: Species assemblage within unimproved calcareous grassland habitat within Compartment E**

*Mosaic habitat: Unimproved neutral grassland (B2.1) & tall ruderal (C3.1)*

- 6.16 Mosaic unimproved neutral grassland and tall ruderal habitat was present in the western part of this compartment. Unimproved neutral grassland species in this habitat are presented in Table 8E, below. Tall ruderal species comprised abundant rosebay willowherb *Chamaenerion angustifolium* and bracken, frequent common nettle, with occasional bramble and dog rose. The mosaic comprised approximately 30% unimproved neutral grassland to 70% tall ruderal.

Common Name	Scientific Name	Frequency
Cock's-foot	<i>Dactylis glomerata</i>	A
False oat-grass	<i>Arrhenatherum elatius</i>	A
Red clover	<i>Trifolium pratense</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Creeping soft-grass	<i>Holcus mollis</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Bittersweet	<i>Solanum dulcamara</i>	O
Red campion	<i>Silene dioica</i>	O

**Table 8E: Species assemblage within unimproved neutral grassland habitat within Compartment E**

## 7 RESULTS: COMPARTMENT F

7.1 Compartment F comprised an area dominated by unimproved calcareous grassland with scrub habitats to the south and comprising mosaics to the south-west of the compartment. Three ponds were present and occasional areas of tall ruderal and scattered scrub were present. A sea wall was present to the far south-western corner of this habitat, although this area was inaccessible. One main path ran north-south in this area, but the grassland had several meander paths throughout this habitat. Compartment level habitat data can be found within Drawing 2363-E1-F; Compartment F is highlighted in Figure 6, below:



**Figure 6: Compartment F, in light green, shown inside the compartment boundary in red**

7.2 Compartment level habitat data can be found within Drawing 2363-E1-F. Habitats found within Compartment F are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/Hard standing (J4)
- Bracken (C1.1)
- Building/structure (J3.6)
- Dense scrub (A2.1)
- Open standing water (G1)
- Scattered scrub (A2.2)
- Tall ruderal herb (C3.1)
- Unimproved calcareous grassland (B3.1)
- Mosaic: Dense scrub (A2.1) & Unimproved calcareous grassland (B3.1)

### *Bare ground (J4)*

7.3 Bare ground in this compartment was represented by areas of unvegetated/sparsely vegetated ground at the edge of the lagoon as well as paths present throughout grassland areas. TNF1 relates to a patch of



exposed bare ground with rubble on the edge of the lagoon. This area was sparsely vegetated and species occasionally present in this disturbed location included patches of red clover, bramble, greater willowherb, bird's foot trefoil, ribwort plantain with rare occurrences of immature hawthorn.

- 7.4 Bare ground habitats along the water's edge comprised a thin strip of gravel, where the land met the water in gradients and in small (~2m) dirt "cliffs".

*Bracken (C1.1)*

- 7.5 This habitat was surrounded by dense scrub and it graded into a stand of bracken with occasional scattered scrub species characterised by gorse and hawthorn present. Sea buckthorn was also present in this area (see *Invasive species*).

*Building/structure (J3.6)*

- 7.6 A sea wall was present to the far south-west of this compartment. Access to this habitat would have required walking atop the remains of the inner sea wall, which faded signage stated was not permissible. Therefore this habitat was not accessed for this survey.

*Dense Scrub (A2.1)*

- 7.7 An area of dense scrub that had the species composition of scrub but the functionality of woodland due to the tree-form nature of the shrubs was present to the south of the compartment. Species composition of this area is presented in Table 1F, below.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	A
Bramble	<i>Rubus fruticosus agg. sp.</i>	F
Goat willow	<i>Salix caprea</i>	F
Grey willow	<i>Salix cinerea</i>	F
Grey x goat willow	<i>Salix cinerea x caprea</i>	F
Male fern	<i>Dryopteris felix-mas</i>	O
Wood sage	<i>Teucrium scorodonia</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Hart's tongue fern	<i>Asplenium scolopendrium</i>	R

**Table 1F: Species assemblage within dense scrub habitat to the south of compartment F**

- 7.8 Dense scrub habitat was also present to the far north-eastern corner of this habitat. This area was dense with a tall ruderal ecotone to the outer edge. Table 2F, below, presents the species composition within this area.

Common Name	Scientific Name	Frequency
Gorse	<i>Ulex europaeus</i>	F
Hawthorn	<i>Crataegus monogyna</i>	F
Rosebay willowherb	<i>Chamerion angustifolium</i>	F
Bramble	<i>Rubus fruticosus agg. sp.</i>	O
Elder	<i>Sambucus nigra</i>	R

**Table 2F: Species assemblage within dense scrub habitat to the far north-eastern corner of compartment F**

- 7.9 An area of impassable dense scrub was present to the south of the compartment, bounding the sea wall and preventing direct access to much of this structure. Species observed in this area from a distance included hawthorn, grey/goat willow, bramble and rarely, immature sea buckthorn (see *Invasive species*).
- 7.10 TNF3 relates to a localised disturbed mosaic surrounded by dense scrub habitat. Scrub species in this area comprised dense bramble with hawthorn and dog rose. Bracken and rosebay willowherb represented a tall ruderal component, with grass species characterised by species such as cock's foot grass, Yorkshire fog, sweet vernal grass, false oat grass and perfoliate St. John's wort. The mosaic was approximately 35% scrub, 35% tall ruderal and 30% grass species in this area.

*Open Standing Water (G1)*

- 7.11 Ponds F1 and F2 were both vegetated with rushes to the north, east and west. F1 was smaller and tall ruderal species (see *Tall ruderal*) encroached to the north and west. F2 was larger and rushes were far more prevalent. A level of disturbance was present to the south of both ponds and dogs were seen during visits to occasionally enter the water of pond F1. Common spike rush *Eleocharis palustris* was abundant within both ponds as emergent vegetation with club rush *Bolboschoenus* sp. frequent within both ponds. Thread leaved water crowfoot *Ranunculus trichophyllus* was present within pond F1, and lesser spearwort *Ranunculus flammula* was present to the edges of both F1 and F2.
- 7.12 Water body 3F was largely dry at the time of survey, but was observed with varying water levels since late April. The bottom was largely bare of vegetation although the outer edges had been colonised by cat ear *Hypochaeris radicata*. Within the remaining water and damper areas, water-milfoil *Myriophyllum* sp. was present.

*Scattered scrub (A2.2)*

- 7.13 Scattered scrub species within the east of the compartment were usually hawthorn or willow. Scattered scrub species within the west of the compartment were usually hawthorn or gorse.

*Tall Ruderal (C3.1)*

- 7.14 Areas with tall ruderal vegetation were present within the eastern half of the unimproved grassland habitat, showing localised eutrophication and disturbance. These areas consisted of pits filled with bricks and general rubble and were vegetated as per Table 3F, below.

Common Name	Scientific Name	Frequency
Rosebay willowherb	<i>Chamerion angustifolium</i>	D
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Hawthorn	<i>Crataegus monogyna</i>	O
Goat willow	<i>Salix caprea</i>	O
Male fern	<i>Dryopteris felix-mas</i>	O
Common ragwort	<i>Jacobaea vulgaris</i>	R
Hart's tongue fern	<i>Asplenium scolopendrium</i>	R
Wild strawberry	<i>Fragaria vesca</i>	R

**Table 3F: Species assemblage within tall ruderal habitats present within compartment F**

- 7.15 A small area of tall ruderal habitat was present to the north of pond 1F and was of a similar character, with the exception of fern species and wild strawberry.

*Unimproved Calcareous Grassland (B3.1)*

7.16 This compartment was dominated by unimproved grassland habitat. Species assemblages were slightly different east and west of the footpath, likely owing to different levels of disturbance. Sea buckthorn was also noted to be occasionally present in this area (see *Invasive Species*). It should be noted that during the NVC survey, dyer's greenweed *Genista tinctoria* was found to be present within the western segment of this habitat. This plant is scarce in Cumbria and records for this plant in this area are over 30 years old. Table 4F, below, provides the species assemblage data for the western half of the unimproved calcareous grassland habitat within compartment F.

Common Name	Scientific Name	Frequency
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
Cat's ear	<i>Hypochaeris radicata</i>	F
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Harebell	<i>Campanula rotundifolia</i>	O
Oxeye daisy	<i>Leucanthemum vulgare</i>	O
Red clover	<i>Trifolium pratense</i>	O
Eyebright	<i>Euphrasia sp.</i>	O
Common centaury	<i>Centaureum erythraea</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Fairy flax	<i>Linum catharticum</i>	O
Perfoliate St. John's Wort	<i>Hypericum perforatum</i>	O
Carlina thistle	<i>Carlina vulgaris</i>	O
Wild thyme	<i>Thymus polytrichus</i>	O
Bramble	<i>Rubus fruticosus agg. sp.</i>	O
Cock's foot grass	<i>Dactylis glomerata</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Restharrow	<i>Ononis repens</i>	O, LF
Lady's bedstraw	<i>Galium verum</i>	O, LF
Rough hawkbit	<i>Leontodon hispidus</i>	O, LF
Yellow oat-grass	<i>Trisetum favesces</i>	O, LF
Quaking grass	<i>Briza media</i>	R
Dog rose	<i>Rosa canina</i>	R
Dyer's greenweed	<i>Genista tinctoria</i>	R

**Table 4F: Species assemblage within unimproved calcareous grassland present to the west of compartment F**

7.17 Unimproved calcareous grassland habitat to the east of the footpath was characterised broadly by the species assemblage within Table 5F, below. A number of plants occurred rarely in this area and were not found to be present in other unimproved grassland habitats across site (e.g. Twayblade *Neottia ovatta*). TNF4 relates to an area of bramble encroaching on this habitat.

Common Name	Scientific Name	Frequency
Yorkshire fog	<i>Holcus lanatus</i>	F

Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
Red fescue	<i>Festuca rubra</i>	F
Rough hawkbit	<i>Leontodon hispidus</i>	F
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	F
Common bent	<i>Agrostis capillaris</i>	O
Fairy flax	<i>Linum catharticum</i>	O
Sheep's fescue	<i>Festuca ovina</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Red clover	<i>Trifolium pratense</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Northern marsh orchid	<i>Dactylorhiza purpurella</i>	O, LF
Restharrow	<i>Ononis repens</i>	O, LF
Agrimony	<i>Agrimonia eupatoria</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Harebell	<i>Campanula rotundiflora</i>	R, LO
Self-heal	<i>Prunella vulgaris</i>	R
Cat's ear	<i>Hypochaeris radicata</i>	R
Tufted vetch	<i>Vicia cracca</i>	R
Twayblade	<i>Neottia ovata</i>	R
Common centaury	<i>Centaureum erythraea</i>	R
Buck's-horn plantain	<i>Plantago coronopus</i>	R

**Table 5F: Species assemblage within unimproved calcareous grassland present to the east of compartment F**

7.18 Where footpaths caused disturbance (especially to the south of the habitat), the sward was generally lower in height and was characterised by the species present in Table 6F, below.

Common Name	Scientific Name	Frequency
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	F
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	F
Crested dog's tail	<i>Cynosurus cristatus</i>	F
Meadowsweet	<i>Filipendula ulmaria</i>	O
Red fescue	<i>Festuca rubra</i>	O
Red clover	<i>Trifolium pratense</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Eyebright	<i>Euphrasia</i> sp.	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O, LF
Wild thyme	<i>Thymus polytrichus</i>	O, LF

**Table 6F: Species assemblage within disturbed areas of the unimproved calcareous grassland present within compartment F**

*Mosaic: Dense scrub (A2.1) and Unimproved calcareous grassland (B3.1)*

7.19 Three areas of dense scrub and unimproved calcareous grassland mosaic were present within this compartment, each having a different composition. The area to the north-west comprised approximately

65% grassland to 35% scrub species. Grassland species were broadly as per those found within the western part of the unimproved calcareous grassland, as discussed above. Scrub species were characterised by frequent and locally dense bramble, with frequent hawthorn, goat willow, grey willow and occasional dog rose.

7.20 Where this habitat was found more centrally and to the west, species diversity was higher than that of the above, with disturbance as paths led to the waterside. This are comprised approximately 65% scrub habitat to 35% grassland habitat, with plants associated with tall ruderal habitats occurring more frequently near to paths. Table 7F below provides the species assemblage for this habitat in this area.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	A
Tufted vetch	<i>Vicia cracca</i>	F
False oat grass	<i>Arrhenatherum elatius</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
Fairy flax	<i>Linum catharticum</i>	F
Bramble	<i>Rubus fruticosus</i> agg. sp.	F
Coltsfoot	<i>Tussilago farfara</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	O
Cock's foot grass	<i>Dactylis glomerata</i>	O
Wild strawberry	<i>Fragaria vesca</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O
Perfoliate St. John's Wort	<i>Hypericum perforatum</i>	O
Red fescue	<i>Festuca rubra</i>	O
Sheep's fescue	<i>Festuca ovina</i>	O
Greater willowherb	<i>Epilobium hirsutum</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Yarrow	<i>Achillea millefolium</i>	O
Restharrow	<i>Ononis repens</i>	O
Downy Oat-grass	<i>Avenula pubescens</i>	O
Grey willow	<i>Salix cinerea</i>	O
Goat willow	<i>Salix caprea</i>	O
Grey x Goat willow	<i>Salix cinerea x caprea</i>	O
Dog rose	<i>Rosa canina</i>	O
Broom	<i>Cytisus scoparius</i>	O
Crispy dock	<i>Rumex crispus</i>	O
Hedge woundwort	<i>Stachys sylvatica</i>	O
Silverweed	<i>Argentina anserina</i>	O, LA
Gorse	<i>Ulex europaeus</i>	O, LD
Yellow oat-grass	<i>Trisetum favesces</i>	O, LF
Rough hawkbit	<i>Leontodon hispidus</i>	O, LF
Hemp-agrimony	<i>Eupatorium cannabinum</i>	R

Male fern	<i>Dryopteris felix-mas</i>	R
Hart's tongue fern	<i>Asplenium scolopendrium</i>	R
Wild thyme	<i>Thymus polytrichus</i>	R
Field horsetail	<i>Equisetum arvense</i>	R
Goat's beard	<i>Tragopogon pratensis</i>	R
Harebell	<i>Campanula rotundifolia</i>	R, LF
Yellow flag iris	<i>Iris pseudacorus</i>	R, LO

**Table 7F: Species assemblage for the western-central dense scrub/unimproved calcareous grassland habitat type within Compartment F**

7.21 The southern-most patch of this mosaic habitat type was successional in nature, comprising 30% bramble scrub, 10% hawthorn scrub, 10% rosebay willowherb, and 50% unimproved calcareous grassland species similar to the assemblage as seen in Table 7F, above.

*Invasive Species*

7.22 Sea buckthorn was occasionally present within the bracken habitat. The individuals present appeared to be of stunted growth and were considered likely to have undergone treatment.

7.23 Sea buckthorn was seen at distance as being rarely present and immature in form within the impassable scrub adjacent to the sea wall. It could not be assessed if this was stunted, immature, or had undergone treatment.

7.24 Immature sea buckthorn individuals were present within the unimproved calcareous grassland habitat. These were usually in areas of higher disturbance, were notably stunted and had likely undergone management as their vitality was low.

## 8 RESULTS: COMPARTMENT G

8.1 Compartment G comprised two large areas divided by a track orientated northwest to southeast. Dense scrub habitats are present throughout, although to the north this habitat was largely inaccessible and to the south it was present as a grassland and unimproved grassland mosaic. Included in Compartment G is a strip of land outside the reserve, directly adjacent to the north-east boundary of the reserve, as there are proposals to re-route the byway along the north-east boundary. The surveyed area extended approximately 30m east beyond the reserve boundary into the adjacent fields. Compartment G is highlighted in Figure 7, below:



**Figure 7: Compartment G, in light green, shown inside the compartment boundary in red**

8.2 Compartment level habitat data can be found within Drawing 2363-E1-G. Habitats found within Compartment G are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/hard standing (J4)
- Bracken (C1.1)
- Defunct species-poor hedge (J2.2.2)
- Dense Scrub (A2.1)
- Dry Acid Heath (D1.1)
- Improved Grassland (B4)
- Scattered scrub (A2.2)
- Semi-improved neutral grassland (B2.2)
- Tall ruderal (C3.1)
- Unimproved calcareous grassland (B3.1)
- Mosaic habitat: Bracken (C1.1), Scrub (A2.1) & Tall ruderal (C3.1)
- Mosaic habitat: Unimproved neutral grassland (B2.1), Tall ruderal (C1.3) & Scrub (A1.2)

*Bare ground/hardstanding (J4)*

- 8.3 Areas of bare ground/hardstanding were associated with paths passing through this habitat. A path led north-south in this area. A northwest to southeast track was also present.

*Bracken (C1.1)*

- 8.4 Stands of bracken to the north of the track were always characterised by a dominance of bracken, although stands to the far north were also characterised by tall ruderal species, indicating disturbance in some areas and likely eutrophication of the soils in others. Table 1G, below, provides the species assemblage for habitats in this area.

Common Name	Scientific Name	Frequency
Bracken	<i>Pteridium aquilinum</i>	D
Common nettles	<i>Urtica dioica</i>	F
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
Gorse	<i>Ulex europaeus</i>	O
Yokshire fog	<i>Holcus lanatus</i>	O
Smooth meadow-grass	<i>Poa pratensis</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Clover	<i>Trifolium spp.</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Dandelion	<i>Taraxacum spp.</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
False brome	<i>Brachypodium sylvaticum</i>	O
Male fern	<i>Dryopteris filix-mas</i>	O
Horsetail	<i>Equisetum spp.</i>	O
Meadowsweet	<i>Filipendula ulmaria</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	R
Yarrow	<i>Achillea millefolium</i>	R

**Table 1G: Species assemblage within stands of bracken to the north of Compartment G**

- 8.5 Bracken was present in the southern area of the compartment as a dense stand over unstable ground. Due to the nature of the ground in this area and the denseness of surrounding scrub, large parts of this habitat were inaccessible. Bracken was the dominant species in this particular area, although a bracken mosaic was adjacent (see *Mosaic habitat: Bracken (C1.1), Scrub (A1.2) & Tall Ruderal (C3.1)*).

*Defunct species-poor hedge (J2.2.2)*

- 8.6 A defunct species-poor hedge was present dividing the two field habitats within the far east of the compartment. This hedgerow was dominated by hawthorn and a stock-proof fence reinforced the division between fields.



*Dense Scrub (A2.1)*

8.7 A large swathe of dense scrub was present to the north of the track. This area had occasional inundations that were primarily viewed at distance. Those present at the time of survey have been target noted for more in depth discussion in the paragraphs below. Table 2G, below, provides the species assemblage for habitats in this area.

Common Name	Scientific Name	Frequency
Grey willow	<i>Salix cinerea</i>	D
Bramble	<i>Rubus fruticosus</i>	A
Goat willow	<i>Salix caprea</i>	F
Bracken	<i>Pteridium aquilinum</i>	F
Gorse	<i>Ulex europaeus</i>	F
Common nettle	<i>Urtica dioica</i>	F
Yokshire fog	<i>Holcus lanatus</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Honeysuckle	<i>Lonicera periclymenum</i>	F
Harts-tongue fern	<i>Phyllitis scolopendrium</i>	F
Dog rose	<i>Rosa canina</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O
Cleavers	<i>Galium aparine</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	O
Elder	<i>Sambucus nigra</i>	O
Crested dog's-tail	<i>Cynosurus cristatus</i>	O
Horsetail	<i>Equisetum spp.</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Male fern	<i>Dryopteris filix-mas</i>	O
Broad buckler-fern	<i>Dryopteris dilatata</i>	O
Red fescue	<i>Festuca rubra</i>	O
Soft rush	<i>Juncus effusus</i>	O
Cuckoo flower	<i>Cardamine pratensis</i>	O
Common sedge	<i>Carex nigra</i>	O
Silverweed	<i>Potentilla anserina</i>	O
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Daisy	<i>Bellis perennis</i>	O
Hawthorn	<i>Crataegus monogyna</i>	O, LA
Herb-robert	<i>Geranium robertianum</i>	R
Tufted vetch	<i>Vicia cracca</i>	R
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	R
Soft shield fern	<i>Polystichum setiferum</i>	R
Hard rush	<i>Juncus inflexus</i>	R
Raspberry	<i>Rubus spp.</i>	R
Germander speedwell	<i>Veronica chamaedrys</i>	R

Sycamore	<i>Acer pseudoplatanus</i>	R
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	R
Osier	<i>Salix viminalis</i>	R
Field forgetmenot	<i>Myosotis arvensis</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Red clover	<i>Trifolium pratense</i>	R
Red campion	<i>Silene dioica</i>	R
Bittersweet	<i>Solanum dulcamara</i>	R
Sweet-grass	<i>Glyceria spp.</i>	R

**Table 2G: Species assemblage within the large area of dense scrub to the north of Compartment G**

- 8.8 An area of impenetrable scrub was present to the north of the track. This area was viewed from a distance and had features similar to that of willow carr, with a water depth of approximately 0.5m. Species noted are provided in Table 3G, below:

Common Name	Scientific Name	Frequency
Bulrush	<i>Typha latifolia</i>	A
Common reed	<i>Phragmites australis</i>	F, LA
Broad-leaved pondweed	<i>Potamogeton natans</i>	O
Marsh pennywort	<i>Hydrocotyle vulgaris</i>	O
Marsh bedstraw	<i>Galium palustre</i>	O
Large bittercress	<i>Cardamine amara</i>	O
Water plantain	<i>Alisma plantago-aquatica</i>	O
Hard rush	<i>Juncus inflexus</i>	O, LF

**Table 3G: Species assemblage within an area of impenetrable scrub to north of the track within Compartment G**

- 8.9 An area of impenetrable scrub was also present south of the track. This area was inaccessible due to the density of the vegetation, but viewed at distance. This vegetation was characterised by a co-dominance of gorse and broom. Hawthorn and bramble were both frequent in this area. This scrub changed in character towards the track, where goat, grey and hybrid goat and grey willow co-dominated. Bramble and nettles were abundant and locally dominant in patches. Tall ruderal ecotones were also present near to the track, characterised by abundances of rosebay willowherb, and occasional goosegrass *Galium aparine* and red campion *Silene dioica*, with common hogweed rarely present.
- 8.10 TNG1 relates to a small, murky and shaded area of standing water that was littered. Very little aquatic vegetation was present.
- 8.11 TNG2 relates to a small damp area where spike rush (*Eleocharis spp.*) was abundant in combination with sweet vernal grass, sedges (*Carex spp.*), and mosses. The assemblage was considered to be potentially indicative of a small basic flush, although in the context of the wider habitat, it may be representative of a localised basic area within a complex willow carr inundation.

- 8.12 TNG3 relates to a larger, mainly inaccessible area of standing water located behind a large pile of concrete blocks and rubble, which was shaded by dense scrub.
- 8.13 TNG4 relates a low area of open scrub on the north-eastern margin of the compartment that was dominated by gorse and bramble with frequently occurring hawthorn and occasionally elder.
- 8.14 TNG5 relates to patches of scrub adjacent to and to the south of the track where gorse was dominant with occasional hawthorn and rarely elder. Tall ruderal ecotones comprised abundant common nettle and occasional common hogweed.
- 8.15 TNG6 relates to a small patch of scrub with the functionality of woodland due to the tree-form nature of the individuals within this habitat. This area was characterised by frequent grey, goat and hybrid grey and goat willow, with a ground flora reflecting a level of eutrophication and consisting of abundant bramble and nettle, with occasional red campion.

#### *Dry Acid Heath (D1.1)*

- 8.16 A localised area of dry acid heath was present in the far south of this compartment, with undulations in the ground indicating that this localised acidification was caused by previous industrial activity. Table 4G, below, provides the species assemblage for this habitat.

Common Name	Scientific Name	Frequency
Broom	<i>Cytisus scoparius</i>	A, LD
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	F
Rosebay willowherb	<i>Chamerion angustifolium</i>	F, LA
Bell heather	<i>Erica cinerea</i>	F, LD
Gorse	<i>Ulex europaeus</i>	F, LD
Sheep's sorrel	<i>Rumex acetosella</i>	O
Hawthorn	<i>Crataegus monogyna</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Northern marsh orchid	<i>Dactylorhiza purpurella</i>	O
Wild strawberry	<i>Fragaria vesca</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O
Heath bedstraw	<i>Galium saxatile</i>	O, LF

**Table 4G: Species assemblage within the dry acid heath habitat present within Compartment G**

- 8.17 TNG7 relates to the transitional grassland area that functioned as a path and entry to the bowl within this area. This area had a very short sward with northern marsh orchids growing frequently through the southern part of the bowl. Bird's-foot trefoil and eyebright (*Euphrasia* sp.) were occasionally present. Grasses present in this area were difficult to identify due to the short height of the sward, but fescue species were observed.

#### *Improved Grassland (B4)*

- 8.18 This habitat lies adjacent to scrub habitat, with the surveyed area extending approximately 30m east beyond the reserve boundary into the field. This habitat comprised mainly pasture with an uncut field margin. The

field was intensively grazed with a short sword. Cattle and numerous sheep were present at the time of survey. A grassy track led from the reserve to the south end of this habitat where a field gate was present. Red bartsia *Odontites vernus* was frequent along the track, alongside a tall ruderal and scrub mix comprising nettles and bramble. In the north-western corner was a stand of tall ruderal comprising common nettle, spear thistle *Cirsium vulgare*, creeping thistle, and dock *Rumex* sp. Indicating local nutrient enrichment in this area. Table 5G, below, provides the species assemblage information for the improved grassland habitat.

Common Name	Scientific Name	Frequency
Yorkshire fog	<i>Holcus lanatus</i>	F
Perennial rye-grass	<i>Lolium perenne</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Rough meadow-grass	<i>Poa trivialis</i>	F
Nettles	<i>Urtica dioica</i>	F
Creeping thistle	<i>Cirsium arvense</i>	F
Bracken	<i>Pteridium aquilinum</i>	O
Dock	<i>Rumex spp.</i>	O
White clover	<i>Trifolium repens</i>	O
Spear thistle	<i>Cirsium vulgare</i>	O

**Table 5G: Species assemblage within the Improved grassland habitat present within Compartment G**

#### Scattered Scrub (A2.2)

- 8.19 Scattered scrub species were found within scrub and bracken habitats to the north of the track. In places where bracken was present, this likely showed a level of succession towards the surrounding dense scrub habitats. Table 6G below provides the species that characterised scattered scrub individuals within Compartment G.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	D
Grey willow	<i>Salix cinerea</i>	D
Bramble	<i>Rubus fruticosus</i>	F
Gorse	<i>Ulex europaeus</i>	F
Elder	<i>Sambucus nigra</i>	R

**Table 6G: Species assemblage of scattered scrub within Compartment G**

#### Semi-improved neutral grassland (B2.2)

- 8.20 Semi-improved neutral grassland was present in the north-east of this compartment, adjacent to the reserve boundary and to the dense scrub habitats inside the reserve. This habitat was extensively grazed with low numbers of sheep present during the survey. The sward was longer than that of the Improved grassland (B4) habitat and patches of soft rush were present throughout. A post and wire fence was present along the western boundary. In the centre of this habitat was a damp area with frequent soft rush, nettle and silverweed present. Table 7G, below, provides the species assemblage that characterised the semi-improved neutral grassland habitat.

Common Name	Scientific Name	Frequency
Yorkshire fog	<i>Holcus lanatus</i>	A
Perennial rye-grass	<i>Lolium perenne</i>	F
Cock's-foot	<i>Dactylis glomerata</i>	F
Crested dog's-tail	<i>Cynosurus cristatus</i>	F
Nettles	<i>Urtica dioica</i>	F
Soft rush	<i>Juncus effusus</i>	F
Common bent	<i>Agrostis capillaris</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O
Silverweed	<i>Potentilla anserina</i>	O

**Table 7G: Species assemblage of semi-improved neutral grassland within Compartment G**

*Tall ruderal (C3.1)*

- 8.21 Tall ruderal habitat was found adjacent to the northern edge of the track, showing local levels of disturbance and eutrophication. Scattered scrub species were also found within this area. Table 8G below provides the species assemblage for this habitat type within compartment G.

Common Name	Scientific Name	Frequency
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	A
Common nettles	<i>Urtica dioica</i>	F
Bracken	<i>Pteridium aquilinum</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
White clover	<i>Trifolium repens</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O
Black currant	<i>Ribes nigrum</i>	R
Meadow foxtail	<i>Alpecurus pratensis</i>	R
Germander speedwell	<i>Veronica chamaedrys</i>	R
Black medick	<i>Medicago lupulina</i>	R

**Table 8G: Species assemblage within the tall ruderal habitat present within Compartment G**

*Unimproved Calcareous Grassland (B3.1)*

- 8.22 A small patch of unimproved calcareous grassland was present to the far north-east of this compartment. This area was found along a path and was surrounded by dense scrub habitats to the north, west and south. Table 9G below provides the species assemblage for this habitat type within Compartment G.

Common Name	Scientific Name	Frequency
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
Sweet vernal-grass	<i>Anthoxanthum odoratum</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	O
Meadow buttercup	<i>Ranunculus acris</i>	O
Yarrow	<i>Achillea millefolium</i>	R
Comfrey	<i>Symphytum officinale</i>	R

Daisy	<i>Bellis perennis</i>	O
Dandelion	<i>Taraxacum spp.</i>	O
Horsetail	<i>Equisetum spp.</i>	O
Meadowsweet	<i>Filipendula ulmaria</i>	O

**Table 9G: Species assemblage within unimproved calcareous grassland habitat present to the north of Compartment G**

- 8.23 A damp grassy area with frequent tussocky grasses and occasional patches of bare ground was also present as part of this habitat.

*Wall (J2.5)*

- 8.24 A stone wall was present to the far north of the semi-improved neutral grassland habitat. This wall had a wide top where a range of species were growing. A large cavity was present in the base of the wall with rubbish present within, with smaller holes throughout. Table 10G, below, provides assemblage data for the species present along the wall.

Common Name	Scientific Name	Frequency
Yorkshire fog	<i>Holcus lanatus</i>	F
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	F
False brome	<i>Brachypodium sylvaticum</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
wild strawberry	<i>Fragaria vesca</i>	O
Maidenhair spleenwort	<i>Asplenium trichomanes</i>	O

**Table 10G: Species assemblage for the species present along the wall within Compartment G**

*Mosaic habitat: Bracken (C1.1), Scrub (A1.2), & Tall ruderal (C3.1)*

- 8.25 Bracken was abundant in this area and occasionally locally dominant, comprising approximately 45% of this mosaic. Scrub species were characterised by frequent and occasionally locally dominant gorse, occasional hawthorn, grey willow, goat willow, broom and bramble. These species comprised approximately 45% of this mosaic. Tall ruderal comprised the remaining 10% of this mosaic. Tall ruderal species were characterised by rosebay willowherb which was abundant to the edges of this habitat, occasional common nettle and red campion.

*Mosaic habitat: Unimproved neutral grassland (B2.1), Tall ruderal (3.1) & Scrub (A1.2)*

- 8.26 This habitat was present to both the west and east of the main footpath. Within the western mosaic, scrub was generally more prevalent towards the edge of the lagoon and paths were present throughout. Grassland habitats were present where disturbance was higher, with tall ruderal ecotones present. Occasionally areas were locally dominated by bramble or by gorse. Within the north of this area, the mosaic was characterised as a 35% grassland, 35% scrub and 30% tall ruderal habitat. This opened up in areas to the south, where the mosaic was a 50% grassland, 25% scrub and 25% tall ruderal habitat. Tables 11G-13G, below, provide the assemblages for the different mosaic habitats in this area.

Common Name	Scientific Name	Frequency
Cock's foot grass	<i>Dactylis glomerata</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
Red fescue	<i>Festuca rubra</i>	F
False oat grass	<i>Arrhenatherum elatius</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	O
Common couch	<i>Elymus repens</i>	O
Rough meadow grass	<i>Poa trivialis</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Red campion	<i>Silene dioica</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O
Meadow vetchling	<i>Lathyrus pratensis</i>	O
Smooth meadow grass	<i>Poa pratensis</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	O, F in south
Germander speedwell	<i>Veronica chamaedrys</i>	O, LF
Yorkshire fog	<i>Holcus lanatus</i>	O, LF
Common vetch	<i>Vicia sativa</i>	R
White dead nettle	<i>Lamium album</i>	R
Male fern	<i>Dryopteris felix-mas</i>	R
Crested dog's tail	<i>Cynosurus cristatus</i>	R
Pendulous sedge	<i>Carex pendula</i>	R
Common knapweed	<i>Centaurea nigra</i>	R
Yellow oat-grass	<i>Trisetum favesces</i>	R
White clover	<i>Trifolium repens</i>	R, LO
Dandelion	<i>Taraxacum officinale agg. sp.</i>	R, LO

**Table 11G: Species assemblage within the grassland component of the complex unimproved neutral grassland, tall ruderal & scrub mosaic within Compartment G**

Common Name	Scientific Name	Frequency
Goat willow	<i>Salix caprea</i>	F
Grey willow	<i>Salix cinerea</i>	F
Gorse	<i>Ulex europaeus</i>	F, LD
Hawthorn	<i>Crataegus monogyna</i>	O
Elder	<i>Sambucus nigra</i>	O
Dog rose	<i>Rosa canina</i>	O
Broom	<i>Cytisus scoparius</i>	O
Bramble	<i>Rubus fruticosus agg. sp.</i>	O, LD

**Table 12G: Species assemblage within the scrub component of the complex unimproved neutral grassland, tall ruderal & scrub mosaic within Compartment G**

Common Name	Scientific Name	Frequency
Rosebay willowherb	<i>Chamerion angustifolium</i>	F, LA
Common nettle	<i>Urtica dioica</i>	F, LD
Goosegrass	<i>Galium aparine</i>	O

Common hogweed	<i>Heracleum sphondylium</i>	O
Field horsetail	<i>Equisetum arvense</i>	O
Creeping thistle	<i>Cirsium arvense</i>	R

**Table 13G: Species assemblage within the tall ruderal component of the complex unimproved neutral grassland, tall ruderal & scrub mosaic within Compartment G**

- 8.27 To the east of the footpath, the mosaic was of slightly different character within the north in comparison to the south. The northern mosaic comprised approximately 50% grassland, 30% scrub and 20% tall ruderal habitats. The southern mosaic in this area was characterised by grassland comprising roughly 40% of the mosaic, with tall ruderal habitat comprising approximately 35% and scrub comprising 25%.
- 8.28 Grass species within the eastern mosaic were similar in character and frequency to those found within the western mosaic, with a few exceptions. Sweet vernal grass was frequent. Red clover was occasionally found near the path, with woodruff *Galium odoratum* and common ragwort both being occasional but locally frequent in patches. Crosswort *Cruiciata laevipes* was rarely present throughout the habitat, but near areas of scrub to the south it was abundant. English bluebells *Hyacinthoides non-scripta* were also rarely present, typically near tall ruderal species or scrub. Tall ruderal species were the same as was found in the western mosaic. Scrub species in this area were characterised by frequent hawthorn and bramble.
- 8.29 South of the fork in the tracks was a small patch of grassland and tall ruderal mosaic. Grassland species were similar to those found within the rest of the mosaic habitat, however an abundance of rosebay and common nettle were present and indicative of localised eutrophication.
- 8.30 TNG8 relates to an area of disturbed bare ground that cars were parked on by visitors to the reserve.
- 8.31 TNG9 relates to an area that a visitor to the reserve had strimmed moments prior to survey. This area had a set of bird feeders and was said by the visitor to have been strimmed to give his disabled wife access to watch the birds at the feeders.



## 9 RESULTS: COMPARTMENT H

9.1 Compartment H includes the norther part of the reserve, comprising mainly dense scrub habitats with varying ground flora, access tracks and a car park area. It should be noted that the more extensive species list for scrub habitats in this area reflects the accessibility of these habitats as surveys were undertaken early in the growing season. This compartment is highlighted in Figure 8, below:



**Figure 8: Compartment H, in light green, shown inside the compartment boundary in red**

9.2 Compartment level habitat data can be found within Drawing 2363-T1-H. Habitats found within Compartment H are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/hard-standing (J4)
- Building/structure (J3.6)
- Dense scrub (A2.1)
- Swamp (F1)
- Mosaic (B2.1 Unimproved Neutral Grassland & A2.1 Dense Scrub)

### *Bare ground/ Hard-standing (J4)*

9.3 Areas of bare ground/hard-standing relate to the main track heading south through the compartment and a paved road along the northern boundary that leads to the nearby recycling centre. A small parking area is also present in the north-west of this compartment.

### *Building/structure (J3.6)*

9.4 A ruined, one-storey, two-roomed building of stone construction was present within the compartment. Scrub species such as hawthorn grew up against the southern aspect. Given the low wall height and the proximity of the vegetation, it was considered to be of negligible potential for roosting bats.

- 9.5 The interior of the building was vegetated with hawthorn growing along the walls and bramble was frequent. Other vegetation was characterised by the following species: Wild strawberry, hard fern, Yorkshire fog, red fescue, rosebay willowherb, meadow vetchling and wall cotoneaster (see *Invasive Species*).

*Dense scrub (A2.1)*

- 9.6 Dense scrub habitats were the dominant habitat within this compartment. Dense scrub habitats in the west and centre of the site were dominated by hawthorn, grey and goat willow, although these species were tree-form in nature and therefore the habitat was closer to a woodland in these areas. Table 1H, below, provides the species assemblage data for the large scrub habitats to the west and centre of this compartment.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	D
Grey willow	<i>Salix cinerea</i>	D
Bramble	<i>Rubus fruticosus</i>	A
Dog rose	<i>Rosa canina</i>	F
Common nettle	<i>Urtica dioica</i>	F
Cleavers	<i>Galium aparine</i>	F
Herb-robert	<i>Geranium robertianum</i>	F
Goat willow	<i>Salix caprea</i>	F
Honeysuckle	<i>Lonicera periclymenum</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
Harts-tongue fern	<i>Phyllitis scolopendrium</i>	F
Ground ivy	<i>Glechoma hederacea</i>	F
Dog's mercury	<i>Mercurialis perennis</i>	F
Bracken	<i>Pteridium aquilinum</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	O
Cow parsley	<i>Anthriscus sylvestris</i>	O
Elder	<i>Sambucus nigra</i>	O
Dandelion	<i>Taraxacum spp.</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	O
Tufted hairgrass	<i>Deschampsia cespitosa</i>	O
Broad buckler-fern	<i>Dryopteris dilatata</i>	O
Male fern	<i>Dryopteris filix-mas</i>	O
Hybrid bluebell	<i>Hyacinthoides hispanica x non-scripta</i>	O
Primrose	<i>Primula vulgaris</i>	O
Lords-and-ladies	<i>Arum maculatum</i>	O
Ivy	<i>Hedera helix</i>	O
Daffodils	<i>Narcissus pseudonarcissus</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	O
Great willowherb	<i>Epilobium hirsutum</i>	O
Soft rush	<i>Juncus effusus</i>	O (near shore)

Water horsetail	<i>Equisetum fluviatile</i>	O (near shore)
Holly	<i>Ilex aquifolium</i>	R
Columbine	<i>Aquilegia vulgaris</i>	R
Sycamore	<i>Acer pseudoplatanus</i>	R
Ribwort plantain	<i>Plantago lanceolata</i>	R
Wild strawberry	<i>Fragaria vesca</i>	R
Ash	<i>Fraxinus excelsior</i>	R
Oak moss	<i>Evernia prunastri</i>	R
Shuttlecock fern	<i>Matteuccia Struthiopteris</i>	R
Red currant	<i>Ribes rubrum</i>	R
Gorse	<i>Ulex europaeus</i>	R
Buddleia	<i>Buddleja davidii</i>	R
Pendulous sedge	<i>Carex pendula</i>	R
Forget-me-not	<i>Myosotis spp.</i>	R

**Table 1H: Dense scrub habitats within the west and centre of Compartment H**

9.7 Scrub habitat to the far east of the compartment had colonised an area with a large hill, with fly-tipping present adjacent to the road within the north-eastern area. Table 2H below provides the species assemblage data for this area.

Common Name	Scientific Name	Frequency
Goat willow	<i>Salix caprea</i>	F
Grey willow	<i>Salix cinerea</i>	F
Hart's tongue fern	<i>Asplenium scolopendrium</i>	F
Hawthorn	<i>Crataegus monogyna</i>	F, LD
Male fern	<i>Dryopteris felix-mas</i>	O
Lords-and-ladies	<i>Arum maculatum</i>	O
Water figwort	<i>Scrophularia umbrosa</i>	O
Dog rose	<i>Rosa canina</i>	O
Field horsetail	<i>Equisetum arvense</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
False brome	<i>Brachypodium sylvaticum</i>	O
Bramble	<i>Rubus fruticosus agg. sp.</i>	O, LA
English bluebell	<i>Hyacinthoides non-scripta</i>	R
Butterbur	<i>Petasites hybridus</i>	R
Lesser celandine	<i>Ficaria verna</i>	R
Herb Robert	<i>Geranium robertianum</i>	R

**Table 2H: Dense scrub habitats within the far east of Compartment H**

9.8 TNH1 relates to an area of planted scrub within the centre of compartment H, with a slightly different species assemblage to that within the rest of the compartment. Table 3H provides the species assemblage for this area.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	D
Blackthorn	<i>Prunus spinosa</i>	D

Meadow vetchling	<i>Lathyrus pratensis</i>	O
Germander speedwell	<i>Veronica chamaedrys</i>	O
Glaucous sedge	<i>Carex flacca</i>	O
Yarrow	<i>Achillea millifolium</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O, LD
Common ragwort	<i>Jacobaea vulgaris</i>	O, LD
Common hogweed	<i>Heracleum sphondylium</i>	R
Dog rose	<i>Rosa canina</i>	R

**Table 3H: Dense scrub habitats associated with TNH1**

- 9.9 TNH3 relates to a localised area of willow carr of a slightly different character than the rest of the scrub habitat in this area. Table 4H, below, provides the species assemblage data for this target note.

Common Name	Scientific Name	Frequency
Meadowsweet	<i>Filipendula ulmaria</i>	F
Yorkshire fog	<i>Holcus lanatus</i>	F
Creeping buttercup	<i>Ranunculus repens</i>	F
Sedge sp.	<i>Carex</i> sp.	F
Soft rush	<i>Juncus effusus</i>	F
Jointed rush	<i>Juncus articulatus</i>	O
Yellow flag iris	<i>Iris pseudacorus</i>	O
Field horsetail	<i>Equisetum arvense</i>	O

**Table 4H: Dense scrub habitats associated with TNH3**

- 9.10 TNH4 relates to a localised clearing within scrub habitats along a path, with a mine shaft capped by a metal grid. Dense wall cotoneaster was noted just prior to this area (see *Invasive species*). The following species provided in Table 5H, below, were present in this area.

Common Name	Scientific Name	Frequency
Daisy	<i>Bellis perennis</i>	F
White clover	<i>Trifolium repens</i>	F
Honeysuckle	<i>Lonicera periclyclamen</i>	F, LD
White stonecrop	<i>Sedum album</i>	O
Wild strawberry	<i>Fragaria vesca</i>	O
Field woodrush	<i>Luzula campestris</i>	O
Dandelion	<i>Taraxacum officinale</i> agg. sp.	O
False brome	<i>Brachypodium sylvaticum</i>	O
Restharrow	<i>Ononis repens</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Yarrow	<i>Achillea millifolium</i>	O
Germander speedwell	<i>Veronica chamaedrys</i>	O

**Table 5H: Dense scrub habitats associated with TNH4**

*Swamp (F1)*

- 9.11 This habitat was present along the edge of the lagoon within the far western part of this compartment and appeared to be entirely dominated by common reed *Phragmites australis*.

*Mosaic: Dense scrub (A2.1) & Unimproved neutral grassland (B2.1)*

- 9.12 This habitat was showing successional changes towards scrub due to the frequency and density of stands of bramble within the grassland, in combination with scattered hawthorn, which formed a complex mosaic. TNH2 relates to a damper area of the grassland with a similar species assemblage although glaucous sedge and soft rush *Juncus effusus* was abundant in this area. One wall cotoneaster was present to the north in this area (see *Invasive species*). Table 6H, below, provides the species assemblage data for this habitat.

Common Name	Scientific Name	Frequency
Red fescue	<i>Festuca rubra</i>	A
Bramble	<i>Rubus fruticosus</i> agg. sp.	F, LA
Hawthorn	<i>Crataegus monogyna</i>	O
Ribwort plantain	<i>Plantago lanceolata</i>	O
Dandelion	<i>Taraxacum officinale</i> agg. sp.	O
Glaucous sedge	<i>Carex flacca</i>	O
Meadow buttercup	<i>Ranunculus acris</i>	O
Agrimony	<i>Agrimonia eupatoria</i>	O
Tufted vetch	<i>Vicia cracca</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
Creeping thistle	<i>Cirsium arvense</i>	O
Germander speedwell	<i>Veronica chamaedrys</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Sweet vernal grass	<i>Anothoxanthum odoratum</i>	O
Silverweed	<i>Argentina anserina</i>	O, LA

**Table 6H: Species assemblage for the mosaic habitat within Compartment H**

*Invasive species*

- 9.13 Small stands of variegated yellow archangel *Lamiastrum galeobdolon* subsp. *argentatum* were present to the east of the track near the car parking areas in this compartment.
- 9.14 Wall cotoneaster was noted near TNH4, where a dense and mature stand was present. The stand was very well established, and smaller individuals were present in the vicinity.

## 10 RESULTS: COMPARTMENT I

- 10.1 Compartment I comprised an area associated with, and adjacent to, a disused quarry. This area was dominated by an extensive central area of slag heaps, comprising exposed, broken up limestone rock with sparse low-lying plants forming open vegetation communities. In some areas the habitats were a very fine-scale mosaic of grassland, open ground, and scrub. Pockets of other habitats such as calcareous grassland, scrub, and swamp were scattered throughout the compartment quarry. This area is highlighted in Figure 9, below:



**Figure 9: Compartment I, in light green, shown inside the compartment boundary in red**

- 10.2 Compartment-level habitat data can be found within Drawing 2363-E1-I. Habitats found within Compartment A are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/Hard-standing (J4)
- Buildings/structures (J3.6)
- Dense scrub (A2.1)
- Ephemeral (J1.3)
- Basic Natural Inland cliff (I1.1.2)
- Natural rock exposure (other: basic) (I1.4.2)
- Open standing water (G1)
- Quarry (I2.1)
- Scattered scrub (A2.2)
- Semi-improved neutral grassland (B2.2)
- Swamp (F1)
- Unimproved calcareous grassland (B3.1)
- Wet ditch (G1)

- Mosaic: Dense Scrub (A2.1), Unimproved calcareous grassland (B3.1) & Tall ruderal (C3.1)

10.3 Japanese knotweed was also present in this area and due to the ecological impacts of this species, it has been mapped separately and with its own coding in order to highlight it within the site.

*Bare ground/Hard-standing (J4)*

10.4 Areas of bare ground/hard-standing in this compartment relate specifically to roads/tracks at the entrance and along the edge of the habitat.

*Buildings/Structures (J3.6)*

10.5 One building/structure was present to the north of the main quarry area of the site within a patch of semi-improved neutral grassland. This building appeared to be a stable in use by a horse and therefore close inspection was not possible. The building was of wooden plank construction with a corrugated metal roof and two large stable doors.

*Dense scrub (A2.1)*

10.6 Scrub species within this compartment were generally characterised by grey, goat and hybrid grey/goat willow, with occasional hawthorn present and a ground flora comprising bramble. Gorse and broom were also occasionally present where the habitat bounded quarry or grassland habitats.

10.7 Scrub in the south-eastern corner of this compartment was of a similar character to grey/goat willow and hawthorn habitats present within other areas of the site with dense bramble ground flora in the understorey. Additional species in this area comprised common figwort, common nettle, common hogweed, greater willowherb, spear thistle, male fern, large bindweed, goose grass, rough meadow grass and greater plantain. These species were occasional within the understorey, but increased in number as the edge of the habitat graded towards a tall ruderal ecotone. TNI1 relates to an open area used as a firepit that also supports gorse as a scrub species.

10.8 TNI2 refers to a pocket of scrub with damp ground conditions. The scrub species were predominantly characterised by mature grey and goat willow that gave this area the functionality of a wet woodland although it largely comprised scrub species. Table 11 below details the species assemblage in this area:

Common name	Scientific name	Frequency
Field horsetail	<i>Equisetum arvense</i>	D
Goat willow	<i>Salix caprea</i>	D
Broad buckler fern	<i>Dryopteris dilatata</i>	O
Hart's tongue fern	<i>Asplenium scolopendrium</i>	O
Rosebay willowherb	<i>Chamerion angustifolium</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Large bindweed	<i>Calystegia sylvaticum</i>	O
Dog rose	<i>Rosa canina</i>	R
Hawthorn	<i>Crataegus monogyna</i>	R
Woody nightshade	<i>Solanum dulcamara</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Common figwort	<i>Scrophularia nodosa</i>	R

Greater willowherb	<i>Epilobium hirsutum</i>	R
Redshank	<i>Persicaria maculosa</i>	R, LF

**Table 1I: Species assemblage for dense scrub habitat associated with TNI2**

- 10.9 TNI3 refers to an area of scrub with very damp ground conditions, similar to TNI2 above, but with more diverse ground flora. Two bird boxes were noted to be present in this area. Jelly ear fungus (*Auricularia auricula-judae*) was found be growing from one of these bird boxes. Table 2I below details the species assemblage in this area:

Common name	Scientific name	Frequency
Field horsetail	<i>Equisetum arvense</i>	D
Goat willow	<i>Salix caprea</i>	A
Grey willow	<i>Salix cinerea</i>	A
Broad buckler fern	<i>Dryopteris dilatata</i>	O
Enchanter's nightshade	<i>circaea lutetiana</i>	O
Red campion	<i>Silene dioica</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	O
Common figwort	<i>Scrophularia nodosa</i>	O
Marsh bedstraw	<i>Galium palustre</i>	O
Hard rush	<i>Juncus inflexus</i>	O
Bramble	<i>Rubus fruticosus agg. sp.</i>	O, LD to edge
Hard fern	<i>Blechnum spicant</i>	R
Herb Robert	<i>Geranium robertianum</i>	R
Marsh marigold	<i>Caltha palustris</i>	R
Wild raspberry	<i>Rubus idaeus</i>	R
Honeysuckle	<i>Lonicera periclymenum</i>	R

**Table 2I: Species assemblage for dense scrub habitat associated with TNI3**

- 10.10 TNI4 refers to areas of scrub of a similar character, generally found adjacent to a path or a road with a tall ruderal ecotone. Table 3I, below, provides the species assemblage for scrub of this character within this compartment.

Common Name	Scientific Name	Frequency
Grey willow	<i>Salix cinerea</i>	F
Hawthorn	<i>Crataegus monogyna</i>	F
Goat willow	<i>Salix caprea</i>	F
Bramble	<i>Rubus fruticosus agg. sp.</i>	F
Cock's foot grass	<i>Dactylis glomerata</i>	O
Broad-leaved dock	<i>Rumex obtusifolius</i>	O
Rosebay willowherb	<i>Chamerion angustifolium</i>	O
Common vetch	<i>Vicia sativa</i>	O
Common hogweed	<i>Heracleum sphondylium</i>	O
Mugwort	<i>Artemisia vulgaris</i>	O

**Table 3I: Species assemblage for dense scrub habitat associated with TNI4**



- 10.11 A narrow, steeply-sloping bank of mature scrub-woodland was present along the north-eastern site boundary, which separated the open habitats from the cliff edge of the off-site quarry lagoon. Frequent species comprised grey willow and hawthorn as canopy species with occasional elder and sycamore. Dog-rose and honeysuckle were noted as being present as understory species; however, it was not possible to compile a more complete list of ground flora and understory species owing to safety constraints.

*Ephemeral/short perennial (J1.3)*

- 10.12 In the south-east corner of the compartment, a plateau of stony ground was present that had been colonised by a mosaic of lichen, mosses, and stonewort dominated species communities. The vegetation was generally more developed than the remainder of the open areas in terms of cover and species, with moss and sedge species present, and grass species found in higher numbers and diversity. The presence of mosses and sedges indicates that drainage across this area may not be as extreme as the remainder of the open quarry habitats. Notable species in relation to conservation status included wild strawberry and eyebright. Wall cotoneaster and garden lady's mantle *Alchemilla mollis* are both invasive non-native species that were found to be present in this area, with wall cotoneaster featuring on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). A species list for this area is provided in Table 4I, below. A combination of species from Tables 4I and 5I (See: *Quarry*) were found to be scattered across a steeply sloping limestone bank to the east of the plateau; safety constraints prevented detailed inspection of this area due to the steep angle of the slope and the nature of the ground.

Common Name	Scientific Name	Frequency
Moss	<i>Moss sp.</i>	F
Reindeer moss	<i>Cladonia rangiferina</i>	F (LD)
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F
White stonecrop	<i>Sedum album</i>	O (LD)
Biting stonecrop	<i>Sedum acre</i>	O (LD)
Common restharrow	<i>Ononis repens</i>	O
Wild thyme	<i>Thymus polytrichus</i>	O
Wall cotoneaster	<i>Cotoneaster horizontalis</i>	O
Eyebright	<i>Euphrasia nemorosa</i>	R
Wild strawberry	<i>Fragaria vesca</i>	R
False brome	<i>Brachypodium sylvaticum</i>	R
Fairy flax	<i>Linum catharticum</i>	R
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	R
Common milkwort	<i>Polygala vulgaris</i>	R
Yorkshire fog	<i>Holcus lanatus</i>	R
Crested dogstail	<i>Cynosurus cristatus</i>	R
Hop trefoil	<i>Trifolium campestre</i>	R
Garden lady's mantle	<i>Alchemilla mollis</i>	R
Black knapweed	<i>Centaurea nigra</i>	R
Common centaury	<i>Centaureum erythraea</i>	R
Weld	<i>Reseda luteola</i>	R
Creeping bent	<i>Agrostis stolonifera</i>	R
Great mullein	<i>Verbascum thapsus</i>	R

Perforate St. John's Wort	<i>Hypericum perforatum</i>	R
Ploughman's spikenard	<i>Inula conyzae</i>	R
Daisy	<i>Bellis perennis</i>	R
Glaucous sedge	<i>Carex flacca</i>	R
Lady's bedstraw	<i>Galium verum</i>	R

**Table 4I: Species assemblage for dense scrub habitat associated with ephemeral/short perennial habitats within compartment I**

- 10.13 A smaller area of ephemeral habitat was present to the north of dense scrub, swamp and rock exposure habitats. This area was characterised by a steep slope with bare ground and a dominance of red valerian *Centranthus ruber* with species as per Table 4I, above.

*Inland Cliff (I1.2)*

- 10.14 Inland cliffs were present in the south of the compartment and were viewed from below. These areas were densely infested with wall cotoneaster (see *Invasive species*). The eastern cliff was undercut in areas and considered to be potentially unsafe.

*Natural Rock Exposure (other: Basic) (I1.4.2)*

- 10.15 Natural rock exposures in the south of this compartment were characterised as areas of bare ground that were observed to be dry on one day during the surveys, but after heavy rain, were observed to hold water. These areas were flat and appeared to comprise an exposed clay-like lining. Vegetation was not present in these areas and a high degree of mineralisation was present on snail shells in the area.
- 10.16 Natural rock exposures to the north of this compartment were subject to occasional rock-balancing art and were very sparsely vegetated. Vegetation generally comprised species such as low-growing rosebay willowherb in very poor health, but incidences of this kind of growth were very infrequent.

*Open Standing Water (G1)*

- 10.17 An area of open standing water was present in the south of the compartment. This area was characterised by a mix of natural rock exposure as per paragraph 10.15, with vegetation present along the edges, as per the Swamp habitat described within *Swamp (F1)*.

*Quarry(I2.1)*

- 10.18 Spoil/slag heaps from the adjacent quarry comprised the dominant habitat within this compartment. This habitat was dominated by an extensive central area of exposed, broken up limestone rock with sparse low-lying plants forming open vegetation communities. The species that were present were typical of open ground, with several calcicoles indicating the basic pH of the limestone. Occasionally species atypical of this habitat were present (e.g. common figwort *Scrophularia nodosa* and goat willow), though these plants were typically discoloured and/or stunted and in poor vigour likely due to exposure, drought and nutrient deprivation. Notable species in relation to their conservation status include common cudweed *Filago vulgaris*, wild strawberry, small-flowered cranesbill *Geranium pusillum*, and early forget-me-not *Myosotis ramosissima*. Wall cotoneaster *Cotoneaster horizontalis* was found scattered throughout the quarry, growing both in small establishing sprigs as well as more mature shrubs, with a prostrate growth habit. One small-leaved cotoneaster *Cotoneaster microphyllus* was also identified in this area. Both of these cotoneaster species are invasive non-native species featured on Schedule 9 of the Wildlife and Countryside

Act 1981 (as amended), both being particularly damaging to exposed limestone habitats. A full species list is provided in Table 41, below.

Common name	Scientific Name	Frequency
Common cudweed	<i>Filago vulgaris</i>	O
Wild strawberry	<i>Fragaria vesca</i>	O
Fairy flax	<i>Linum catharticum</i>	O
Wood sage	<i>Teucrium scorodinia</i>	O
Carlina thistle	<i>Carlina vulgaris</i>	O
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	O
Perforate st. john's wort	<i>Hypericum perforatum</i>	O
Wild thyme	<i>Thymus polytrichus</i>	O
Ploughman's spikenard	<i>Inula conyzae</i>	O
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O
Rosebay willowherb	<i>Chamerion angustifolium</i>	O
Wall cotoneaster	<i>Cotoneaster horizontalis</i>	O
False brome	<i>Brachypodium sylvaticum</i>	O
Red fescue	<i>Festuca rubra</i>	O
Small-flowered cranesbill	<i>Geranium pusillum</i>	R
Early forget-me-not	<i>Myosotis ramosissima</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Bramble	<i>Rubus fruticosus agg. sp.</i>	R
Scarlet pimpernel	<i>Anagallis arvensis</i>	R
Small-leaved cotoneaster	<i>Cotoneaster microphyllus</i>	R
Common figwort	<i>Scrophularia nodosa</i>	R
Selfheal	<i>Prunella vulgaris</i>	R
Daisy	<i>Bellis perennis</i>	R
Grey willow	<i>Salix cinerea</i>	R
Hoary ragwort	<i>Senecio erucifolius</i>	R
White stonecrop	<i>Sedum album</i>	R
Biting stonecrop	<i>Sedum acre</i>	R
Wall rue	<i>Asplenium ruta-muraria</i>	R
Hawthorn	<i>Crataegus monogyna</i>	R
Hart's-tongue fern	<i>Phyllitis scolopendrium</i>	R
Common centaury	<i>Centaurium erythraea</i>	R
Creeping willow	<i>Salix repens</i>	R

**Table 51: Species assemblage for the quarry habitat**

- 10.19 The bowl of the quarry (TNI5) was characterised by a local dominance of biting stonecrop *sedum acre* with occasional bramble and goat willow. Other species occasionally present in this area included those found throughout the rest of the quarry habitat, along with hop trefoil *Trifolium campestre*, red valerian, great mullein *Verbascum thapsus*, and male fern *Dryopteris felix-mas*.
- 10.20 TNI6 relates to a distinct area where the quarry ends abruptly at an inland cliff, and below lies a rocky grassland. Species present in this area included wall cotoneaster, yellow loosestrife *Lysimachia vulgaris*,

reflexive stonecrop *Sedum reflexum*, wild strawberry, birdsfoot trefoil, and lady's mantle. A grass fringe was present that comprised many of the same species as that were prevalent throughout the grasslands on the quarry site, but with more common knapweed.

#### Scattered Scrub (A2.2)

- 10.21 Patches of scattered scrub characterised by grey/goat willow were present across the compartment. Occasional areas of scattered scrub featuring gorse and broom were also present. Hawthorn and elder were rarely present as scattered scrub within this compartment.

#### Semi-Improved Neutral Grassland (B2.2)

- 10.22 This habitat was grazed and no direct access was possible. Species observed from the southern boundary included white clover, ragwort, self-heal, black medic *Medicago lupulina*, mouse-ear hawkweed *Pilosella officinarum*, red fescue, bird's-foot trefoil, and lesser trefoil.

#### Swamp (F1)

- 10.23 This habitat was adjacent to the southern natural rock exposures and as such the ground beneath the vegetation comprised the same clay-like soils and retained water on days with heavy rain. The area was densely vegetated and dominated by field horsetail in the south. A stand of bulrushes was also present in the south and locally dominant. Greater species diversity was present in the north of this habitat. A full species list for this habitat is provided in Table 6I, below:

Common name	Scientific name	Frequency
Field horsetail	<i>Equisetum arvense</i>	D
Bulrush	<i>Typha latifolia</i>	F, LD
Agrimony	<i>Agrimonia eupatoria</i>	O
Woody nightshade	<i>Solanum dulcamara</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Red campion	<i>Silene dioica</i>	O
Glaucous sedge	<i>Carex flacca</i>	O, LF
Marsh bedstraw	<i>Galium palustre</i>	O, LF
Amphibious bistort	<i>Persicaria amphibia</i>	O, LF
Angelica	<i>Angelica sylvestris</i>	R
Common figwort	<i>Scrophularia nodosa</i>	R
Northern marsh orchid	<i>Dactylorhiza purpurella</i>	R
Marsh thistle	<i>Cirsium palustre</i>	R
Yellow flag iris	<i>Iris pseudacacorus</i>	R
Hairy sedge	<i>Carex hirta</i>	R
Tufted forget-me-not	<i>Myosotis laxa</i>	R

**Table 6I: Species assemblage for swamp habitat present within Compartment I**

#### Unimproved Calcareous Grassland (B3.2)

- 10.24 Small pockets of species-rich grassland communities persisted across the compartment, comprising species associated with calcareous to neutral soils. Notable species in relation to conservation status included wild strawberry, quaking grass *Briza media*, and northern marsh orchid *Dactylorhiza purpurella*. Wall cotoneaster, gorse and bramble were also occasionally present. A full species list is provided in Table 7I (below) with typical abundance values, although these vary between different pockets of the habitat.

Common Name	Species	Frequency
False brome	<i>Brachypodium sylvaticum</i>	F
Yellow oat grass	<i>Trisetum flavescens</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Bird's-foot trefoil	<i>Lotus corniculatus</i>	F (LD)
Cock's-foot	<i>Dactylus glomerata</i>	O
Red clover	<i>Trifolium pratense</i>	O
Moss	Moss sp.	O
False oat-grass	<i>Arrhenatherum elatius</i>	O
Yorkshire fog	<i>Holcus lanatus</i>	O
Sweet vernal grass	<i>Anthoxanthum odoratum</i>	O
Wood sage	<i>Teucrium scorodinia</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Hawthorn	<i>Crataegus monogyna</i>	O
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	O
Rough hawkbit	<i>Leontodon hispidus</i>	O
Zigzag clover	<i>Trifolium medium</i>	O (LA)
Common comfrey	<i>Symphytum officinale</i>	O (LA)
Glaucous sedge	<i>Carex flacca</i>	O (LA)
Northern marsh-orchid	<i>Dactylorhiza purpurella</i>	R
Wild strawberry	<i>Fragaria vesca</i>	R
Quaking grass	<i>Briza media</i>	R
Goat's-beard	<i>Tragopogon pratensis</i>	R
Black knapweed	<i>Centaurea nigra</i>	R
Wall cotoneaster	<i>Cotoneaster horizontalis</i>	R
Hop trefoil	<i>Trifolium campestre</i>	R
Nipplewort	<i>Lapsana communis</i>	R
Lesser hawkbit	<i>Leontodon saxatilis</i>	R
Hoary ragwort	<i>Senecio erucifolius</i>	R
Hawkweed sp.	<i>Hieracium</i> sp.	R
Red fescue	<i>Festuca rubra</i>	R
Common centaury	<i>Centaurium erythraea</i>	R
White clover	<i>Trifolium repens</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Creeping thistle	<i>Cirsium arvense</i>	R
Common restharrow	<i>Ononis repens</i>	R
Field horsetail	<i>Equisetum arvense</i>	R
Creeping cinquefoil	<i>Potentilla reptans</i>	R
Crested dog's-tail	<i>Cynosurus cristatus</i>	R
Meadow vetchling	<i>Lathyrus pratensis</i>	R
Broad-leaved spurge	<i>Euphorbia platyphyllos</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R

Selfheal

*Prunella vulgaris*

R

**Table 7I: Species assemblage for unimproved calcareous grassland habitats within Compartment I***Wet Ditch: G1*

- 10.25 A wet ditch was present within a pocket of scrub. This ditch was vegetated by species as found in the scrub habitat, such as grey/goat willow and horsetail *Equisetum* sp.

*Mosaic: Dense Scrub (A2.1), Unimproved Calcareous Grassland (B3.1) & Tall ruderal (C3.1)*

- 10.26 An area of open mosaic comprising scrub (45%), unimproved calcareous grassland (45%) and tall ruderal (10%) species was present in the south-west part of the compartment. Scrub species were characterised by a mix of goat and grey willow as well as gorse. Grassland species were typical of those recorded within Table 7I, above, with the addition of occasional bee orchid *Ophrys apifera*, oxeye daisy *Leucanthemum vulgare*, and meadow vetchling *Lathyrus aphaca*. Tall ruderal species were characterised by occasional common nettle, common hogweed, and greater willowherb.

*Invasive Species*

- 10.27 Wall cotoneaster was found to be present throughout this compartment, usually in low densities and growing low throughout the quarry, ephemeral, inland cliff and grassland habitats. Two dense infestations were present within the inland cliff habitats. These infestations were dense and very mature and extended down the cliff face from the top of the cliff.
- 10.28 In addition to the wall cotoneaster present within the quarry, one individual small-leaved cotoneaster was also identified within this area.
- 10.29 A stand of Japanese knotweed was present along the western boundary of this compartment. This stand presented as two separate stands, however, direct access was not possible due to the denseness of intervening scrub habitats and the ground conditions. Due to their proximity to each other, it is considered highly likely that these two stands are one dense and mature stand, and so has been mapped as such. The southern-most stand was approximately 20m long by 15m deep. The northern-most stand was approximately 12m long by 15m wide. These stands were approximately 10m apart, making rhizomatic connection between the two very likely.

## 11.0 REFERENCES

British Standards Institution (2013). British Standard 42020: 2013. Biodiversity – Code of practice for planning and development. British Standards Institution, London.

British Standards Institution. (2012). British Standard 5837:2012, Trees in relation to design, demolition and construction – recommendations. British Standards Institution, London.

Institute of Environmental Assessment. (1995). Guidelines for Baseline Ecological Assessment, Institute of Environmental Assessment. E&FN Spon, An Imprint of Chapman and Hall. London.

Joint Nature Conservation Committee (2010). Handbook for Phase 1 Habitat Survey: A technique for environmental audit (reprint). Joint Nature Conservation Committee, Peterborough.















Joint Nature Conservation Committee (2012). UK Post-2010 Biodiversity Framework. Available: [http://jncc.defra.gov.uk/pdf/UK\\_Post2010\\_Bio-Fwork.pdf](http://jncc.defra.gov.uk/pdf/UK_Post2010_Bio-Fwork.pdf)



**APPENDIX 1**



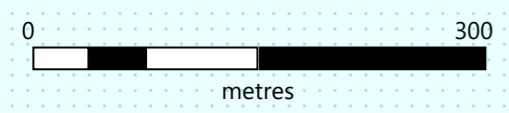


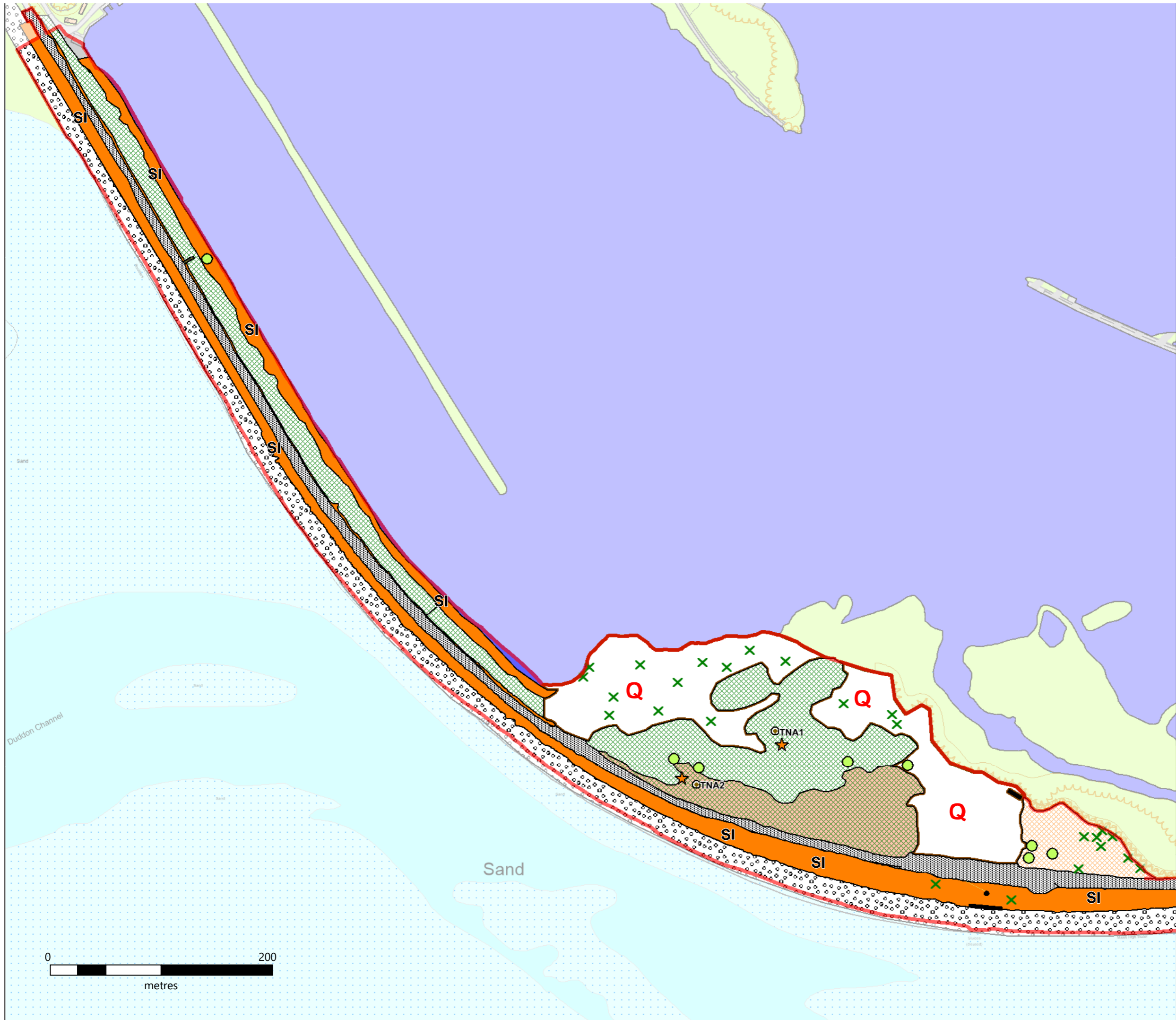
-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B2.2 Semi-improved neutral grassland
-  B3.1 Unimproved calcareous grassland
-  C1.1 Bracken
-  H4 Boulders/rocks above high tide mark
-  I1.2 Quarry
-  J3.6 Building/structure
-  J4 Bare ground/hard standing
-  Mosaic: H6.5 Sand dune grassland & H6.7 Sand dune scrub
-  Compartment A boundary
-  Sea buckthorn
-  Montbretia
-  Target notes
















**RSPB Hodbarrow: Compartment A**  
 Phase 1 Habitat Plan  
 RSPB

N	Drawing: 2363-E1-A0	Drawn by: LM
	Revision: 1	Checked by: LG
	Date: 21/09/21	Scale: 1:5000 @ A3






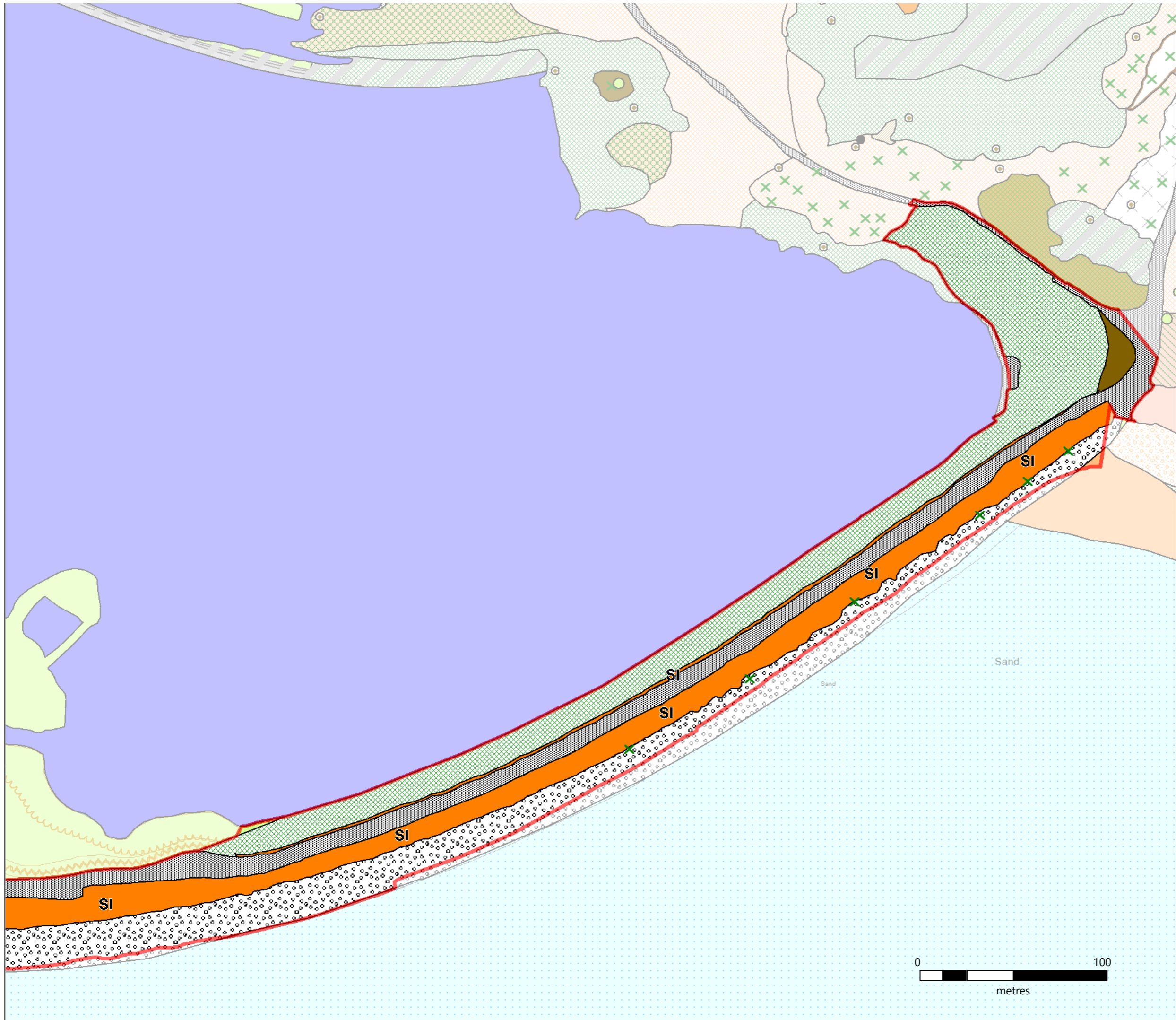
-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B2.2 Semi-improved neutral grassland
-  B3.1 Unimproved calcareous grassland
-  H4 Boulders/rocks above high tide mark
-  I1.2 Quarry
-  J3.6 Building/structure
-  J4 Bare ground/hard standing
-  Mosaic: H6.5 Sand dune grassland & H6.7 Sand dune scrub
-  Compartment A boundary
-  Sea buckthorn
-  Montbretia
-  Target notes











**RSPB Hodbarrow: Compartment A**  
 Phase 1 Habitat Plan  
 RSPB

 Drawing: 2363-E1-A1 Drawn by: LM  
 Revision: 0 Checked by: LG  
 Date: 21/09/21 Scale: 1:3200 @ A3




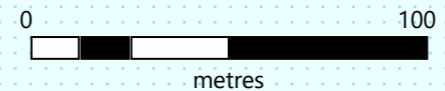


-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B2.2 Semi-improved neutral grassland
-  C1.1 Bracken
-  H4 Boulders/rocks above high tide mark
-  J3.6 Building/structure
-  J4 Bare ground/hard standing
-  Compartment A boundary

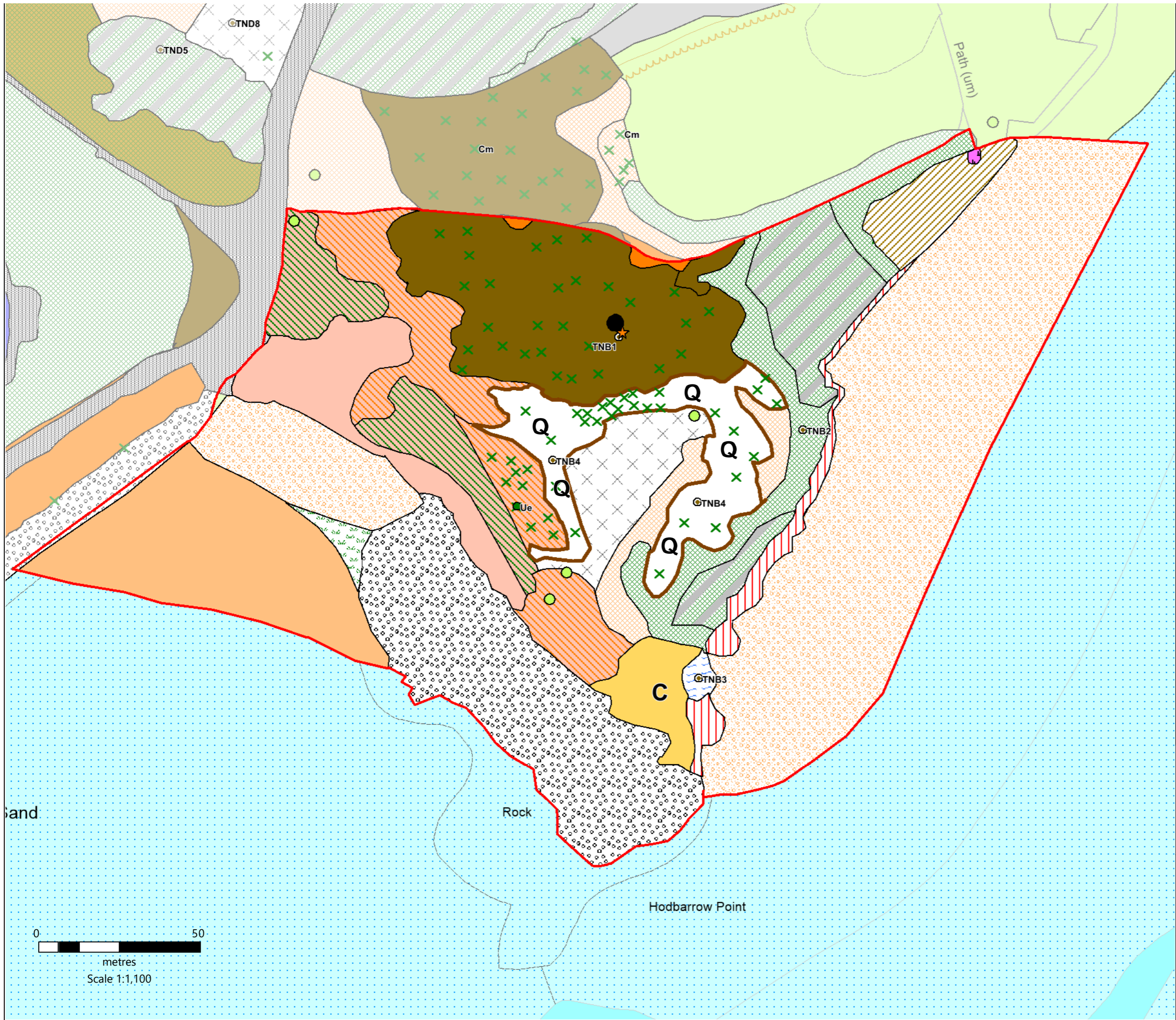


**RSPB Hodbarrow: Compartment A**  
 Phase 1 Habitat Plan  
 RSPB

	Drawing: 2363-E1-A2	Drawn by: LM
	Revision: 0	Checked by: LG
	Date: 21/09/21	Scale: 1:1900 @ A3

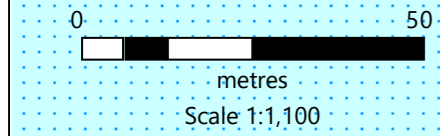






- A2.1 Dense/continuous scrub
- A2.2 Scattered scrub
- B3.1 Unimproved calcareous grassland
- B2.1 Unimproved neutral grassland
- C1.1 Bracken
- C3.1 Tall ruderal
- H1 Intertidal sand
- H3 Shingle/gravel above high tide mark
- H4 Boulders/Rocks above high tide mark
- H5 Strandline vegetation
- H6.5 Sand dune grassland
- H6.7 Sand dune scrub
- H6.8 Open sand dune
- H8.1 Maritime hard cliff
- H8.3 Crevice/ledge vegetation
- H8.4 Coastal grassland
- I2.1 Quarry
- J1.3 Ephemeral/Short perennial
- J3.6 Building/structure
- Compartment B boundary
- Japanese knotweed
- Montbretia
- Sea buckthorn
- Target note

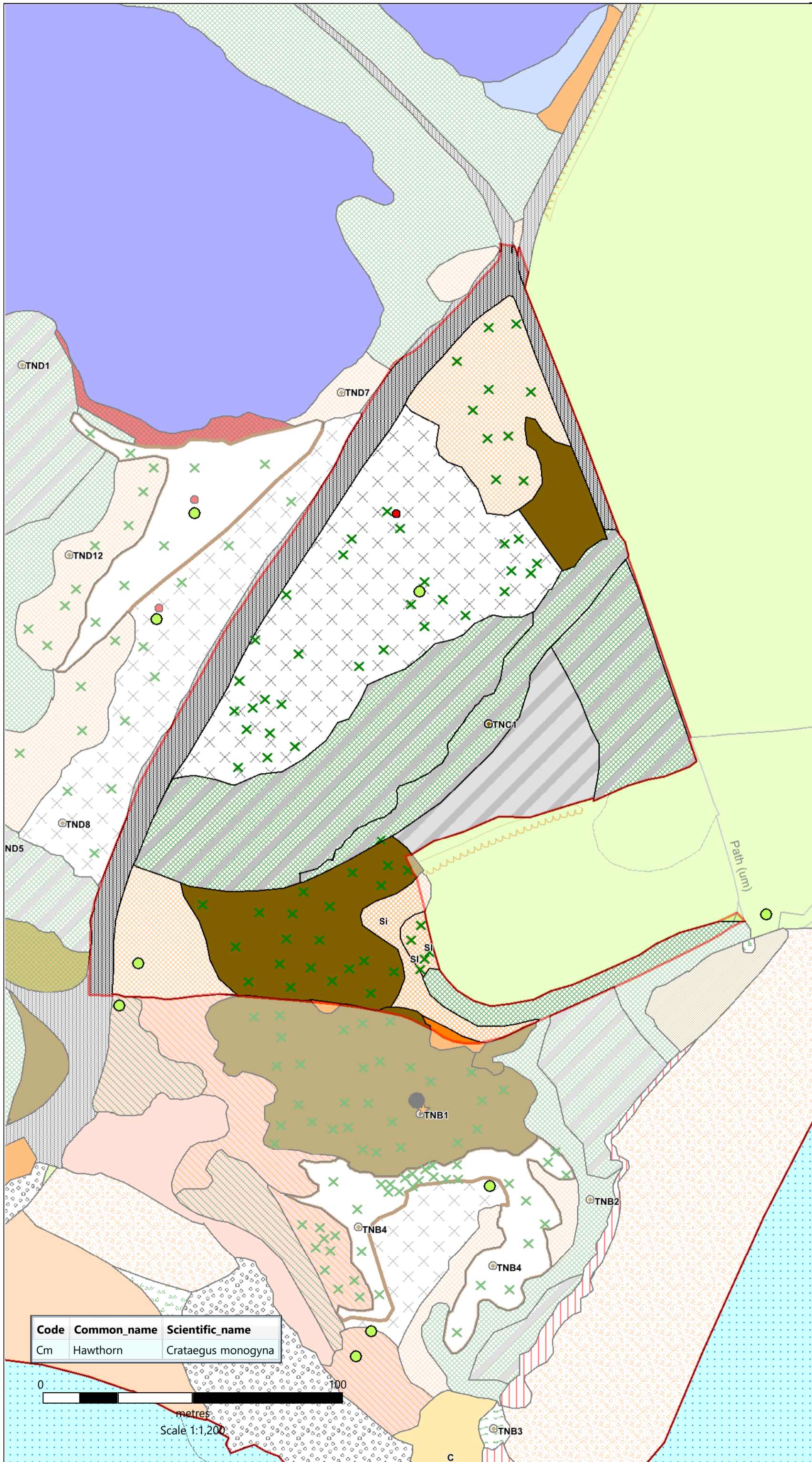
Code	Common_name	Scientific_name
Ue	Gorse	Ulex europaeus



**RSPB Hodbarrow: Compartment B**  
Phase 1 Habitat Plan  
RSPB

	Drawing: 2363-E1-B Revision: 0 Date: 23/08/2021	Drawn by: LM Checked by: PB Scale: 1:1500 @ A3
--	---	--





- A2.1 Dense/continuous scrub
- A2.2 Scattered scrub
- B3.1 Unimproved calcareous grassland
- B3.2 Semi-improved calcareous grassland
- C1.1 Bracken
- J1.3 Ephemeral/short perennial
- J4 Hard standing
- Inaccessible
- Unknown grassland
- Compartment C boundary
- Sea buckthorn
- Wall cotoneaster
- Target note

Code	Common_name	Scientific_name
Cm	Hawthorn	<i>Crataegus monogyna</i>



Scale 1:1,200



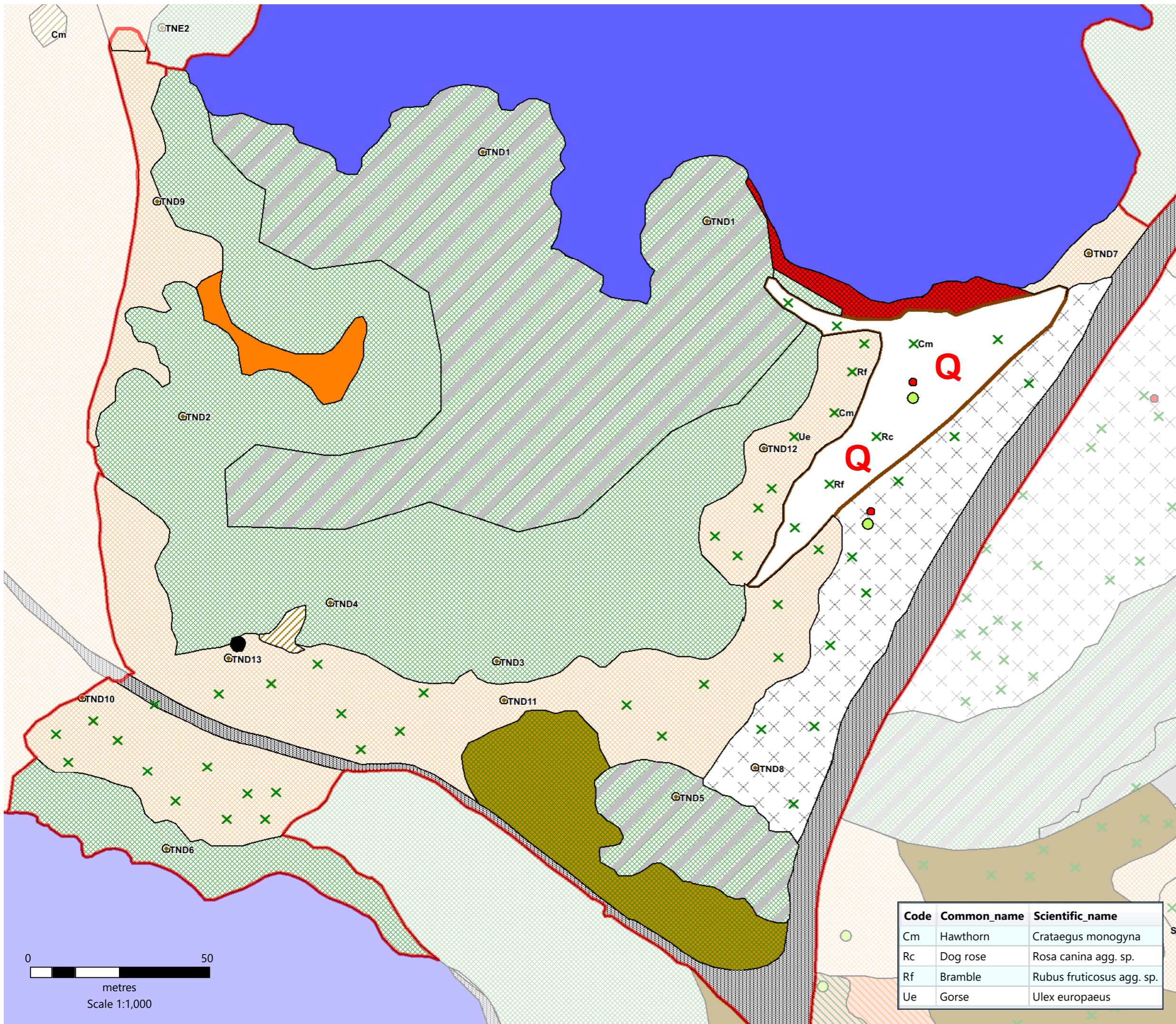
**RSPB Hodbarrow: Compartment C**  
Phase 1 Habitat Plan  
RSPB

Drawing: 2363-E1-C  
 Revision: 0  
 Date: 25/08/2021  
 Drawn by: LM  
 Checked by: PB  
 Scale: 1:1200 @ A3

**Landscape Institute**  
 Registered practice  
 Web: [www.appletons.uk.com](http://www.appletons.uk.com)  
 Email: [info@appletons.uk.com](mailto:info@appletons.uk.com)

Appletons  
 17 Chorley Old Road  
 Bolton  
 BL1 3AD  
 Tel: 01204 393006





- A2.1 Dense/continuous scrub
- A2.2 Scattered scrub
- B2.1 Unimproved neutral grassland
- B3.1 Unimproved calcareous grassland
- C3.1 Tall ruderal
- G1 Open standing water
- I1.1.2 Basic natural inland cliff
- I1.2 Quarry
- J1.3 Ephemeral/short perennial
- J3.6 Building/structure
- J4 Bare ground/hard standing
- Mosaic: scattered scrub/Bracken (50/50)
- Inaccessible
- Target note
- Wall cotoneaster
- Sea buckthorn
- Compartment D boundary

Code	Common_name	Scientific_name
Cm	Hawthorn	<i>Crataegus monogyna</i>
Rc	Dog rose	<i>Rosa canina</i> agg. sp.
Rf	Bramble	<i>Rubus fruticosus</i> agg. sp.
Ue	Gorse	<i>Ulex europaeus</i>

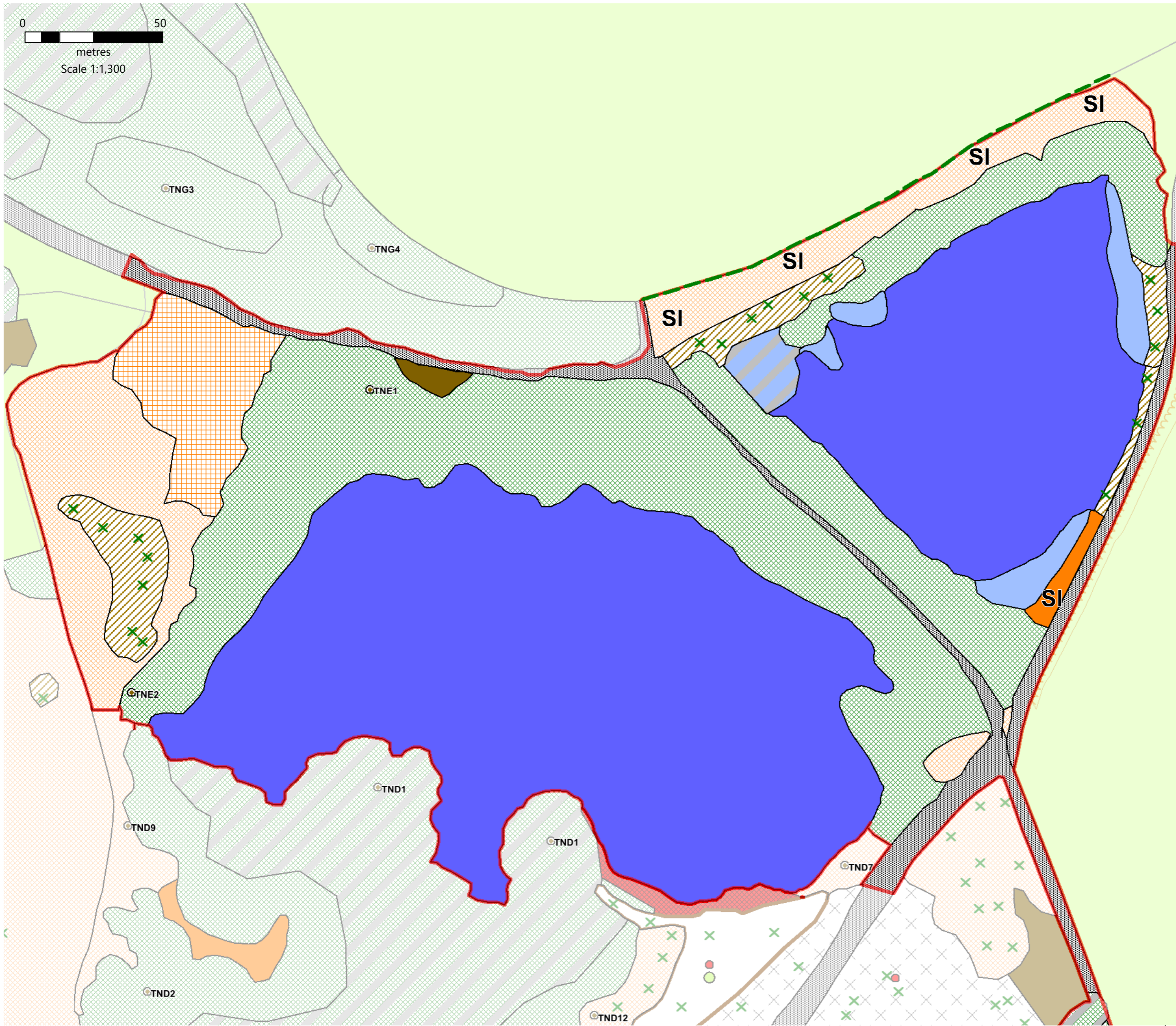

















**RSPB Hodbarrow: Compartment D**

Phase 1 Habitat Plan  
RSPB

Drawing: 2363-E1-D  
Revision: 0  
Date: 02/09/2021  
Drawn by: LM  
Checked by: LG  
Scale: 1:1000 @ A3






-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B3.2 Semi-improved calcareous grassland
-  B2.2 Semi-improved neutral grassland
-  B3.1 Unimproved calcareous grassland
-  C1.1 Bracken
-  C3.1 Tall ruderal
-  F1 Swamp
-  G1 Open standing water
-  J2.2 Species poor defunct hedgerow
-  J4 Bare ground/hard standing
-  Mosaic: B2.1 Unimproved neutral grassland and C3.1 Tall ruderal
-  Inaccessible
-  Compartment E boundary
-  Target note

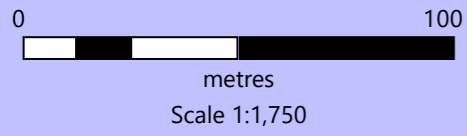














**RSPB Hodbarrow: Compartment E**

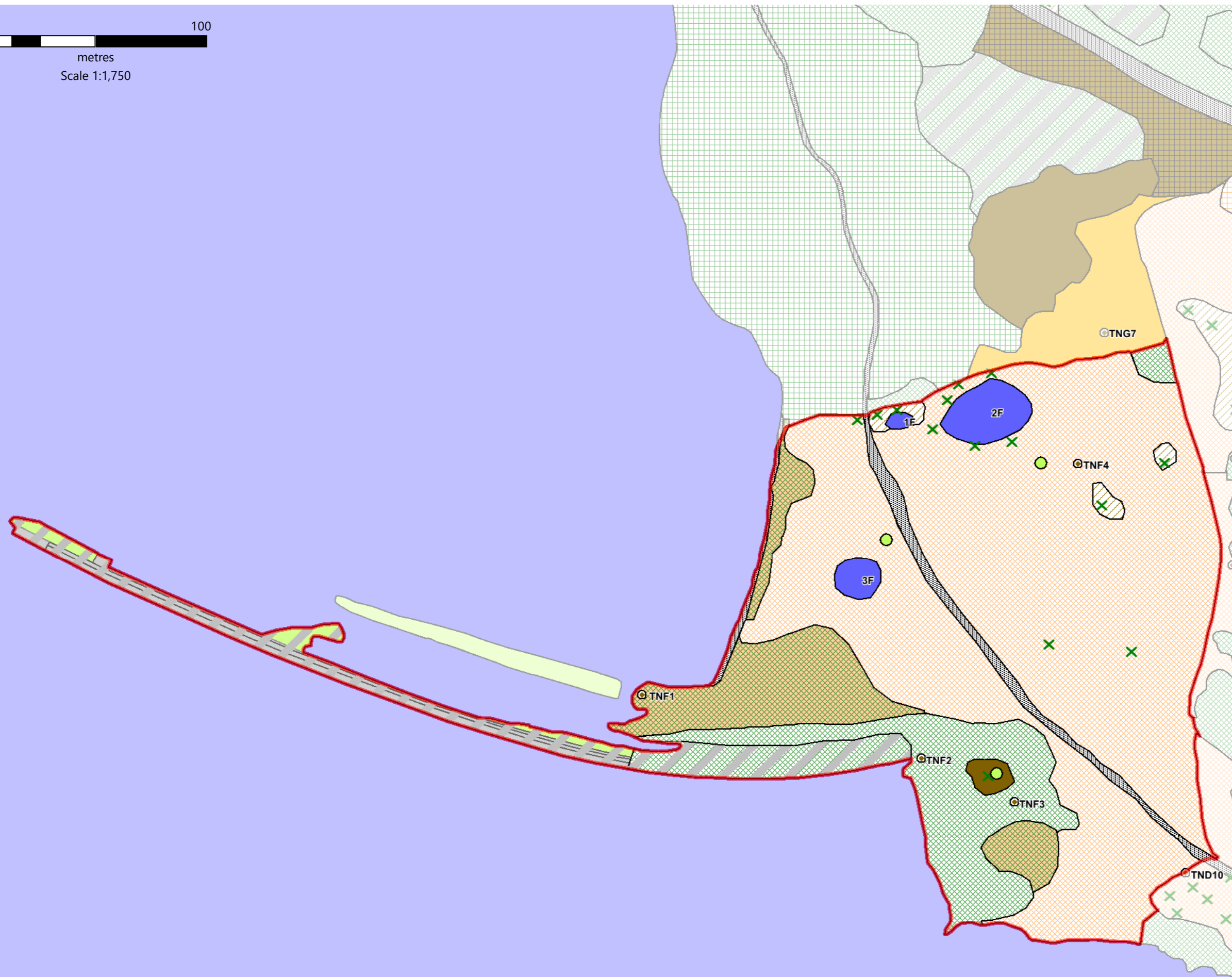
Phase 1 Habitat Plan  
RSPB

	Drawing: 2363-E1-E Revision: 0 Date: 03/09/21	Drawn by: LM Checked by: LG Scale: 1:1300 @ A3
---	---	--






-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B3.1 Unimproved calcareous grassland
-  C3.1 Tall ruderal
-  C1.1 Bracken
-  G1 Open standing water
-  J4 Bare ground/hard standing
-  Mosaic: Dense scrub (A2.1) and Unimproved calcareous grassland (B3.1)
-  Inaccessible
-  Target note
-  Sea buckthorn
-  Compartment F boundary



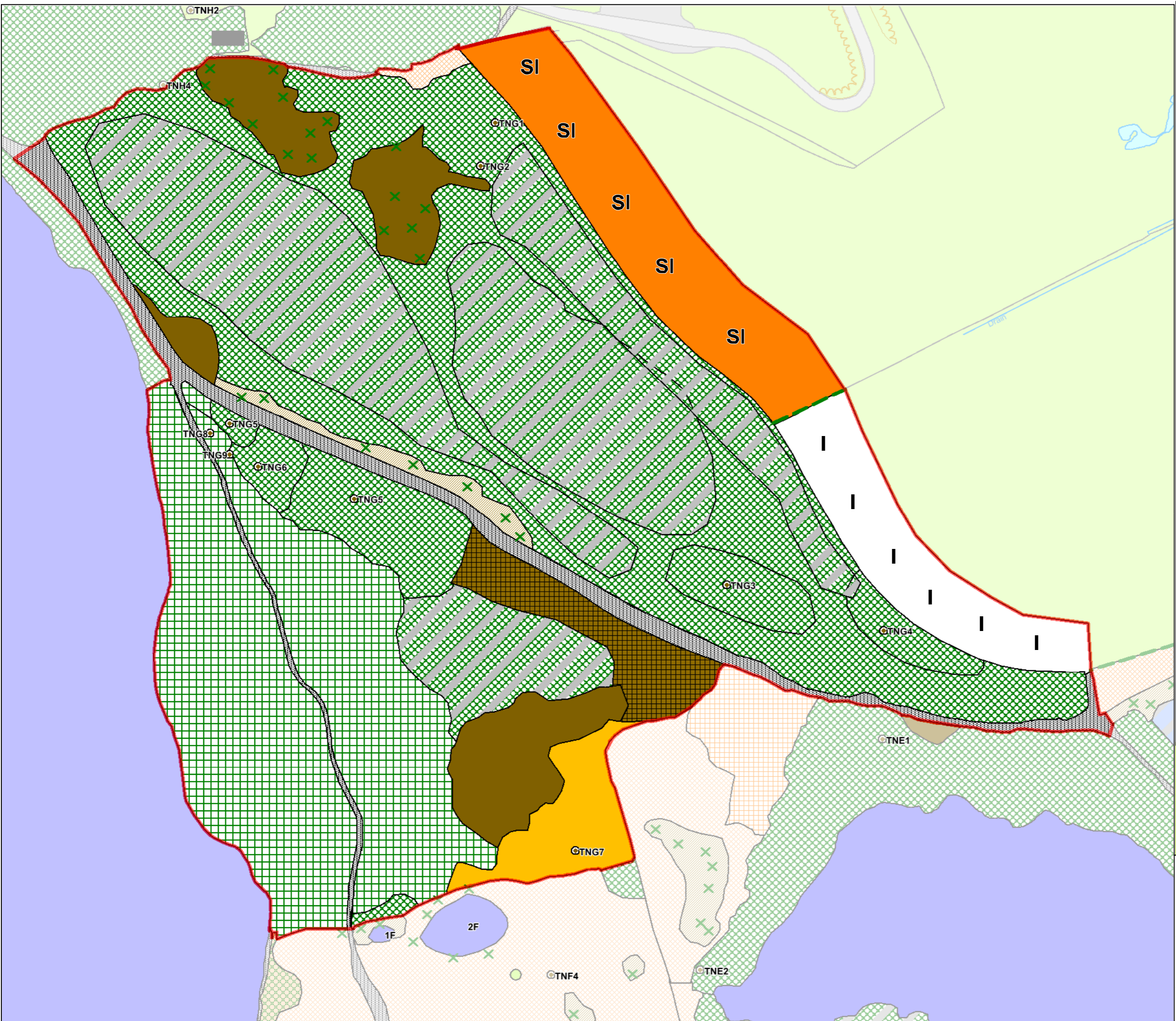
**RSPB Hodbarrow: Compartment F**

















Phase 1 Habitat Plan

RSPB

	Drawing: 2363-E1-F	Drawn by: LM
	Revision: 0	Checked by: LG
	Date: 14/09/21	Scale: 1:1750 @ A3






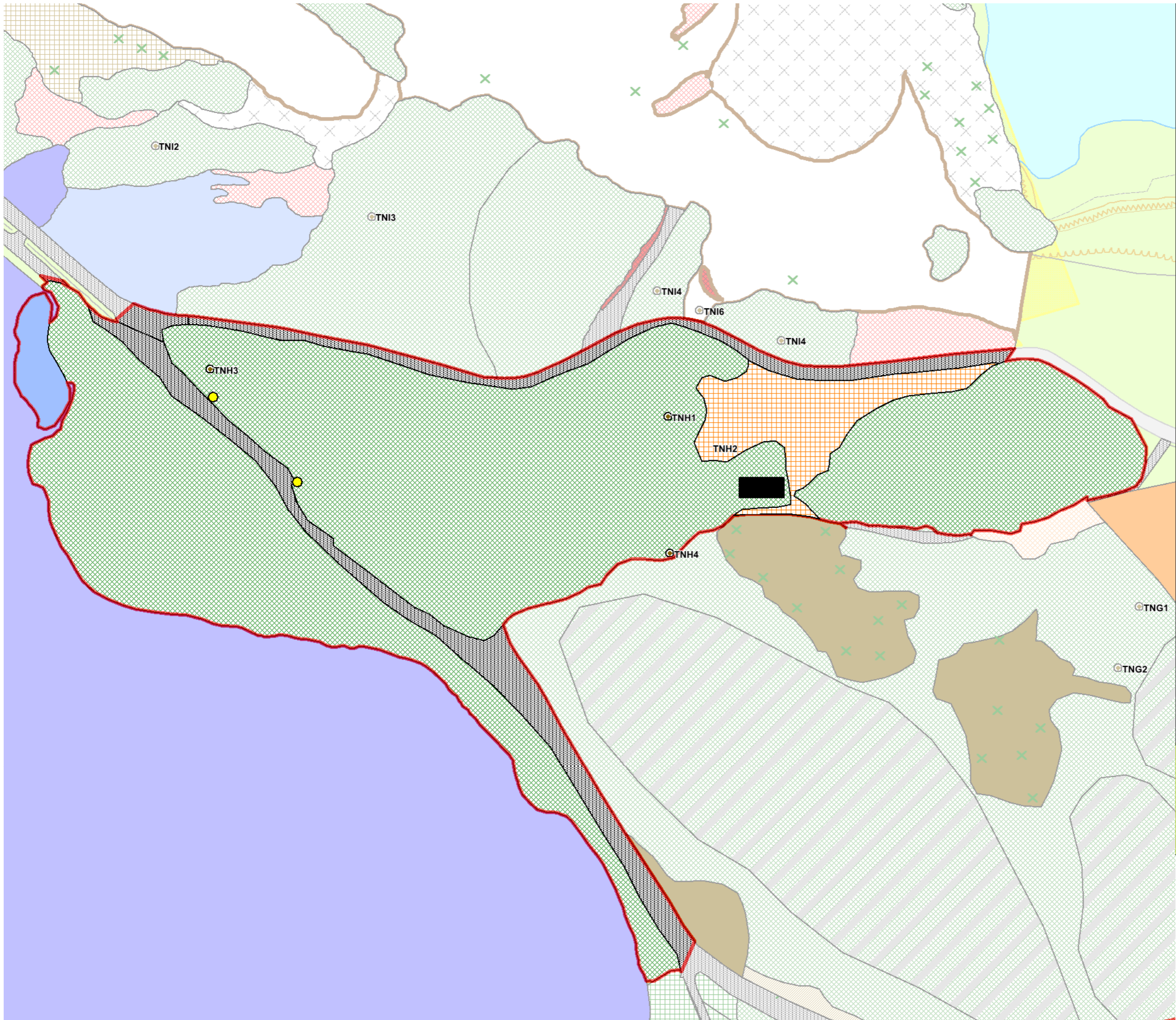
-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B2.2 Semi-improved neutral grassland
-  B3.1 Unimproved calcareous grassland
-  B4 Improved grassland
-  C1.1 Bracken
-  C3.1 Tall ruderal
-  D1.1 Dry acid heath
-  J2.2.2 Defunct species poor hedgerow
-  J2.5 Wall
-  J4 Bare ground/hard standing
-  Mosaic: B2.1 Unimproved neutral grassland, C3.1 Tall ruderal, & A1.2 Dense scrub
-  Mosaic: C1.1 Bracken, A1.2 Dense scrub & C3.1 Tall ruderal
-  Inaccessible
-  Target note
-  Compartment G boundary











**RSPB Hodbarrow: Compartment G**  
Phase 1 Habitat Plan  
RSPB

	Drawing: 2363-E1-G Revision: 0 Date: 28/09/21	Drawn by: LM Checked by: LG Scale: 1:1700@ A3
---	---	---






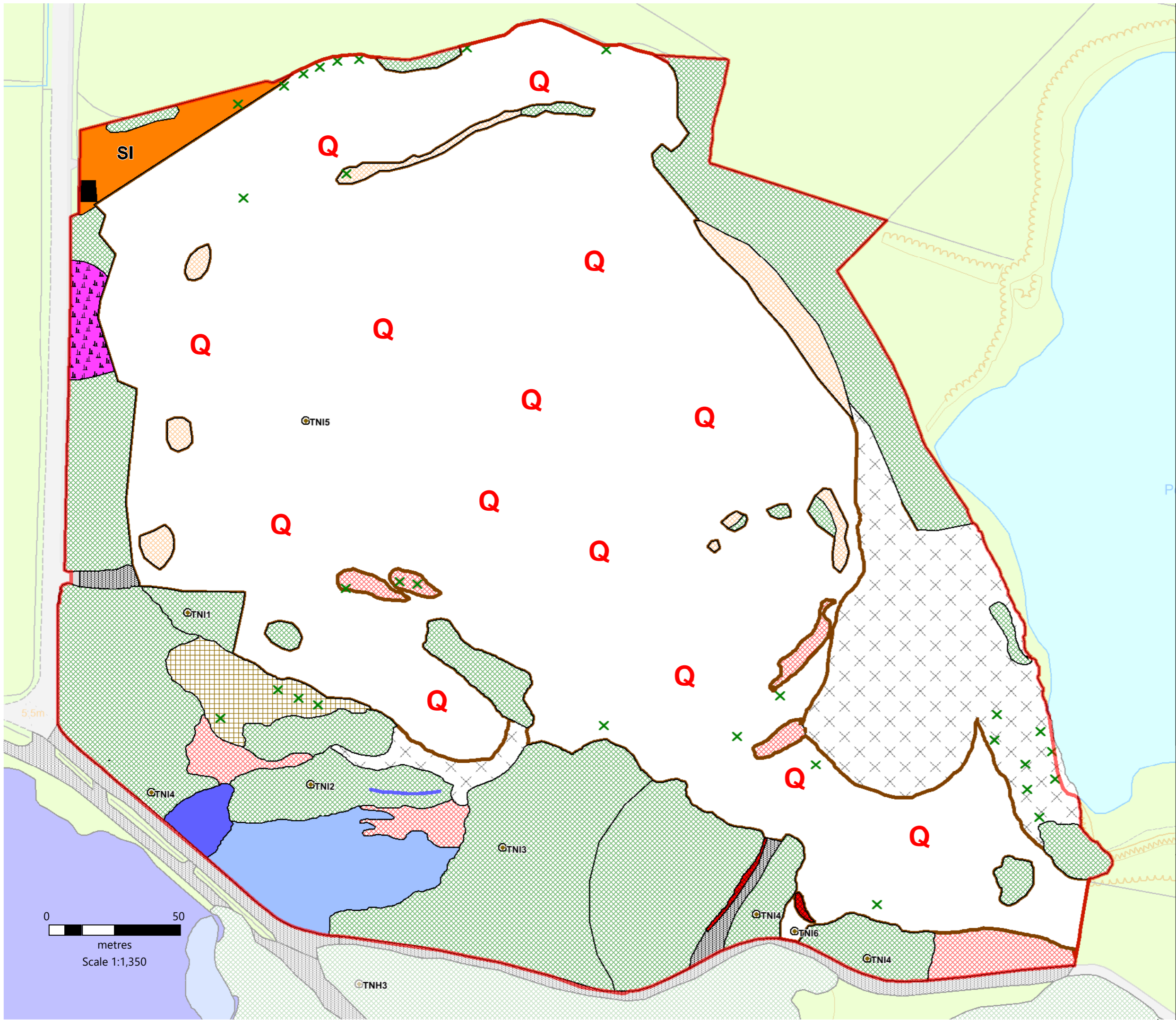
-  A2.1 Dense/continuous scrub
-  F1 Swamp
-  F1 Swamp
-  J3.6 Building/structure
-  J4 Bare ground/hard standing
-  Mosaic: B2.1 Unimproved neutral grassland & A2.1 Dense scrub
-  Compartment boundary
-  Variegated yellow archangel



**RSPB Hodbarrow: Compartment H**  
Phase 1 Habitat Plan  
RSPB

	Drawing: 2363-E1-H Revision: 0 Date: 30/09/2021	Drawn by: LM Checked by: LG Scale: 1:1200 @ A3
---	---	--





-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B3.1 Unimproved calcareous grassland
-  B2.2 Semi-improved neutral grassland
-  G1 Open standing water
-  G1 Wet ditch
-  F1 Swamp
-  J1.3 Ephemeral/short perennial
-  J4 Bare ground/hard standing
-  I1.1.2 Basic natural inland cliff
-  I1.2 Quarry
-  I1.4.2 Basic rock exposure (other)
-  J3.6 Building/structure
-  Mosaic: A2.1 Dense scrub, B3.1 Unimproved calcareous grassland & C3.1 Tall ruderal
-  Japanese knotweed
-  Target note
-  Compartment I boundary



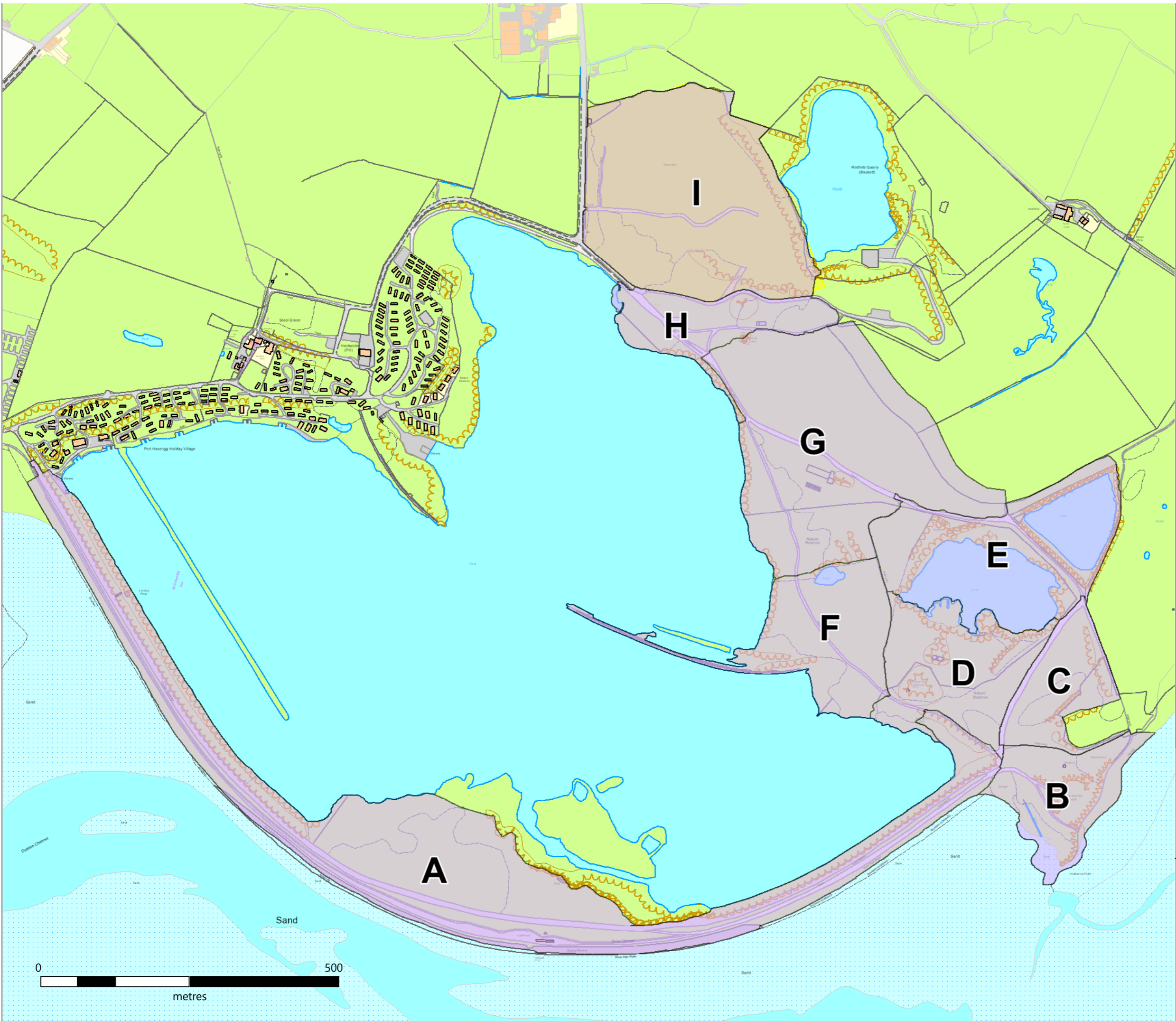
**RSPB Hodbarrow: Compartment I**  
 Phase 1 Habitat Plan  
 RSPB

N	Drawing: 2363-E1-I	Drawn by: LM
	Revision: 0	Checked by: LG
	Date: 29/09/2021	Scale: 1:1350 @ A3




**APPENDIX 2**





**RSPB Hodbarrow**  
 Compartments Plan  
 RSPB

	Drawing: 2363-E1-J	Drawn by: LM
	Revision: 1	Checked by: LG
	Date: 10/12/2021	Scale: 1:6000 @ A3



- Areas that support notable invertebrate species
- Locations of works with greatest potential to disturb nesting terns
- Areas requiring NVC survey
- Areas with potential for reptiles near the proposed works, requiring survey work
- Area of works closest to natterjack toad observations
- Areas identified in NVC survey as requiring detailed Phase 3 botanical surveys
- Further survey work required for invertebrates, NVC and reptiles



**RSPB Hodbarrow**  
 Constraints Plan  
 Copeland Borough Council

N	Drawing: 2363-E1-CP	Drawn by: LM
	Revision: 1	Checked by: LG
	Date: 22/02/2022	Scale: 1:6000 @ A3



**APPENDIX 3**



## Compartment A



Photograph 1: General character of Compartment A



Photograph 2: Lighthouse and wall at the middle of the seawall



Photograph 3: Bird watching hide in the centre of the seawall



Photograph 4: General character of the unimproved calcareous grassland habitat



Photograph 5: Mosaic habitat of sand dune grassland and sand dune scrub



Photograph 6: An example of Montbretia growing in this compartment



## Compartment B



Photograph 1: General character of the beach area, looking towards the dune habitats



Photograph 2: Remains of the windmill with Montbretia



Photograph 3: General character of the dune, grassland and beach habitats



Photograph 4: General character of grassland and quarry habitats

## Compartment C



Photograph 1: General character of the compartment, showing bracken, calcareous grassland, scattered scrub and scrub habitats



Photograph 2: Hardstanding being used by a vehicle with ephemeral habitat and scattered scrub adjacent



Photograph 3: TNC1, a row of planted hawthorn on the edge of the compartment



Photograph 4: Dense bracken, ruderal and scrub habitats within the compartment



**Compartment D**



Photograph 1: General character of open water, inland cliff, scrub and grassland habitats



Photograph 2: General character of grassland habitats and the stone lighthouse



Photograph 3: Exposed rock and scrub habitats



Photograph 4: Mosaic habitat of scattered scrub and scattered bracken



Photograph 5: General character of hawthorn/willow scrub habitats



Photograph 6: Invasive cotoneaster growing within the compartment



## Compartment E



Photograph 1: Southern larger waterbody, approximately 2.6ha; man-made and part of the old quarry works



Photograph 2: General character of bracken and scrub habitats in this compartment



Photograph 3: General character of grassland habitats in this compartment



Photograph 4: General character of the smaller waterbody to the northeast of the compartment, approximately 1.5ha in size



Photograph 5: Narrow rectangular field of semi-improved grassland along northern margin.



## Compartment F



Photograph 1: An area of bare ground on the edge of the lagoon, relating to TNF1



Photograph 2: Scattered scrub and unimproved calcareous grassland



Photograph 3: Pond F1, showing significant drying



Photograph 4: General character of the large area of unimproved calcareous grassland



Photograph 5: Waterbody 3F, showing significant drying between seasons



## Compartment G



Photograph 1: General character of hawthorn and bramble scrub adjacent to grassland in the north of the compartment



Photograph 2: TNG1 – a small, murky and shaded waterbody



Photograph 3: Character of mosaic habitat comprising bracken, scrub and tall ruderal



Photograph 4: Character of mosaic habitat comprising unimproved neutral grassland, tall ruderal and scrub



Photograph 5: Scattered scrub habitat within this compartment



Photograph 6: Dry acid heath bounded by bracken to the north



Photograph 7: Dry acid heath area as seen from the south



## Compartment H



Photograph 1: Character of scrub habitat to the west of the compartment



Photograph 2: Swamp habitat shown to the far right, entirely dominated by common reed



Photograph 3: Remains of a building with compartment H



Photograph 4: Mosaic of dense scrub and unimproved neutral grassland



Photograph 5: Character of dense scrub to the east of the car parking area



**Compartment I**



Photograph 1: General character of the slag banks in this compartment



Photograph 2: Small building within the semi-improved neutral grassland to the north-west



Photograph 3: Inland cliff habitat



Photograph 4: Swamp habitat in the south, dominated by horsetail



Photograph 5: Natural Rock Exposure present within the southern area of this compartment



Photograph 6: A stand of Japanese knotweed adjacent to scrub along the western boundary





**APPENDIX 4**

This section provides an overview of the framework of legislation and policy which underpins nature conservation and is a material consideration in the planning process in England.

## GENERAL BIODIVERSITY LEGISLATION AND POLICY

### **Conservation of Habitats and Species Regulations 2017, as amended (Habitats Regulations 2010, as amended)**

The Habitats Regulations 2017 consolidate and update the Conservation (Natural Habitats, &c.) Regulations 1994 and all its various amendments. The Habitats Regulations 2017 are the principal means by which the EEC Council Directive 92/43 (The Habitats Directive) as amended is transposed into English and Welsh law.

The Habitats Regulations 2017 place duty upon the relevant authority of government to identify sites which are of importance to the habitats and species listed in Annexes I and II of the Habitats Directive. Those sites which meet the criteria are, in conjunction with the European Commission, designated as Sites of Community Importance, which are subsequently identified as Special Areas of Conservation (SAC) by the European Union member states. The regulations also place a duty upon the government to maintain a register of European protected sites designated as a result of EC Directive 79/409/EEC on the Conservation of Wild Birds (The Birds Directive). These sites are termed Special Protection Areas (SPA) and, in conjunction with SACs, form a network of sites known as Natura 2000. The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest.

The Habitats Regulations 2010 also provide for the protection of individual species of fauna and flora of European conservation concern listed in Schedules 2 and 5 respectively. Schedule 2 includes species such as otter and great crested newt for which the UK population represents a significant proportion of the total European population. It is an offence to deliberately kill, injure, disturb or trade these species. Schedule 5 plant species are protected from unlawful destruction, uprooting or trade under the regulations.

The Habitats Regulations 2010 were amended in August 2012 and in 2017 to ensure clearer transposition of the provisions of Articles 2, 3, 4(4) (second sentence) and Article 10 of the Wild Birds Directive, by giving additional and specific duties to relevant bodies. A number of amendments were also made to transpose more clearly certain elements of the Habitats Directive.

### **The Wildlife and Countryside Act (WCA) 1981 (as amended)**

The WCA, as amended, consolidates and amends pre-existing national wildlife legislation in order to implement the Bern Convention and the Birds Directive. It complements the Habitat Regulations 2010 (as amended), offering protection to a wider range of species. The Act also provides for the designation and protection of national conservation sites of value for their floral, faunal or geological features, termed Sites of Special Scientific Interest (SSSIs).

Schedules of the act provide lists of protected species, both flora and fauna, and detail the possible offences that apply to these species. All relevant species specific legislation is detailed later in this Appendix.

### **The Countryside and Rights of Way (CRoW) Act 2000**

The CROW Act, introduced in England and Wales in 2000, amends and strengthens existing wildlife legislation detailed in the WCA. It places a duty on government departments and the National Assembly for Wales to have regard for biodiversity, and provides increased powers for the protection and maintenance of SSSIs. The Act also contains lists of habitats and species (Section 74) for which conservation measures should be promoted, in accordance with the recommendations of the Convention on Biological Diversity (Rio Earth Summit) 1992.

### **The Natural Environment and Rural Communities (NERC) Act 2006**

Section 40 of the NERC Act places a duty upon all local authorities and public bodies in England and Wales to promote and enhance biodiversity in all of their functions. Sections 41 (England) and 42 (Wales) list habitats and species of principal importance to the conservation of biodiversity. These lists superseded Section 74 of the CRoW Act 2000.

### **The Hedgerow Regulations 1997**

The Hedgerow Regulations make provision for the identification of important hedgerows which may not be removed without permission from the Local Planning Authority.

## UK Biodiversity Action Plan

The United Kingdom Biodiversity Action Plan (UK BAP), first published in 1994 and updated in 2007, was a government initiative designed to implement the requirements of the Convention of Biological Diversity to conserve and enhance species and habitats. The UK BAP contained a list of priority habitats and species of conservation concern in the UK, and outlined biodiversity initiatives designed to enhance their conservation status. Lists of Broad and Local habitats were also included. The priority habitats and species correlated with those listed on Section 41 and 42 of the NERC Act.

The UK BAP required that conservation of biodiversity was addressed at a County level through the production of Local BAPs. These were complementary to the UK BAP, however were targeted towards species of conservation concern characteristic of each area. In addition, a number of local authorities and large organizations have produced their own BAPs.

## Species and Habitats of Material Consideration for Planning in England

In 2011, the government published the 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' to replace the previous England Biodiversity Strategy. In 2012 the UK BAP was replaced by the UK Post-2010 Biodiversity Framework.

Previous planning policy (and some supporting guidance which is still current, e.g. ODPM Circular 06/2005, now under revision), refers to UK BAP habitats and species as being a material consideration in the planning process. Equally many local plans refer to BAP priority habitats and species. Both remain as material considerations in the planning process but such habitats and species are now described as Species and Habitats of Principal Importance for Conservation in England, or simply priority habitats and priority species under the UK Post-2010 Biodiversity Framework. The list of habitats and species remains unchanged and is still derived from Section 41 list of the Natural Environmental and Rural Communities (NERC) Act 2006. As was previously the case when it was a BAP priority species hen harrier continues to be regarded as a priority species although it does not appear on the Section 41 list.

## NATIONAL PLANNING POLICY FRAMEWORK

The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced.

Chapter 15, on conserving and enhancing the natural environment, sets out how the planning system should protect and enhance the natural and local environment by:

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

To protect and enhance biodiversity and geodiversity, plans should:

- a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
- b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

When determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons<sup>58</sup> and a suitable compensation strategy exists; and
- d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

The following should be given the same protection as habitats sites:

- a) potential Special Protection Areas and possible Special Areas of Conservation;
- b) listed or proposed Ramsar sites; and
- c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site is being planned or determined.

## LOCAL PLANNING POLICY

The Local Plan Strategy was adopted in 2013. Policy ENV3 – Biodiversity and Geodiversity address wildlife habitats and species:

### Policy ENV3 – Biodiversity and Geodiversity

The Council will contribute to the implementation of the UK and Cumbria Biodiversity Action Plan within the plan area by seeking to:

- A) Improve the condition of internationally, nationally and locally designated sites
- B) Ensure that development incorporates measures to protect and enhance any biodiversity interest
- C) Enhance, extend and restore priority habitats and look for opportunities to create new habitat
- D) Protect and strengthen populations of priority or other protected species
- E) Boost the biodiversity value of existing wildlife corridors and create new corridors, and stepping stones that connect them, to develop a functional Ecological Network
- F) Restrict access and usage where appropriate and necessary in order to conserve an area's biodiversity value

The site is specifically named within Table 6.1 as being a designated site of biodiversity importance within the Copeland Plan Area.

Policy DM25 supports this policy, setting out the detailed approach towards managing development proposals that are likely to have an effect on nature conservation sites, habitats and protected species. Policy DM25 – Protecting Nature Conservation Sites, Habitats and Species is presented below:

- A) All development proposals should:
  - i) Protect the biodiversity value of land and buildings
  - ii) Minimise fragmentation of habitats
  - iii) Maximise opportunities for conservation, restoration, enhancement and connection of natural habitats and creation of habitats for species listed in UK and Cumbria Biodiversity Action Plans. Special consideration should also be given to those European habitats that lie outside the boundaries of European designated sites
- B) Development proposals that would cause a direct or indirect adverse effect on locally recognised sites of biodiversity and geodiversity importance, including County Wildlife Sites, Local Nature Reserves and Regionally Important Geological/Geomorphological Sites or protected species will not be permitted unless:

- i) The benefits of the development clearly outweigh the impacts on the features of the site and the wider network of natural habitats, and;
  - ii) Prevention, mitigation and/or compensation measures are provided. An appropriate long-term management plan will be sought and arrangements to provide adequate funding will be made in accordance with a formal planning agreement or obligation
- C) Where compensatory habitat is created, it should be of equal or greater size than the area lost as a result of the development
- D) Development proposals where the principal objective is to conserve or enhance biodiversity or geodiversity interests will be supported in principle
- E) Where there is evidence to suspect the presence of protected species any planning application should be accompanied by a survey assessing their presence and, if present, the proposal must be sensitive to, and make provision for, their needs
- F) All development proposals must take into account any likely significant effects on the internationally important sites both within the Borough and within a 20km radius of the Borough boundary

## SPECIES SPECIFIC LEGISLATION

This section contains a summary of legislation with relation to the species present or potentially present in the survey area. The reader should refer to the original legislation for definitive interpretation.

### Birds

The Wildlife and Countryside Act (WCA) 1981 (as amended) gives general protection to all wild birds in Britain (subject to the provisions of the act). It is an offence to intentionally or recklessly\*:

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

It is also an offence for any person to have in his possession or control any live or dead wild bird, egg of a wild bird, or any part, or derivative, of such a bird or egg (subject to the provisions of the act).

Birds listed on Schedule 1 of the WCA 1981 (as amended) are protected by special penalties, and it is an offence to intentionally or recklessly\*:-

- Disturb any wild bird included in Schedule 1 whilst it is building a nest or is in, on or near a nest containing eggs or young, or
- Disturb dependent young of such a bird.

\*Reckless offences were added by the Countryside Rights of Way (CRoW) Act 2000.

\*Reckless offences were added by the Countryside Rights of Way (CRoW) Act 2000.

Birds receive further protection through the Bern Convention, the Bonn Convention and the European Communities Council Directive on the Conservation of Wild Birds, or EC Birds Directive:

1. The Bern Convention aims to ensure the conservation and protection of wild bird species and their natural habitats (listed in Appendix II of the Convention), and to regulate the exploitation of those species (including migratory species) listed in Appendix III.
2. The Bonn Convention aims to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix I of the Convention), whilst species on Appendix II are generally of conservation concern and / or deemed to be able to benefit from international cooperation.
3. The EC Birds Directive is the tool through which the European Community meets its obligations for bird species under the Bern Convention and Bonn Convention. The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. Article 5 requires members to establish a general scheme of protection for all wild birds. Annex I contains a list of specially protected bird species. The EC Birds Directive is implemented in the UK by several statutes, including the WCA 1981 (as amended).

Several bird species are Species of Principal Importance for Nature Conservation in England, making them capable of being material considerations in the planning process.

The reader should refer to the original legislation for the definitive interpretation.

### Invasive Flora

The Wildlife and Countryside Act 1981 provides the primary controls on the release of non-native species into the wild in Great Britain. It is an offence under section 14(2) of the Act to 'plant or otherwise cause to grow in the wild' any plant listed in Schedule 9, Part II. This list contains 36 plant species and their hybrids, and includes Japanese rose and Japanese knotweed.

Section 33 of the Environmental Protection Act 1990 states that a person shall not:

- deposit controlled waste, or knowingly cause or knowingly permit controlled waste to be deposited in or on any land unless a waste management licence authorising the deposit is in force and the deposit is in accordance with the licence;
- treat, keep or dispose of controlled waste, or knowingly cause or knowingly permit controlled waste to be treated, kept or disposed of:
- in or on any land, or
- by means of any mobile plant,
- except under and in accordance with a waste management licence;
- treat, keep or dispose of controlled waste in a manner likely to cause pollution of the environment or harm to human health.

### Mammals

It is an offence to kill any mammal (including rabbits and foxes) by cruel methods, as outlined within the Wild Mammals (Protection) Act 1996. In brief, the legislation states that:

- If, save as permitted by this Act, any person mutilates, kicks, beats, nails or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering he shall be guilty of an offence.

The death of any mammal by crushing, asphyxia or dragging, such as may be caused by plant during construction may be classed as an offence if construction activities are undertaken without due regard for burrowing mammal species.

### Reptiles

All of the UK's native reptiles are protected by law. The two rarest species – sand lizard (*Lacerta agilis*) and smooth snake (*Coronella austriaca*) – benefit from the greatest protection, however these species have a limited geographical distribution and none of the habitats within the study area fulfill their specific habitat requirements. It is therefore considered that these species are unlikely to be present within the study area. Common lizard (*Lacerta vivipara*), slow-worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix*) are protected under the Wildlife and Countryside Act 1981 as amended from intentional killing or injuring.

In England and Wales, this Act has been amended by the Countryside and Rights of Way Act 2000 (CRoW), which adds an extra offence, makes species offences arrestable, increases the time limits for some prosecutions and increases penalties. The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on Government Departments to have regard for the conservation of biodiversity and maintains lists of species and habitats which are of principal importance for the purposes of conserving biodiversity in England and Wales. All native reptile species are included on these lists.

This is a simplified description of the legislation. In particular, the offences mentioned here may be absolute, intentional, deliberate or reckless. Note that where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.

### Otter

The otter benefits from world-wide protection under Appendix I of the Convention on International Trade in Endangered Species of Wild Flora and Fauna. It also receives European protection under Appendix II of the Bern Convention and Annexes II and IV of the EU Habitats Directive 94/43/EEC, which is transposed into UK Law by means of The Conservation of Habitats and Species Regulations 2017, as amended (Habitats Regulations 2017, as amended).

Regulation 43 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill an otter;

- deliberately disturb otters; or
- damage or destroy a breeding site or resting place.

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017, as amended, for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead otter, part of an otter or anything derived from an otter which has been unlawfully taken from the wild.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to intentionally (rather than deliberately) kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to intentionally or recklessly\* damage or destroy, or obstruct access to, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to intentionally or recklessly\* disturb any protected species while it is occupying a structure or place which it uses for shelter or protection. \*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on public bodies to have regard for the conservation of biodiversity and maintains lists of species and habitats which are of principal importance for the purposes of conserving biodiversity in England and Wales. These lists supersede Section 74 of the CRoW Act 2000. Otters are listed on Section 41 (England) and Section 42 (Wales) of the NERC Act 2006.

The reader should refer to the original legislation for the definitive interpretation.

### Bats

Bats and the places they use for shelter or protection (i.e. roosts) receive protection under The Conservation of Habitats and Species Regulations 2017, as amended (Habitats Regulations 2017, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that bats, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 43 of the Habitats Regulations 2017 (as amended), states that a person commits an offence if they:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats; or
- damage or destroy a bat roost (breeding site or resting place).

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 (as amended) for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead bats, part of a bat or anything derived from bats, which has been unlawfully taken from the wild.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* (rather than deliberately) kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly\** damage or destroy, or *obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly\** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

\*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

As bats re-use the same roosts (breeding site or resting place) after periods of vacancy, legal opinion is that roosts are protected whether or not bats are present.

The following bat species are Species of Principal Importance for Nature Conservation in England: Babastrelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule bat *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*.

The reader should refer to the original legislation for definitive interpretation.

#### Great crested newt

Great crested newts (GCN) and the places they use for shelter or protection receive European protection under The Conservation of Habitats and Species Regulations 2017, as amended (Habitats Regulations 2017, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that GCN, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 43 of the Habitats Regulations 2017 (as amended), states that a person commits an offence if they:

- deliberately capture, injure or kill a GCN;
- deliberately disturb GCN;
- deliberately take or destroy eggs of a GCN; or
- damage or destroy a GCN breeding site or resting place.

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Conservation of Habitats and Species Regulations 2017 (as amended) for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead GCN, part of a GCN or anything derived from GCN, which has been unlawfully taken from the wild. This legislation applies to all life stages of GCN.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* (rather than deliberately) kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly\** damage or destroy, or *obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly\** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

\*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

Great crested newts are listed as Species of Principal Importance on the UK Post-2010 Biodiversity Framework (2012), and as such are material considerations in the planning process.

#### Natterjack Toads

Natterjack Toads are protected through Conservation of Habitats and Species Regulations 2017 (as amended) and are also included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to:

- Section 9(1) of the WCA makes it an offence to *intentionally* (rather than deliberately) kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly\** damage or destroy, or *obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly\** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.



\*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

### Badgers

Badgers and their setts are protected under the Protection of Badgers Act 1992. The Protection of Badgers Act 1992 is based primarily on the need to protect badgers from baiting and deliberate harm or injury, badgers are not protected for conservation reasons. The following are criminal offences:

- To intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it.
- To wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so.

A badger sett is defined in the legislation as:

*'Any structure or place that displays signs indicating current use by a badger'*.

'Current use' is not synonymous with current occupation and a sett is defined as such (and thus protected) as long as signs of current usage are present. Therefore, a sett is protected until such a time as the field signs deteriorate to such an extent that they no longer indicate 'current usage'.

Badgers and their setts are also protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Under this Act it is unlawful to:

- Willfully kill, injure or take a badger or attempt to do so.
- Cruelly ill-treat a badger.
- Interfere with a sett by doing any of the following:-
  - (i) damaging a badger sett or any part of it
  - (ii) destroying a badger sett
  - (iii) obstructing access to a badger sett
  - (iv) causing a dog to enter a sett
  - (v) disturbing a badger while it is occupying a sett.

For any activity that would contravene the above legislation a badger development licence would be required from Natural England (NE). Natural England will normally only issue such licences for work to be carried out between the months of July and November inclusive, to avoid the breeding season, although exceptions may be possible if a sound justification can be made.

Guidance on the interpretation of the term 'disturbance' in relation to the above legislation is provided by Natural England at <https://www.gov.uk/guidance/badgers-protection-surveys-and-licences> and states that a licence will not be required to clear ditches and watercourses using hand tools or machinery if clearance is unlikely to disturb a badger in its sett or damage a sett. Existing levels of disturbance are also considered

Badger sett interference can result from a multitude of operations including excavation and coring, even if there is no direct damage to the sett, such as through the disturbance of badgers whilst occupying the sett. Any intentional or reckless work that results in the interference of badger setts is illegal without a licence from Natural England<sup>30</sup>. In England a licence must be obtained from Natural England before any interference with a badger sett occurs.



**HODBARROW NATURE RESERVE**

**For**

**COPELAND BOROUGH COUNCIL**

**ADDENDUM: PRELIMINARY ECOLOGICAL APPRAISAL OF  
ALTERNATIVE CAR PARK SITE (SUMMARY)**

**JANUARY 2022**

📍 17 Chorley Old Road,  
Bolton,  
Lancashire  
BL1 3AD

☎ **Tel:** 01204 393 006

☎ **Fax:** 01204 388 792

✉ **E-mail:** [info@appletons.uk.com](mailto:info@appletons.uk.com)

[www.appletons.uk.com](http://www.appletons.uk.com)  [@Appletons\\_LArch](https://twitter.com/Appletons_LArch)

Landscape Architecture Ecology Environmental Planning & Assessment • Arboriculture

**Landscape  
Institute**  
Registered practice

**appletons**



# appletons

17 Chorley Old Road  
Bolton  
Lancashire  
BL1 3AD

**Tel:** 01204 393006

**Email:** [info@appletons.uk.com](mailto:info@appletons.uk.com)

**Web:** [www.appletons.uk.com](http://www.appletons.uk.com)

#### **Copyright and Non-Disclosure Notice**

The contents and layout of this report are subject to copyright owned by Appleton Deeley Limited trading as Appletons save to the extent that copyright has been legally assigned by Appletons to another party or is used by Appletons under license. To the extent that Appletons own the copyright to this report, it may not be used without written agreement from Appletons for any purpose other than that indicated in this report.

The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without prior written agreement of Appletons. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to third party disclaimer set out below.

---

#### **Third Party Disclaimer**

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Appletons at the instruction of, and for the use by our client on the front of this report. It does not in any way constitute advice to any third party who is liable to access it by any means. Appletons excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. Appletons does not however, exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud, or any other matter in relation to which we cannot legally exclude liability.

# DOCUMENT CONTROL

**TITLE:** ADDENDUM: PRELIMINARY ECOLOGICAL APPRAISAL OF ALTERNATIVE CAR PARK SITE (SUMMARY)

**PROJECT:** HODBARROW NATURE RESERVE

**JOB NO:** 2363-E1

**CLIENT:** COPELAND BOROUGH COUNCIL

<b>Prepared by:</b> Lucy Gibson	<b>Date:</b> January 2022
<b>Surveyors:</b> Lucy Gibson	<b>Date:</b> January 2022
<b>Checked by:</b> Lorraine McKee	<b>Date:</b> February 2022
<b>Approved for distribution by:</b> Lucy Gibson	<b>Date:</b> 02/02/2022

## Document

Status	Description	Rev date	By	Approved by	Issued to	Issue date	Comments
Final	Preliminary Ecological Appraisal		LM & LG	LG			

## Revisions to Final Document

Rev	Description	Rev date	By	Approved by	Issued to	Issue date	Comments

## CONTENTS:

---

**1.0 Introduction**

**2.0 Methodologies**

**3.0 Summary of PEA Data & Recommendations**

**4.0 RESULTS: ALTERNATIVE CAR PARK SITE (COMPARTMENT J)**

APPENDIX 1: Phase 1 Habitat Survey Data

APPENDIX 2: Photographs

## 1.0 INTRODUCTION

### Project background

- 1.1 In May 2021, Appletons was commissioned by Copeland Borough Council to carry out an initial ecological appraisal at Hodbarrow Nature Reserve. This survey is required to inform the design, construction and improvement of paths within the reserve; a project known as the Iron Line. To fulfil this brief a Preliminary Ecological Assessment was undertaken during summer 2021. The PEA survey in 2021 included an area adjacent to the north of Hodbarrow Nature Reserve, comprising predominantly slag banks from Redhills Quarry, as a potential site for a new car park and visitors centre (compartment I in Appendix 2). Subsequently, an alternative site for a car park and visitors centre has been identified adjacent to the north-east of the nature reserve, which forms part of Redhills Quarry site. As this area was not included in the PEA survey work undertaken in 2021, a further PEA walkover visit was made of the alternative car park site in January 2022, which this appendix refers to.
- 1.2 To date, the following additional surveys have been undertaken at Hodbarrow Nature Reserve in 2021 in association with the Iron Line project:
- Natterjack Toad and Great Crested Newt Survey – Tyrer Ecological Consultants Ltd, August 2021
  - Invertebrate Survey – Stenecology, August 2021
  - Phase 2 Habitat Survey (NVC) – Joshua Styles, August 2021
- 1.3 This report is an addendum to and should be read in conjunction with the main Preliminary Ecological Appraisal (Summary) document, 2363-E1-SUM. Legislation relating to habitats and species within this addendum are to be found within Appendix 3 of that report.

### Site description and context

- 1.4 The alternative car park site measures approximately 2.1ha and is centred approximately at Ordnance Survey Grid Reference SD 17987896. To the north of the site is the recycling centre and Redhills Quarry (disused) with a large waterbody, to the west of the site is Hodbarrow Nature Reserve and the adjacent slag banks, and to the south and east lie fields used for pasture. A tarmac road runs through the site providing vehicular access to the adjacent recycling centre. The Duddon Estuary lies approximately 240m to the south-west of the site at its closest point. The site lies in a rural context, with Millom town situated approximately 610m to the north of the survey site, beyond fields.

## **2.0 METHODOLOGIES**

### **Extended Phase 1 Habitat survey**

- 2.1 As part of the Preliminary Ecological Assessment (PEA), a Phase 1 Habitat Survey was conducted following the methodology of the Joint Nature Conservation Committee (JNCC, 2010) and the Institute of Environmental Assessment (IEA, 1995). The Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats. The aim is to provide a record of habitats that are present on site. Data recorded during the field survey of the alternative car park site is shown in Drawing 2363-E1-J in Appendix 1 of this report.
- 2.2 As part of the PEA undertaken at the alternative car park site, the Phase 1 Habitat Survey scope was extended to search the site for field signs indicating the presence of protected/notable species and for habitat with the potential to support protected/notable species, including badgers, reptiles, bats, nesting birds, amphibians, otters, etc. This search was undertaken by Lucy Gibson MCIEEM during the daytime survey visit to record the botanical species and broad habitats present for the Phase 1 Habitat Survey, on 18<sup>th</sup> January 2022. Signs of protected/notable species that were found, such as footprints, hairs, droppings, likely setts/roosts/nests, feeding remains, were noted during the surveys, and locations were annotated on a map along with GPS coordinates wherever possible.
- 2.3 Constraints to the PEA include, but are not limited to, the presence of inaccessible dense and extensive scrub habitat in some areas. Therefore, it is possible that some of these habitats contained evidence of protected/notable species, but they could not be accessed to be recorded by the surveyor. This is of particular relevance to finding signs of species that may be more elusive and prefer dense cover in which to shelter/nest, for example badgers, otters and some bird species. However, it is likely that frequent signs of badger activity indicating the presence of a sett would have been found in other, more accessible areas of the survey site, such as along site boundaries and the edges of woodland/scrub habitats, where badgers often leave territorial signs, such as latrines, and trails through vegetation and under fences. It is also likely that mammal trails would have been relatively obvious through dense vegetation on site, should larger mammals, such as badger, regularly move across the site. In addition, the PEA survey was undertaken in January, which is outside of the main survey season for many ecological receptors, such as nesting birds, plants and invertebrates, and when some wildlife, including bats, reptiles and amphibians are most likely to be hibernating. Therefore, many plant species would have been dormant and less visible in the sward during the survey visit, and may not have been recorded; however, a detailed botanical survey was not undertaken as part of the PEA.
- 2.4 As part of the PEA for Hodbarrow Nature Reserve, records of protected and notable species from within 2km of the survey site were obtained from the local records centre, Cumbria Biodiversity Data Centre (CBDC), in 2021. The records were analysed to identify those from the survey site itself, and to provide a wider ecological context to the survey site.

## **3.0 SUMMARY OF PEA DATA & RECOMMENDATIONS**

### *Survey Findings and Recommendations*

- 3.1 A general summary of the findings and recommendations as a result of the PEA survey of the alternative car park site is provided in Table 3.1 below, including records returned from the local records centre, of protected/notable species from the Hodbarrow Nature Reserve or from within 2km of the site (7065 records

in total). Detailed findings of the Phase 1 Habitat Survey, with lists of the plant species and habitats identified in each compartment, can be found in the appendix.

Species/Group	Likely presence on Alternative Car Park Site	Records within 2km of Hodbarrow Reserve	Survey work recommended?
Birds	<p>Yes. The alternative car park site is adjacent to the RSPB reserve, which is also designated as part of the Duddon Estuary SSSI and Ramsar site, the Morecambe Bay SAC and the Duddon Estuary and Morecambe Bay SPA, with designated features inclusive of important populations of wintering birds and breeding birds.</p> <p>The PEA survey visit was undertaken in January, outside of the nesting bird season, which is generally mid-March to August. Therefore, breeding bird activity was not observed and summer visiting bird species were not present during the survey. Birds will nest in the dense bramble scrub, hawthorns and willows during spring and summer months.</p> <p>Birds seen/heard during the PEA visit include: wren, herring gull, blackbird, bullfinch, goldfinch, oystercatcher, black-headed gull, robin, crow, blue tit, long-tailed tit, great spotted woodpecker, pheasant, jay.</p>	<p>Yes - there are 5692 records of birds included in the data from within 2km of the site.</p>	<p>No, but timing of the works is critical to avoid disturbance of nesting birds/destruction of nests, particularly in areas of dense scrub.</p>
Bats	<p>Yes – likely foraging and commuting along scrub edge habitat, over grassland and adjacent waterbody in the quarry. Majority of trees on site are likely to be small and lacking in potential roost features and/or too densely growing for suitable bat roosting habitat.</p>	<p>Yes - three records of bats (unidentified bat and common pipistrelles) are included in the data. Nearest record is of common pipistrelle from c.1km north of survey site.</p>	<p>When the full extent of tree/scrub removal is known the trees should be examined in more detail for potential roost features by an experienced and licensed ecologist before any works are undertaken.</p>
Amphibians	<p>Yes – likely present in nearby waterbodies, and have been recorded on adjacent pasture and within the reserve during 2021 survey work. Likely to be present in scrub and grassland habitats across the site, and could potentially breed in the ditches near the entrance to the recycling centre.</p> <p>Survey work has been undertaken in 2021 on the reserve for great crested newts and natterjack toads; on this basis both species are likely absent from site (refer to amphibian survey report for details). However, further survey work for natterjack toads (NJT) will be undertaken in 2022 to cover the early part of the season.</p>	<p>Yes – 523 records of amphibians are included in data from CBDC. 74 records of common frog, 81 records of common toad, 2 records of great crested newt (from Sandscale and Haverigg), 315 records of NJT (many of which are from Hodbarrow reserve), 7 records of palmate newt, 44 records of smooth newt.</p>	<p>Yes – additional NJT survey work is being undertaken in in spring/early summer 2022 to ensure the whole survey season has been covered and to include the proposed car park site. Mitigation for NJT is likely to be necessary due to their presence close to the site, on grazing marsh to the south-east and to previous records of this species on the reserve.</p>
Reptiles	<p>Yes (records of common lizard from the reserve) and much of the alternative car park site has potential habitat for reptiles, with tussocky grassland areas, scrub and mosaics of grassland, scrub and open areas. There is potential for common lizard, slow-worm and grass snake on site.</p>	<p>Yes - Seven records of common lizard are included in CBDC data, from near paths/tracks on Hodbarrow Reserve, in compartments A (end of sea wall near caravan site), B along eastern coastline, and F (either side of the footpath near the northern end). Most recent records are from 2017.</p>	<p>Yes – reptile presence/likely absence survey work will be undertaken in spring/early summer 2022 in suitable habitat on the proposed car park site.</p>
Botany	<p>Notable plant species and habitats of importance are present on the reserve,</p>	<p>Yes – 55 records of notable botanical</p>	<p>Yes – NVC and Phase 3 botanical survey work will be undertaken on</p>



	identified during the PEA and the NVC survey undertaken in 2021. Calcareous grassland was identified on the alternative car park site during the PEA visit, and species of note were incidentally observed on the car park site during survey work in 2021, such as orchids and quaking grass.	species are included in data from CBDC, 24 of which are labelled 'Hodbarrow'.	the proposed car park site in spring/early summer 2022.
Badger	Likely badger foraging signs and trails were found in grassland near the southern site boundary with pasture (SD 1805678885), with a trail leading under the boundary fence. No badger hairs were found on the fence where the trail passed through, however, and no latrines were found nearby.	No – there are no records of badger within 2km included in the data from CBDC.	No, but caution is required - there is no evidence of an active sett on site on the basis of the PEA visit, and relatively low evidence of badger activity (foraging) was found during the PEA visit (detailed badger survey work was not undertaken, however, and access was not possible within areas of dense scrub to search for setts/signs). As a precaution, removal of dense scrub should be undertaken slowly and carefully by hand ideally, and in the presence of an ecologist to look out for any potential badger signs/setts within the scrub.
Otter	Possible – no signs of otter were seen during the PEA visit (a detailed otter survey was not undertaken, however, and access was not possible within areas of dense scrub to search for holts/signs). If present in the locality of the survey site, it is possible that otters may shelter in dense scrub habitats on site. However, disturbance levels on site are relatively high due to the access road for the adjacent recycling centre crossing the site, which may deter otters from visiting the site and/or seeking shelter on the site.	Yes - one record of otter located ~1.5km north of the survey site is included in the data from CBDC.	No – no evidence of otter activity was found to be present on site during PEA visit, although a detailed otter survey was not undertaken. Suitable otter sheltering habitat is present on site and otter foraging habitat is present in the waterbodies on adjacent land; however, the levels of disturbance from people (and possibly dogs) are generally high and are likely to deter otter from seeking shelter on site. However, otter may occasionally visit the site when foraging/dispersing in the locality.
Invertebrates	Due to the PEA survey being undertaken during winter, invertebrates were not observed during the visit, although it was noted that there were many anthills present in grassland on site. Invertebrate survey work undertaken in 2021 found notable species present on the adjacent reserve; refer to the invertebrate survey report for details.	Yes – 732 records of protected/notable invertebrates are included in the data from CBDC.	Yes, the mosaic of open habitats on the site, including grassland, ruderal, patches of bare ground, wetland and scrub would provide potential for invertebrate species of note to be present – invertebrate survey work will be undertaken in spring/early summer 2022 on the proposed car park site.
Other	Rabbit evidence was present in many grassland areas during the PEA visit, comprising droppings and burrows. There was also recent evidence of fox activity on site, including a scat, feeding remains and scent of fox.	Three records of weasel, two from Hodbarrow reserve. Four records of red squirrel (nearest record from c.700m north of survey site). Two records of grey squirrel (nearest record from c.1.5km north of survey site). Six records of hedgehog (nearest record from c.1.3km north-west of survey site).	On the basis of the PEA findings, is possible that there is a fox's earth within dense scrub on the site. The precautionary recommendations regarding badgers above would also serve for foxes.

**Table 3.1: Summary table providing general results and recommendations from the Alternative Car Park Site PEA**

## 4 RESULTS: ALTERNATIVE CAR PARK SITE (COMPARTMENT J)

4.1 The alternative car park site situated adjacent to the north-east of Hodbarrow Nature Reserve comprised an area dominated by unimproved calcareous grassland with dense scrub habitats. A tarmac road runs west to east across the site near the southern boundary, before heading northwards to the adjacent recycling centre on Redhills Quarry (disused) to the north of the site. Two small, water-filled ditches were present on either side of the road near the north boundary, and areas of standing water were also present during the PEA visit, to the east of the road and ditch near the northern part of the site. Areas of tall ruderal and scattered scrub were also present. Large areas of dense scrub were present on site, which were mainly inaccessible. Compartment level habitat data can be found within Drawing 2363-E1-J; Compartment J is highlighted in Figure 10, below:



**Figure 10: Compartment J, in light green, shown inside the compartment boundary in red**

4.2 Compartment level habitat data can be found within Drawing 2363-E1-J. Habitats found within the alternative car park site are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/Hard-standing (J4)
- Dense scrub (A2.1)
- Mosaic: Tall ruderal herb (C3.1) & Dense scrub (A2.1)
- Mosaic: Scattered scrub (A2.2) & Unimproved calcareous grassland (B3.1)
- Open standing water (G1)
- Running water (G2)

#### *Bare ground (J4)*

- 4.3 Bare ground in this compartment is represented by the tarmac road running across the site to the recycling centre adjacent to the north of the site, and a lay-by area of hard-standing to the north of the road.

#### *Dense Scrub (A2.1)*

- 4.4 An area of dense scrub that has the species composition of scrub but the functionality of woodland due to the tree-form nature of the shrubs is present along the northern margin of the compartment. This area was largely inaccessible during the survey. Species composition of this area is presented in Table 1J, below.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	A
Willow	<i>Salix spp.</i>	A
Bramble	<i>Rubus fruticosus agg. sp.</i>	F
Hart's tongue fern	<i>Asplenium scolopendrium</i>	F
Male fern	<i>Dryopteris felix-mas</i>	O

**Table 1J: Species assemblage within dense scrub habitat along the northern margin of the site.**

- 4.5 Dense, inaccessible scrub habitat with some ruderal herbs is also present in the eastern part of the site, growing along the embankment along the west of the road. Table 2J, below, presents the species composition within this area.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	A
Willow	<i>Salix spp.</i>	A
Bramble	<i>Rubus fruticosus agg. sp.</i>	F
Greater willowherb	<i>Epilobium hirsutum</i>	O
Bracken	<i>Pteridium aquilinum</i>	O

**Table 2J: Species assemblage within dense scrub habitat in the eastern part of the site.**

- 4.6 Inaccessible, dense scrub is also present across the centre of the site and in the south-eastern part, which is of a lower height than the other dense scrub habitat described above, due to the dominance of bramble in these areas. Table 3J, below, presents the species composition within these areas.

Common Name	Scientific Name	Frequency
Bramble	<i>Rubus fruticosus agg. Sp.</i>	D
Hawthorn	<i>Crataegus monogyna</i>	F
False oat grass	<i>Arrhenatherum elatius</i>	F
Common hogweed	<i>Heracleum sphondylium</i>	O
Dog rose	<i>Rosa canina</i>	O

**Table 3J: Species assemblage within dense scrub habitat in the central and south-eastern parts of the site.**

#### *Open Standing Water (G1)*

- 4.7 Several small areas of standing water were present during the PEA visit, in the north-eastern corner of the site near the ditch along the east of the road. No vegetation associated with these areas of water was noted.

#### *Running Water (G2)*

- 4.8 Two small ditches are present on both sides of the road near the northern boundary of the site, which held water during the survey visit. Vegetation associated with the ditches included frequent hard rush *Juncus*

*inflexus*, occasional common water-starwort *Callitriche stagnalis* and brooklime *Veronica beccabunga*, and rarely bulrush *Typha latifolia*.

*Mosaic: Tall Ruderal (C3.1) and dense scrub (A2.1)*

- 4.9 Along the eastern boundary of the site is an area comprising mainly tall ruderal herbs and dense scrub at a ratio of approximately 60:40 respectively. Species included in this area are shown in Table 4J, below.

Common Name	Scientific Name	Frequency
Bramble	<i>Rubus fruticosus</i> agg. sp.	A
Rosebay willowherb	<i>Chamerion angustifolium</i>	A
Greater willowherb	<i>Epilobium hirsutum</i>	F
Hawthorn	<i>Crataegus monogyna</i>	F
Willow	<i>Salix</i> spp.	O
Gorse	<i>Ulex europaeus</i>	O
Common knapweed	<i>Centaurea nigra</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	R
Sheep's fescue	<i>Festuca ovina</i>	R

**Table 4J: Species assemblage within tall ruderal/dense scrub mosaic habitat present within the site.**

*Mosaic: Scattered scrub (A2.2) and Unimproved calcareous grassland (B3.1)*

- 4.10 The swathe of unimproved calcareous grassland and scattered scrub mosaic habitat covers roughly the central area of the site, with the tarmac road dissecting it towards the south. The area comprises approximately 70% grassland to 30% scrub species. Ruderal herbs were present occasionally, and cotoneaster shrubs were also present within this area. The grassland in the north-eastern part of the habitat was mossy in character, and there were small, brown fungi present occasionally. Table 5J below includes species noted in this mosaic habitat.

Common Name	Scientific Name	Frequency
Hawthorn	<i>Crataegus monogyna</i>	F
False oat grass	<i>Arrhenatherum elatius</i>	F
Glaucous sedge	<i>Carex flacca</i>	F
False brome	<i>Brachypodium sylvaticum</i>	F
Ribwort plantain	<i>Plantago lanceolata</i>	F
Cock's-foot grass	<i>Dactylis glomerata</i>	F
Wild strawberry	<i>Fragaria vesca</i>	F
Fescue	<i>Festuca</i> spp.	F
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	F
Common bent	<i>Agrostis capillaris</i>	F
Quaking grass	<i>Briza media</i>	F
Common knapweed	<i>Centaurea nigra</i>	O
Dog rose	<i>Rosa canina</i>	O
Bramble	<i>Rubus fruticosus</i> agg. sp.	O
Creeping bent	<i>Agrostis stolonifera</i>	O
Gorse	<i>Ulex europaeus</i>	R
Grey willow	<i>Salix cinerea</i>	R
Hedge bedstraw	<i>Galium mollugo</i>	R
Upright brome	<i>Bromopsis erecta</i>	R

**Table 5J: Species assemblage for the unimproved calcareous grassland and scattered scrub habitat mosaic type within the site.**

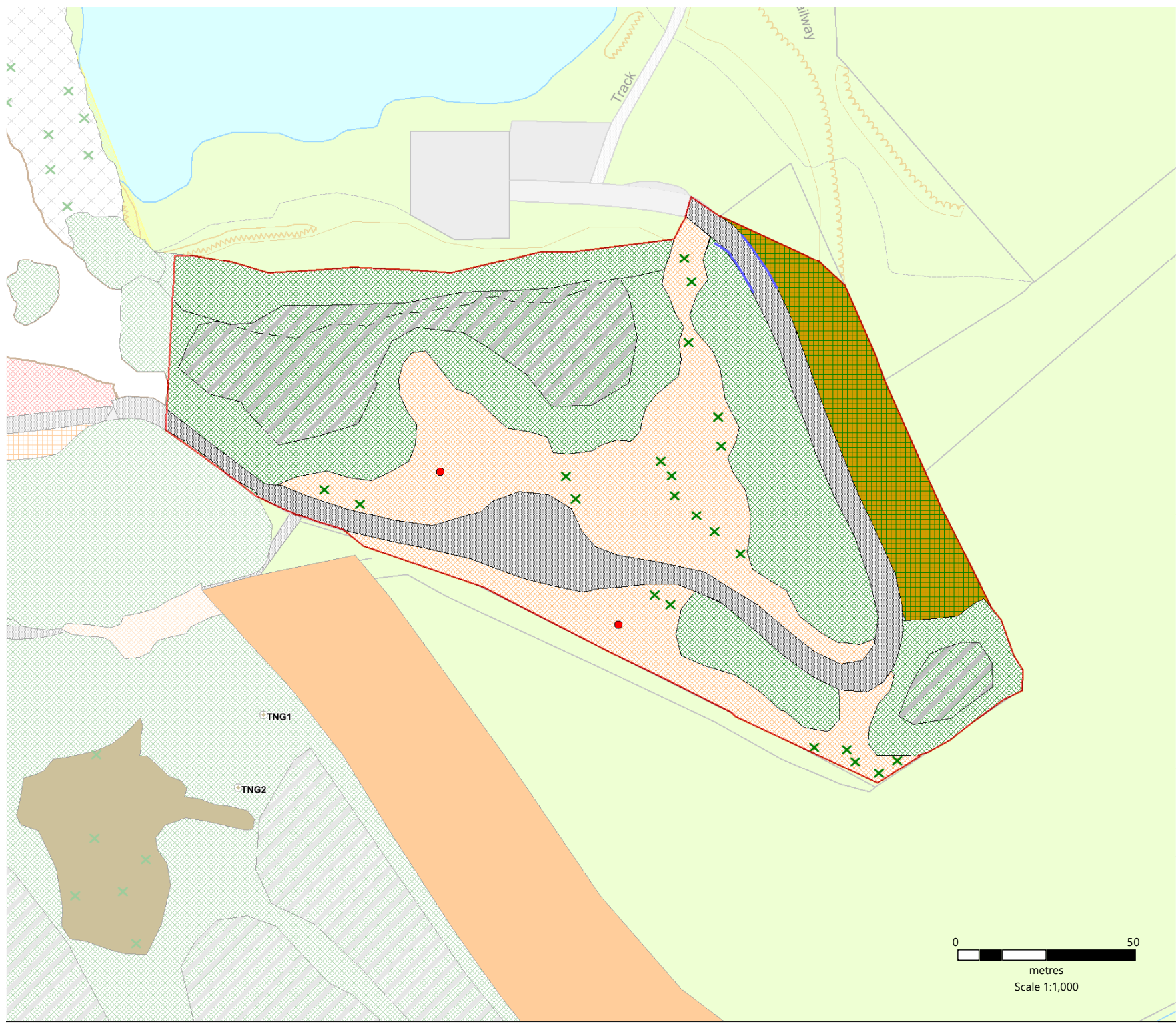
*Invasive Species*










- 4.11 Cotoneaster shrubs were present within the unimproved calcareous grassland and scattered scrub mosaic habitat, both to the north and the south of the road. The majority of the cotoneaster shrubs were relatively small; however, they appear to be spreading in distribution. The cotoneaster was growing mainly around grid references SD1799378988 and SD1797278932 (See Drawing 2363-E1-J, Appendix 1).

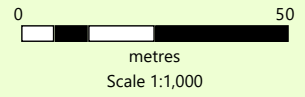






**APPENDIX 1**



-  A2.1 Dense/continuous scrub
-  A2.2 Scattered scrub
-  B3.1 Unimproved calcareous grassland
-  Mosaic: C3.1 Tall ruderal and A2.1 Dense scrub
-  G1 Standing water and G2 Running water
-  J4 Bare ground/hard standing
-  Cotoneaster
-  Inaccessible
-  Compartment boundary



<b>RSPB Hodbarrow: Compartment J</b>	
Phase 1 Habitat Plan	
RSPB	
N 	Drawing: 2363-E1-J Revision: 0 Date: 02/02/2022
	Drawn by: LM Checked by: LG Scale: 1:1000 @ A3
 Appletons 17 Chorley Old Road, Bolton, BL1 3AD. Tel: 01204 393006 Web: www.appletons.uk.com Email: info@appletons.uk.com	



**APPENDIX 2**



## APPENDIX 2 – PHOTOGRAPHS



Photo 1: Tarmac road leading to adjacent recycling centre.



Photo 2: Unimproved calcareous grassland and scattered scrub mosaic habitat.



Photo 3: Scrub growing along the northern margin.



Photo 4: Grassland and dense scrub in south-east of site.



Photo 5: Dense scrub and ruderal along road leading north.



Photo 6: Ditch holding water next to road near northern boundary.





Photo 7: Grassland and scrub with trails to south of road.



Photo 8: Tall ruderal and dense scrub habitat along eastern margin.



Photo 9: Dense scrub in western part of site.



Photo 10: Mossy grassland and scattered scrub in north-eastern part of site.



Photo 11: Grassland south of road with cotoneaster shrubs.



Photo 12: Calcareous grassland with hard-standing lay-by in background.