

A303 Amesbury to Berwick Down

TR010025

6.3 Environmental Statement Appendices

Appendix 8.2B Beacon Hill lichen report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

October 2018



Technical Note

A303 Amesbury to Berwick Down



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1 Summary

The notable lichens at Beacon Hill are all corticolous species except for *Verrucaria ochrostoma* which is present on concrete. Powell (2015) provided evidence that *V. ochrostoma* is much-overlooked. The only category of lichens that would be germane to the conservation status of the primary interest feature (calcareous grassland) of the SAC are terricolous lichens. Only two terricolous lichens were recorded at Beacon Hill and neither of these are notable.

2 Methods

- 2.1 The survey was conducted by Mark Powell on the 1st December 2017. All lichens and lichenicolous fungi that were encountered were recorded using the names currently listed in the British Lichen Society (BLS) Taxon Dictionary.
- 2.2 Lichens were identified with the aid of a x10 hand lens and a set of three spot chemicals. Where relevant, the methodology recommended by BLS (2006) was followed. Some lichen species cannot be reliably identified in the field, therefore required microscopic examination. Frugal specimens were collected and placed into paper packets. Specimens were dried gently but swiftly to prevent degradation and subsequently stored in dry conditions. Standard light microscope techniques (BLS 2006) were used to confirm identifications.
- 2.3 The survey of all habitats at Beacon Hill was conducted in fine weather conditions.
- 2.4 The area of Beacon Hill surveyed is shown in Figure 1 Appendix A

3 Results and Discussion

- 3.1 Seventy-eight taxa of lichens and lichenicolous fungi were recorded as confirmed identifications and a further three species remain unidentified. Three of the taxa are non-lichenized bark fungi which are traditionally recorded by lichenologists (they have a similar ecology as lichens and are not plant pathogens). Four of the taxa are lichenicolous fungi (fungi which live in or on lichens). The remainder are lichenized

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- fungi (lichens).
- 3.2 Despite large areas of chalk grassland, some occurring on steep slopes and some areas disturbed by various activities, terricolous lichens are very scarce and include no notable species.
 - 3.3 The lower stem of a hawthorn (*Crataegus monogyna*) (Photograph 1, Appendix B), located at SU 1969 4266 supports a colony of *Arthonia cinnabarina*, not a notable species but one more typical of old woodland and perhaps indicative of the age and continuity of some of the scrub on Beacon Hill. A stand of well-established old scrub dominated by hawthorn with elder (*Sambucus nigra*) is located at SU 1949 4285 (Photograph 2, Appendix B). Elders within this scrub supports colonies of the Nationally Scarce *Bacidia friesiana*.
 - 3.4 Paths regularly used by trail bikes are located at Beacon Hill (Photograph 3 & 4, Appendix B). While paths on chalk grassland when trodden by humans are often found to support quite rich terricolous lichen communities, those used by sheep (and by bikes) cause too much disturbance (Gilbert, 2000). While such scars might develop some interest for terricolous lichens for a period of years or decades when the activity has finished, currently no lichens can establish due to the regular disturbance. In chalk habitats, terricolous lichens are associated with places where the vascular vegetation is suppressed, usually where the soil is very thin and infertile and where steep slopes prevent the development of a dense grass sward. While this sort of disturbance may be an unwelcome mistreatment of chalk grassland, such scars may provide interesting lichen habitat if the activity ceases and if the soil and sward remain very thin.
 - 3.5 An old stand of hazel with scattered ash (*Fraxinus excelsior*) trees is located at SU 1908 4255 (Photograph 5, Appendix B). The hazel stems support one IUCN Vulnerable species *Pyrenula coryli* along with *Anisomeridium viridescens* and *Eopyrenula coryli* (both species for which Britain has International Responsibility). All three species grow on stems of varying diameters but particularly on 'sun-shoots' arising on old unmanaged stools. While some coppicing appears to have occurred in recent decades on the steeper slopes, and this management may be appropriate for some of the hazel stand, some areas of old, unmanaged stools should be retained.
 - 3.6 Grassland within the site is mainly rank and provides no opportunities for terricolous lichens. Slopes on site are too densely vegetated to support terricolous lichens (Photograph 6, Appendix B). Chalk sites require very specific conditions for rich terricolous lichen communities to develop. A narrow strip of land to the south of the A303 (Photograph 7, Appendix B) was also found to be too heavily dominated by rank grassland and light scrub to support any terricolous lichens, although a small number of lichens (common to the region) were found on scrub twigs.
 - 3.7 A plantation of sycamore (*Acer pseudoplatanus*) and Norway maple (*Acer platanoides*) is located to the north of the A303 at SU 188 424 (Photograph 8, Appendix B). While not supporting lichen communities of significant conservation importance, *Porina byssophila* (Nationally Rare) and *Strigula taylorii* (Nationally Scarce, International Responsibility) are found on these planted trees. Powell (2013) demonstrated that *P. byssophila* is much more widespread than previously realised. *S. taylorii* is undergoing a rather remarkable spread from its former strongholds in the south and west of Britain, where it was formerly mainly found in old woodlands. In recent years it has been recorded widely across Eastern England and the Home Counties and now appears to grow on trees in any type of site, including gardens

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and urban parks.

3.8 Infrequently used tracks are located within the site (Photograph 9, Appendix B). They contain some exposed chalk but terricolous lichens are effectively absent. A small number of lichens are associated with flints lying on the ground. These include two species of *Verrucaria* which belong to the *V. dolosa/murina* complex which is not currently well understood taxonomically. One disused grassy track (Photograph 10, Appendix B) supports a poorly-developed terricolous community with several individuals of *Leptogium schraderi*. It is not uncommon for the richest terricolous lichen communities on chalk to be associated with human activities, especially earthworks. In the area of Beacon Hill surveyed, no rich terricolous communities were found.

3.9 A list of all of the lichens and lichenicolous fungi recorded on Beacon Hill can be found in Table 1 below.

Table 1: Lichens and lichenicolous fungi recorded on Beacon Hill

Standard British Lichen Society (BLS) number	Taxon	Taxon Type ¹	Conservation designation ²	Substratum in which the taxon was growing ³	Details of substratum using standard BLS codes ⁴
48	<i>Anisomeridium biforme</i>	L	LC	Cort	CAp,CCo
49	<i>Anisomeridium polypori</i>	L	LC	Cort	CAp
1607	<i>Anisomeridium viridescens</i>	L	LC NS IR	Cort	CCo
72	<i>Arthonia cinnabarina</i>	L	LC	Cort	CCt
56	<i>Arthonia didyma</i>	L	LC	Cort	CFx,CAp
69	<i>Arthonia radiata</i>	L	LC	Cort	CCt
70	<i>Arthonia spadicea</i>	L	LC	Cort	CP
1540	<i>Arthopyrenia analepta</i>	F	LC	Cort	CCt
147	<i>Bacidia friesiana</i>	L	LC NS	Cort	CSm
2442	<i>Caloplaca arcis</i>	L	LC NS	Sax	SCo
247	<i>Caloplaca citrina s. lat.</i>	L	LC	Sax	SCo
2315	<i>Caloplaca flavocitrina</i>	L	LC	Sax	SCo
2461	<i>Caloplaca oasis</i>	L	LC	Sax	SCo
289	<i>Candelaria concolor</i>	L	LC	Cort	CCt
291	<i>Candelariella aurella f. aurella</i>	L	LC	Sax	SCo
297	<i>Candelariella reflexa</i>	L	LC	Cort	CCt
316	<i>Catillaria nigroclavata</i>	L	LC NS	Cort	CCt
375	<i>Cladonia coniocraea</i>	L	LC	Cort	CCt
359	<i>Cladonia ramulosa</i>	L	LC	Cort	CCt
460	<i>Collema tenax var. ceranoides</i>	L	LC	Terr	
491	<i>Diploicia canescens</i>	L	LC	Cort	CCt
1616	<i>Eopyrenula grandicula</i>	F	LC NS IR	Cort	CCo
511	<i>Evernia prunastri</i>	L	LC	Cort	CCt
987	<i>Flavoparmelia caperata</i>	L	LC	Cort	CCt
533	<i>Graphis scripta</i>	L	LC	Cort	CCo
1704	<i>Halecania viridescens</i>	L	LC NS	Cort	CCt
2240	<i>Heterocephalacria physciacearum</i>	LF	LC NS	Lic	Z1112,CCt
1125	<i>Hyperphyscia adglutinata</i>	L	LC	Cort	CCt

2468	<i>Hypotrachyna afrorevoluta</i>	L	LC	Cort	CCt
2577	<i>Hypotrachyna revoluta s. str.</i>	L	LC	Cort	CCt
2L71	<i>Illosporopsis christiansenii</i>	LF	LC NS	Lic	Z153L,CCt
616	<i>Lecania erysibe s. str.</i>	L	LC	Sax	SCo
627	<i>Lecanora albescens</i>	L	LC	Sax	SCo
635	<i>Lecanora campestris subsp. campestris</i>	L	LC	Sax	SCo
636	<i>Lecanora carpinea</i>	L	LC	Cort	CCt
639	<i>Lecanora chlarotera</i>	L	LC	Cort	CCt
646	<i>Lecanora dispersa</i>	L	LC	Sax	SCo
797	<i>Lecidella elaeochroma f. elaeochroma</i>	L	LC	Cort	CCt
1629	<i>Lepraria finkii</i>	L	LC	Cort	CCt
1974	<i>Lepraria incana s. str.</i>	L	LC	Cort	CCt
845	<i>Leptogium schraderi</i>	L	LC	Terr	
1L2L	<i>Melanelixia subaurifera</i>	L	LC	Cort	CCt
92L	<i>Normandina pulchella</i>	L	LC L*	Cort	CCt
938	<i>Opegrapha atra</i>	L	LC	Cort	CCo,CAP
948	<i>Opegrapha herbarum</i>	L	LC	Cort	CAP,CCt
953	<i>Opegrapha niveoatra</i>	L	LC	Cort	CAP
954	<i>Opegrapha ochrocheila</i>	L	LC	Cort	CCo
958	<i>Opegrapha rufescens</i>	L	LC	Cort	CAP
964	<i>Opegrapha varia</i>	L	LC	Cort	CCt,CAP
943	<i>Opegrapha vulgata</i>	L	LC	Cort	CAP
1L22	<i>Parmelia sulcata</i>	L	LC	Cort	CCt
1LL8	<i>Parmotrema perlatum</i>	L	LC	Cort	CCt
1L79	<i>Pertusaria leioplaca</i>	L	LC	Cort	CCo
11L3	<i>Phaeographis smithii</i>	L	LC	Cort	CCt
11L7	<i>Phaeophyscia orbicularis</i>	L	LC	Sax	SCo
111L	<i>Phlyctis argena</i>	L	LC	Cort	CCt
1112	<i>Physcia adscendens</i>	L	LC	Cort + Sax	CCt,SCo
1113	<i>Physcia aipolia</i>	L	LC	Cort	CCt
112L	<i>Physcia tenella</i>	L	LC	Cort	CCt
1127	<i>Physconia grisea</i>	L	LC	Cort	CCt
1168	<i>Porina aenea</i>	L	LC	Cort	CCo
1614	<i>Porina byssophila</i>	L	DD NR	Cort	CAP
1189	<i>Protoblastenia rupestris</i>	L	LC	Sax	SCK,SPe
163L	<i>Psoroglaena stigonemoides</i>	L	LC	Cort	Csm
2L7L	<i>Punctelia subrudecta s. str.</i>	L	LC	Cort	CCt
1675	<i>Pyrenula coryli</i>	F	VU D2 NR	Cort	CCo
1234	<i>Ramalina farinacea</i>	L	LC	Cort	CCt
1235	<i>Ramalina fastigiata</i>	L	LC	Cort	CCt
1289	<i>Rinodina oleae</i>	L	LC	Sax	SCo
1375	<i>Strigula jamesii</i>	L	LC NS	Cort	CFx,Csm
1378	<i>Strigula taylorii</i>	L	LC NS IR	Cort	CAP
2L68	<i>Teloggalla olivieri</i>	LF	NE NR	Lic	Z153L,CCt
15L7	<i>Verrucaria muralis</i>	L	LC	Sax	SCK,SPe,SCo
151L	<i>Verrucaria nigrescens f. nigrescens</i>	L	LC	Sax	SCo,SPe
1511	<i>Verrucaria ochrostoma</i>	L	DD NR	Sax	SCo
1528	<i>Xanthoria elegans</i>	L	LC	Sax	SCo
153L	<i>Xanthoria parietina</i>	L	LC	Cort + Sax	CCt,SCo

2272	<i>Xanthoriicola physciae</i>	LF	LC	Lic	Z153L,CCt
<p>¹ F= Fungus, LF= Lichenicolous fungus L= lichen L</p> <p>² DD = Data Deficient, LC = Least Concern, NE = Not Evaluated, VU = IUCN Vulnerable, IR = International Responsibility, NS = Nationally Scarce, NR = Nationally Rare.</p> <p>³ Cort = corticolous (growing on bark), Lic = lichenicolous (growing on or in lichens), Sax = saxicolous (growing on rocky substrata), Terr = terricolous (growing on the ground).</p> <p>⁴ CAp = Corticolous on <i>Acer pseudoplatanus</i>, CCo = Corticolous on <i>Corylus</i>, CCt = Corticolous on <i>Crataegus</i>, CFx = Corticolous on <i>Fraxinus</i>, CP = Corticolous on <i>Pinus</i>, CSm = Corticolous on <i>Sambucus</i>, SCK = Saxicolous on chalk, SCo = Saxicolous on concrete, SPe = Saxicolous on a pebble, Z1112 = Lichenicolous on <i>Physcia adscendens</i>, Z1530 = Lichenicolous on <i>Xanthoria parietina</i></p>					
3.10	<p><i>Pyrenula coryli</i> is Nationally Rare, IUCN Vulnerable (D2) and new to VC 8 (South Wiltshire). There is just one previous English record from Somerset. <i>P. coryli</i> is present on hazel stems in a rather large stand of old hazels centred at SU 191 426 where it is accompanied by two Nationally Scarce species (<i>Anisomeridium viridescens</i> and <i>Eopyrenula grandicula</i>) for which Britain has International Responsibility (the latter is new to VC 8). No published information is available regarding the nitrogen sensitivity of these three species. Field observations by the author and records in the BLS (British Lichen Society) mapping database suggest that these and other species on hazel stems are expanding their range and increasing in abundance across lowland England despite increasing influence of nitrogen pollution. Such species, growing on smooth bark within sheltered stands, appear to be relatively unaffected by widescale eutrophication.</p>				
3.11	<p><i>Porina byssophila</i> is currently IUCN Data Deficient and Nationally Rare. Powell (2013) provided evidence that this lichen is much more common as a corticolous lichen than was formerly realised and that it is more widely distributed in England than the previous records suggested. No published information is available regarding the nitrogen sensitivity of <i>P. byssophila</i> but its occasional presence in nutrient-enriched rain tracks suggests that it is not likely to be significantly affected by nitrogen pollution. <i>P. byssophila</i> is also a lichen that usually grows in shaded situations.</p>				
3.12	<p><i>Teloggalla olivieri</i> is a lichenicolous fungus. Lichenicolous fungi grow on or in lichens and are often pathogenic and host-specific. They are a group of fungi traditionally recorded by (some) lichenologists and most are considerably under-recorded.</p>				
3.13	<p>Lichens are sensitive to changes in the environment and have often been used as environmental indicators (Hawksworth & Rose 1970, Nimis <i>et al.</i> 2002). Traffic creates dust and gaseous compounds of nitrogen, which can cause changes in lichen communities leading to a predominance of nitrophilic ruderal species (Angold 1997). Lichen communities have changed dramatically in lowland England in the past two decades due to the reduction in acidic atmospheric pollution (especially sulphur dioxide from coal burning) and the increasing influence of compounds of nitrogen (especially from the burning of fossil fuels and agricultural activities). The changes are most marked on relatively young bark of trees (Vilsholm <i>et al.</i> 2009, Skinner 2016).</p>				
3.14	<p>The Centre for Ecology and Hydrology (CEH) has developed an app which defines some nationally common species as either nitrogen sensitive or nitrogen tolerant. The app is a tool for assessing the status of nitrogen in an area by surveying lichens</p>				

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on trees. By identifying the presence or absence of nine nitrogen-sensitive and eight non-sensitive lichens on tree trunks and branches, nitrogen pollution can be estimated. www.apis.ac.uk/lichen-app/main

- 3.15 The trees and shrubs at Beacon Hill are dominated by nitrogen tolerant species except in sheltered situations in dense stands of woodland and scrub. In shaded situations, the effect of shade appears to be dominant. Almost all the nitrogen tolerant species of lichen at Beacon Hill are also those which thrive in high light conditions. The nitrogen sensitive species are restricted to niches which have retained some acidity due to the nature and position of the particular trunk or branch, or where nitrogen tolerant species are excluded by shade. Even in open, well-lit situations, nitrogen sensitive and nitrogen tolerant lichens may be present on the same tree or shrub, their occurrence influenced by shade, rapidity of drying, exposure of surfaces to leaching by rain and rain tracks concentrating nutrients from the crown. The CEH app stresses the necessity to record on individuals of a single species of tree growing in similar ecological conditions in order for the assessment of local nitrogen pollution to be reliable.

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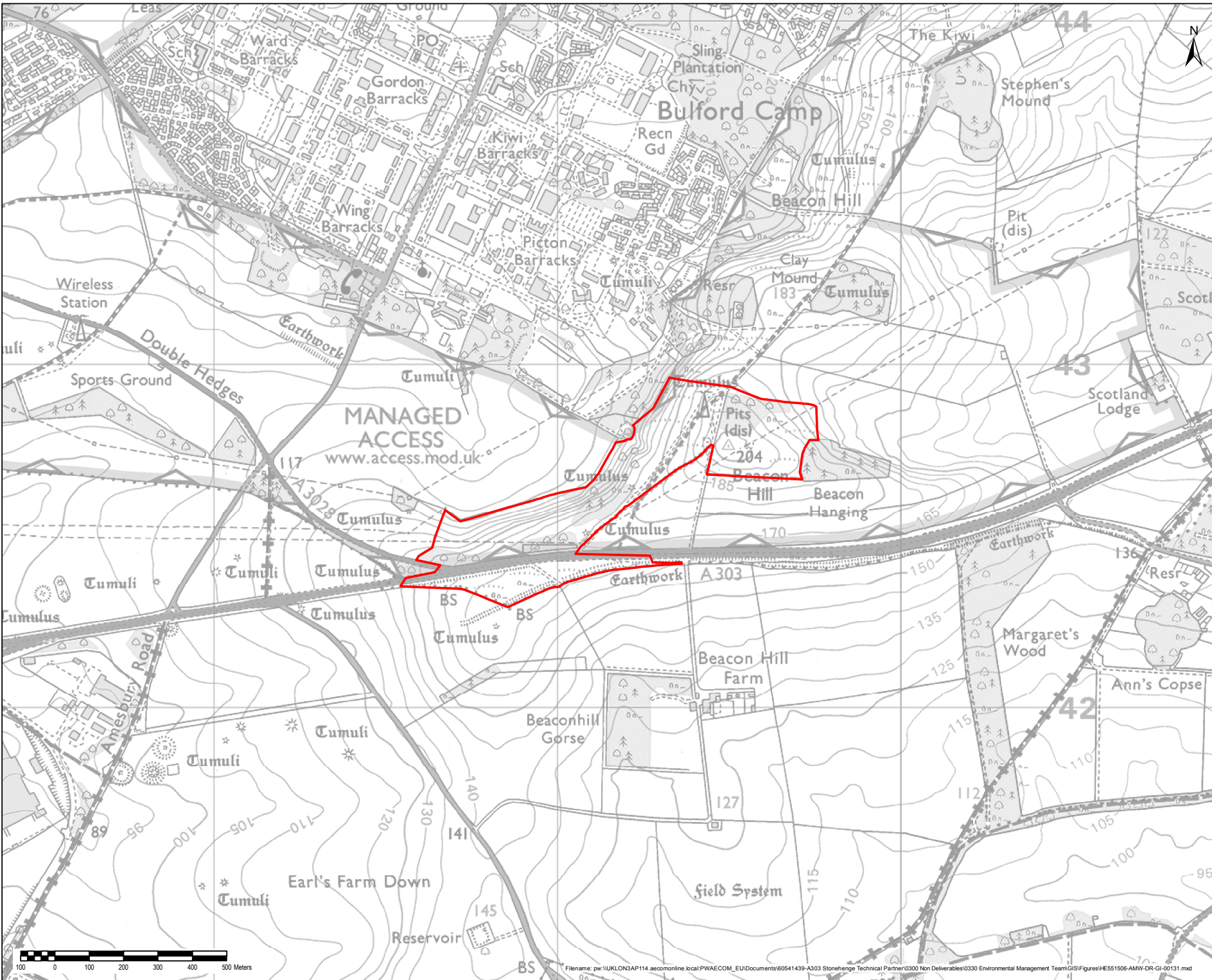
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Appendix A

Location of Survey

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NOTES / LEGEND

Lichen Survey Extent

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Purpose of issue: FINAL

Client: Highways England
 Working on behalf of:

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: FIGURE 1
 LICHEN SURVEY EXTENT
 AT BEACON HILL

Designed	Drawn	Checked	Approved	Date
				23/01/2018

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Scale @ A3: 1:10,000 Zone: SW

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Appendix B

Photographs

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Photograph 1: Old hawthorn (*Crataegus*) scrub



Photograph 2: Well-established old scrub

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Photograph 3: A path used regularly by trail motorbikes



Photograph 4: Extensive disturbance by trail bikes

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Photograph 5: Old stand of hazel with scattered ash trees



Figure 6: Example of rank grassland slopes on site

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Photograph 7: Narrow strip, part of the Beacon Hill site, to the south of the A303.



Photograph 8: Plantation to the north of the A303

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Photograph 9: Track at SU 1941 4278



Photograph 10: Disused grassy track

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