A303 Amesbury to Berwick Down

Applicant's provision of technical reports supporting the Environmental Information Review

Parsonage Down Stone Curlew Plot - Botanical Survey Report (2021)

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Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

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Executive Summary

A botanical survey was undertaken of an area of grassland within the Salisbury Down Special Area of Conservation (SAC) which is planned to be translocated to facilitate the creation of a stone curlew *Burhinus oedicnemus* breeding plot as part of the A303 – Amesbury to Berwick Down scheme. The translocated grassland will act as a 'biodiversity bank' for the proposed grassland creation area within the Parsonage Down National Nature Reserve (NNR), as part of the integrated landscaping of the Scheme. The translocated grassland habitat will facilitate the integration of less mobile species including fungi, bacteria and archaea and soil microfauna than would happen through seeding of the grassland creation area alone.

The objective of the survey was to identify the baseline condition of the existing grassland, including determining the following:

- baseline of the community composition of species present as per the National Vegetation Classification surveys.
- the condition of the grassland habitat to be translocated, based on standard parameters.

The baseline information will be used to inform the target condition for the grassland creation area to be established within Parsonage Down NNR and will provide a set of conditions that will be monitored.

The NVC survey identified the grassland habitat within the area to be translocated as being a CG2 *Festuca ovina-Avenula pratensis* grassland community. Habitat condition information collected during the survey has provided a baseline, that will be the target condition of the grassland habitat to be created in Parsonage Down NNR.

1 Introduction

1.1 Purpose of Report

1.1.1 As part of the embedded mitigation of the A303 – Amesbury to Berwick Down Scheme a new 1.2ha stone curlew *Burhinus oedicnemus* breeding plot will be created within Parsonage Down Special Area of Conservation (SAC) / Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). The new breeding plot will be created, under agreement with Natural England, approximately 500m from the stone curlew breeding plot to be lost, in what is considered to be the foraging area for the same breeding pair. The grassland to be removed to facilitate the creation of the stone curlew plot is to be translocated to an area of arable land, managed as part of Parsonage Down. The grassland will be translocated into an area that has been designated for the creation of calcareous grassland within the embedded design of the Scheme. The translocated grassland will aim to speed up the establishment of the target grassland community by being a source of locally prevalent seeds, fungi, bacteria, archaea and soil microfauna. It is anticipated that this translocation would increase the speed to which the target condition of the newly created grassland is achieved than would happen through seeding alone.

1.1.2 This report provides a pre-commencement survey, as required by Natural England, and will form the current baseline to identify the target condition of the grassland habitat to be created. This report will be used for future monitoring and condition assessment of the habitat creation area by the Main Works contractor.

1.2 Previous Surveys and background

1.2.1 A botanical survey was undertaken in 2017 in a different area of Parsonage Down, on a north facing bank, that has remained as grassland as far as is known. This north facing bank is approximately 200m south of the stone curlew plot. The 2017 survey area was identified as being a location where indirect air quality impacts associated with the Scheme[1] could occur because the Scheme would be in a cutting closer to the southern boundary of the SSSI, although air quality modelling reported in the Environmental Statement later indicated that there would be no significant effect[2]. Furthermore, the seeding of the area between the highway and the SSSI with calcareous grassland would remove the bank from any influence from adjacent arable farming. This north-facing bank within the SAC/SSSI/NNR was selected for survey in 2017 as it supports the most diverse calcareous grassland within the SAC/SSSI/NNR. Some of the more notable species have been recorded there, including early gentian *Gentianella anglica* and burnt orchid *Neotinea ustulata*.

1.2.2 The 2017 botanical surveys provided a baseline and methodology to which further monitoring surveys could follow to identify changes in species

[1] Arup Atkins Joint Venture (2017) A303 Botanical Survey Report 2017

[2] Highways England (2018), A303 Amesbury to Berwick Down, 6.1 Environmental Statement, Chapter 8: Biodiversity

abundance and distribution. The surveys used a high density of quadrats, with nested quadrats of different sizes within each sampling point. While the 2021 survey is in a different location, its proximity means that the data is still useful for establishing additional detail on sward composition and structure and understanding the differences between the habitat retained and to be translocated. The two areas have different management histories, as well as different aspect. The location for the stone curlew plot is on the upper part of a more gradual, south-facing slope. It is known to have been ploughed for arable use during the 1940s, but was subsequently put back to pasture some time after the Second World War, prior to the acquisition of the reserve by Natural England in 1979 (information provided by Natural England). Both areas are within the same extensive grazing unit, grazed by English Longhorn cattle and sheep.

1.3 Objectives

1.3.1 This report uses data from 2017 and 2021 surveys to provide a botanical baseline, it includes:

- undertaking a National Vegetation Classification (NVC) Survey (Rodwell, 2006) of the Site to provide a baseline of the community composition;

- providing detailed notes on the habitat condition based on a number of physical parameters measured during the survey to inform the creation of target condition for the grassland area to be created as part of the A303 Scheme and any further mitigation measures that may be required. Consideration of the 2017 survey data obtained from 200m south of the stone curlew plot in terms of its vegetative composition and structure is used to infer condition data from the wider surrounds.

2 Methodology

2.1 2017 baseline survey

2.1.1 The 2017 botanical survey was undertaken on 5-7th June. Three 100m long linear transects approximately parallel to the A303 were set up across Parsonage Bank. Transects were positioned using a GPS at the bottom, middle and top of the bank over a linear distance of 75m in approximately the same places as a previous survey carried out in 2002 (Nicholas Pearson Associates, 2003).

2.1.2 Twenty quadrats were randomly placed along each transect, each comprising nested sub-quadrats of 10x10, 25x25, 50x50 and 100x100cm. For each size class of sub-quadrat, presence of all vascular plants and bryophytes was recorded. In addition, for the largest quadrats (100x100cm), percentage cover of each species was also estimated. This nested quadrat design allows changes in frequency of occurrence of rare species in different quadrat sizes to be detected between years. The estimates of percentage cover can be used to detect any changes in the more common species present.

2.2 2021 modified baseline survey

2.2.1 The 2021 baseline survey was undertaken on the 24th June.

2.2.2 The 2021 approach used a modified version of the 2017 method, adapted to be applicable for the area of habitat to be translocated [redacted]. The transect route was recorded by capturing geospatial data for each quadrat sampled using a handheld GPS device. Ten quadrats per transect were then sampled with 100x100cm quadrats recording presence of all vascular plants and percentage cover estimated. The GPS co-ordinates are listed in Appendix B.

2.2.3 A single 10x10 cm was placed at random within each 100x100cm quadrat, in this smaller quadrat species were simply recorded if they were present, an estimate of percentage cover was not recorded.

2.3 Data analysis

2.3.1 The 2017 report did not provide any analysis or commentary of the data obtained from Parsonage Bank and has been used as a benchmark only. In addition to this the precise location for the transects recorded was not provided in the report. [redacted]

2.3.2 The 2021 Data has been assessed using Modular Analysis of Vegetation Information System (MAVIS)[3] software. This software compares the quadrat data from a given Site and highlight potential affinities with published NVC

[3] Modular Analysis of Vegetation Information System (MAVIS) software developed by the Centre of Ecology and Hydrology.

communities/sub-communities. Such analysis produces a numerical coefficient of similarity on a scale from 0 to 100 for each dataset. It indicates a 'goodness of fit' with documented NVC communities and as a general rule, the higher the number, the greater the confidence in the result. MAVIS has the advantage of being freely available and thus suitable to compare repeated surveys.

2.4 Habitat Mapping and Condition Assessment Survey

2.4.1 In order to establish a baseline for future monitoring of newly created calcareous grassland at Parsonage Down NNR, the following information was recorded with reference to Natural England's Biodiversity Metric 3.0 Habitat Condition Assessment instructions at each quadrat (Panks *et al*, 2021)

- **Sward height** (the average height of the sward excluding emergent grass flower spikes)
- **Leaf litter / thatch % cover** (defined as dead plant material in the base of living plants)
- **Leaf litter / thatch depth** (the depth of the thatch/litter layer where present)
- **Percentage cover of bare ground** (areas free of vegetation, including localised areas, for example, rabbit warrens)
- **Presence of undesirable perennial plants** – These have been listed as: - Creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex obtusifolius*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, greater plantain *Plantago major*, white clover *Trifolium repens*, cow parsley *Anthriscus sylvestris*.
- **Presence of notable vascular plant species** (defined as any of the named notable species listed in the SSSI citation[4])
- **Presence of desirable vascular plant species** (defined as the constant species for CG2 grassland community).
- **Photographs representative of the typical sward composition** and height were recorded to capture the general condition of the Site (Appendix A).

2.4.2 These assessment criteria will be used in future to inform condition assessment targets for the habitat creation area that will be created using the translocated turves. Where this data was included in the 2017 work – it was extracted to provide a comparison with the 2021 survey and for the wider surrounds of the stone curlew plot.

[4] [redacted] [Accessed 09/09/2021]

2.5 Limitations

2.5.1 The 2017 transects are from a separate location within the SAC/SSSI/NNR so while not providing a direct comparison of site conditions in 2017 the proximity and presence within the same field, under similar management means that some comparison between the data sets can be made.

2.5.2 The approach used for the 2017 and 2021 survey differs from that stated in the NVC handbook (Rodwell, 2006) with smaller quadrats used: 100x100cm rather than 200x200cm. This is not a limitation on the survey, however, because the large quadrats were originally selected to enable sampling across all grassland communities, including coarse grasslands which require large quadrats. The small 100x100cm quadrats were agreed with Natural England in 2017 as being suitable for sampling the grazed calcareous grassland at Parsonage Down and had been used in previous surveys on the site. The sampling for NVC only requires five quadrats, but as the use of five quadrats for NVC sampling is only to determine the relative frequency of occurrence of species in quadrats, i.e. their 'constancy' in the vegetation, this can be readily applied to larger numbers of quadrats and so is not a limitation on the survey. For the purpose of monitoring details of changes in vegetation composition at different times a greater sampling effort is required than for NVC community classification. This is why in 2017 transects of 20 quadrats were used along three contours on the north-facing bank. In 2021 the area for the stone curlew plot was surveyed to provide a large enough sample to assess the homogeneity of the vegetation in the plot and to provide a baseline for future comparison with grassland established by translocation. Whilst NVC provides a description of the community, it is not primarily a monitoring tool.

2.5.3 While the scope and scale of the 2021 work is smaller in terms of the area covered and the number of quadrats taken, as well as a reduction in the number of different sized quadrats used, the 2017 data can be used to provide some context to the 2021 data.

2.5.4 The 2017 survey did not record early gentian *Gentianella anglica* or burnt orchid *Neotinea ustulata*. None were recorded in 2021 quadrats or the wider surrounds either. Historically, there were records of these two species of note from the north-facing bank in Parsonage Down. Their presence is likely to be influenced by the grazing regime and climatic factors. Their status since 2017 has not been confirmed by Natural England and these species were not expected to occur in the area for the stone curlew plot. Whilst sampling with many quadrats increases the likelihood of detecting species which only occur at low frequency in the grassland, it is possible that some species may not be recorded in the quadrats. A walkover of the surrounding area was carried out to identify additional species outside the quadrats, making it more likely that these two species would have been detected if they had been present within the area for the stone curlew plot.

3 Results

3.1 2021 NVC Survey

3.1.1 The results of the quadrat data analysis using MAVIS software are shown in Table 1 below. For the full quadrat data please see Appendix A.

3.1.2 Calcareous grassland (CG)3 communities had the highest goodness of fit with four of the top ten matches being for this community type.

3.1.3 The CG3 *Bromus erectus* grassland community is described as grassland where upright brome *Bromus erectus* makes up more than 10% of the sward and where plants of similar physiognomy, such as tor grass *Brachypodium pinnatum* and downy oat grass *Avenula pubescens* make a negligible contribution. There is also reduced frequency of the chamaephytes (woody plants whose buds are on or near the ground): wild thyme *Thymus praecox*, mouse-ear-hawkweed *Pilosella officinarum* and common rock rose *Helianthemum nummularium*. Reduced frequency of certain therophytes (annual plants that complete their lifecycle in a short period when conditions are favourable and survive harsh conditions as seeds): fairy flax *Linum catharticum*, Autumn gentian *Gentianella amarella* and hemicryptophytes that cannot produce a large rosettes, tall shoots or bushy sprawls, such as crested hair grass *Koeleria macrantha*, quaking grass *Briza media*, harebell *Campanula rotundifolia* and small scabious *Scabiosa columbaria*. The most frequent associated species are the hemicryptophytes (perennial plants that have overwintering buds at the ground surface) that can depress the surrounding vegetation or grow through the bulky grasses and the accumulating litter from the grasses: salad burnet *Sanguisorba minor*, carnation sedge *Carex flacca*, ribwort plantain *Plantago lanceolata*, dwarf thistle *Cirsium acaule* and bird's foot-trefoil *Lotus corniculatus* For the full description of the CG3 community please refer to pages 166 – 169 of the British Plant Communities Volume 3 -Grasslands and Montane Communities (Rodwell, 1992)

3.1.4 CG2 had two of the top ten goodness of fits along with CG6. CG 4 and CG5 occurred once along with MG5.

3.1.5 CG2 *Festuca ovina-Avenula pratensis* grassland typically comprises a diverse herb-rich closed sward, which is not dominated by bulky grasses. Grasses present are typically fine leaved species with sheep's fescue *Festuca ovina* normally the most abundant, with red fescue *Festuca rubra* being less common. Other grasses associated with this community are quaking grass, crested hair grass and meadow oat grass *Avenula pratensis*. A number of other grasses occur as well including among others crested dog's tail *Cynosurus cristatus* and downy oat grass. Upright brome and tor grass are infrequent and never abundant. Carnation sedge is frequent and spring sedge *Carex caryophyllea* is occasional. Typical herbs associated with this community include salad burnet, ribwort plantain, common knapweed Centaurea nigra, bird's-foot trefoil, small scabious, selfheal *Prunella vulgaris*, harebell, and ladies-bedstraw *Galium verum*, burnet saxifrage *Pimpinella saxifraga*, Dropwort *Filipendula vulgaris*, red clover

Trifolium pratense, hoary plantain *Plantago media*, cowslip *Primula veris*, common milkwort *Polygala vulgaris* and hairy violet *Viola hirta*. Chamaephytes are few but both wild thyme and common rockrose are frequent and can be locally abundant. Therophytes occur on bare patches of soil with smaller species such as fairy flax, Autumn gentian and in sub communities black medic *Medicago lupulina* are common. As above for a full description see pages 140 – 156 of the British Plant Communities Volume 3 -Grasslands and Montane Communities (Rodwell 1992).

Table 1 – Mavis analysis output

NVC Community	Goodness of Fit (%)
CG3c	62.20
CG3	57.48
CG6	57.00
CG2c	56.49
CG3a	56.38
CG2	56.22
CG3b	55.82
CG6a	55.74
MG5b	53.56
CG4	53.55

3.2 Assessment of the Data with the Key to Calcicolous Grasslands (Rodwell, 1992)

3.2.1 Analysis of the quadrat data using the Key to Calcicolous Grasslands (Rodwell 1992) [3] shows that the grassland present in the survey area has the closest affinity to a CG2 community. The main difference between CG2 and CG3 grasslands is that in the latter the bulky grasses - *Bromus erectus, Brachpodium pinnatum* or *Avenula pubescens* are constant at more than 10% cover. None of these grasses were constant or reached over 10% in any quadrats sampled in 2021. With *Bromus erectus* not being a significant component of the sward, with *Festuca ovina* and *F.rubra* dominating this shows that the grassland is a good fit with the CG2 community, despite the less species-rich CG3 having the highest goodness of fit as shown in Table 1 above.

3.2.2 The fit to CG2 is further supported by *Filipendula vulgaris* being occasional only, and the lack of bryophyte species as an important component of the sward suggest that the grassland in the site is a good fit for CG2 *Festuca ovina-Avenula pratensis* grassland *Cirsium acaule-Asperla cynanchica* sub-community Typical variant. The herbaceous species present include many of the constant species including quaking grass, glaucous sedge, mouse ear hawkweed, fairy flax, birds-foot trefoil, salad burnet and ribwort plantain. While small scabious and thyme were not recorded in any quadrat the other constant species of CG2 were all recorded as present.

3.3 Condition Assessment

3.3.1 The data gathered during the 2021 survey and data obtained from the 2017 report are summarised in Table 2 below.

Table 2 – Condition assessment data summary from the 2017 and 2021 quadrat results

Criteria	2017 (based on 3 transects of 20 quadrats on Parsonage Bank)		2021 (based on two transects of 10- quadrats of the 1ha plot)	
	Range	Average	Range	Average
Bare ground %	0-10	2.08	0-5	0.25
Sward height (cm)	Not recorded	-	6 - 20	11.45
leaf litter/thatch %	0-10	3.5	60 - 80	77
Litter/thatch depth (cm)	Not recorded	-	1 - 3	2.15
Total herb cover %	Not recorded	-	35 - 90	64.5
Bryophyte cover %	Not recorded	o	0 – 5	1.95

4 Discussion

4.1 2021 results

4.1.1 Assessment with MAVIS and the Key to Calcicolous Grasslands have shown that the grassland present within the Site is a closest match to CG2 *Festuca ovina-Avenula pratensis* grassland *Cirsium acaule-Asperla cynanchica* sub-community typical variant. The target set out in the BNG Condition Assessment guidance states that the grassland should meet the community description used for the habitat in the UKhab methodology.

4.1.2 The condition assessment results show that the grassland within the area to be translocated to facilitate the stone curlew plots is relatively homogenous in terms of sward structure and height, with some localised variance attributable to open grazing of a large field block by low density of cattle. The sward is considered to have matched the criteria set out in the BNG 3.0 Condition Assessment guidance notes for the reasons below.

4.1.3 Undesirable perennial plants were largely absent with some minor incidence of creeping thistle and ragwort being the only injurious weeds recorded either in the quadrats or in the course of the transects, and well below the 5% threshold set out in the BNG 3.0 Condition Assessment guidance notes.

4.1.4 There was a high cover of herbs in the sward though dwarf thistle *Cirsium acaule* dominated. This may be an indication of previous intensive grazing by sheep.

4.1.5 Bare ground was well below the 1-5% threshold stipulated in the Natural England BNG 3.0 Condition Assessment guidance notes. However the timing of the survey in the peak botanical season is a poor time to record bare ground as any bare ground created over winter by cattle poaching could have been occupied by the opportunistic species that such bare patches are intended for. Also capturing bare ground in quadrats excludes wider areas of bare ground created from burrowing mammals and in regularly walked cattle paths.

4.2 Comparison of 2017 and 2021 data

4.2.1 The 2017 survey data has not been assessed using MAVIS but a general comparison of the two sets of survey data show that a slightly higher species diversity was recorded in the 2017 survey. The total species counts of the 2017 transects were 52-57 species, per transect, whilst in comparison the 2021 survey data recorded 39 and 38 species counts per transect respectively.

4.2.2 The stone curlew plot location was agreed with Natural England to avoid the more species rich grassland covered by the 2017 survey, so this is unsurprising. It is also possible that the higher species counts were in part attributable to the increased survey effort with a higher number of quadrats sampled – three transects of 20 quadrats instead of two quadrats with 10 quadrats. The 2017 survey location had greater variation in slopes between

the transects along Parsonage Back than the plot area sampled in 2021. It is, however, most likely that the difference reflects a combination of the environmental conditions at the two sites, together with the differences in past management.

4.2.3 The presence of bare ground was similar between the data sets, with the 2017 survey only recording bare ground on one transect – presumably on the steeper parts of the slope, where there were some rabbit burrows and sheep had also rubbed bare patches. The other two transects on Parsonage Bank did not record any bare ground, which is in accordance with the 2021 data at the plot site.

4.2.4 Thatch/leaf litter levels differed considerably between the 2017 and 2021 data, which could be due to differences between the level of thatch in the different location covered in the respective years, or to a change in grazing pressure / timing of the survey in relation to grazing rotation. There were some differences in survey methodology approach as depth of litter/thatch was not recorded in 2017. With the 2021 survey thatch/leaf litter was taken as the presence of a thin litter layer beneath the sward, as opposed to thick patches of thatch forming in ungrazed sections of the sward. Even so the scale difference (0-10% cover of thatch on Parsonage Down in 2017, compared to 60-80% thatch on the stone curlew plot) is more likely to be related to management.

4.2.5 No detail on sward height, bryophyte cover or litter depth was recorded in 2017 so no comparison can be made of those.

5 Conclusion

5.1.1 The 2021 data show that for the purposes of the future monitoring of the translocated turf, the target habitat at the receptor site should be a close match with a CG2 *Festuca-ovina Avenula pratensis* grassland.

5.1.2 The donor area is not the best example of this habitat present within the context of the wider SSSI (with the 2017 survey covering a more species-rich area), but it is still a highly distinctive habitat supporting a range of desirable species, including fragrant orchid and pyramidal orchid, as well as the majority of the constant species associated with this habitat. It shows what can be achieved in the long term with arable reversion to calcareous grassland. In this case the species were acquired slowly by colonisation from the retained grassland nearby, rather than seeding as is typically done now to accelerate the process.

5.1.3 The grassland currently meets four of the five BNG 3.0 metric condition assessment criteria for this habitat type. Though it was close to meeting the bare ground criteria if based on the wider conditions beyond the quadrats – or if the area was assessed earlier in the year.

5.1.4 This data should be used to inform the condition assessment targets going forward.

5.1.5 Subject to the success of turf translocation – with the turves being moved with minimal fragmentation and successfully bedded down onto the receptor site and the weather conditions during the establishment period being favourable, the species present are expected to survive translocation or re-establish from the soil seedbank. The disturbance and bare ground created where turves abut each other will allow opportunities for both positive and negative indicator species to establish. Careful management will be required to control any undesirable species that may establish during in the first few years. Management will be by mowing and removal of cuttings until the sward is sufficiently well established for grazing to be resumed with the stock which graze the SSSI.

5.1.6 While this survey provides a baseline for botanical monitoring of impacts further investigation on soil communities (fungi / bacteria /archaea / microfauna) through eDNA metabarcoding approaches would add additional depth to the future monitoring, should this approach be taken forward.

References

Highways England (2017), A303 Botanical Survey Report 2017, Arup Atkins Joint Venture on behalf on Highways England.
Nicholas Pearson Associates Ltd, (2003) “A303 Stonehenge Improvement: Environmental Statement Volume 2 Part 3,” unpublished.

Rodwell, J.S, (2006). NVC Users' Handbook. JNCC. Peterborough.

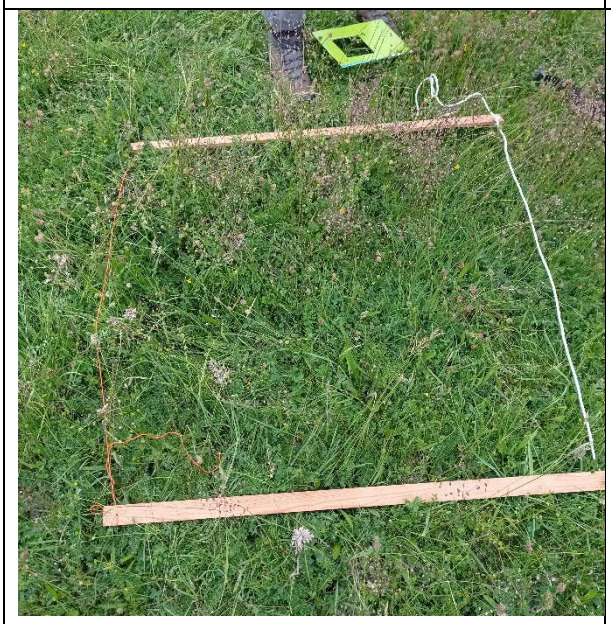
Rodwell, J.S, (1991) British Plant Communities Volume 3: Grasslands and Montane Communities; Cambridge University Press.

Stephen Panks A, Nick White A, Amanda Newsome A, Jack Potter A, Matt Heydon A, Edward Mayhew A, Maria Alvarez A, Trudy Russell A, Sarah J. Scott B, Max Heaver C, Sarah H. Scott C, Jo Treweek D, Bill Butcher E And Dave Stone A., (2021) Biodiversity metric 3.0: Auditing and accounting for biodiversity – User Guide. Natural England.

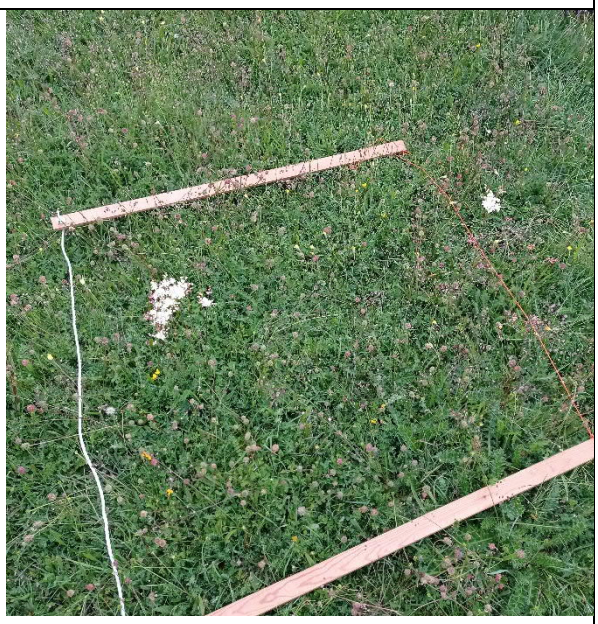
Appendix A Photographs

Photograph 1: Quadrat 1

Photograph 2 – Quadrat 1 sward

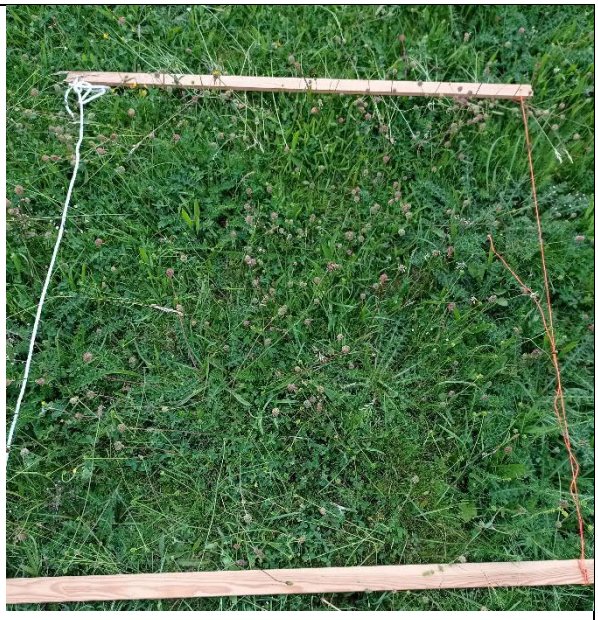


Photograph 3 – Quadrat 8



Photograph 4 – Quadrat 15

Photograph 5 – Quadrat 19



Photograph 6 – Quadrat 20

Photograph 7 – example of nested 10x10cm quadrat

Photograph 8 – general overview of survey area and land management

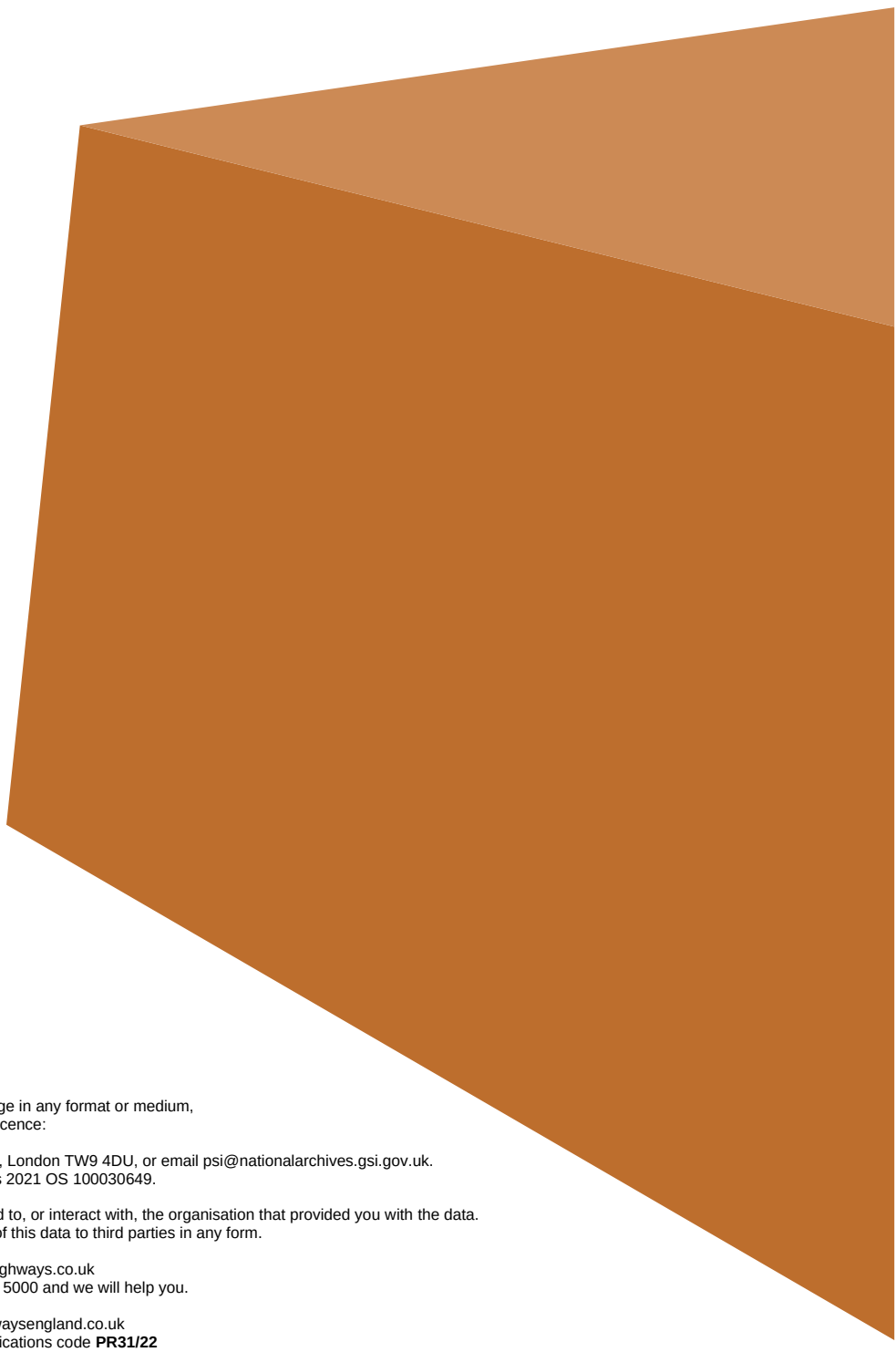
Appendix B Raw Data

B.1 Site Name: Parsonage Bank

		Transect 1 Q1		Transect 1 Q2		Transect 1 Q3		Transect 1 Q4		Transect 1 Q5		Transect 1 Q6		Transect 1 Q7		Transect 1 Q8		Transect 1 Q9		Transect 1 Q10		Transect 2 Q11		Transect 2 Q12		Transect 2 Q13		Transect 2 Q14		Transect 2 Q15		Transect 2 Q16		Transect 2 Q17		Transect 2 Q18		Transect 2 Q19		Transect 2 Q20	
	what three words	[redacted]																																					
	Quadrat size cm	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10	100	10
Achillea millefolium	Yarrow	8								7	*			15	*	3																							
Anacamptis pyramidalis	Pyramidal Orchid									2														2															
Avenula pubescens	Downy oat grass			4	*	2				2		1		2		1	*					1		1		1								1	1	1			
Bellis perennis	daisy	2								4		3						1								1				1				1		1		1	
Briza media	Quaking grass	45	*			2								+		50		60	+	30	+	10	*	5	*	5		30	*	20	*	35	*	20	*	25		30	*	3	
Bromopsis erecta	Upright Brome															1		2		2																			
Calliergon cuspidatum	speartipped moss																			2						1				2				1					
Carex flacca	Carnation sedge																	1		3	*	2		4	*	1		4		4	*	2	*	4		3			
Cerastium fontanum	Mouse eared chickweed	2		2		1		1				1												2															
Cirsium arvense	creeping thistle			3						1				1		1																							
Cirsium acaule	Dwarf Thistle	25	*					20		1						20		10		2		30	*	25		20		45	*	25		30	*	30 *		25		20		25	*
Convulvulus arvensis	meadow bindweed											20		6	*																								
cynosurus cristatus	Crested dog's tail	5		4		4		6		8		20	+	4	+	4		2		2		2				5				1		2		2		5		5		5	
Dactylis glomerata	Cock's-foot	2		4	+	2	+	5		4		6	+	3	+	2	+	3		5	+	1		2				1				1		5		5	*	3			

Festuca ovina / rubra	Sheeps / red Fescue	40		80	*	40	*	50	*	50	*	40	*	70	*	10		5		15		15	*	10		5	*	2		1		3	5			5		5		10	*
Filipendula vulgaris	Dropwort																													2											
Galium verum	Ladies bedstraw															4	*	4	*	3		5		8	*	10		9	*	2	*	8		4		10	*	10	*	10	
Galium mollugo	Hedge Bedstraw																					2				1								1	*						
Gymnadenia conopsea	Fragrant orchid																															1									
Hieracium sp.	Hawkweed	1						1		1		1																													
Holcus lanatus	Yorkshire Fog															1				1		1		1		3						2									
Leontodon hispidus	Rough Hawkbit	2		2						1								1		1		3		10	*	5		3	*	4	*	3		5	*	4	*	4			
Linum catharticum	Fairy Flax																					1						2		3		3		2				4		1	
Lotus corniculatus	Birds-foot trefoil	10	*			2				12	*			4	*	10				4	*	1		3	*	2		3		5		15	*	3		3		5	*	5	
Lolium perenne	perenial rye									2				1						1				2	*	1															
Luzula campestris	Field wood-rush																							1																	
medicago lupulula	black medick	15		10	*	15	*	15	*	5		4		8	*	8		7	*	10	*	2		5	*	8	*	7	*	4		4		4		7	*	7		3	
Pilosella officinarum	Mouse-ear-hawkweed																									4	*			4		3		7		3					
Pimpinella saxifraga	Burnet saxifrage							2		1												2		1																	
Plantago media	Hoary plantain	3	*	10		25	*	5	*	10	*	4		15		8		5		3	*	2	*	4		2		3		4	*	3	*	5		3		6		5	
Plantago lanceolata	Ribwort Plantain	1						6		1	*			1		1	*	1	*	3	*			2		2				2		1	*	1				1	*		
Phleum pratensis	Timothy	3				4	*	4		4		4		2						1						2												1			
Potentilla reptans	creeping cinquefoil					8	*									1																									
Primula veris	Cowslip																							2																	
Prunella vulgaris	Selfheal							1		1								1		1						3		3				4						1	*		

Ranunculus acris	meadow buttercup	8		10	*	15		15	*	10	*	12	*	10	*	6		8		5	*	10	*	8	*	12	*	5		8	*	8	*	8	*	10		8	*	8	*
Senecio jacobaea	Common Ragwort									1										1																					
Sanguisorba minor	Salad Burnet					4	*									25	*	40	*	35	*	30	*	25	*	30		60		65	*	35	*	20	*	15	*	20	*	15	*
Taraxacum agg.	Dandelion			14	*	3		2		2		2		1		1	*	1	*	3		3				1		1		1		1		2		1				1	
Tragopogon pratensis	Goats beard																	1						1										1		1	*				
Trifolium pratense	red clover	2		2		1				1												4				1				4	*	3	*	3		3		3	*		
Trifolium repens	white clover			3	*	15		1	*	4		2		3		3			*	4		4	*	8		8		7		3		5		4		4		5		6	
Trisetum flavescens	Yellow oat grass																					3		5		8	*	1						3		3	*			5	
Viola seedling/sp	Viola sp.																					1																			
Vicia cracca	Tufted vetch																							2																2	*
Pleurozium schrebi		5		4		5		2		1		1		1		1		1																							
Bare ground		0		0		0		0		0		0		0		0		0		0		0		0		5		0		0		0		0		0		0		0	
sward height (cm)		20		14		12		10		14		14		10		16		11		10		10		10		12		6		8		11		12		10		9		10	
litter		60		80		80		80		80		70		80		80		80		80		80		70		60		80		80		80		80		80		80		80	
litter depth		2		3		2		2		1		1		3		3		2		2		2		2		2		2		3		3		2		2		2		2	
Bryophye cover %		5		5		5		2		1		1		1		0		5		3		2		1		1		0		2		2		1		0		1		1	
Total herb cover %		70		35		70		40		60		45		35		70		90		60		70		60		60		90		80		85		70		60		70		70	



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