

A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010041

6.8 Environmental Statement – Appendix 11.5 Soils and Agricultural Land Quality Report

Part B

APFP Regulation 5(2)(a)

Planning Act 2008

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

June 2020

Infrastructure Planning

Planning Act 2008

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

The A1 in Northumberland: Morpeth to Ellingham
Development Consent Order 20[xx]

Environmental Statement - Appendix

Regulation Reference:	APFP Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010041
Application Document Reference	TR010041/APP/6.8
Author:	A1 in Northumberland: Morpeth to Ellingham Project Team, Highways England

Version	Date	Status of Version
Rev 0	June 2020	Application Issue

**SOILS AND
AGRICULTURAL QUALITY
OF LAND ADJACENT TO THE A1
NORTHUMBERLAND**

Report 1540/1

27th September, 2019

Land
Research
ASSOCIATES
www.lra.co.uk

**SOILS AND AGRICULTURAL QUALITY
OF LAND ADJACENT TO THE A1, NORTHUMBERLAND**

M. W. Palmer, MSc, PhD
A Harper BSc

Report 1540/1
Land Research Associates Ltd
Lockington Hall,
Lockington,
Derby
DE74 2RH
www.lra.co.uk

27th September, 2019

SUMMARY

A soil and agricultural land quality survey has been undertaken of 282 ha of land adjacent to the A1 in Northumberland.

The land mainly has fine loamy slowly permeable soils formed in glacial till. In the north and in patches elsewhere loamy permeable soils formed in sand and gravel deposits are found.

Land quality is mainly of subgrade 3b limited by wetness, with areas of subgrade 3a, grade 2 locally.

1.0 Introduction

- 1.1 This report provides information on the soils and agricultural quality of 282.4 ha of land adjacent to the A1 north of Alnwick, Northumberland. The land is proposed for road widening works, new road accesses and for supporting construction working areas. The report is based on a survey of the land in June and September 2019.

SCHEME DESCRIPTION

- 1.2 The Scheme aims to increase capacity along an approximately 8 km section of the existing A1 between Alnwick and Ellingham, in Northumberland. The Scheme includes widening the existing A1 from single carriageway to a dual carriageway. The Scheme also includes improving the existing junction at Charlton Mires with a new grade-separated junction and a new accommodation overbridge at Heckley Fence. The Scheme aims to increase capacity, enhance resilience, improve safety and improve journey times along the route.
- 1.3 The Scheme comprises dualling of the existing A1 single carriageway; a new southbound carriageway would be constructed to the east of the existing A1, and the existing A1 would act as a new northbound carriageway. A number of Private Means of Access (PMAs) will need to be stopped up and replaced with new access routes including new roads for East and West Linkhall, and from the B6347 and Rock South Farm. To facilitate the construction of the Scheme, sections of an Extra High Voltage cable, utility pipes and telecommunication cables would need to be diverted. The Scheme also includes new drainage features, new and extended culverts, and temporary and permanent Public Right of Way diversions, together with new and/or improved ancillary features.

SITE ENVIRONMENT

- 1.4 The survey area crosses sections of arable fields, pasture and grassland paddocks. The site is located either side of the A1 between Alnwick and North Charlton. It is bordered by adjoining agricultural land.
- 1.5 The site is undulating with an average elevation of approximately 90 m AOD.

PUBLISHED INFORMATION

- 1.6 1:50,000 scale BGS information records the basal geology as mixed sedimentary rocks of the Tyne Limestone and Alston Formations and the Scremerston Coal Member. Drift deposits of Devensian glacial till are recorded under most of the land, with sand and gravel deposits in the north, and

patches of alluvium and peat on lower ground elsewhere.

- 1.7 The National Soil Map (published at 1:250,000 scale) shows most of the land as Brickfield 3 Association, comprising mainly slowly permeable fine loamy soils formed in glacial till. Land at the northern and southern ends of the site is recorded as Wick 1 Association, comprising mainly coarse loamy and sandy soils formed in sand and gravel deposits¹.
- 1.8 Provisional Agricultural Land Classification mapping from the 1970s shows all of the land as grade 3. No more recent survey (to the current guidelines) has been published.

¹Jarvis R.A. *et al.*, (1984). *Soils and their use in Northern England*, Soil Survey of England and Wales. Bulletin No. 10, Harpenden.

2.0 Soils

2.1 A detailed soil resource and agricultural quality survey was carried out in June and September 2019. It was based on observations at intersects of a 100 m grid, with a sampling density of at least 1 observation per hectare. Along linear sections sample points were spaced every 100 m. During the survey, soils were examined by a combination of pits and augerings to a maximum depth of 1.2 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

2.2 Soils at the site were found to vary in texture and drainage. The main soil types are described below.

FINE LOAMY SLOWLY PERMEABLE SOILS

2.3 The dominant soils are formed in glacial till deposits, similar to those of the Brickfield 3 Association previously mapped over much of the land. They mainly comprise sandy clay loam or medium clay loam topsoil, over poorly-structured heavy clay loam or sandy clay loam subsoil, usually with a thin permeable upper subsoil. The soils show evidence of seasonal waterlogging (greyish and ochreous mottled *gley* colouration) to shallow depth.

2.4 An example of a profile is described below from a pit at observation 170 (Map 1):

0-24 cm	Very dark greyish brown (10YR 3/2) medium clay loam to sandy clay loam; very slightly stony (small and medium rotten sand stone); moderately developed coarse sub-angular blocky structure; firm; smooth clear boundary to:
24-51 cm	Greyish brown (10YR 5/2) sandy clay loam with many distinct fine and medium strong brown (7.5YR 5/6) mottles; slightly stony; weakly developed very coarse angular blocky structure; dense; very firm; smooth gradual boundary to:
51-110 cm+	Dark yellow (10YR 4/1) heavy clay loam with many distinct dusky red (2.5YR 3/2) mottles; slightly stony; weakly developed very prismatic to massive structure; very firm..

2.5 These soils are poorly-draining (Soil Wetness Class IV) with a poor capacity to absorb excess winter rainfall.

LOAMY FREELY-DRAINING SOILS

2.6 These soils are found in the north of the site (where sand and gravel deposits are mapped) and also in patches elsewhere where lighter permeable drift deposits have accumulated. They comprise sandy clay loam or sandy loam topsoil and subsoil and are permeable to depth or have only slight drainage restrictions.

2.7 An example of a sandier profile is described below from a pit at observation 160 (Map 1):

- | | |
|------------|--|
| 0-26 cm | Very dark greyish brown (10YR 3/2) sandy clay loam; stoneless; moderately developed medium sub-angular blocky structure; friable; smooth clear boundary to: |
| 26-35 cm | Dark grey (10YR 4/1) medium sandy loam with common distinct fine and medium reddish brown (5YR 4/4) mottles; stoneless; moderately developed fine to medium sub-angular blocky structure; friable; smooth diffuse boundary to: |
| 35-100 cm+ | Dark grey (10YR 4/1) loamy medium sand with common distinct fine reddish yellow (5YR 5/8) mottles; stoneless; weakly developed fine sub-angular blocky structure; very friable. |

2.8 An example of a permeable fine loamy profile is described below from a pit at observation 238 (Map 1):

- | | |
|------------|--|
| 0-31 cm | Very dark greyish brown (10YR 3/2) sandy clay loam; slightly stony (small soft sand stone); moderately developed medium sub-angular blocky structure; friable; smooth gradual boundary to: |
| 31-78 cm | Dark brown to brown (7.5YR 4/4) sandy clay loam with few faint greyish brown (10YR 5/2) mottles; slightly stony (10% small and medium soft sand stone); moderately developed coarse sub-angular blocky structure; friable; smooth diffuse boundary to: |
| 78-100 cm+ | Dark brown to brown (10YR 4/3) sandy clay loam with few distinct brownish yellow (10YR 6/8) mottles; slightly stony; moderately developed coarse sub-angular blocky structure; friable. |

2.9 These soils are freely to imperfectly-draining (Soil Wetness Class I to III)

HEAVY SLOWLY PERMEABLE SOILS

2.10 These soils are found in an area of fine-textured alluvium in the south of the site, and comprise heavy silty clay loam topsoil over dense poorly-structured subsoil of similar texture.

2.11 An example of a profile is described below from a pit at observation 268 (Map 1):

- | | |
|------------|---|
| 0-32 cm | Very dark greyish brown (10YR 3/2) heavy silty clay loam; stoneless; moderately developed very coarse sub-angular blocky structure; firm; smooth clear boundary to: |
| 32-100 cm+ | Grey (10YR 5/1) heavy silty clay loam with common distinct fine reddish yellow (7.5YR 6/8) mottles; stoneless; weakly developed very coarse angular blocky to very coarse prismatic structure; very firm. |

2.12 These soils are poorly-draining (Soil Wetness Class IV).

3.0 Agricultural land quality

3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification². The relevant site data for an average elevation of 90 m is given below.

- Average annual rainfall: 700 mm
- January-June accumulated temperature >0°C 1237 day°C
- Field capacity period 185 days
(when the soils are fully replete with water) early Oct-late Apr
- Summer moisture deficits for: wheat: 83 mm
potatoes: 67 mm

3.3 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF³. The slightly cool temperatures of this part of the country limit land quality to a maximum of grade 2.

SURVEY RESULTS

3.4 The agricultural quality of the land is mainly determined by wetness and climate. Land of grades 2, 3 and 4 has been identified.

Grade 2

3.5 This land grade is found in the north of the site over deep permeable loamy soils (Soil Wetness Class I). This land is slightly limited by the local climate, but can support good yields of a large variety of crops.

²Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

³MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Subgrade 3a

- 3.6 Land within this subgrade has loamy soils with slight to moderate drainage impedance (Soil Wetness Class II or III). Access to land with farm machinery is restricted in winter and early spring, but the land can support late spring as well as autumn sowings.

Subgrade 3b

- 3.7 This land has fine loamy slowly permeable soils with significant drainage impedance (Soil Wetness Class IV). Under the local climate the combination of moderately high topsoil clay content and restricted drainage means this land is usually too wet for spring land access with machinery. Arable cropping is mainly limited to autumn-sown cereal-based rotation.
- 3.8 Small patches of better-draining land are found within fields in some locations. However, as these patches are too small to map with accuracy or manage separately, they are effectively limited by wetness to use according to the more restricted surrounding land (and therefore included in this land grade).

Grade 4

- 3.9 This land comprises a small low-lying area in the south of the site with heavy slowly permeable soils formed in alluvium. Wetness restrictions mean arable cropping is rarely possible and this land is more suited to use as improved pasture.
- 3.10 Also included is a small area in the north over stony historic earthworks, which could not be cultivated and therefore is limited to use as grassland.

Non-agricultural

- 3.11 This comprises public roads, farm tracks, water bodies and patches of woodland.

Unsurveyed land

- 3.12 Land access to a section of the site was not available and this section is therefore excluded from the survey.

Grade areas

- 3.13 The boundaries between the different grades of land are shown on Map 2 and the areas occupied by each are shown below.

Table 1: Areas occupied by the different land grades

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Grade 2	6.0	2
Subgrade 3a	50.3	18
Subgrade 3b	113.6	40
Grade 4	3.3	1
Non-agricultural	64.7	23
Unsurveyed	44.5	16
Total	282.4	100

APPENDIX

MAPS AND DETAILS OF OBSERVATIONS

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
40													
41													
42													
43	0-33	MCL	<5	33-100	HCL sinc	xxx				2	IV	3b	W
44	0-30	MCL	<5	30-100	HCL sinc	xxx				3	IV	3b	W
45	0-23	MCL	<5	23-52	HCL	xxx	52-100	HCL slst	xxx	1	III/IV	3b	W
46	0-22	MCL	<5	22-39	MCL gritty	xxx	39-51 51+	Stopped on stones		0	II/III	3a	W
47													
48													
49													
50													
51													
52													
53													
54	0-24	MCL	<5	24-65	MCL brashy	xxx	62-100+	HCL	xxx	1	III	3a	W
55	0-29	MCL	<5	29-100+	HCL slst	xxx				3	IV	3b	W
56	0-19	MCL	<5	19-46	MCL	xxx	46+	Stopped on stones		1	III/IV	3a/3b	W
57	0-29	MCL	<5	29-100+	HCL	xxx				0	IV	3b	W
58	0-29	MCL	<5	29-58	HCL	xxx	58-100	HCL/C	xxx	0	IV	3b	W
59	0-34	MCL	<5	34-73	HCL	xxx	73-100	C	xxx	0	IV	3b	W
60													
61													
62													
63													
64	0-33	MCL	<5	33-61	HCL sinc	xxx	61-100+	HCL/C	xxx	0	IV	3b	W
65	0-34	MCL	<5	34-46	MCL sinc	xxx	46+	Stopped on stones		4	II	3a	W
66	0-32	MCL	<5	32-76	HCL	xxx	76-100+	C	xxx	4	IV	3b	W
67	0-36	MCL	<5	36-100	HCL	xxx				2	IV	3b	W
68	0-31	MCL	<5	31-60	HCL	xxx	60-100	HCL	xxx	0	IV	3b	W
69	0-33	MCL	<5	33-58	HCL	xxx	58-100	HCL	xxx	0	IV	3b	W
70													
71													
72													
73													
74	0-27	SCL	<5	27-56	SCL	xxx	56-90+	SCL dist?	xxx	0	III	3a	W
75	0-29	MCL	<5	29-57	HCL	xxx	57-100	HCL slst	xxx	2	IV	3b	W
76	0-31	MCL	<5	31-61	HCL	xxx	61-100	SCL slst	xxx	2	IV	3b	W
77	0-27	MCL	0	27-38	MCL	xxx	38-90+	HCL	xxx	3	IV	3b	W
78	0-27	MCL	<5	27-80+	HCL	xxx				3	IV	3b	W
79													
80	0-27	MCL	0	27-100+	HCL	xxx				1	IV	3b	W
81	0-26	MCL	<5	26-51	MCL	xxx	51-100+	HCL	xxx	1	III/IV	3a/3b	W
82	0-23	MCL	<5	23-42	MCL	xxx	42-100+	HCL	xxx	2	IV	3b	W
83	0-30	MCL	<5	30-90+	HCL/SCL	xxx				2	IV	3b	W

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
84	0-30	SCL	<5	30-38	SCL	xxx	38-100+	HCL	xxx	2	IV	3b	W
85	0-31	SCL	<5	31-90+	HCL	xxx				1	IV	3b	W
86	0-30	MCL	<5	30-100+	HCL	xxx				3	IV	3b	W
87	0-25	MCL	0	25-100+	HCL	xxx				1	IV	3b	W
88	0-29	MCL	0	29-54	SCL/HCL	xxx	54-100+	MCL wet gritty	xxx	1	IV	3b	W
89	0-31	SCL	<5	31-47	SCL	xxx	47-100+	HCL	xxx	0	IV/III	3b/a	W
90	0-26	SCL	<5	26-90+	HCL/SCL	xxx				2	IV	3b	W
91	0-33	SCL	<5	33-90+	SCL	xxx				1	IV/III	3b/a	W
92	0-31	SCL	0	31-40	SCL	xxx	40-50 (s)	HCL	xxx	3	IV	3b	W
93	0-26	SCL	0	26-78	SCL	xxx	78-100+	SCL	xxx	2	III	3a	W
94	0-32	MCL	0	32-57	HCL	xxx	57-100+	HCL	xxx	0	IV	3b	W
95	0-31	MCL	0	31-100+	HCL	xxx				0	IV	3b	W
96	0-32	SCL	<5	32-45	SCL	xxx	45-90+	HCL	xxx	0	IV	3b	W
97	0-38	SCL	0	38-90+	SCL	xxx				1	III	3a	W
98	0-30	SCL	0	30-90+	SCL/HCL	xxx				1	IV	3b	W
99	0-32	SCL	0	32-50	SCL	xxx	50-74 (s)	SCL	xxx	3	IV/III	3b/a	W
100	0-23	SCL	<5	23-36	SCL	xxx	36-80+	SCL	xxx	2	IV	3b	W
101	0-25	HZCL	0	25-90+	HZCL	xxx				0	III/IV	3b/4	W
102	0-32	MZCL	0	32-63	MCZL	xxx	63-100+	MSL	xxx	0	II	3a	W
103	0-32	MCL	<5	32-100+	HCL	xxx				1	IV	3b	W
104	0-31	SCL	0	31-100+	SCL	xxx				2	III	3a	W
105	0-32	SCL	0	32-90+	HCL/SCL	xxx				2	IV	3b	W
106	0-25	SCL	0	25-38	SCL	xxx	38-90+	HCL	xxx	1	IV	3b	W
107	0-23	SCL/MCL	0	23-43	SCL	xxx	43-90+	SCL	xxx	0	III	3a	W
108	0-29	MZCL	0	29-100+	MSZL	xxx				0	II	3a	W
109	0-31	MCL	0	31-64	HCL	xxx	64-90	HCL	xxx	1	IV	3b	W
110	0-34	MCL	<5	34-96+	SCL/SC	xxx				1	IV	3b	W
111													
112	0-26	SCL	0	26-51	SCL	xxx	51-90+	SCL	xxx	2	III	3a	W
113	0-32	SCL	0	32-51+ (s)	HCL	xxx				1	IV	3b	W
114	0-26	MCL/SCL	0	26-78+ (s)	HCL	xxx				2	IV	3b	W
115	0-32	MCL	0	32-90+	HCL	xxx				1	III/IV	3a/b	W
116	0-38	MCL	0	38-100+	HCL	xxx		DIST?		2	III	3a	W
117	0-33	MCL	<5	33-90+	HCL/C	xxx				2	IV	3b	W
118	0-26	MCL	<5	26-90+	C	xxx				1	IV	3b	W
119	0-56	SCL	0	56-100+	SCL	xxx		DIST					
120	0-28	SCL/MCL	0	28-90+	HCL	xxx				1	IV	3b	W
121	0-27	MCL	0	27-90+	HCL	xxx				2	IV	3b	W
122	0-26	MCL	<5	26-100+	C	xxx				1	IV	3b	W
123	0-21	MCL	<5	21-59	SCL	xxx	59-100+	C	xxx	2	IV	3b	W
124	0-30	SCL	0	30-60	SCL	xxx	60-100+	HCL/SCL	xxx	1	III	3a	W
125	0-28	SCL	0	28-48	SCL	xxx	48-90+	HCL	xxx	2	IV	3b	W

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
126	0-25	SCL	0	25-34	SCL	xxx	34-90+	HCL	xxx	3	IV	3b	W
127	0-23	MCL	0	23-100+	HCL	xxx				1	IV	3b	W
128	0-33	SCL	0	33-80+	HCL	xxx				2	IV	3b	W
129	0-30	SCL	0	30-41	SCL	xxx	41-90+	HCL	xxx	3	IV	3b	W
130	0-31	SCL	0	31-63	MSL	xxx	63-100+	SCL	xxx	2	III	3a	W
131	0-35	SCL	0	35-55	SCL	xxx	55-100+	SCL	xxx	3	III	3a	W
132	0-27	SCL	0	27-47	SCL	xxx	47-90+	SCL/HCL	xxx	2	IV/III	3b/a	W
133	0-23	MCL	0	23-35	MCL	xxx	35-90+	HCL	xxx	1	IV	3b	W
134	0-29	MCL	<5	29-58	HCL	xxx	58-87+	C	xxx	2	IV	3b	W
135	0-26	SCL/MSL	0	26-66	LMS	xx	66-81 81-100+	ASH SCL	xxx	1	II	3a	W
136	0-31	SCL	0	31-49+ (s)	SCL/HCL	xxx				3	IV	3b	W
137	0-27	SCL	0	27-40	SCL	xxx	40-80+	HCL	xxx	2	IV	3b	W
138	0-22	HZCL	0	22-42	ZC	xxx	42-65+ (s)	HCL	xxx	0	IV	4	W
139	0-34	MZCL/PL	0	34-100+	MSZL	xxx				1	II	2/3a	W
140	0-32	HCL	0	32-100+	HCL	0				3	I	2	C/W
141	0-28	MCL	<5	28-65+ (s)	HCL/C	xxx				3	IV	3b	W
142	0-31	SCL	0	31-61	SCL	xxx	61-73+ (s)	SCL	xxx	3	III	3a	W
143	0-30	SCL	0	30-90+	SCL	xxx				1	III	3a	W
144	0-57	SCL dist	0	57-100+	SCL	xxx				1			
145	0-30	SCL	0	30-44	MSL	xxx	44-90+	SCL	xxx	1	III	3a	W
146	0-30	MCL	0	30-90+	MCL	0				2	I	2	C/W
147	0-26	SCL	0	26-46	SCL	xxx	46-80+	SCL	xxx	0	IV	3b	W
148	0-27	SCL	0	27-100+	MSL	xxx				0	II	3a	W
149	0-34	MZCL/PL	0	34-100+	MSZL	xxx				0	II	3a	W
150	0-26	MCL	0	26-73	HCL	xxx	73-100+	MCL	xx	1	III	3a	W
151	0-30	MCL	0	30-45	SCL	xxx	45-67+ (s)	SCL	xxx	0	III	3a	W
152	0-28	MZCL	0	28-90+	MZCL	xxx				0	III	3a	W
153	0-24	MCL	0	24-80+	HCL	xxx				1	IV	3b	W
154	0-29	SCL	0	29-100+	SCL	xxx				1	III	3a	W
155	0-29	HZCL	0	29-100+	HCL	xxx				0	III	3b	W
156	0-34	MZCL/PL	0	34-90+	SCL	xxx				0	III	3a	W
157	0-32	MSL	0	32-100+	LMS	xxx		SATURATED AT 70		0	II	2	W/C
158	0-32	SCL	0	32-63	MSL (r)	0	63-100+	LMS	xx	0	I	2	W/C
159	0-28	MCL	0	28-90+	MSL	xxx				0	II	3a	W
160	0-26	SCL	0	26-35	MSL	xxx	35-100+	LMS	xxx	0	II	3a	W
161	0-29	MCL	0	29-90+	SCL	xx				1	I	2	W/C
162	0-29	SCL	0	29-78	SCL	xxx	78-100+	MSL	xxx	0	III	3a	W
163	0-28	SCL	0	28-41	SCL	xxx	41-61 61-90+	HCL/SCL SCL	xxx xxx	0	II/III	3b/a	W

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
164	0-25	SCL	0	25-39	SCL	xxx	39-72+ (s)	SCL	xxx	0	IV/III	3b/a	W
165	0-28	SCL	0	28-39	SCL	xxx	39-80+	SCL/HCL	xxx	1	IV	3b	W
166	0-39	SCL	0	39-100+	SCL	xxx				5	III	3a	W
167	0-28	SCL	0	28-79	SCL	xxx	79-90+	HCL	xxx	2	III	3a	W
168	0-30	SCL	0	30-40	SCL	xxx	40-90+	SCL	xxx	3	IV	3b	W
169	0-28	MCL	0	28-80+	HCL	xxx				0	IV	3b	W
170	0-28	MCL/SCL	0	28-90+	HCL/SCL	xxx				2	IV	3b	W
171	0-39	MCL	<5	39-62	SCL	xxx	62-90+	HCL sinc	xxx	2	IV	3b	W
172	0-30	MCL/HCL	0	30-90+	HCL	xxx				2	IV	3b	W
173	0-24	MCL/HCL	<5	24-64	HCL	0	64-100+	HCL	xxx	1	III	3a/b	W
174	0-29	MCL	<5	29-72+ (s)	SCL slst	xxx				3	IV	3b	W
175	0-26	MCL	<5	26-89+	HCL	xxx				0	IV	3b	W
176	0-30	MCL	<5	30-90	C slst	xxx				2	IV	3b	W
177	0-26	MCL	<5	26-51	MCL	xxx	51-80+	HCL	xxx	1	IV/III	3b/a	W
178	0-26	MCL	<5	26-33	MCL	xxx	33-90+	HCL	xxx	2	IV	3b	W
179	0-25	MCL	<5	25-34	MCL	xxx	34-75 75-90+	HCL C	xxx xxx	2	IV	3b	W
180	0-38	MCL	<5	38-90+	HCL/SCL	xxx				2	III	3a	W
181	0-28	MCL	<5	28-50	M/HCL	x	50-74+(s)	C	xxx	1	III/IV	3a/b	W
182	0-27	SCL	<5	27-42	SCL	xxx	42-80+	SCL	xxx	1	IV/III	3b/a	W
183	0-28	MCL	<5	28-49	M/HCL	x	49-90+	HCL sinc	xxx	2	IV/III	3b/a	W
184	0-28	SCL	<5	28-53	SCL	xxx	53-90+	HCL	xxx	2	III/IV	3a/b	W
185	0-26	MCL	<5	26-85+	SCL	xxx				4	II	3a	W
186	WOODLAND												
187	0-23	MCL/SCL	<5	23-48	MCL	xxx	48-80+	HCL	xxx	2	IV/III	3b/a	W
188	0-28	MCL	<5	28-90+	SCL	xxx				1	IV	3b	W
189	0-30	SCL	<5	30-49	HCL	xxx	49-90+	SCL	xxx	1	IV/III	3b/a	W
190	0-29	MCL	<5	29-90+	SCL	xxx				2	IV	3b	W
191	WOODLAND												
192	0-27	SCL	<5	27-42	SCL	xxx	42-59 59-74 (s)	SCL/HCL SCL	xxx xxx	0	IV	3b	W
193	0-29	SCL	<5	29-53	SCL	xxx	53-80+	SCL	xxx	0	III	3a	W
194	0-27	MCL	<5	27-90+	SCL	xxx				2	IV	3b	W
195	WOODLAND												
196	0-27	SCL	<5	27-47	SCL	xxx	47-90+	HCL/SCL	xxx	0	IV/III	3b/a	W
197	0-27	SCL	<5	27-43	SCL	xxx	43-90+	HCL	xxx	0	IV	3b	W
198	0-31	MCL	<5	31-46	HCL	xxx	46-90+	HCL sinc	xxx	0	IV	3b	W
199	0-29	MCL	<5	29-90+	HCL	xxx				0	IV	3b	W
200	0-28	MCL	<5	28-90+	HCL	xxx				0	IV	3b	W
201	0-33	SCL	<5	33-90+	HCL	xxx				0	IV	3b	W
202	0-32	SCL	<5	32-59	SCL	xxx	59-100+	HCL	xxx	0	III	3a	W
203	0-27	MCL	<5	27-90+	HCL	xxx				0	IV	3b	W

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
204	0-31	MCL	<5	31-90+	HCL sinc	xxx				0	IV	3b	W
205	0-30	MCL	<5	30-90+	HZCL	xxx				1	IV	3b	W
206	0-28	MCL	<5	28-61	HCL	xxx	61-90+	SCL	xxx	0	III	3a	W
207	LEFT OUT												
208	0-32	SCL	<5	32-65	MSL	xxx	65-90+	HCL/SCL	xxx	0	III	3a	W
209	0-27	SCL	<5	27-42	SCL	xxx	42-90+	HCL	xxx	0	IV	3b	W
210	0-29	MCL	<5	29-56	H/MCL	xx	56+	Stopped at Stone		0	IV	3b	W
211	WOODLAND												
212	0-27	SCL	<5	27-47	SCL	xxx	47-90+	HCL/SCL	xxx	1	IV	3b	W
213	0-27	SCL	<5	27-43	SCL	xxx	43-90+	HCL	xxx	2	IV	3b	W
214	0-32	MCL	<5	32-59	MCL	xxx	59+	Stone		3	III	3a	W
215	0-19	MCL	<5	19-32	MCL	xxx	32-90+	SCL	xxx	4	II	3a	W
216	0-20	MCL	<5	20-46	HCL	xxx	46-100+	SCL	xxx	1	IV	3b	W
217	0-28	SCL	<5	28-52	SCL	xxx	52-90+	HCL	XXX	2	III/IV	3a/b	W
218	0-29	SCL	<5	29-42	SCL	xxx	42-80+	HCL	xxx	3	IV	3b	W
219	0-27	MCL	<5	27-46	MCL	xxx	40-62 62-90+	SCL r HCL	xxx xxx	2	IV	3b	W
220	0-34	MCL	<5	34-90+	SCL	xxx				4	IV	3b	W
221	0-24	MCL	<5	24-65	SCL	xxx	65+	Stopped at Stone		3	II	3a	W
222	0-23	MCL	<5	23-69	SCL	xxx	69+	Stopped at Stone		2	II	3a	W
223	0-28	SCL	<5	28-45	SCL	xxx	45-90+	SCL	xxx	3	III	3a	W
224	0-50+	MCL	<5	DIST	STOPPED								
225	0-33	SCL	<5	33-90+	HCL	xxx				4	IV	3b	W
226	0-35	SCL	<5	35-47	SCL	xxx	47-90+	HCL	xxx	4	IV	3b	W
227	0-30	MCL	<5	30-90+	SCL	xxx				2	II	3a	W
228	0-28	MCL	<5	28-90+	SCL	xxx				4	II	3a	W
229	0-32	MCL	<5	32-90+	HCL/SCL	xxx				3	IV	3b	W
230	0-34	SCL	<5	34-66	SCL	xxx	66-90+	HCL	xxx	2	III	3a	W
231	0-22	SCL	<5	22-30	SCL	xxx	30-80+	HCL	xxx	1	IV	3b	W
232	0-27	SCL	<5	27-65	SCL	xx	65-90+	HCL	xxx	3	III	3a	W
233	0-10	MCL	<5	OVER EXPOSED ROCK									
234	0-32	MCL	<5	32-90+	SCL	xxx				1	II	3a	W
235	0-30	SCL	<5	30-44	SCL	xxx	44-90+	SCL/HCL	xxx	4	IV	3b	W
236	0-27	SCL	<5	27-42	SCL	xxx	42-90+	HCL	xxx	3	IV	3b	W
237	0-31	SCL	<5	31-54	SCL	xxx	54-80+	SCL	xxx	3	III	3a	W
238	0-31	SCL	<5	31-80+	SCL	xxx				4	I/II	2/3a	W
239	0-27	SCL	<5	27-69	SCL	xxx	69+	Stopped at Stone		2	II/III	3a	W
240	0-32	SCL	<5	32-72 (s)	SCL	xxx				1	II	3a	W
241	0-33	SCL	<5	33-62	SCL	xxx	62-100+	HCL	xxx	3	III	3a	W
242	0-30	SCL	<5	30-71	HCL	xxx	71+	Stopped at Stone		4	IV	3b	W
243	0-27	SCL	<5	27-80+	SCL	xxx				4	II	3a	W
244	0-32	SCL	<5	32-52	SCL DIST	-	52-90+	HCL DIST	-	1	III/IV	3a/b	W
245	0-32	SCL	<5	32-45	SCL	xxx	45-90+	HCL	xxx	3	IV	3b	W

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
246	0-28	SCL	<5	28-51	SCL	xxx	51-90+	HCL	xxx	1	III/IV	3a/b	W
247	0-33	SCL	<5	33-62	SCL	xxx	62-100+	SCL DIST				-	
248	0-30	SCL	<5	30-46	SCL	xxx	46-90+	HCL	xxx	2	IV	3b	W
249	0-42	SCL	<5	42-62	SCL	xxx	<u>62-90+</u>	SCL	xxx	3	II/III	3a	W
250	0-28	SCL	<5	28-80+	SCL	xxx				3	II	3a	W
251	0-29	SCL	<5	29-57	SCL	xxx	<u>57-90+</u>	HCL	xxx	0	III	3a	W
252	WOODLAND												
253	0-25	SCL	<5	25-49	SCL	xxx	49-100+	HCL/SCL	xxx	3	IV	3b	W
254	WOODLAND												
255	0-25	SCL	<5	25-38	SCL	xxx	<u>38-90+</u>	HCL/SCL	xxx	2	IV	3b	W
256	0-26	SCL	<5	26-45	SCL	xxx	45-90+	HCL	xxx	2	IV	3b	W
257	WOODLAND												
258	0-30	SCL	<5	30-52	SCL	xxx	52-100+	MSL	xxx	1	I/II	2/3a	W
259	0-50+	SCL	(DIST)	Stoppe d								-	
260	0-25	SCL	<5	25-38	SCL	xxx	<u>38-90+</u>	HCL	xxx	4	IV	3b	W
261	0-33	SCL	<5	33-47	SCL	xx	47-80+	SCL	DIST			-	
262	0-34	SCL	<5	34-90+	SCL mst	xxx				3	II	3a	W
263	0-31	SCL	<5	31-50	SCL	xxx	<u>50-90+</u>	SCL	xxx	0	III/IV	3a/b	W
264	0-23	HZCL	0	<u>23-51</u>	HZCL	xxx	51-90+	MCL	xxx	0	IV/III	4/3b	W
265	0-34	SCL	<5	34-62	SCL	xxx	62-100+	FSZL	xxx	0	II	3a	W
266	0-30	SCL	<5	30-42	SCL	xxx	<u>42-80+</u>	SCL	xxx	2	IV	3b	W
267	0-23	SCL	<5	<u>23-100+</u>	HCL	xxx				3	IV	3b	W
268	0-32	HZCL	0	<u>32-100+</u>	HZCL	xxx				0	IV	4	W
269	0-30	SCL	<5	30- 76(s)	SCL	xxx				2	II	3a	W
270	0-50+	SCL	DIST									-	

Key to table

Mottle intensity:

- o unmottled
- x few to common rusty root mottles (topsoils)
or a few ochreous mottles (subsoils)
- xx common to many ochreous mottles and/or dull structure faces
- xxx common to many greyish or pale mottles (gleyed horizon)
- xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

a depth underlined (e.g. 50) indicates the top of a slowly permeable layer
(a wavy underline indicates the top of a layer borderline to slowly permeable)

Texture:

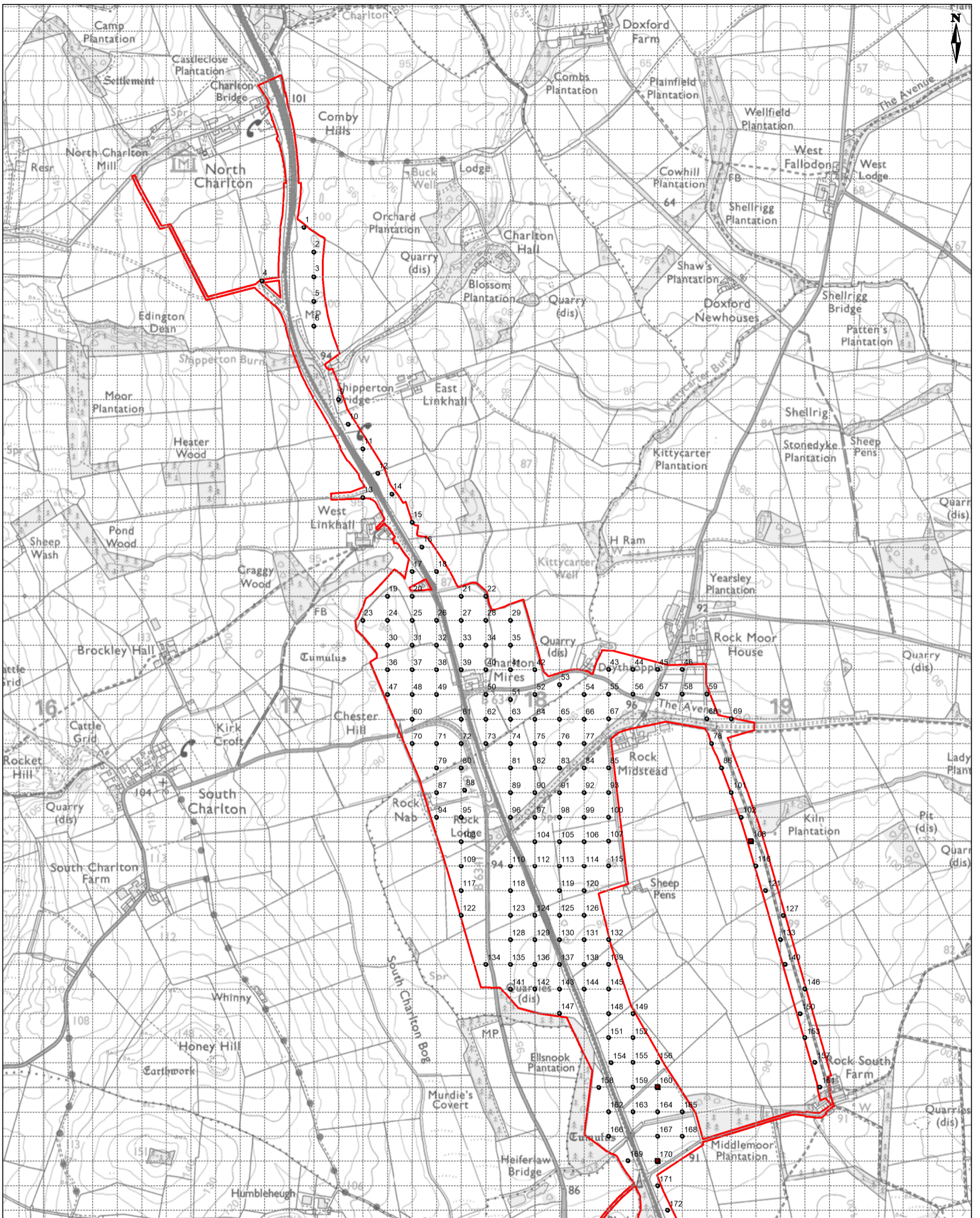
- C - clay
- ZC - silty clay
- SC - sandy clay
- CL - clay loam (H-heavy, M-medium)
- ZCL - silty clay loam (H-heavy, M-medium)
- SCL - sandy clay loam
- SZL - sandy silt loam (F-fine, M-medium, C-coarse)
- SL - sandy loam (F-fine, M-medium, C-coarse)
- LS - loamy sand (F-fine, M-medium, C-coarse)
- S - sand (F-fine, M-medium, C-coarse)
- P - peat (H-humified, SF-semi-fibrous, F-fibrous)
- LP - loamy peat; PL - peaty loam
- R - bedrock

Limitations:

- W - wetness/workability
- D - droughtiness
- De - depth
- St - stoniness
- Sl - slope
- F - flooding
- T - topography/microrelief

Texture suffixes & prefixes:

- ca - calcareous: x-extremely, v-very, sl-slightly
(ca) marginally calcareous
- mn - ferrimanganiferous concentrations
- gn - greenish, yb - yellowish brown, rb - reddish brown
- r - reddish; (v)st - (very) stony; sdst - sandstone; lst - limestone
- dist - disturbed soil layer; mdst - mudstone



Client:



Project:

A1, Northumberland

Map title:

Map 1A
Survey observations

KEY

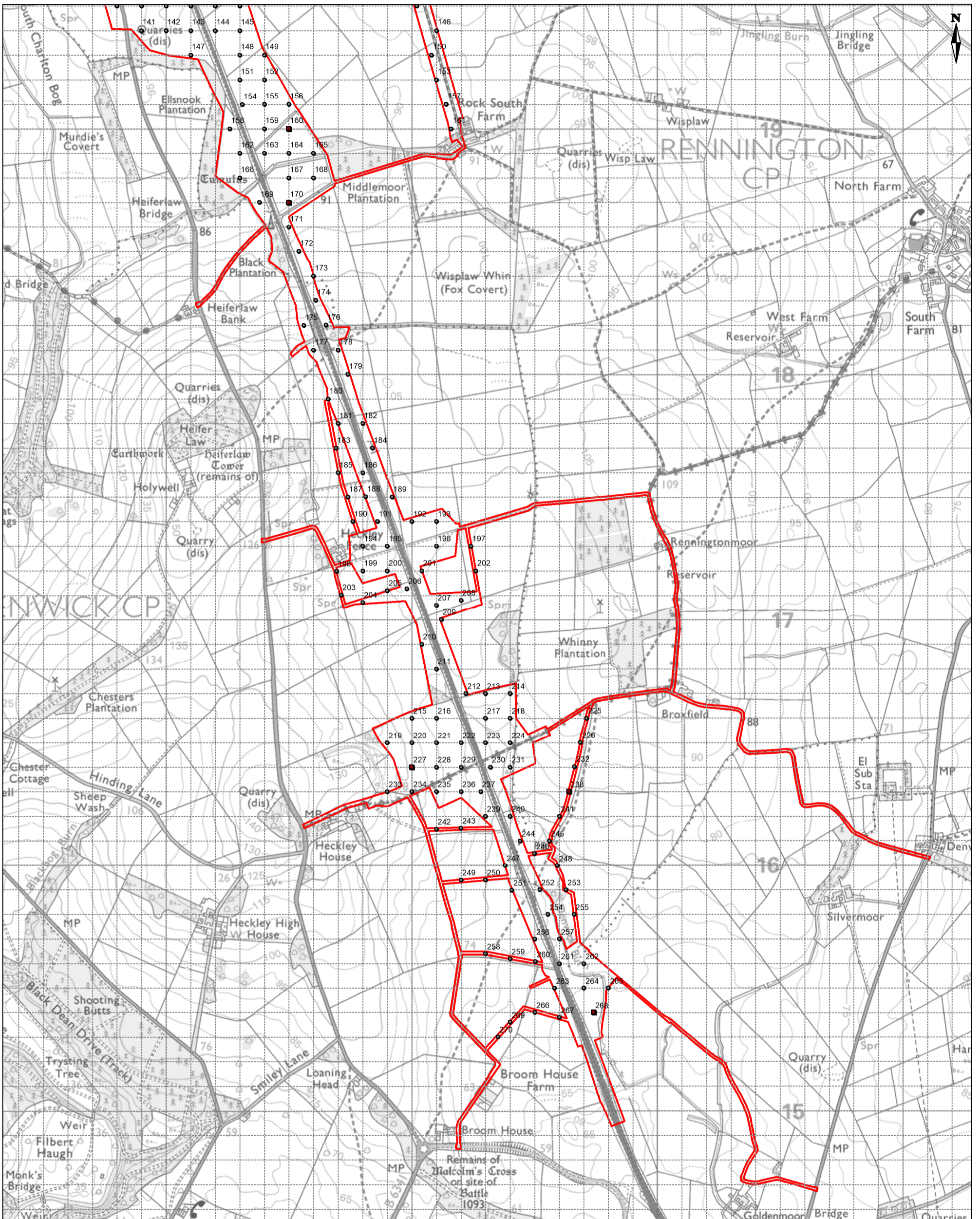
- Survey observation
- Soil/land grade description pit
- Survey area


Scale: 1:15,000 at A3

Date: 18/09/2019




**Land
Research
ASSOCIATES**

Lockington Hall
Lockington
Derby DE74 2RH
Tel: 01509 670570



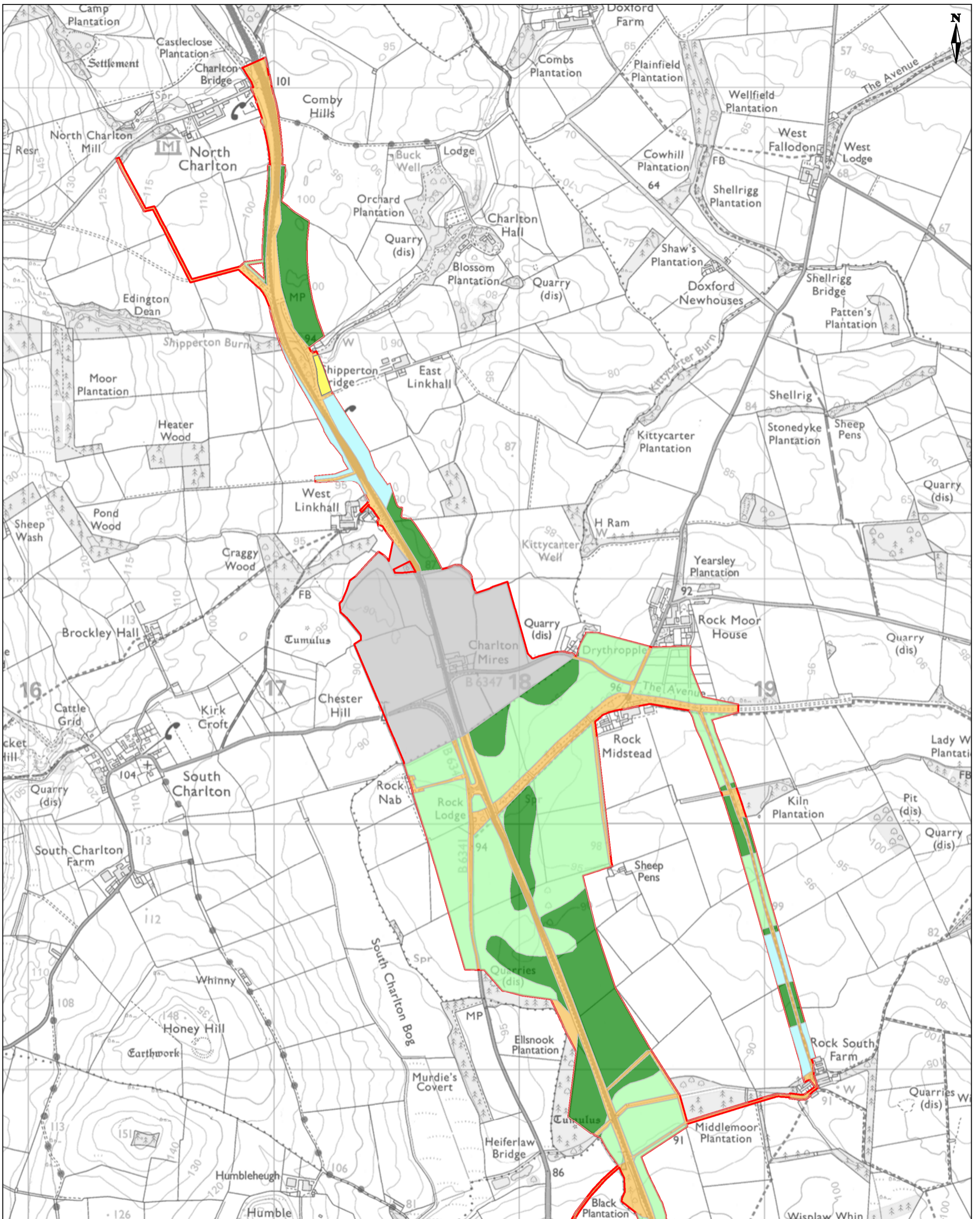
Client:

 Project:
 A1, Northumberland
 Map title:
 Map 1B
 Survey observations


KEY

-  Survey observation
-  Soil/land grade description pit
-  Survey area


Scale: 1:15,000 at A3
 Date: 18/09/2019

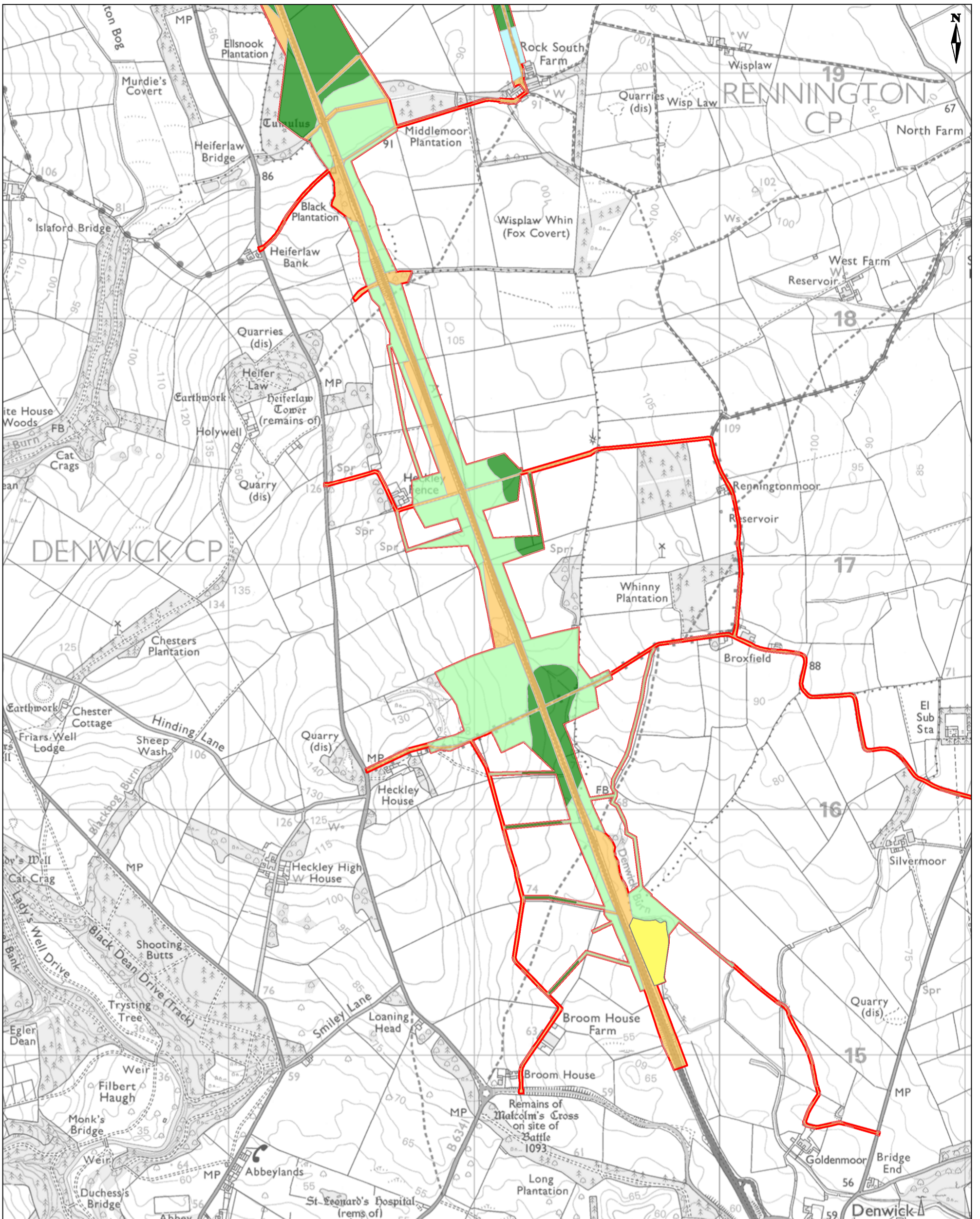
Land Research ASSOCIATES
 Lockington Hall
 Lockington
 Derby DE74 2RH
 Tel: 01509 670570



Client:

 Project:
 A1, Northumberland
 Map title:
 Map 2A
 Agricultural Land
 Classification

KEY	
	Grade 2
	Subgrade 3a
	Subgrade 3b
	Grade 4
	Non-agricultural
	Not surveyed
	Survey area

Scale: 1:15,000 at A3
 Date: 18/09/2019

 Lockington Hall
 Lockington
 Derby DE74 2RH
 Tel: 01509 670570



Client:



Project:

A1, Northumberland

Map title:

Map 2B
Agricultural Land
Classification

KEY

- | | | | |
|---|-------------|---|------------------|
|  | Grade 2 |  | Non-agricultural |
|  | Subgrade 3a |  | Not surveyed |
|  | Subgrade 3b |  | Survey area |
|  | Grade 4 | | |

Scale: 1:15,000 at A3

Date: 18/09/2019

**Land
Research**
ASSOCIATES

Lockington Hall
Lockington
Derby DE74 2RH
Tel: 01509 670570

© Crown copyright 2020.

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence:

visit www.nationalarchives.gov.uk/doc/open-government-licence/

write to the **Information Policy Team, The National Archives,**

Kew, London TW9 4DU, or email

psi@nationalarchives.gsi.gov.uk.

This document is also available on our website at www.gov.uk/highways

If you have any enquiries about this document A1inNorthumberland@highwaysengland.co.uk or call **0300 470 4580***.

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls.

These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone. Calls may be recorded or monitored.

Registered office Bridge House, 1 Walnut Tree Close, Guildford GU1 4LZ

Highways England Company Limited registered in England and Wales number 09346363