

# Infinity Garden Village (Wragley Way)

## ENVIRONMENTAL STATEMENT

### Volume 3

### Appendices and Figures to the Main Technical Studies

June 2019



**Hallam Land  
Management**

**SOILS AND AGRICULTURAL  
QUALITY OF LAND SOUTH OF  
WRAGLEY WAY, DERBY**

Report 537/7

24<sup>th</sup> May, 2019

***Land***  
***Research***  
**ASSOCIATES**  
[www.lra.co.uk](http://www.lra.co.uk)

**SOILS AND AGRICULTURAL QUALITY  
OF LAND SOUTH OF WRAGLEY WAY, DERBY**

L Thomas, MSc

A Harper, BSc

Report 537/7  
Land Research Associates Ltd  
Lockington Hall,  
Lockington,  
Derby  
DE74 2RH  
[www.lra.co.uk](http://www.lra.co.uk)

24<sup>th</sup> May, 2019

## **SUMMARY**

A soil and agricultural land quality survey has been undertaken of 154.5 ha of land south of Wragley Way, Derby.

The land has clayey soils with impeded drainage and loamy over clay soils. The land is predominantly of subgrade 3b agricultural quality with small areas of subgrade 3a quality land. All land within the site is limited by wetness restrictions.

## 1.0 Introduction

---

- 1.1 This report provides information on the soils and agricultural quality of 154.5 ha of land south of Wragley Way, Derby. The report is based on a survey of the land in July 2005 and May 2019.

### **SITE ENVIRONMENT**

- 1.2 Land within the site investigated is primarily in arable use with some areas of grassland. The site is bordered to the north by residential development and Wragley Way, to the south by the A50 and to the east and west by adjoining agricultural land.
- 1.3 The land is level to gently sloping in the south, at an average elevation of approximately 45 m AOD.

### **PUBLISHED INFORMATION**

- 1.4 1:50,000 scale BGS information records the geology of the land as Gunthorpe Member mudstone with Branscombe Mudstone Formation in the east. The basal geology is overlain by Lacustrine Deposits (clay and silt) in the east, with a smaller area of Head (clay, silt, sand and gravel) in the south of the site.
- 1.5 The National Soil Map (published at 1:250,000 scale) shows land in the north-east as Thames Association (mainly stoneless calcareous clayey soils affected by groundwater); in the east as Whimple 3 Association (mainly reddish fine loamy or fine silty over clayey slowly permeable soils); and in the west as Salop Association (mainly slowly permeable reddish fine loamy over clayey soils)<sup>1</sup>.
- 1.6 Provisional mapping from the 1970s shows the agricultural land at the site as grade 3. No more recent survey of the site is available.

<sup>1</sup>Ragg, J.M. *et al.*, (1984). *Soils and their use in Midland and Western England*, Soil Survey of England and Wales. Bulletin No. 12, Harpenden.

## 2.0 Soils

---

2.1 A detailed soil resource and agricultural quality survey was carried out in July 2005 and May 2019. It was based on observations at intersects of a 100 m grid, giving a sampling density of one observations per hectare. During the survey, soils were examined by a combination of pits and augerings. 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 drainage. A description of the main soil types encountered is provided below.

### CLAYEY SOILS

2.3 These soils dominate at the site. They comprise very dark organic stoneless clays that are calcareous in few locations, overlying mottled grey slowly permeable clays. In places the clay is calcareous in upper parts and in other places they contain off-white non-calcareous inclusions, probably of calcium sulphate. At a depth of 55-75 cm they pass to a pale-coloured layer, 30 cm or so thick, that is extremely calcareous and often contains thin bands of shells. Below this the carbonate content declines slightly and a grey heavy silty clay loam layer is typical.

2.4 A typical profile is described below from a pit at observation 9 in 2005 (Map 1).

|            |                                                                                                                                                                                                                                               |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0-27 cm    | Black (10YR 2/1) stoneless organic clay; moderately developed medium angular blocky structure; 5% macropores; non-calcareous; many fibrous roots.                                                                                             |
| 27-72 cm   | Light brownish grey (10YR 6/2) clay with common yellowish brown (10Y 5/6) and a few strong brown (7.5YR 4/6) medium mottles; moderately developed very coarse prismatic structure; 1% macropores; slowly permeable; a few fine fibrous roots. |
| 72-95 cm   | Light grey (5Y 7/2) extremely calcareous material (textures as medium silty clay loam) with a few yellowish brown (10YR 5/6) mottles; structureless; 2% macropores; shell band at 85 cm; no roots                                             |
| 95-100+ cm | Grey to light grey (5Y 6/1) heavy silty clay loam with common dark yellowish brown (10YR4/6) mottles; structureless, 3% macropores; very calcareous; no roots firm.                                                                           |

2.5 On the alluvium the soils have stoneless clay or heavy clay loam topsoils. They are over greyish brown ochreous-mottled, sometimes calcareous and often slowly permeable, clay upper subsoils. Below 60 cm depth the subsoils are generally grey-coloured and coarser textured, varying from sandy clay loams to medium sandy loams. Gravel is encountered below 1m depth locally.

2.6 These soils are mainly imperfectly to poorly-draining (Soil Wetness Class IV) with a low capacity to absorb excess winter rainfall.

## **LOAMY OVER CLAY SOILS**

- 2.7 These soils are located principally on higher ground alongside the A50 where there is a thin loamy drift over reddish mudstone.
- 2.8 The topsoils are slightly stony medium or sandy clay loams, and overlie permeable medium or heavy clay loam upper subsoils. These show ochreous mottling indicating some seasonal waterlogging over the slowly permeable red and grey clay lower subsoils.
- 2.9 A typical profile is described below from a pit at observation SK 33952 30315 (Map 1).
- |            |                                                                                                                                                                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0-26 cm    | Very dark greyish brown (10YR 3/2) medium clay loam; 4% small rounded quartzite stones up to 5 cm in diameter; weakly developed medium subangular blocky structure; common fine fibrous roots.                                                        |
| 26-47 cm   | Brown (7.5YR 5/4) and light brown (7.5YR 6/4) heavy clay loam with common pinkish grey (7.5YR 6/2) mottles; 4% small rounded quartzite stones up to 5 cm in diameter; weakly developed medium subangular blocky structure; common fine fibrous roots. |
| 47-58 cm   | Reddish brown (5YR 4/4) and grey (5YR 5/1) clay; rare quartzite stones; weakly developed very coarse angular blocky structure. a few macropores and earthworm channels, common fine fibrous roots; slowly permeable.                                  |
| 58-100+ cm | Grey (5Y 5.1) calcareous clay with common very large reddish brown (5YR 4/4) mottles; structureless, massive; a few fine fibrous roots above 80 cm depth.                                                                                             |
- 2.10 These soils are mainly imperfectly-draining (Soil Wetness Class III) with a moderate capacity to absorb excess winter rainfall.

## **Disturbed land**

- 2.11 The most westerly field shows evidence of disturbance extending as a 20 m-wide linear strip alongside Wragley Way. This is the result of ground-raising and soil storage during the construction of the Stenson Fields housing during the late 1970s. There is similar ground raising affecting the narrow strip of land east of Deep Dale Lane.

## 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 Classification<sup>2</sup>. The relevant site data for an average elevation of 45 m is given below.

- Average annual rainfall: 628 mm
- January-June accumulated temperature >0°C 1410 day°
- Field capacity period 142 days  
(when the soils are fully replete with water) late Nov-early April
- Summer moisture deficits for: wheat: 107 mm  
potatoes: 99 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 MAFF<sup>3</sup>. There is no overall climatic limitation to agricultural quality in the district.

### **SURVEY RESULTS**

3.4 The agricultural quality of the land is determined by wetness. Land of grade 3 has been identified.

#### **Subgrade 3a**

3.5 This land grade is made up of the loamy over clay soils found on higher ground. The moderately high topsoil clay content and impeded drainage of the lower subsoil means that access for cultivation is rarely possible in winter and early spring due to wetness limitations.

<sup>2</sup>Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

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

### **Subgrade 3b**

- 3.6 The land has high topsoil clay content and impeded drainage (Soil Wetness Class IV). This combination means that under the local climate, opportunities for spring land access are rare and arable cropping is mainly limited to autumn-sown cereal-based rotations.

### **Non Agricultural**

- 3.7 This land comprises a farm stead and tracks.

### **Grade areas**

- 3.8 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><b>Grade/subgrade</b></i> | <i><b>Area (ha)</b></i> | <i><b>% of the land</b></i> |
|------------------------------|-------------------------|-----------------------------|
| <b>Subgrade 3a</b>           | 23.7                    | 15                          |
| <b>Subgrade 3b</b>           | 126.1                   | 82                          |
| <b>Non Agricultural</b>      | 4.7                     | 3                           |
| <b>Total</b>                 | 154.5                   | 100                         |

## **4.0 Soil resources and their use**

---

### **TOPSOILS**

- 4.1. The heavy clay loam and clay topsoils are moderate to low quality resources for reuse in landscaping and gardens. The medium and sandy clay loams are or high quality for reuse. Soil handling would be best performed between May and August, when the soils are likely to be drier and less susceptible to compaction and smearing.

### **SUBSOILS**

- 4.2. The upper subsoils are susceptible to compaction during construction activities which could result in restricted rooting depth, increased droughtiness and risk of localised flooding. If compacted during construction, subsoils should be loosened before any topsoil is spread on them.

### **SOIL HANDLING**

- 4.3. Areas not being built over (e.g. environmental buffers and landscape areas) should not be trafficked by construction vehicles as this will render the soils impermeable, preventing percolation of rainfall beyond the base of the topsoil, which will quickly become saturated.
- 4.4. Stripped topsoil should be stored in separate resource bunds no more than 3 m high and kept grassed and free from construction traffic until required for reuse. The Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra, 2009) provides guidance on good practice in soil handling.

## **APPENDIX**

### **MAPS AND DETAILS OF OBSERVATIONS**

**Land south of Wragley Way, Derby: ALC and soil resources survey – Details of observations at each sampling point**

**July 2005 Survey Observations**

| Obs No | Topsoil       |            |            | Upper subsoil          |                                         |              | Lower subsoil             |                                     |              | Slope (°) | Wetness Class | Agricultural quality |                 |
|--------|---------------|------------|------------|------------------------|-----------------------------------------|--------------|---------------------------|-------------------------------------|--------------|-----------|---------------|----------------------|-----------------|
|        | Depth (cm)    | Texture    | Stones (%) | Depth (cm)             | Texture                                 | Mottling     | Depth (cm)                | Texture                             | Mottling     |           |               | Grade                | Main limitation |
| 1      | 0-28<br>28-30 | C<br>org C | 0          | <u>30</u> -72          | C (+CaSO <sub>4</sub> )                 | xxxx         | 72-115                    | MZCL xca<br>shells @100             | xxx          | 0         | IV            | 3b                   | W               |
| 2      | 0-27          | C (ca)     | 0          | <u>27</u> -70          | C (ca at top)                           | xxxx         | 70-110<br>110-115         | MZCL xca<br>HZCL vca                | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 3      | 0-20          | org C ca   | 0          | <u>20</u> -65          | C (ca at top)                           | xxxx         | 65-95<br>95-115           | MZCL xca<br>HZCL vca                | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 4      | 0-30          | C          | 0          | <u>30</u> -55          | C                                       | xxxx         | 55-120                    | MZCL xca<br>calc conc >80           | xxxx         | 0         | IV            | 3b                   | W               |
| 5      | 0-27          | org C      | 0          | <u>27</u> -65          | C (+CaSO <sub>4</sub> )                 | xxxx         | 65-90<br>90-115           | MZCL xca<br>HZCL vca                | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 6      | 0-27          | org C      | 0          | 27-55<br>55-80         | C<br>HCLca                              | xxxx<br>xxxx | 80-105<br>105-115         | MZCL xca<br>HZCL vca                | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 7      | 0-27          | (org) C ca | 0          | <u>27</u> -40<br>40-75 | C (ca)<br>HZCL<br>(+CaSO <sub>4</sub> ) | xxxx<br>xxxx | 75-90<br>90-115           | MZCL xca<br>HZCL vca                | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 8      | 0-28          | (org) C    | 0          | <u>28</u> -65          | C (+CaSO <sub>4</sub> )                 | xxxx         | 65-95<br>95-115           | C (+CaSO <sub>4</sub> )<br>HZCL vca | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 9      | 0-28          | org C      | 0          | <u>28</u> -65          | C                                       | xxxx         | 65-100<br>100-115         | MZCL xca<br>HZCL vca                | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 10     | 0-35          | HCL/C      | 3          | <u>35</u> -70          | dense C                                 | xxxx         | 70-95<br>95-110           | HCL<br>C                            | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 11     | 0-55          | dense MCL  | 3          | 55-65                  | dense MCL                               | xx           | 65+                       | dense                               |              | 1         | (II)          | (3a)                 | W               |
| 12     | 0-35          | MCL        | 4          | <u>37</u> -65          | r&gn C                                  | xxx          | 65+                       | soft mdst                           |              | 1         | III-IV        | 3a-b                 | W               |
| 13     | 0-35          | HCL        | 8          | 35-55                  | MCL+stC                                 | xxx          | <u>55</u> -100<br>100-110 | rC<br>soft mdst                     | xxx          | 1         | III           | 3b                   | W               |
| 14     | 0-35          | MCL        | 4          | 35-55                  | HCL                                     | xxx          | <u>55</u> -110            | rC                                  | xxx          | 1         | III           | 3a                   | W               |
| 15     | 0-35          | C          | 3          | 35-85                  | distrbd MCL                             | xxx          | 85+                       | impenetrable                        |              | 1         | (III)         | 3b                   | W               |
| 16     | 0-26          | HCL        | 3          | 26-50                  | MSL                                     | xxx          | 50-65<br>65-110           | ZCL (grey)<br>stopped               | xxx          | 0         | II            | 3a                   | W (disturbed)   |
| 17     | 0-30          | HCL        | 5          | 30-70                  | HCL/C                                   | xxx          | 70-110                    | C                                   | xxxx         | 0         | III/IV        | 3b                   | W               |
| 18     | 0-20          | C          | 0          | <u>20</u> -45          | C                                       | xxx          | 45-55<br>55-110+          | stHCL<br>red & grey C               | xxx<br>xxxx  | 0         | IV            | 3b                   | W               |
| 19     | 0-30          | MCL        | 0          | 30-45<br>45-55         | HCL<br>stHCL                            | x<br>xxx     | <u>55</u> -110            | red & grey C                        | xxxx         | 0         | III           | 3a                   | W               |
| 20     | 0-25          | C          | 0          | <u>25</u> -80          | C                                       | xxxx         | 80-120                    | HCL                                 | xxxx         | 0         | IV            | 3b                   | W               |
| 21     | 0-23          | HCL(h?)    | 0          | <u>23</u> -45          | C                                       | xxxx         | 45-55<br>55-120           | olive C<br>ecaSCL                   | xxxx<br>xxxx | 0         | IV            | 3b                   | W               |

| Obs | Topsoil    |         |            | Upper subsoil          |                |              | Lower subsoil                               |                            |                      | Slope  | Wetness  | Agricultural quality |                 |
|-----|------------|---------|------------|------------------------|----------------|--------------|---------------------------------------------|----------------------------|----------------------|--------|----------|----------------------|-----------------|
| No  | Depth (cm) | Texture | Stones (%) | Depth (cm)             | Texture        | Mottling     | Depth (cm)                                  | Texture                    | Mottling             | (°)    | Class    | Grade                | Main limitation |
| 22  | 0-26       | hC      | 0          | <u>26</u> -80          | C              | xxx          | 80-120                                      | vcaHCL                     | xxxx                 | 0      | IV       | 3b                   | W               |
| 23  | 0-30       | MCL     | 4          | 30-40                  | HCL            | xxx          | <u>40</u> -110+                             | red C                      | xxx                  | 1      | III      | 3a                   | W               |
| 24  | 0-28       | C       | 1          | 28-40                  | C              | xx           | <u>40</u> -65<br>65-120                     | C grey<br>red C            | xxx<br>xx            | 0      | III      | 3b                   | W               |
| 25  | 0-22       | HCL     | 0          | <u>22</u> -50          | C              | xxx          | 50-80<br>80-120                             | stSCL+SC<br>red & grey C   | xxxx<br>xxx          | 0<br>0 | IV<br>IV | 3b<br>3b             | W<br>W          |
| 26  | 0-19       | HCL     | 0          | <u>19</u> -85          | C              | xxx-xxxx     | 85-120                                      | stSCL+MSL                  | xxxx                 | 0      | IV       | 3b                   | W               |
| 27  | 0-18       | C       | 0          | 18-35<br><u>35</u> -60 | C<br>C         | xx(x)<br>xxx | 60-100<br>100-120                           | stSC+SCL<br>stMSL          | xxxx<br>xxxx         | 0      | IV       | 3b                   | W               |
| 28  | 0-18       | HCL     | 0          | <u>18</u> -60          | C              | xxx          | 60-90<br>90-110+                            | stSCL<br>SCL               | xxx<br>xxxx          | 0      | IV       | 3b                   | W               |
| 29  | 0-20       | C       | 0          | 20-45                  | C              | xx(x)        | <u>45</u> -70<br>70-100<br>stopped on stone | C<br>stSCL                 | xxxx<br>xxxx         | 0      | III      | 3b                   | W               |
| 30  | 0-20       | C       | 1          | <u>20</u> -55          | C              | xxx          | 55-70<br>70-110+                            | olive SCL<br>C+S           | xxxx<br>xxxx         | 0      | IV       | 3b                   | W               |
| 31  | 0-30       | ZC      | 0          | 30-40                  | SCL            | xxx          | 40-70<br>70-110+                            | stMSL<br>caSCL             | xxx<br>xxxx          | 0      | II/III   | 3b                   | W               |
| 32  | 0-23       | HCL     | 0          | <u>23</u> -50          | HCL-C          | xxx          | 50-110+                                     | caSCL                      | xxxx                 | 0      | IV       | 3b                   | W               |
| 33  | 0-32       | SCL-HCL | 3          | 32-46<br>46-65         | SCL<br>stHCL-C | o<br>xxx     | <u>65</u> -100                              | red C                      | xxx                  | 1      | II       | 2/3a                 | W               |
| 34  | 0-27       | MCL     | 4          | <u>27</u> -65          | red C          | xxx          | stopped on hard skerry                      |                            |                      | 1      | IV       | 3b                   | W               |
| 35  | 0-25       | MCL     | 4          | 25-42                  | HCL            | xxx          | <u>42</u> -100+                             | red C                      | xxx                  | <1     | III      | 3a                   | W               |
| 36  | 0-26       | HCL     | 4          | <u>26</u> -45          | C              | xxx          | 45-120                                      | red & grey C               | xxxx                 | 0      | IV       | 3b                   | W               |
| 37  | 0-26       | HCL     | 3          | <u>26</u> -45          | C              | xxx          | 45-60                                       | SCL                        | xxx                  | 0      | IV       | 3b                   | W               |
| 38  | 0-24       | HCL     | 3          | 24-40                  | HCL            | xxx          | <u>40</u> -110+                             | C                          | xxx                  | 0      | III      | 3b                   | W               |
| 39  | 0-17       | C       | <1         | <u>17</u> -40<br>40-55 | C<br>stHCL     | xxx<br>xxx   | 55-75<br>75-120                             | MSL<br>C                   | xxx<br>xxxx          | 0      | III/IV   | 3b                   | W               |
| 40  | 0-24       | C       | <1         | <u>24</u> -45          | C              | xxx          | 45-80<br>80-100<br>100-120                  | C<br>stSCL<br>red+grey HCL | xxxx<br>xxxx<br>xxxx | 0<br>0 | IV<br>IV | 3b<br>3b             | W<br>W          |
| 41  | 0-23       | C       | 1          | <u>23</u> -70          | C              | xxx          | 70-90<br>90-110                             | SCL+HCL<br>MSL             | xxx<br>xxx           | o      | IV       | 3b                   | W               |
| 42  | 0-25       | M/HCL   | 1          | 25-40<br><u>40</u> -75 | HCL<br>C       | xxx<br>xxxx  | 75-95<br>95-110                             | ZC<br>SZL (LM) ca          | xxxx<br>xx           | o      | III      | 3a-b                 | W               |
| 43  | 0-32       | C       | 1          | <u>32</u> -80          | SL/SCL         | xxx          | <u>80</u> -100<br>100-110                   | ZC<br>SZL (LM) ca          | xxxx<br>xx           | o      | III      | 3a                   | W               |
| 44  | 0-28       | HCL-SCL | 2          | 28-50                  | (st)SCL        | xx(x)        | 50+                                         | stopped                    |                      | <1     | II/III   | 3a/3b                | W               |
| 45  | 0-27       | MCL     | 3          | 27-50                  | HCL            | xxx          | 50-90                                       | HCL grey skerry            |                      | 1      | ii       | 2                    | W               |

| Obs | Topsoil    |         |            | Upper subsoil |              |          | Lower subsoil      |                      |             | Slope | Wetness | Agricultural quality |                 |
|-----|------------|---------|------------|---------------|--------------|----------|--------------------|----------------------|-------------|-------|---------|----------------------|-----------------|
| No  | Depth (cm) | Texture | Stones (%) | Depth (cm)    | Texture      | Mottling | Depth (cm)         | Texture              | Mottling    | (°)   | Class   | Grade                | Main limitation |
|     |            |         |            |               |              |          | 90-110+            | red & grey C         | xxxx        |       |         |                      |                 |
| 46  | 0-25       | M-HCL   | 2          | 25-40         | (st)HCL      | xxx      | 40-110+            | red & grey C         | xxxx        | 0     | III     | 2A/B                 | W               |
| 47  | 0-23       | C       | 1          | 23-60         | red C        | xxx      | 60-90              | grey C               | xxxx        | 0     | IV      | 3b                   | W               |
|     |            |         |            |               |              |          | stopped on skerry  |                      |             |       |         |                      |                 |
| 48  | 0-23       | C       | 1          | 23-50         | C            | xxx      | 50-120             | grey ZCL             | xxxx        | 0     | IV      | 3b                   | W               |
| 49  | 0-24       | dk C    | 3          | 24-65         | red C        | xxx      | 65-110             | red & grey C         | xxxx        | 0     | IV      | 3b                   | W               |
| 50  | 0-25       | dk C    | 0          | 25-85         | C            | xxx      | 85-110             | redC                 | xxx         | 0     | IV      | 3b                   | W               |
| 51  | 0-21       | HCL     | <1         | 21-80         | C            | xxx      | 85-105<br>105-110  | SCL<br>MSL           | xxxx<br>xxx | 0     | IV      | 3b                   | W               |
| 52  | 0-22       | C       | 1          | 22-75         | C            | xxxx     | 75-110             | SCLca                | xxx         | 0     | IV      | 3b                   | W               |
| 53  | 0-28       | HCL/C   | 1          | 28-75         | HCL          | xxxx     | 75-100             | rMCL<br>rHCL+mdst ca | x           | o     | IV      | 3b                   | W               |
| 54  | 0-30       | HCL     | 3          | 30-45         | HCL          | xxx      | 45-60              | redC                 | xxxx        | 0     | III     | 3b                   | W               |
|     |            |         |            |               |              |          | stopped on skerry  |                      |             |       |         |                      |                 |
| 55  | 0-27       | HCL     | 4          | 27-65         | redC         | x        | 65-110+            | red & grey C         | xxx         | 1     | IV      | 3b                   | W               |
| 56  | 0-27       | (ca)HCL | 2          | 27-40         | C            | xxx      | 40-120             | red & grey C         | xxx         | 0     | IV      | 3b                   | W               |
| 57  | 0-23       | C       | 1          | 23-53         | caC          | xxx      | 53-110+            | red C+skerry         | xxx         | 0     | IV      | 3b                   | W               |
| 58  | 0-25       | dk HCL  | 0          | 25-50         | HCL          | xxx      | 50-70<br>70-110    | SCL<br>red C         | xxx<br>xxxx | 0     | IV      | 3b                   | W               |
| 59  | 0-26       | dk C    | <1         | 26-40         | SCL          | xxx      | 40-90<br>90-120    | ZCL<br>ZC            | xxx<br>xxxx | 0     | III     | 3b                   | W               |
| 60  | 0-25       | C       | 5          | 25-75         | C            | xxxx     | 75-100<br>100-110  | SCL<br>ZCL           | xxx<br>xxx  | 0     | IV      | 3b                   | W               |
| 61  | 0-25       | C       | 1          | 25-45         | C            | xxx      | 45-95<br>95-110    | rZCL<br>rMCL+mdstca  | xx          | 0     | IV      | 3b                   | W               |
| 62  | 0-26       | MCL     | 3          | 26-40         | HCL          | xx(x)    | 40-70              | red C                | xx          | 0     | II/III  | 2/3a                 | W               |
|     |            |         |            |               |              |          | stopped on skerry? |                      |             |       |         |                      |                 |
| 63  | 0-28       | HCL     | 2          | 28-45         | HCL          | x        | 45-110             | red C                | xxx         | 0     | III     | 3b                   | W               |
| 64  | 0-23       | C       | 1          | 23-70         | C            | xxx      | 70-110+            | grey C               | xxxx        | 0     | IV      | 3b                   | W               |
| 65  | 0-50       | C       | 4          | 50-110        | red & grey C | xxx      |                    |                      |             | 0     | III     | 3b                   | W               |
| 66  | 0-30       | C       | 2          | 30-65         | C            | xxx      | 65-90<br>90-110    | C(ca)<br>rZC+mdstca  | xxxx        | o     | IV      | 3b                   | W               |
| 67  | 0.30       | MCL     | 2          | 30-55         | HCL          | xx(x)    | 55-70<br>70+       | rC<br>rmdst          | xxx         | 0     | II-III  | 2-3a                 | W               |
| 68  | 0-29       | SCL     | 5          | 29-45         | SCL          | x        | 45-80<br>80+       | gnC<br>gn mdst       | xxxx        | 1     | III     | 3a                   | W               |

## May 2019 Survey Observations

[illegible]

| Obs | Topsoil                     |                                                |                   | Upper subsoil  |            |          | Lower subsoil    |                      |            | Slope | Wetness | Agricultural quality |                 |
|-----|-----------------------------|------------------------------------------------|-------------------|----------------|------------|----------|------------------|----------------------|------------|-------|---------|----------------------|-----------------|
| No  | Depth (cm)                  | Texture                                        | Stones >20 mm (%) | Depth (cm)     | Texture    | Mottling | Depth (cm)       | Texture              | Mottling   | (°)   | Class   | Grade                | Main limitation |
| 36  | Non agricultural, wood land |                                                |                   |                |            |          |                  |                      |            |       |         |                      |                 |
| 37  | 0-29                        | MCL                                            | <5                | 29-48          | C r        | xxx      | 48-89+           | C                    | xxx        | 0     | IV      | 3b                   | W               |
| 38  | 0-24                        | MCL                                            | 5-10              | 24-45          | MCL        | xxx      | 45-96+           | C                    | xxx        | 0     | III     | 3a                   | W               |
| 39  | 0-31                        | MCL                                            | 5-10              | 31-44          | MCL        | xxx      | 44-91+           | C                    | xxx        | 0     | III     | 3a                   | W               |
| 40  | 0-30                        | MCL                                            | 5-10              | 30-82+         | C r        | xxx      |                  |                      | xxx        | 0     | IV      | 3b                   | W               |
| 41  | 0-27                        | MCL                                            | 5-10              | 27-64+         | C r        | xxx      | 64+              | Stopped at stone     | xxx        | 0     | IV      | 3b                   | W               |
| 42  | 0-31                        | MCL                                            | <5                | 31-52          | C r        | xxx      | 52-89+           | C                    | xxx        | 0     | IV      | 3b                   | W               |
| 43  | 0-32                        | MCL                                            | <5                | 32-69          | HCL        | xxx      | 69-92+           | C r                  | xxx        | 0     | III     | 3a                   | W               |
| 44  | 0-36                        | MCL                                            | <5                | 36-100+        | C r        | xxx      |                  |                      | xxx        | 0     | IV      | 3b                   | W               |
| 45  | 0-23                        | MCL                                            | 5-10              | 23-57          | MCL        | xxx      | 57-96+           | C r                  | xxx        | 0     | III     | 3a                   | W               |
| 46  | 0-21                        | MCL                                            | <5                | 21-57          | MCL        | xxx      | 57-94+           | C r                  | xxx        | 0     | III     | 3a                   | W               |
| 47  | 0-25                        | MCL                                            | 5-10              | 25-41          | MCL        | xxx      | 41-97+           | C r                  | xxx        | 0     | III     | 3a                   | W               |
| 48  | 0-30                        | C xca                                          | <5                | 30-60          | C          | xxx      | 60-100+          | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 49  | 0-30                        | C ca                                           | <5                | 30-64          | C          | xxx      | 64-100+          | MZL                  | xxx        | 0     | IV      | 3b                   | W               |
| 50  | 0-36                        | C ca                                           | <5                | 36-60          | C          | xxx      | 60-90+           | ZL                   | xxx        | 0     | IV      | 3b                   | W               |
| 51  | 0-40                        | C                                              | <5                | 40-50_         | ZC         | xxx      | 50+              | Stopped on tree root |            | 0     | IV      | 3b                   | W               |
| 52  | 0-21                        | C                                              | <5                | 21-66          | ZC         | xxx      | 66-90+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 53  | 0-23                        | C                                              | <5                | 23-74          | ZC         | xxx      | 74-93+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 54  | 0-27                        | C                                              | <5                | 27-60          | C          | xxx      | 60-100+          | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 55  | 0-26                        | C                                              | <5                | 26-69          | ZC         | xxx      | 69-97+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 56  | 0-24                        | C                                              | <5                | 24-77          | ZC         | xxx      | 77-92+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 57  | 0-24                        | C                                              | <5                | 24-67          | ZC         | xxx      | 67-93+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 58  | 0-34                        | C (flyash?)                                    | <5                | 34-78          | ZC         | xxx      | 78-100+          | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 59  | 0-21                        | C                                              | <5                | 21-33<br>33-66 | MZCL<br>ZC | xxx      | 66-78<br>78-100+ | HZCL<br>HZCL         | xxx<br>xxx | 0     | IV      | 3b                   | W               |
| 60  | 0-20                        | HZCL                                           | <5                | 20-44          | HZCL       | xxx      | 44-67<br>67-94+  | ZC<br>HZCL           | xxx<br>xxx | 0     | III/IV  | 3b                   | W               |
| 61  | 0-28                        | C                                              | <5                | 28-40          | HZCL       | xxx      | 40-90+           | HZCL/C               | xxx        | 0     | IV      | 3b                   | W               |
| 62  | 0-31                        | C                                              | <5                | 31-80+         | C          | xxx      |                  |                      |            | 0     | IV      | 3b                   | W               |
| 63  | 0-31                        | C                                              | <5                | 31-80+         | C          | xxx      |                  |                      |            | 0     | IV      | 3b                   | W               |
| 64  | 0-30+                       | v compact HCL + building rubble ca (disturbed) | 0                 | IV             | 3b         | W        |                  |                      |            |       |         |                      |                 |
| 65  | 0-48                        | C                                              | <5                | 48-72          | ZC         | xxxx     | 72-100+          | ZCL                  | xxx        | 0     | III     | 3b                   | W               |
| 66  | 0-24                        | C                                              | <5                | 24-64          | ZC         | xxx      | 64-96+           | ZCL                  | xxx        | 0     | IV      | 3b                   | W               |
| 67  | 0-30                        | C                                              | <5                | 30-62          | C          | xxx      | 62-90+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 68  | 0-27                        | C                                              | <5                | 27-67          | ZC         | xxx      | 67-89+           | ZCL                  | xxx        | 0     | IV      | 3b                   | W               |
| 69  | 0-31                        | C                                              | <5                | 31-50          | C          | xxx      | 50-100+          | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |
| 70  | Non agri, Ditch             |                                                |                   |                |            |          |                  |                      |            |       |         |                      |                 |
| 71  | 0-25                        | C                                              | <5                | 25-48          | C          | xxx      | 48-90+           | HZCL                 | xxx        | 0     | IV      | 3b                   | W               |

| Obs | Topsoil    |         |                   | Upper subsoil |         |          | Lower subsoil                  |                   |            | Slope | Wetness | Agricultural quality |                 |
|-----|------------|---------|-------------------|---------------|---------|----------|--------------------------------|-------------------|------------|-------|---------|----------------------|-----------------|
| No  | Depth (cm) | Texture | Stones >20 mm (%) | Depth (cm)    | Texture | Mottling | Depth (cm)                     | Texture           | Mottling   | (°)   | Class   | Grade                | Main limitation |
| 72  | 0-35       | HCL     | <5                | 35-48         | MSL     | xxx      | <u>48-74</u><br><u>74-100+</u> | C<br>ZC           | xxx<br>xxx | 0     | III     | 3b                   | W               |
| 73  | 0-40       | SCL     | <5                | 40-70         | SCL     | xxx      | <u>70-100+</u>                 | C                 | xxx        | 1     | II      | 2                    | W               |
| 74  | 0-27       | HCL     | <5                | <u>27-80+</u> | C       | xxx      |                                |                   |            | 2     | IV      | 3b                   | W               |
| 75  | 0-23       | C       | <5                | <u>23-39</u>  | ZC r    | xxx      | <u>39-86+</u>                  | SCL r             | xxx        | 0     | IV      | 3b                   | W               |
| 76  | 0-32       | C       | <5                | <u>32-50</u>  | C       | xxx      | <u>50-80+</u>                  | MZCL              | xxx        | 0     | IV      | 3b                   | W               |
| 77  | 0-30       | C       | <5                | <u>30-80+</u> | C       | xxx      |                                |                   |            | 0     | IV      | 3b                   | W               |
| 78  | 0-20       | C       | <5                | <u>20-51</u>  | C       | xx       | <u>51-87</u>                   | C                 | xxx        | 2     | IV      | 3b                   | W               |
| 79  | 0-30       | HCL     | <5                | <u>30-70+</u> | C       | xxx      |                                |                   |            | 3     | IV      | 3b                   | W               |
| 80  | 0-34       | SCL     | <5                | 34-72         | SCL     | xx       | <u>72-100+</u>                 | Cr                | xxx        | 3     | II      | 2                    | W               |
| 81  | 0-26       | HCL     | <5                | 26-44         | MSL     | xxx      | <u>44-56</u><br><u>56-90+</u>  | MCL<br>C          | xxx<br>xxx | 4     | III     | 3b                   | W               |
| 82  | 0-34       | HCL     | <5                | <u>34-92+</u> | C r     | xxx      |                                |                   |            | 3     | IV      | 3b                   | W               |
| 83  | 0-28       | HCL     | <5                | <u>28-80+</u> | Cr      | xx       |                                |                   |            | 2     | IV      | 3b                   | W               |
| 84  | 0-30       | SCL     | <5                | 30-60+        | SCL     | xxx      | 60+                            | Stopped on stones |            | 1     | II/III  | 2/3a                 | W               |
| 84b | 0-30       | SCL     | <5                | 30-50         | SCL     | xxx      | <u>50-80+</u>                  | Cr                | xxx        | 4     | III     | 3a                   | W               |
| 85  | 0-34       | HCL     | <5                | 34-65         | HCLr    | xxx      | <u>65-100+</u>                 | Cr                | xxx        | 3     | III     | 3b                   | W               |
| 86  | 0-30       | MCL     | 5-10              | 30-48         | MCL     | xxx      | <u>48-82+</u>                  | C                 | xxx        | 1     | III     | 3a                   | W               |
| 87  | 0-30       | MCL     | <5                | 30-40         | HCL     | xxx      | <u>40-80+</u>                  | Cr                | xxx        | 0     | IV      | 3b                   | W               |
| 88  | 0-30       | HZCL    | 5-10              | <u>30-66</u>  | C       | xxx      | <u>66+</u>                     | Stopped at stone  |            | 0     | IV      | 3b                   | W               |
| 89  | 0-26       | HCL     | <5                | <u>26-45</u>  | HCL     | xxx      | <u>45-80+</u>                  | Cr                | xx         | 0     | IV      | 3b                   | W               |

### 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:

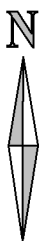
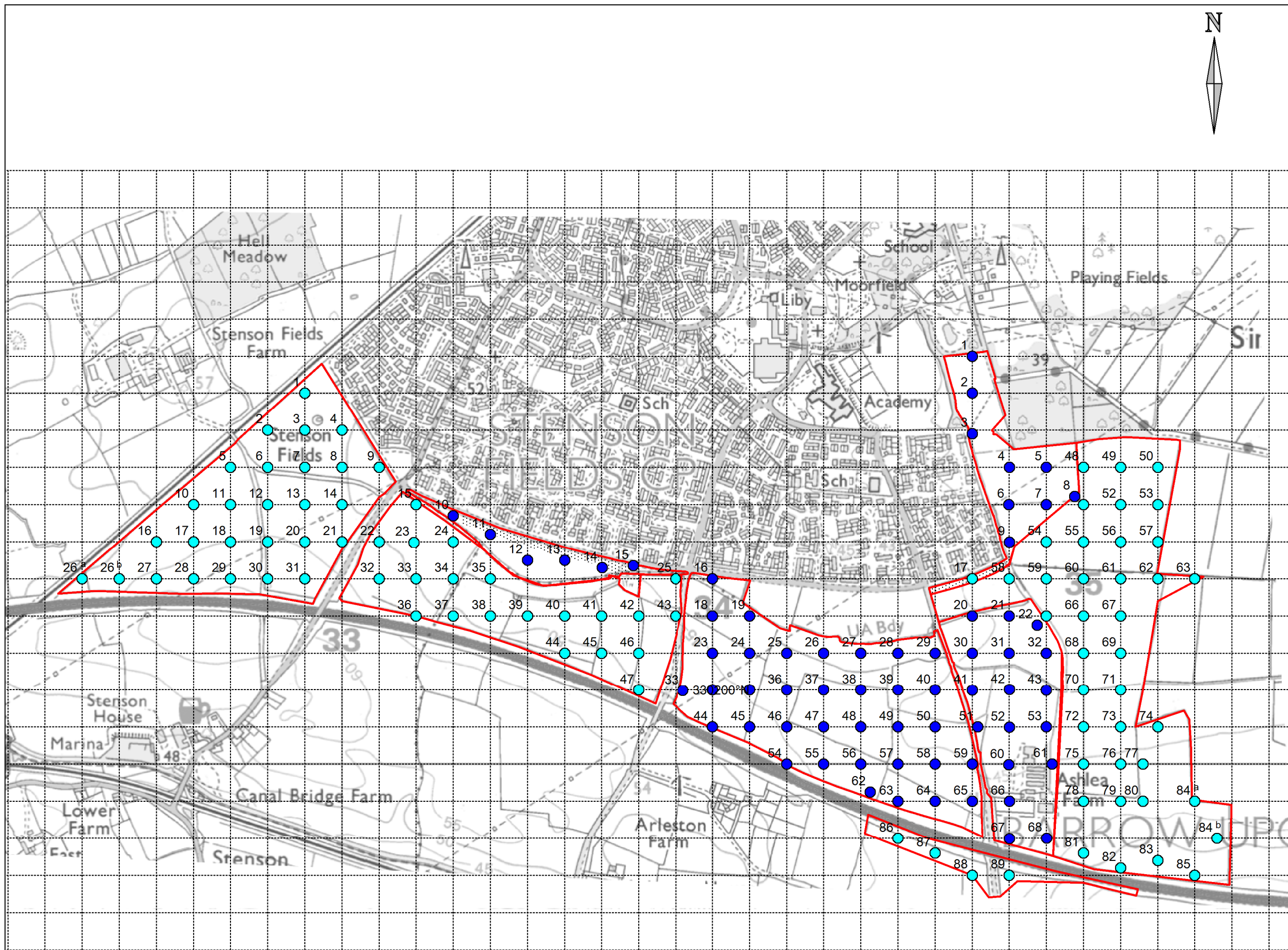
- C - clay
- ZC - silty clay
- SC - sandy clay
- CL - clay loam (H-heavy, M-medium)
- ZCL - silty clay loam (H-heavy, M-medium)
- SCL - sandy clay loam
- SZL - sandy silt loam (F-fine, M-medium, C-coarse)
- SL - sandy loam (F-fine, M-medium, C-coarse)
- LS - loamy sand (F-fine, M-medium, C-coarse)
- 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



**KEY**

● Observations (2005)

● Observations (2019)

□ Survey area

Client:



Site:

**Land south of Wragley Way,  
Derby**

Map title:

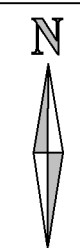
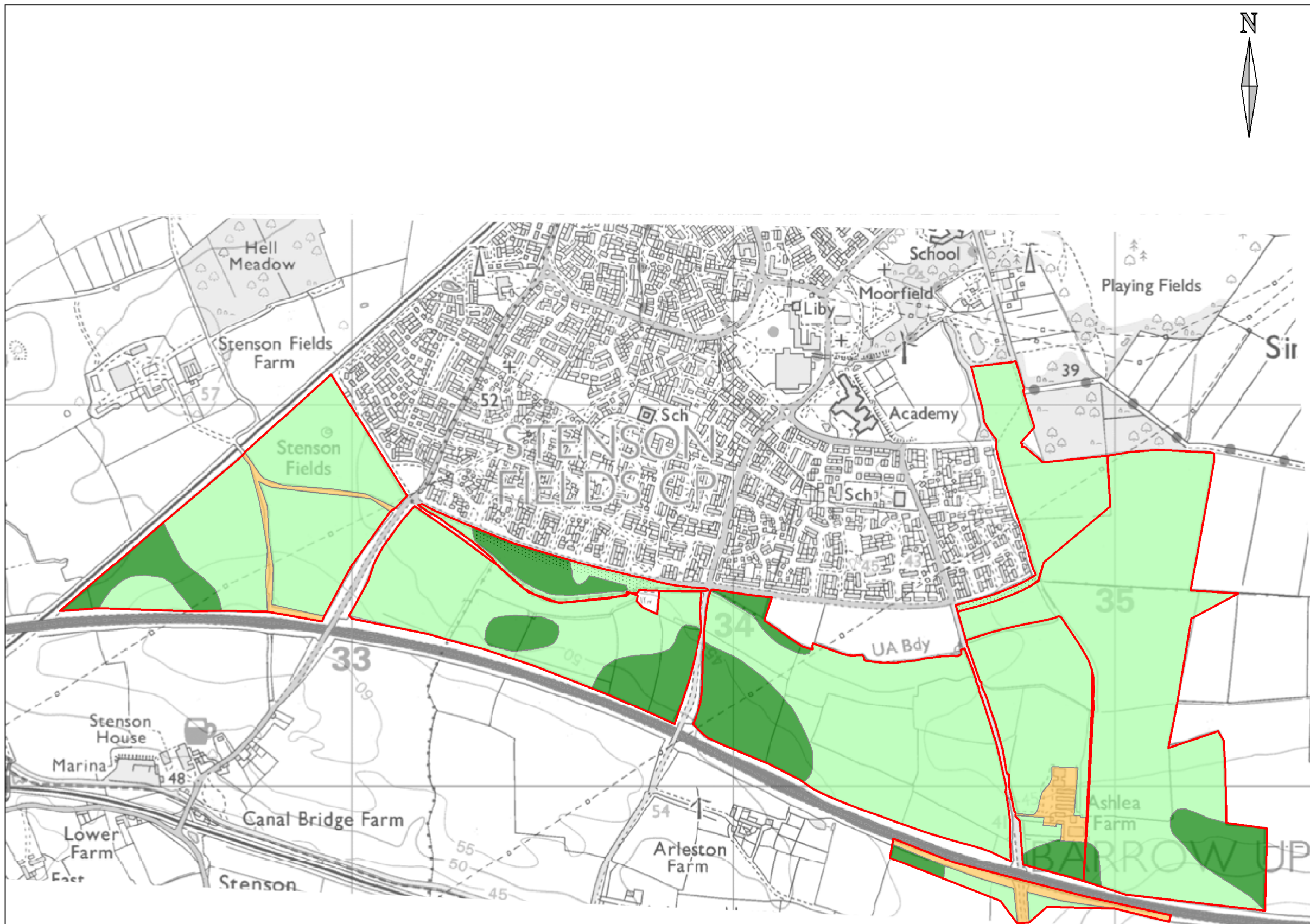
**Map 1  
Survey observations**



Land Research Associates  
Lockington Hall  
Lockington  
Derby DE74 2RH  
01509 670570

Scale: 1:10,750  
(at A3)

Date: 24/05/2019



**KEY**

-  Subgrade 3a
-  Subgrade 3b
-  Disturbed land
-  Non agricultural
-  Survey area

Client:



Site:

**Land south of Wragley Way,  
Derby**

Map title:

**Map 2  
Agricultural Land Classification**



Land Research Associates  
Lockington Hall  
Lockington  
Derby DE74 2RH  
01509 670570

Scale: 1:10,750  
(at A3)

Date: 24/05/2019