A12 Chelmsford to A120 widening scheme

TR010060

6.3 ENVIRONMENTAL STATEMENT

APPENDIX 10.2 AGRICULTURAL LAND CLASSIFICATION SURVEY REPORT

APFP Regulation 5(2)(a)

Planning Act 2008

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

Volume 6

August 2022

Infrastructure Planning

Planning Act 2008

A12 Chelmsford to A120 widening scheme

Development Consent Order 202[ ]

ENVIRONMENTAL STATEMENT APPENDIX 10.2 AGRICULTURAL LAND CLASSIFICATION SURVEY REPORT

Regulation Reference	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010060
Application Document Reference	TR010060/APP/6.3
Author	A12 Project Team & National Highways

Version	**Date**	**Status of Version**
Rev 1	August 2022	DCO Application

SOILS AND AGRICULTURAL QUALITY OF LAND ADJACENT TO THE A12 BOREHAM TO MARKS TEY

Report 1804/1

15th October, 2021

Land Research ASSOCIATES
www.lra.co.uk

SOILS AND AGRICULTURAL QUALITY

OF LAND ADJACENT TO THE A12: BOREHAM TO MARKS TEY

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Report 1804/1
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[redacted]

15th October, 2021

SUMMARY

A soil and agricultural land quality survey has been undertaken of 465.8 ha of land adjacent to the A12, between Boreham and, Marks Tey.

The land has three main soil types: heavy slowly permeable soils over glacial till; deep permeable loamy soils formed in silty drift and medium loams over gravel deposits.

Land quality is mainly of subgrade 3a and 3b quality, with areas of grade 2 locally. The land is limited by either wetness or droughtiness.

1.0 Introduction

1.1 This report provides information on the soils and agricultural quality of 465.8 ha of land adjacent to the A12 between junction 19, Boreham interchange and junction 25, Marks Tey interchange., Essex. 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 between April and September 2021.

SITE ENVIRONMENT

1.2 The survey area crosses mainly arable fields, with areas of livestock pasture and horse paddocks.

1.3 The site is dominantly gently undulating, with an average elevation of approximately 20 m AOD.

PUBLISHED INFORMATION

1.4 1:50,000 scale BGS information records the basal geology as London Clay Formation. All of the land is recorded to be drift-covered, mainly comprising sand and gravel deposits in the centre, Lowestoft Formation chalky glacial till in the east and west, and areas of brickearth (wind-/blown silts) in the west. Minor areas of glaciolacustrine and alluvial deposits are recorded locally.

1.5 The National Soil Map (published at 1:250,000 scale) records central areas as Efford 1 Association, comprising mainly well drained fine loamy soils often over gravel. Land in the north-eastern and central sections of the route are mapped to be within the Hanslope Association, comprising mainly slowly permeable calcareous clayey soils over chalky glacial till. Towards the western end of the route land is mapped as Hornbeam 3 Association: mainly non-calcareous heavy slowly permeable soils[1].

[1]Hodge C. A. H., *et al*., (1984). *Soils and their use in Eastern England,* Soil Survey of England and Wales. Bulletin No. 13, Harpenden.

2.0 Soils

2.1 A detailed soil resource and agricultural quality survey was carried out in April, July and September 2021. It was based on observations at alternate intersects of a 100 m grid, with a sampling density of at least 1 observation every two hectares. Areas of significant variation in soil typoe and land grade were surveyed at a higher density (one observation per hectare) to accurately determine the boundaries. 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 maps (Map 1-17) 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 and their distribution shown on Map 30-42 in an appendix to this report.

HEAVY SLOWLY PERMEABLE SOILS

2.3 These soils are typical of the Hanslope and Hornbeam Associations and occur in the east and central areas of the site. They mainly comprise clayey or fine loamy topsoils over dense slowly permeable clay, often with a moderately permeable upper subsoil, but in places directly over clay. The subsoils are gleyed (greyish and pale colours with ochreous mottes), evidence of waterlogging, usually at shallow depth. These soils mainly have a chalky calcareous lower subsoil, but the upper layers vary between calcareous and non-calcareous (depending on the presence or absence of decalcified drift).

2.4 An example of a calcareous profile is described below from a pit at observation WO15 (Map 1):

0-26 cm	Dark greyish brown (10YR 4/2) clay; slightly stony (small and medium subangular flints); moderately developed very coarse sub-angular blocky structure; very firm; calcareous; smooth clear boundary to:
26-38 cm	Light yellowish brown (2.5Y 6/4) clay with 10% faint fine light olive brown (2.5Y 6/8) mottles and 2-3% very dark grey (10YR 3/1) ferri-manganiferous concentrations; slightly stony; moderately developed very coarse sub-angular blocky structure; firm; porous; medium packing density; calcareous; smooth gradual boundary to:
38-120 cm	Pale brown (2.5Y 7/4) clay with 25% distinct fine light olive brown (2.5Y 6/8) mottles; moderately stony (small soft chalk); weakly developed very coarse angular blocky structure to structureless (massive); very firm; no roots or macropores (high packing density); calcareous.

2.5 An example of a decalcified profile is described below from a pit at observation S23 (Map 1):

0-29 cm	Dark greyish brown (10YR 4/2) heavy clay loam; very slightly stony (small subangular flints); moderately developed very coarse sub-angular blocky structure; firm; few fine fibrous roots; smooth clear boundary to:
29-44 cm	Light yellowish brown (2.5Y 6/4) heavy clay loam with 5% distinct fine yellowish brown (10YR 5/6) mottles; very slighty stony; moderately developed medium and coarse sub-angular blocky structure; friable; many fine fissures; medium packing density; few fine fibrous roots; smooth gradual boundary to:
44-65 cm	Light brownish grey (2.5Y 6/2) clay with 10% distinct fine yellowish brown (10YR 5/6) mottles and fine very dark grey (7.5YR 3/1) ferri-manganiferous concentrations; very slightly stony; moderately developed very coarse angular blocky structure; very firm; no roots or macropores (high packing density); very slightly calcareous; smooth diffuse boundary to:
65-120 cm	Light brownish grey (2.5Y 6/2) clay with 20% distinct fine olive yellow (2.5Y 6/8) mottles; moderately stony (small soft chalk); weakly developed very coarse angular blocky structure to structureless (massive); very firm; no roots or macropores (high packing density); calcareous firm.

2.6 These soils are imperfectly to moderately freely-draining (Soil Wetness Class III to II).

DEEP PERMEABLE SOILS

2.7 These soils are found chiefly in western areas of the site (where silty drift deposits form the surface geological layer) as well as in central areas where deep loamy river terrace deposits occur and in some localised alluvial areas. The comprise medium loamy topsoils over fine or medium loamy subsoils. They are permeable but in places gleyed (greyish and pale colours with ochreous mottles) indicating seasonal waterlogging caused by shallow groundwater.

2.8 An example of a silty profile is described below from a pit at observation W9 (Map 1):

0-35 cm	Dark greyish brown (10YR 4/2) medium silty clay loam; stoneless; moderately developed coarse sub-angular blocky structure; friable; smooth clear boundary to:
35-70 cm	Brown (7.5Y 5/4) medium silty clay loam with paler brown (7.5Y 5/3) ped faces and 10% faint fine light brown (7.5YR 6/3) mottles; stoneless; weakly developed coarse sub-angular blocky structure; friable; porous; low packing density; calcareous; smooth diffuse boundary to:
70-120 cm	Brown (7.5Y 5/4) heavy silty clay loam with 3-4% fine very dark grey (10YR 3/1) ferri-manganiferous concentrations stoneless; moderately developed very coarse sub-angular blocky structure; firm; porous; no macropores; medium packing density.

2.9 These soils are freely-draining (Soil Wetness Class I to II).

MEDIUM LOAMS OVER GRAVEL

2.10 These soils occur along the route and are typical of the Efford 1 Association. They comprise medium loamy topsoils that are often moderately stony with flints and quartz. The topsoils overlie subsoils of a similar texture, overlying gravel typically at approximately 50 cm depth.

2.11 An example of a profile is described below from a pit at observation W9 (Map 1):

0-32 cm	Dark greyish brown (10YR 4/2) medium clay loam; 10-15% small and medium quartz pebbles and subangular flints (5-10% >20 mm); moderately developed coarse and very coarse sub-angular blocky structure; firm; few medium fibrous roots; smooth clear boundary to:
32-39 cm	Pale brown (10YR 6/3) medium clay loam with 20% distinct fine and medium reddish yellow (7.5YR 6/8) mottles; 15-20% stones; moderately developed coarse sub-angular blocky structure; firm (dry); few fibrous roots; medium packing density; smooth gradual boundary to:
39-62 cm	Brown (7.5Y 5/3) coarse sandy loam with 15% yellowish brown (10YR 5/6) mottles; 50-60% small and medium flints and quartz pebbles; weakly developed fine sub-angular blocky structure; very friable; no roots; low packing density; smooth diffuse boundary to:
48-100 cm+	Greyish brown (10YR 5/2) loamy coarse sand; 60% coarse gravel; single grain; loose; no roots; low packing density.

2.12 These soils are freely to moderately freely-draining (Soil Wetness Class I to II).

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[2]. The relevant site data for an average elevation of 20 m is given below.

- Average annual rainfall: 561 mm
- January-June accumulated temperature >0°C 1456 day°C
- Field capacity period (when the soils are fully replete with water) 101 days mid Dec-late Mar
- Summer moisture deficits for: wheat: 128 mm potatoes: 126 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[3]. There are no climatic limitations in this area.

SURVEY RESULTS

3.4 The agricultural quality of the land is determined by either wetness or droughtiness. Other factors were assessed but were not found to affect the overall land grading. Land of grades 2 and 3 has been identified.

Grade 2

3.5 This land grade is found mostly in the centre and west of the site over deep permeable loamy soils (Soil Wetness Class I/II). This land is slightly limited by droughtiness under the local climate, but can support high yields of a wide variety of crops.

[2]Meteorological Office, (1989).*Climatological Data for Agricultural Land Classification*.
[3]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Subgrade 3a

3.6 This subgrade includes land with fine loamy soils with slight drainage restrictions (Soil Wetness Class II) or medium loamy soils with moderate drainage restriction (Soil Wetness Class III); also included are fine loamy calcareous soils with moderate drainage restrictions. Access to this land with farm machinery is restricted in winter and early spring, but it can support late spring as well as autumn sowings.

3.7 Also included within this subgrade is land with droughtiness restrictions. Typically this land comprises medium loamy soils with gravel at below 50 cm depth. The high stone content of the subsoils will not store sufficient moisture for crop uptake in dry summers under the local climate, reducing average yields.

Subgrade 3b

3.8 This subgrade includes land with fine loamy slowly permeable soils and imperfect drainage (Soil Wetness Class III). 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.

3.9 Also included are areas where gravel is encountered within 50 cm depth. The soils will store insufficient moisture for summer crop uptake under the local climate, resulting in low average yields.

Estimated land quality

3.10 Land access to some of the agricultural land within the site was not available and grades for these areas have been interpolated from surveyed areas and published soils and geological information. The grading of this land is provisional.

Grade areas

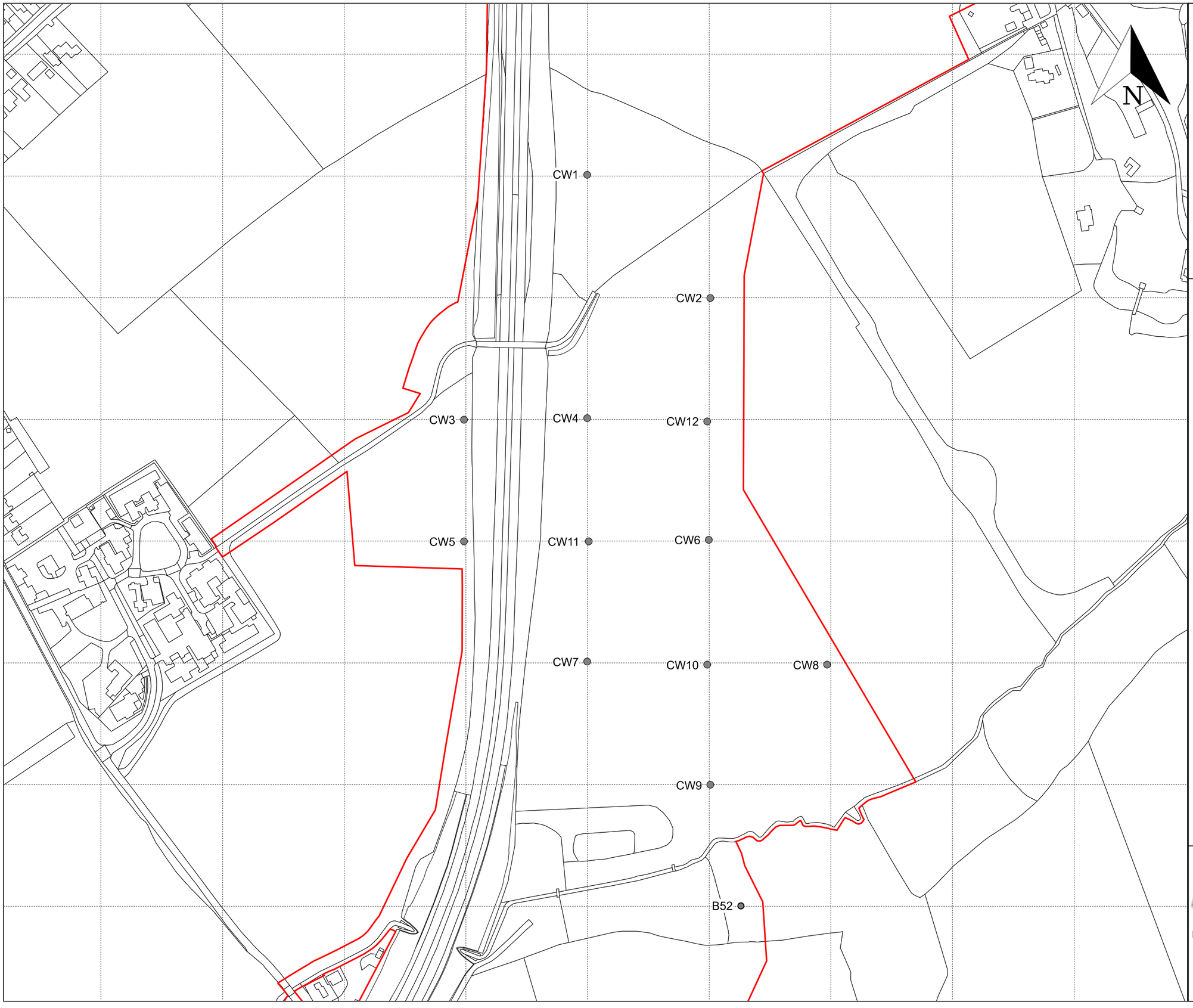
3.11 The boundaries between the different grades of land are shown on Map 2 and the areas occupied by each are shown below.

Table 1: Areas occupied by the different land grades

	surveyed area		*estimated grade areas*	
Grade/subgrade	***Area (ha)***	***% of the land***	***Estimated grade areas***	***% of the land***
Grade 2	85.0	18	11.4	6
Subgrade 3a	238.7	51	61.0	33
Subgrade 3b	142.1	31	20.9	11
Total	465.8	100	93.3	50

APPENDIX

MAPS AND DETAILS OF OBSERVATIONS



KEY

Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

Map 17
Survey Observations

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

Scale: 1:3,000

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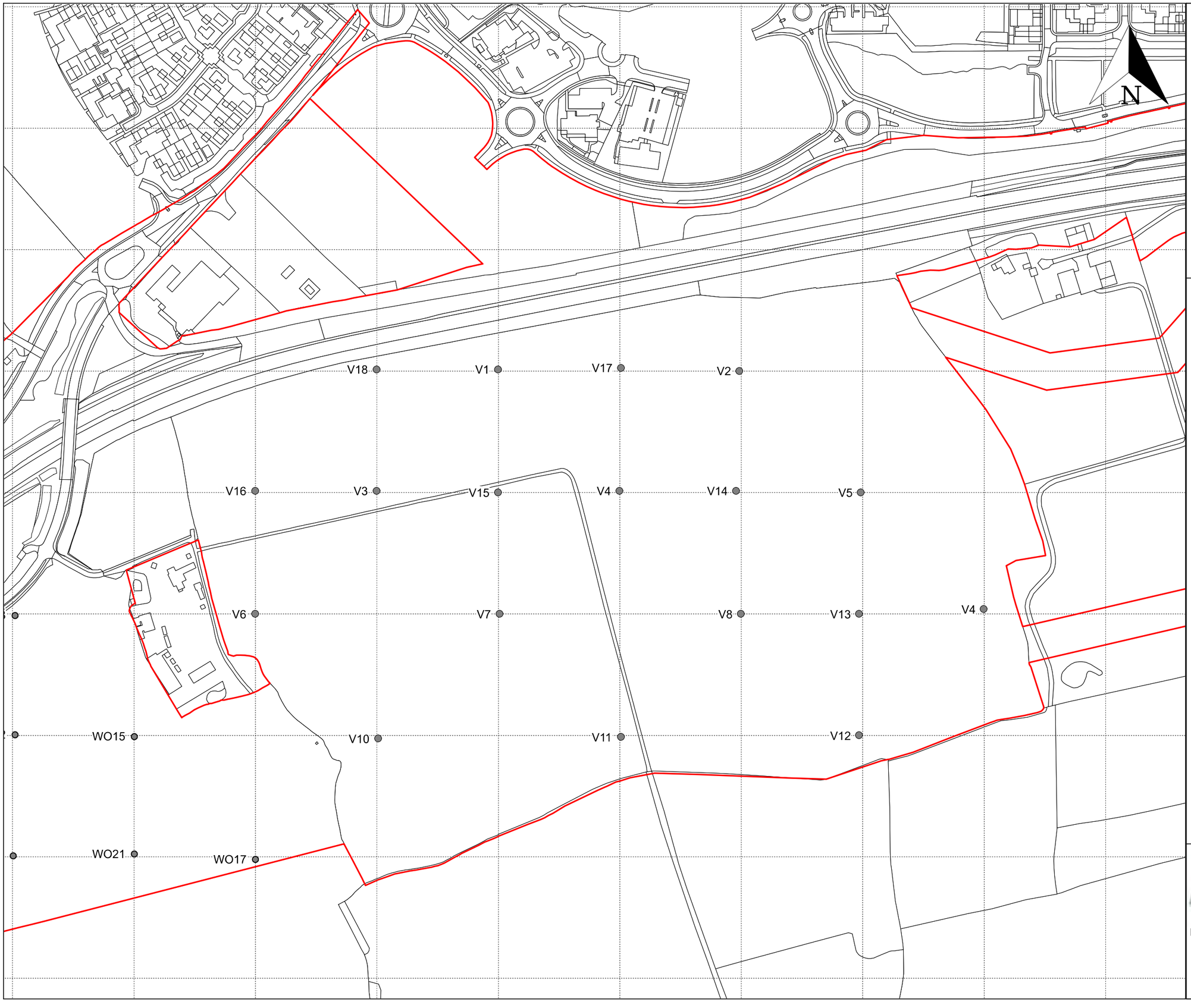

KEY

Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

Map 16
Survey Observations

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

Scale: 1:3,000

Date: 30/09/2021

BO1
BO2
BO16
BO3
BO4
BO17
BO5
BO15
BO6
BO7
BO8
BO10
BO9
BO14
BO11
BO12
BO13

KEY

Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

Map 15
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Lockington
Derby DE74 2RH
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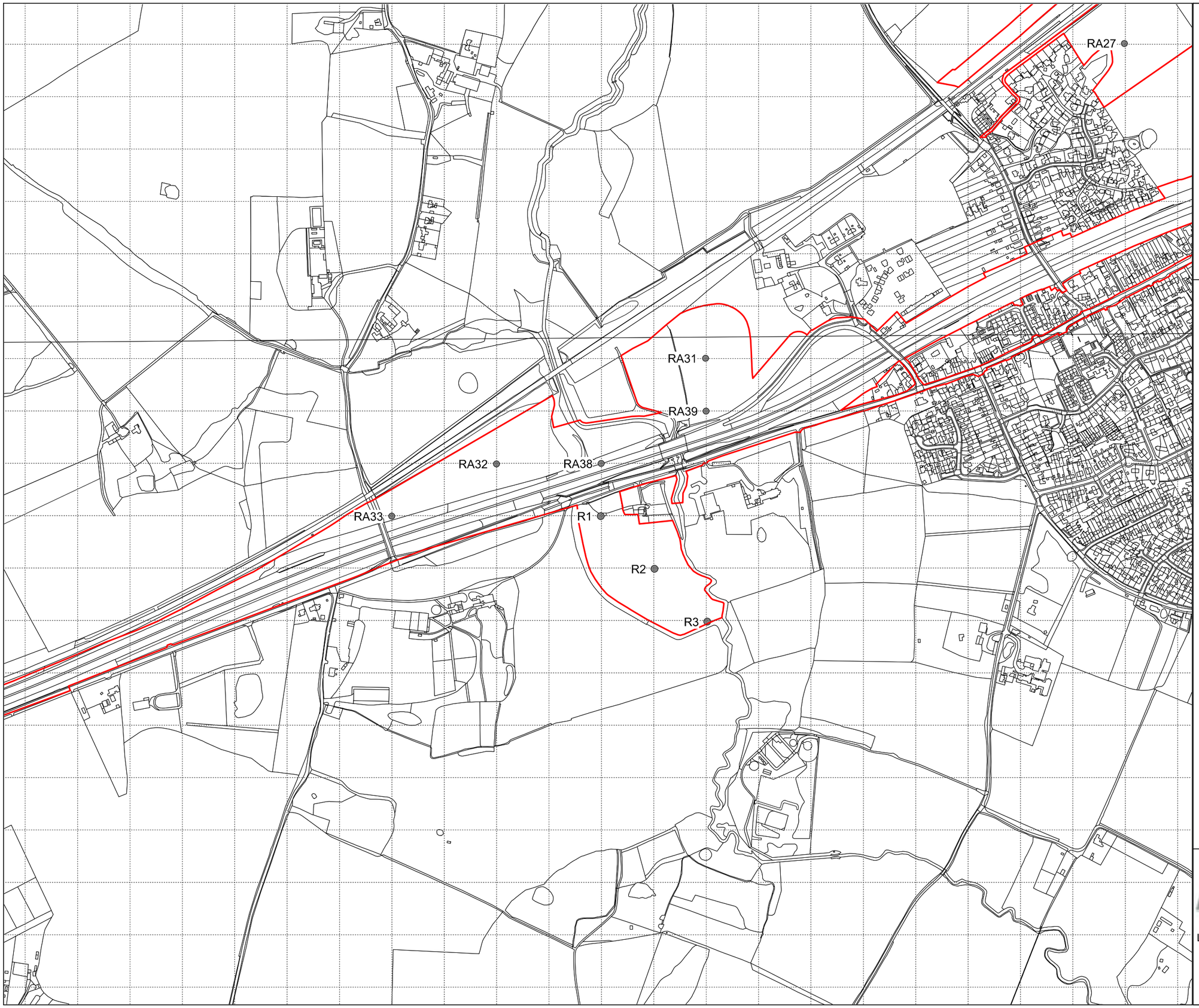

KEY

Auger observation

Survey area

Site:

Map 14
Observations

Map title:

Map
Survey observations

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Lockington
Derby DE74 2RH
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Scale: 1:7,000

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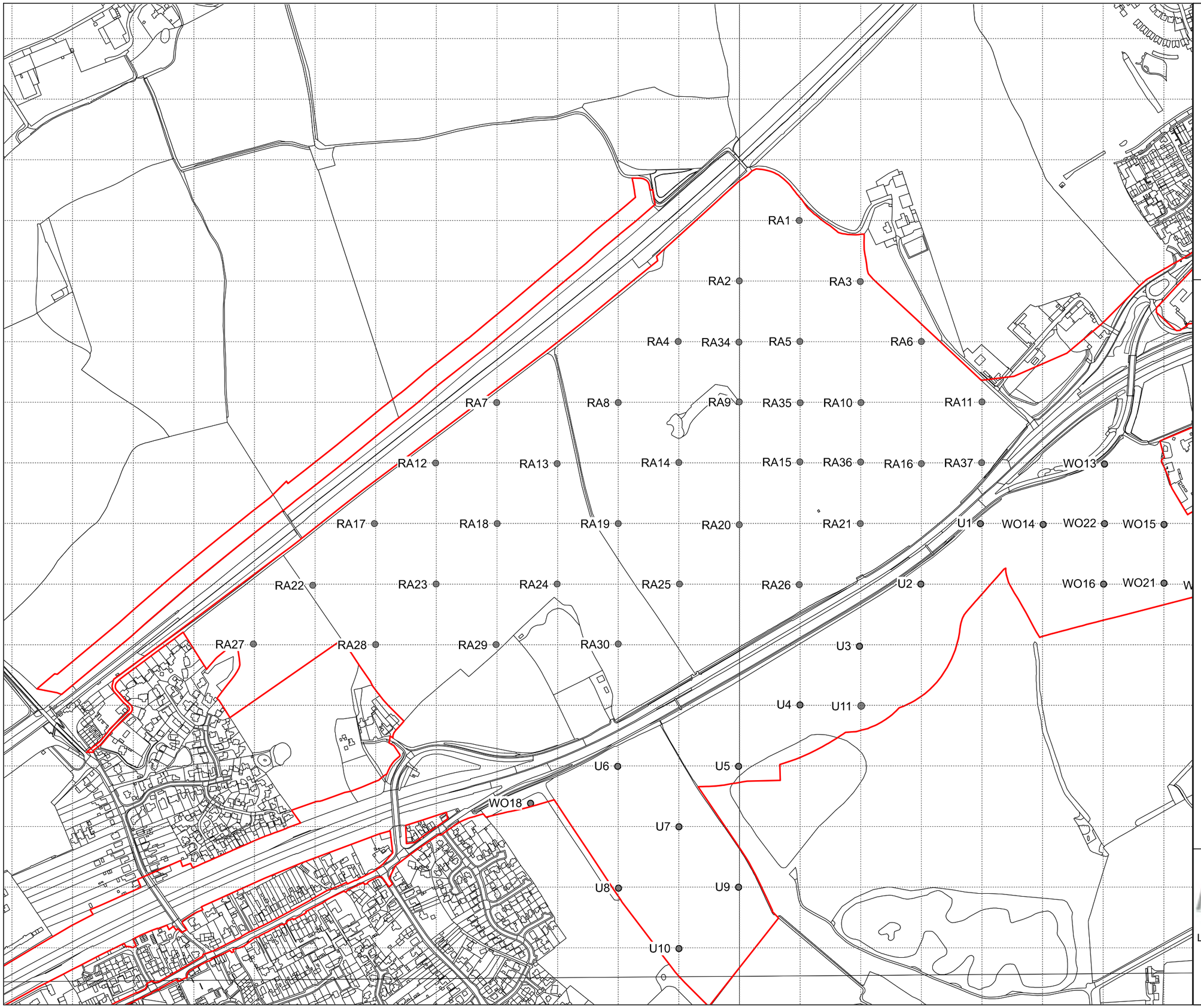

KEY

Auger observation

Survey area

Site:

Map 13
Survey observations

Map title:

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Survey observations

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Derby DE74 2RH
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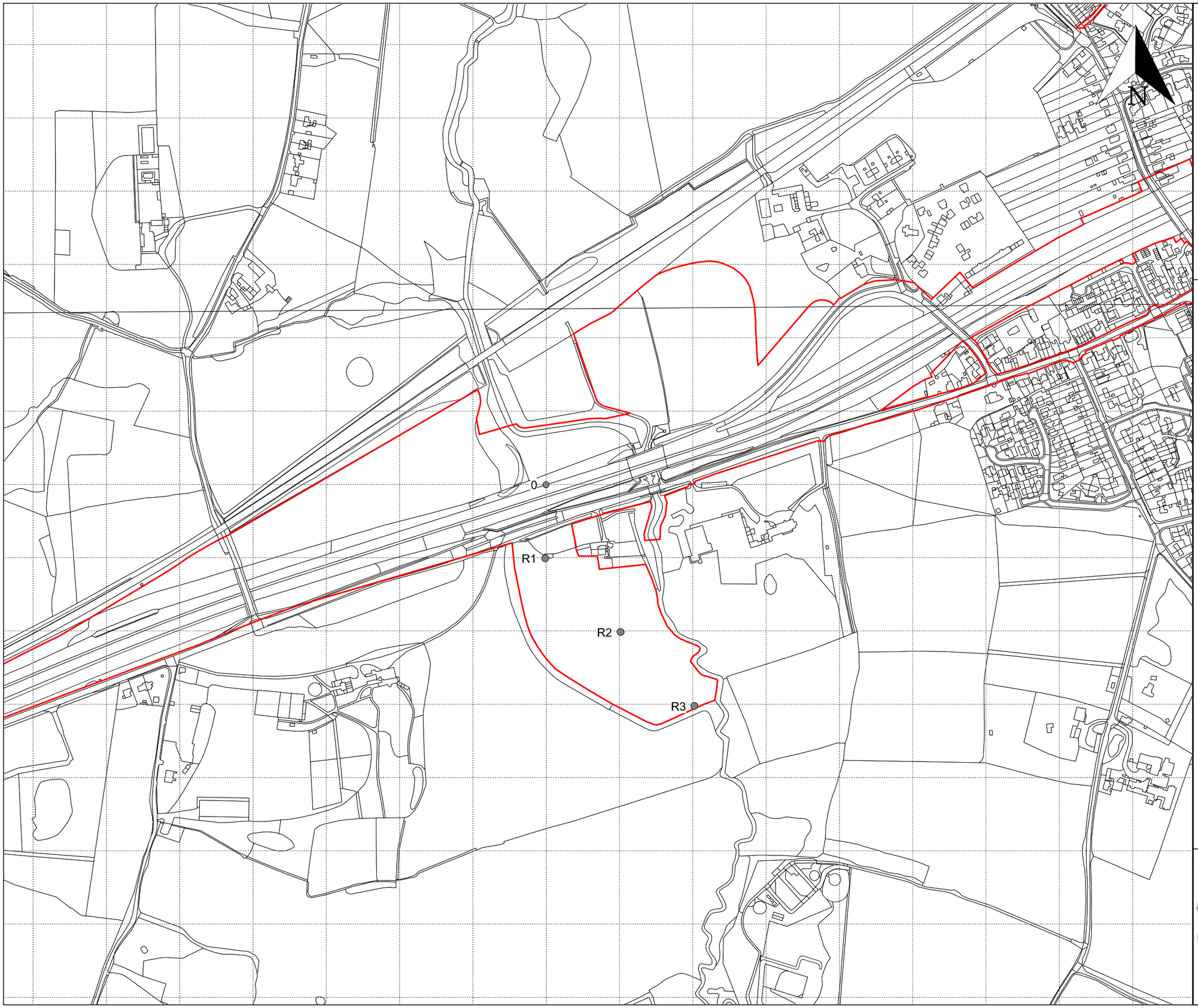

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Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

Map 12
Survey observations

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Lockington
Derby DE74 2RH
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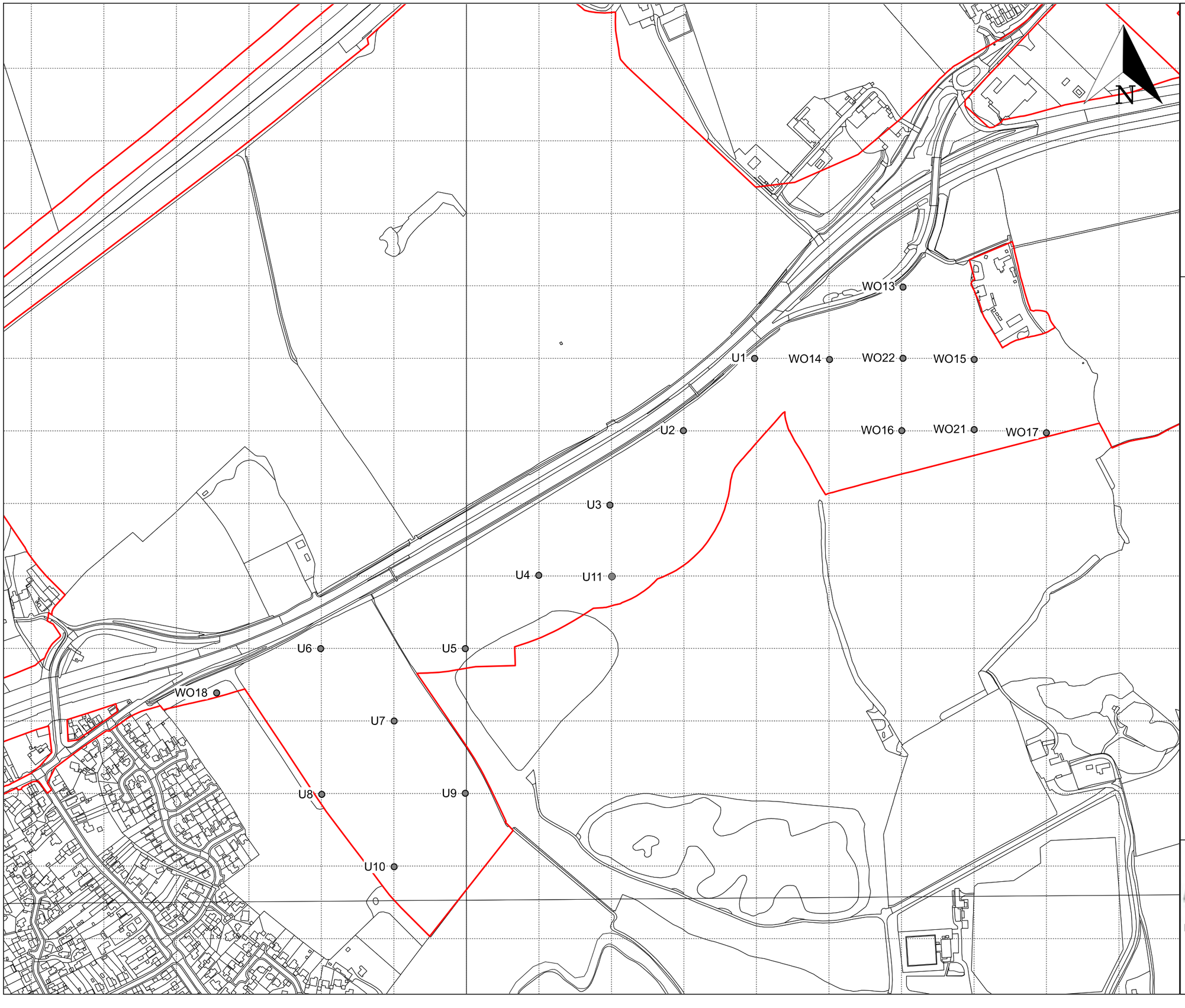

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Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

Map 11
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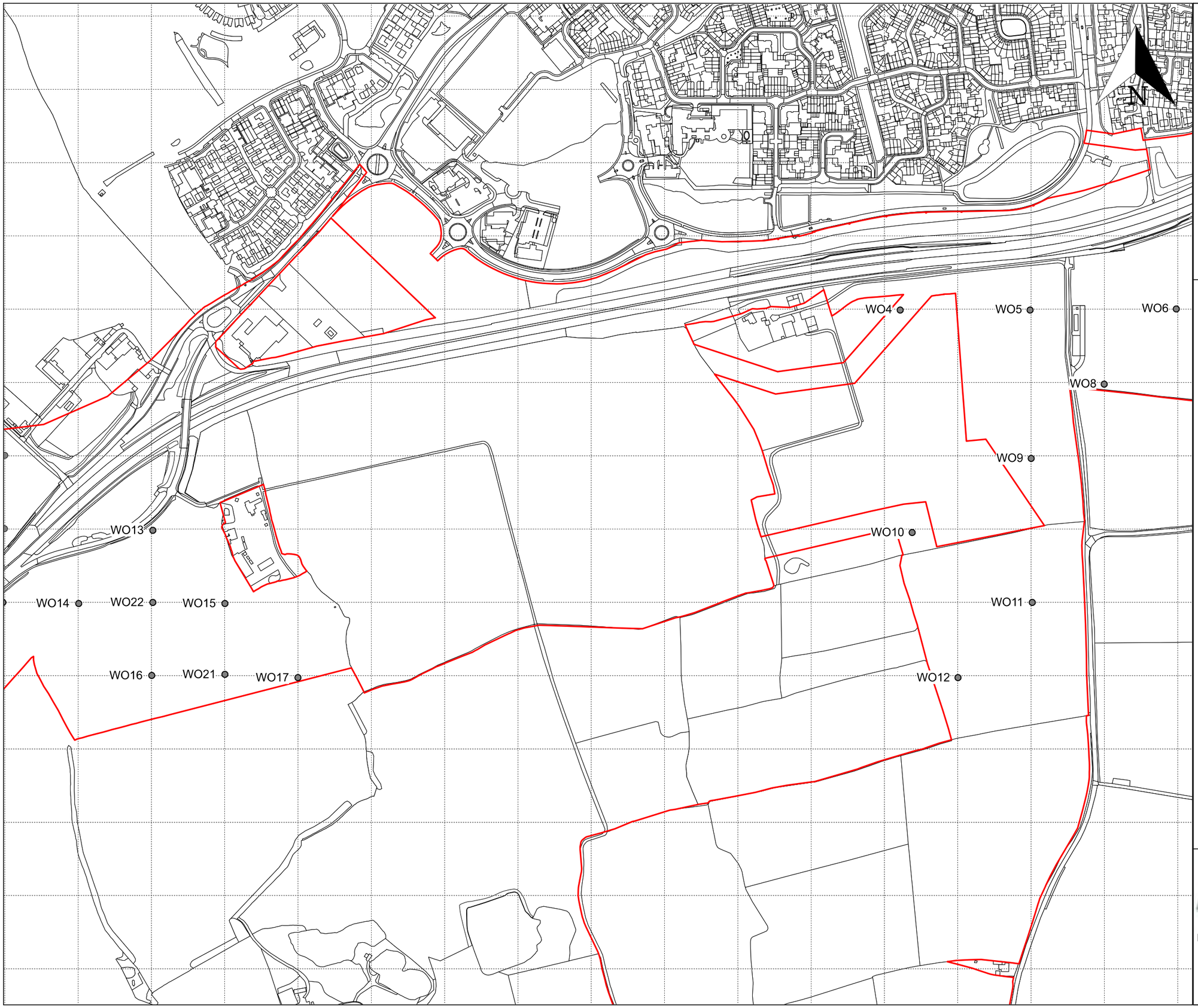

KEY

Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

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Survey observations

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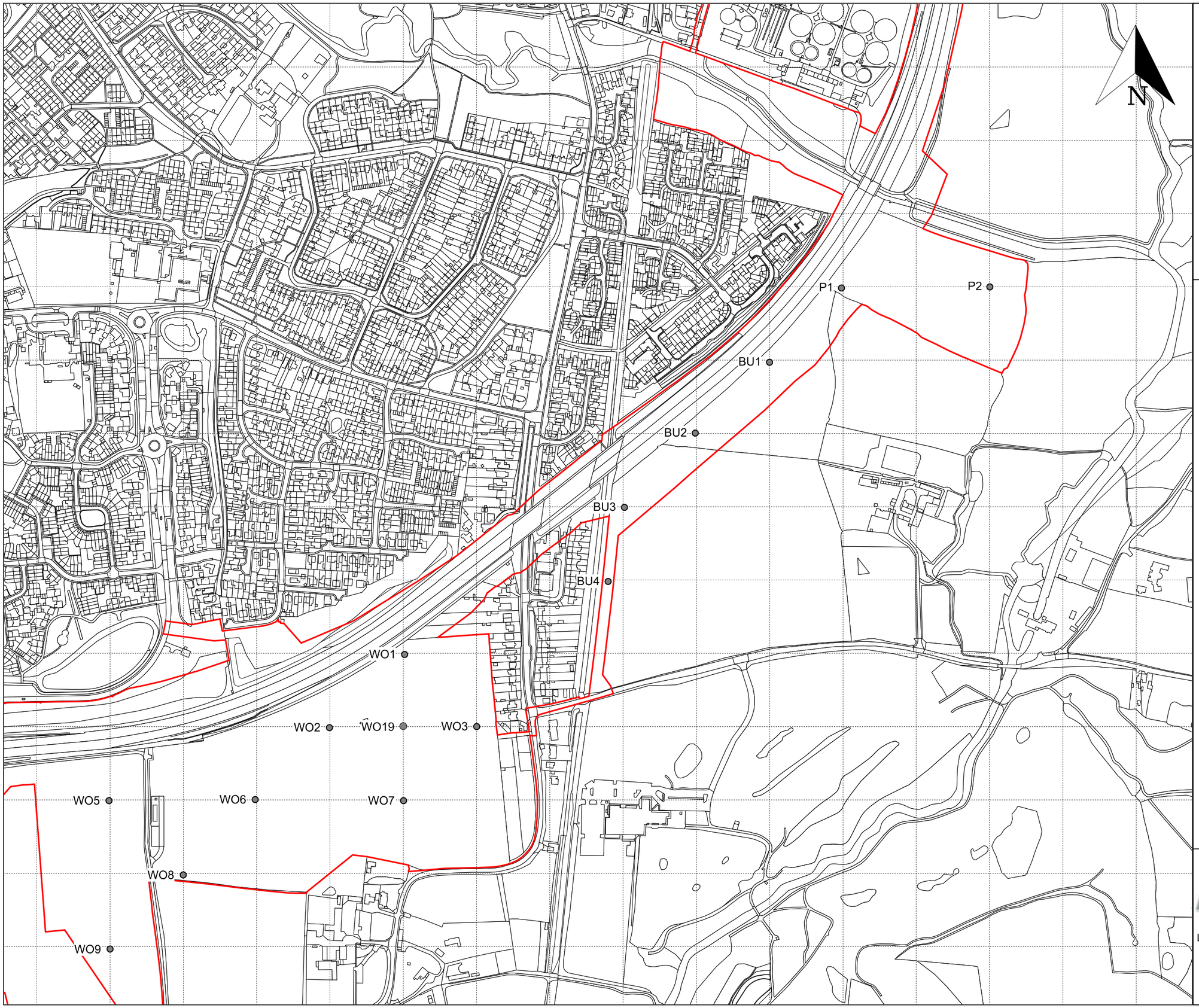

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Site:

A12 Chelmsford

Map title:

Map 9
Survey observations

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Derby DE74 2RH
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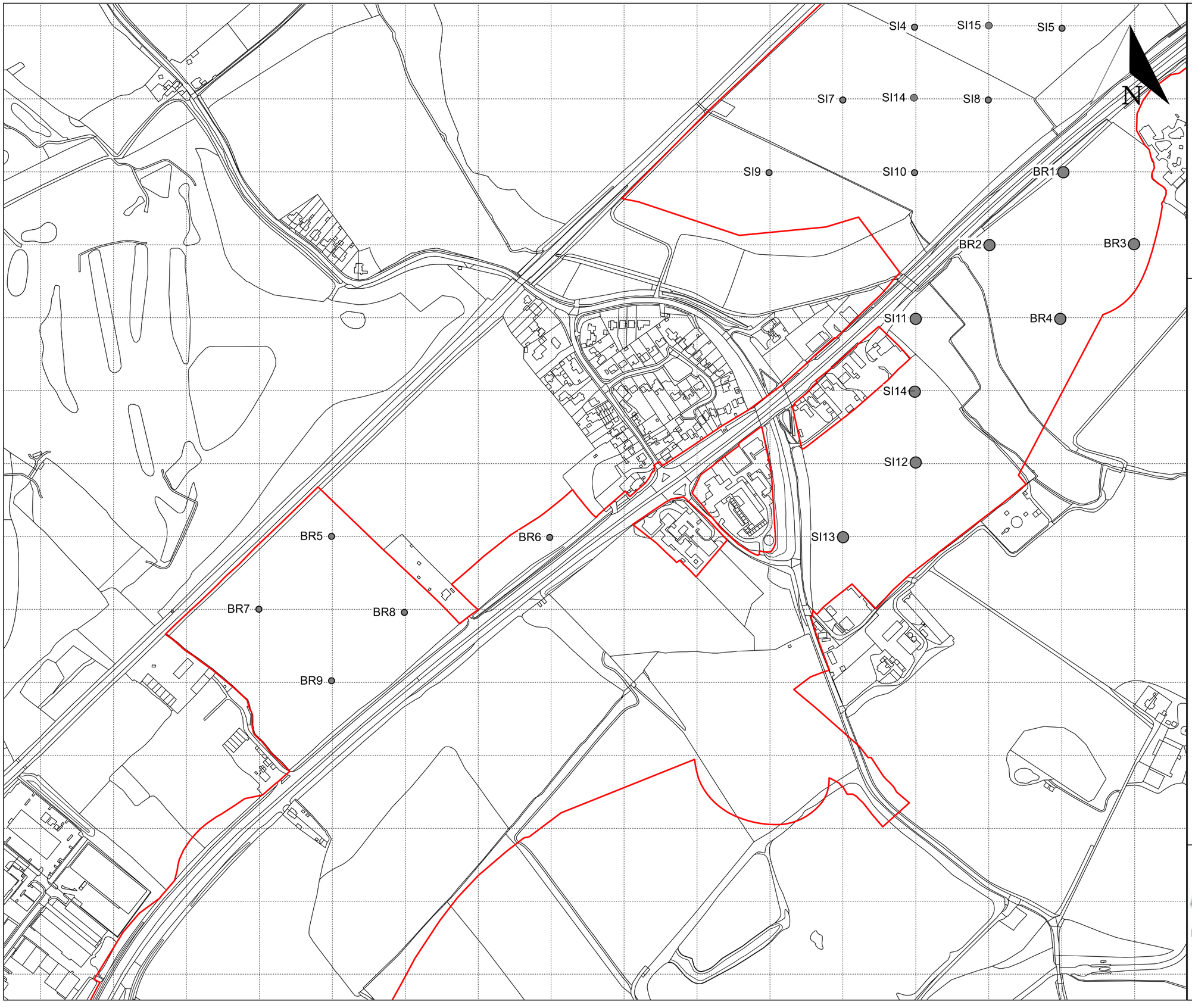

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Survey area

Site:

A12 Chelmsford

Map title:

Map 8
Survey observations

Land Research Associates
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Derby DE74 2RH
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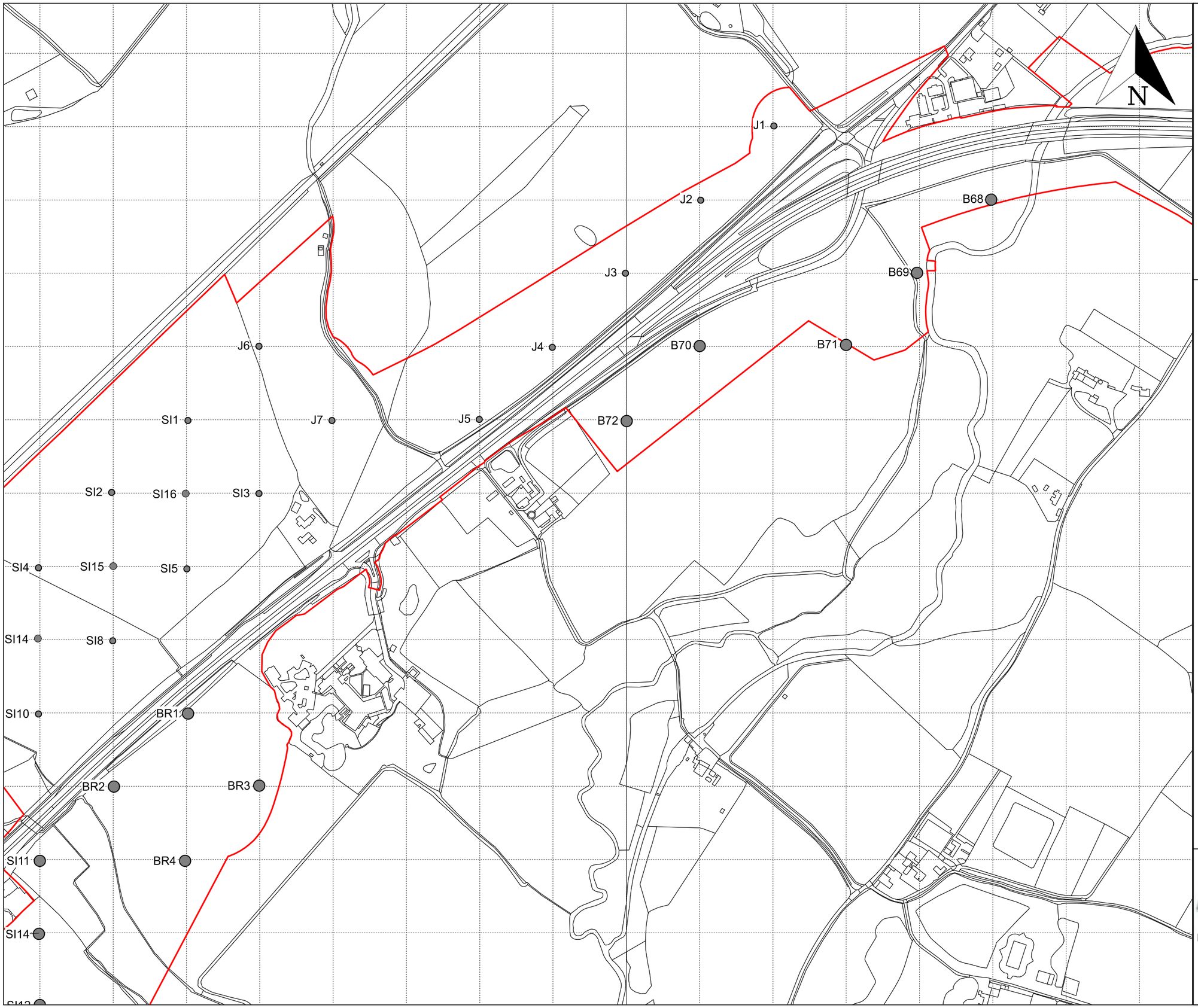

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Survey area

Site:

A12 Chelmsford

Map title:

Map 7
Survey observations

Land Research Associates
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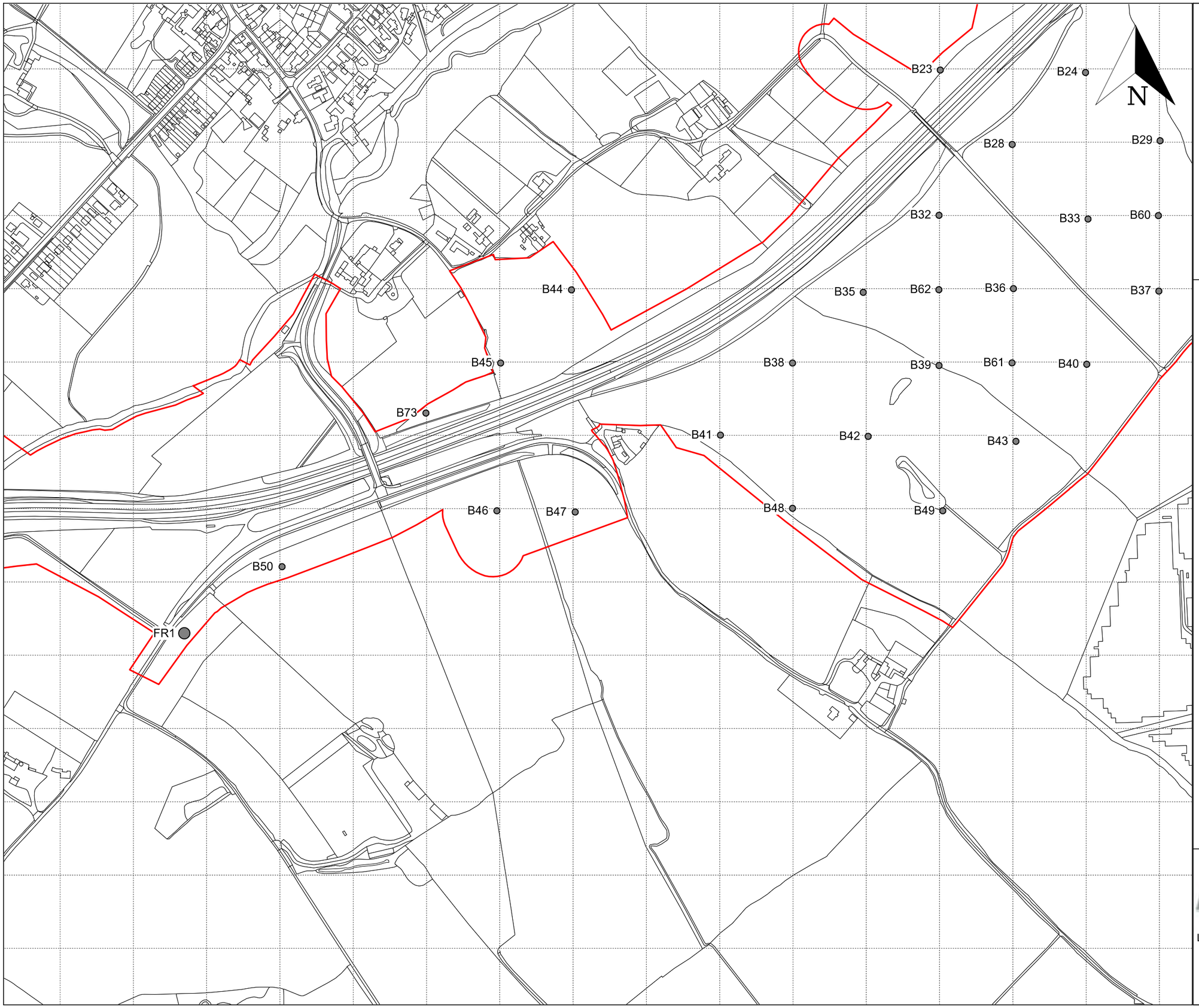

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Survey area

Site:

A12 Chelmsford

Map title:

Map 6
Survey observations

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Derby DE74 2RH
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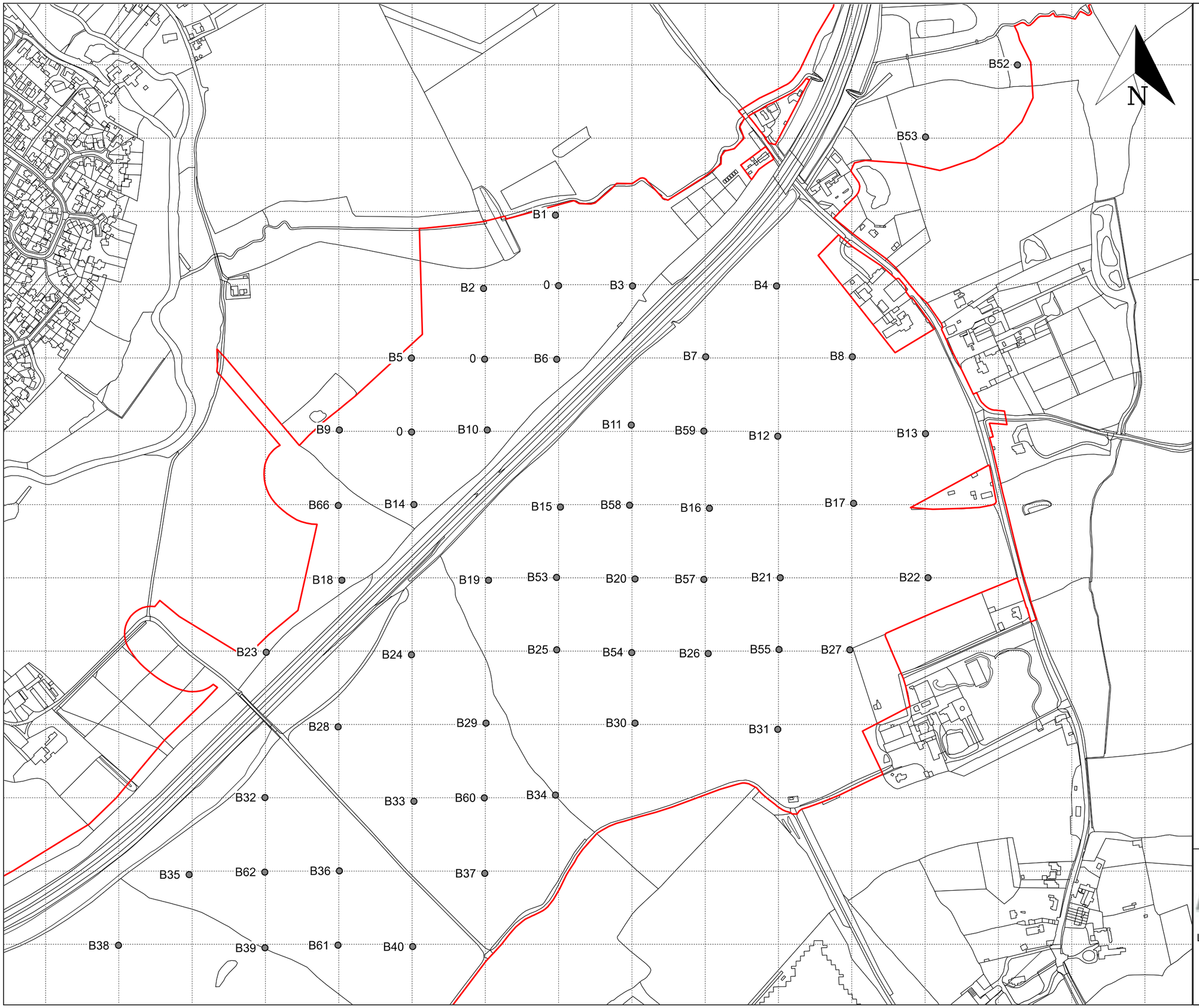

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Survey area

Site:

A12 Chelmsford

Map title:

Map 5
Survey observations

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Lockington
Derby DE74 2RH
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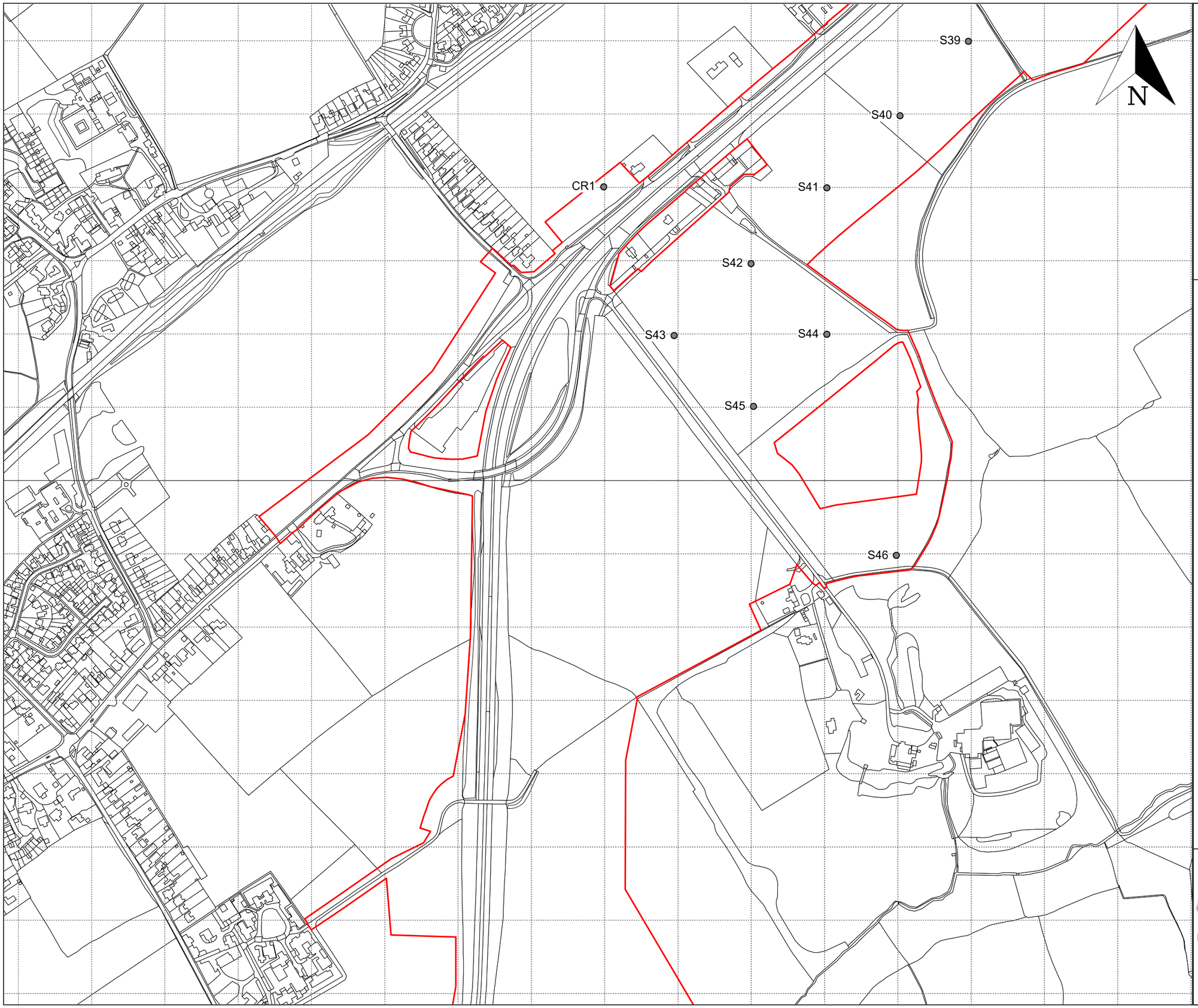

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Survey area

Site:

A12 Chelmsford

Map title:

Map 4
Survey observations

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Lockington
Derby DE74 2RH
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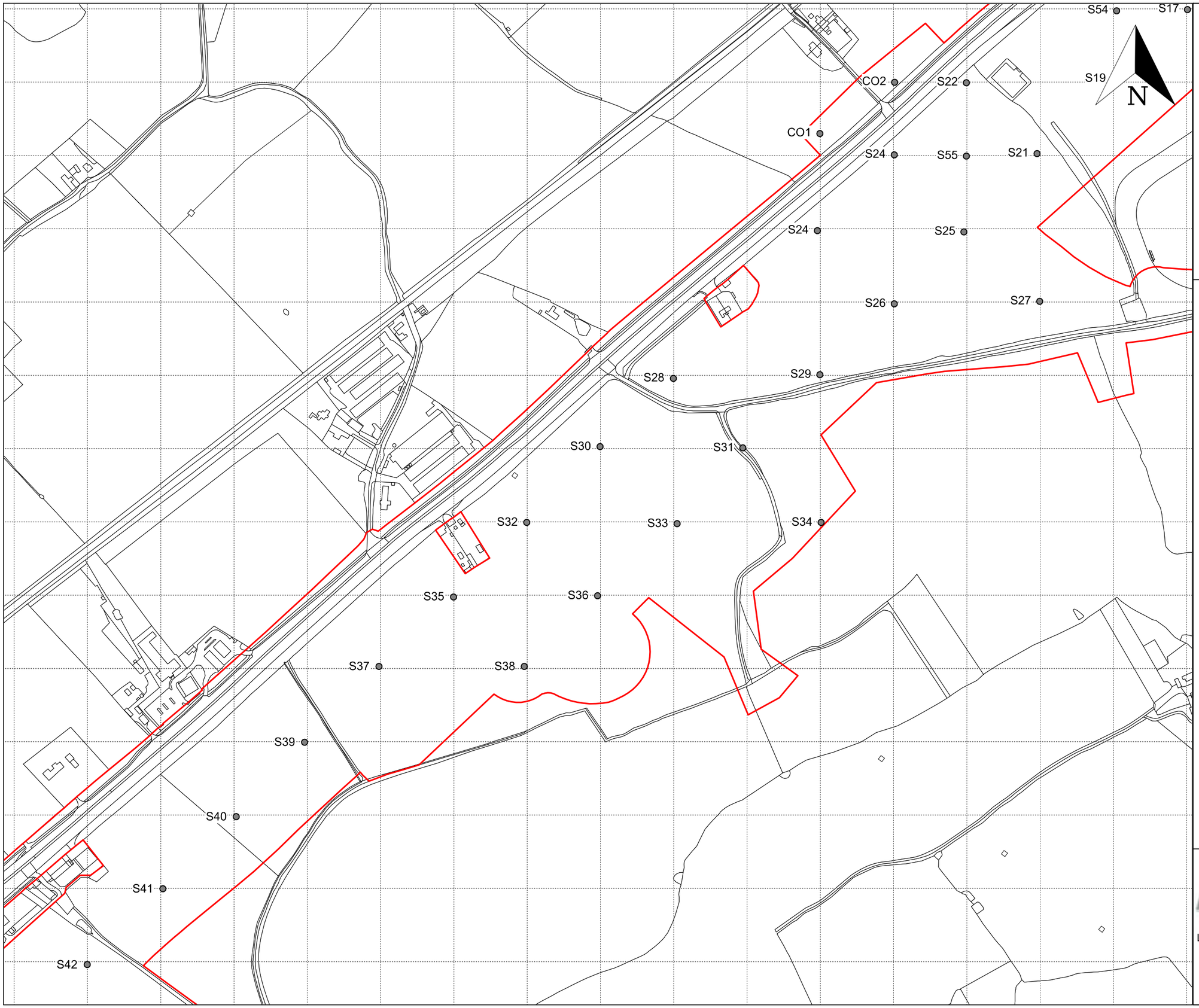

KEY

- Auger observation
- Survey area

Site:

A12 Chelmsford

Map title:

Map 3
Survey observations

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Derby DE74 2RH
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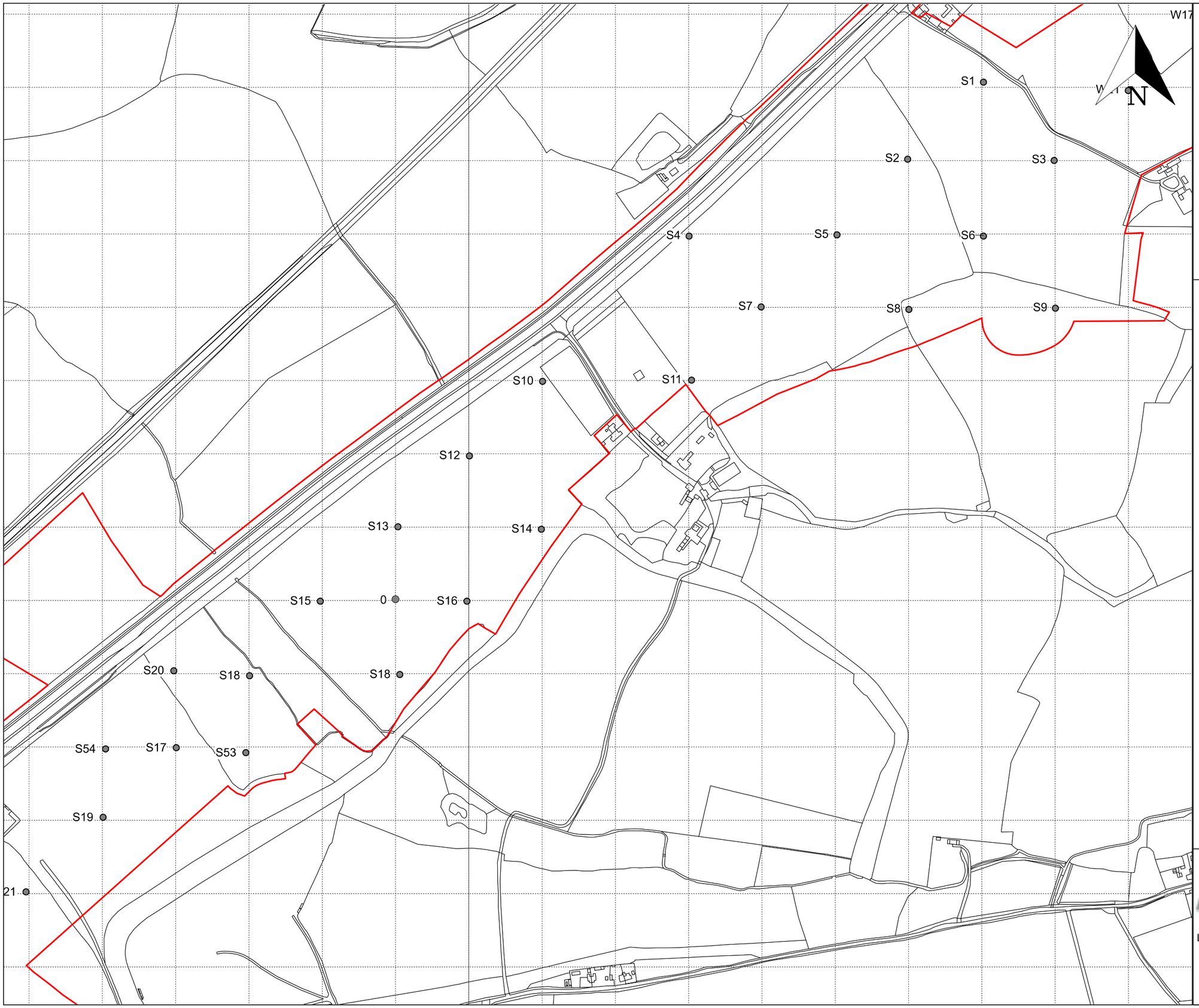

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Survey area

Site:

A12 Chelmsford

Map title:

Map 2
Survey observations

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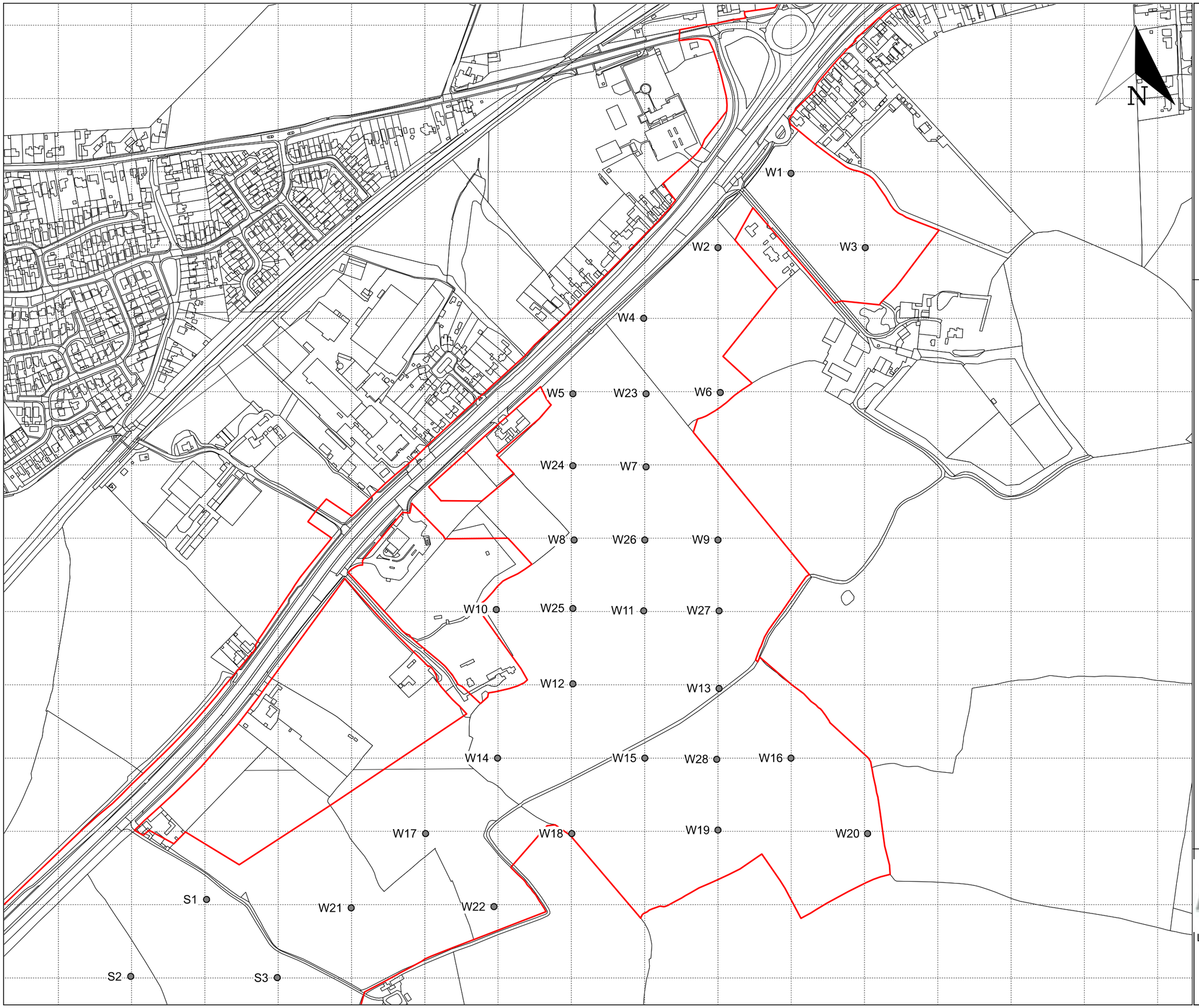

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Auger observation

Survey area

Site:

A12 Chelmsford

Map title:

Map 1
Survey observations

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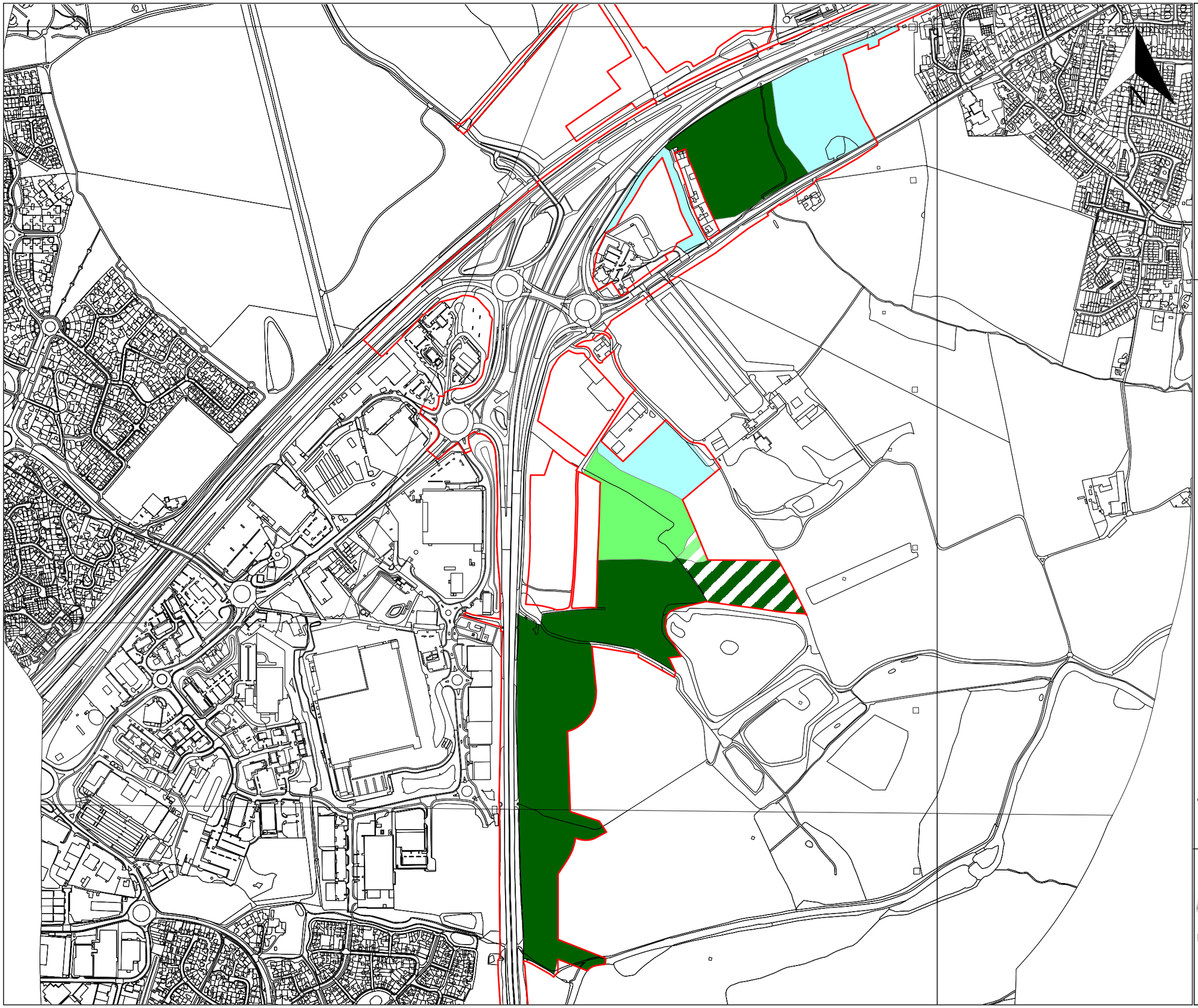
Scale: 1:5,000

Date: 30/04/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

Map title:

Map 29
Agricultural Land Classification

Land Research Associates
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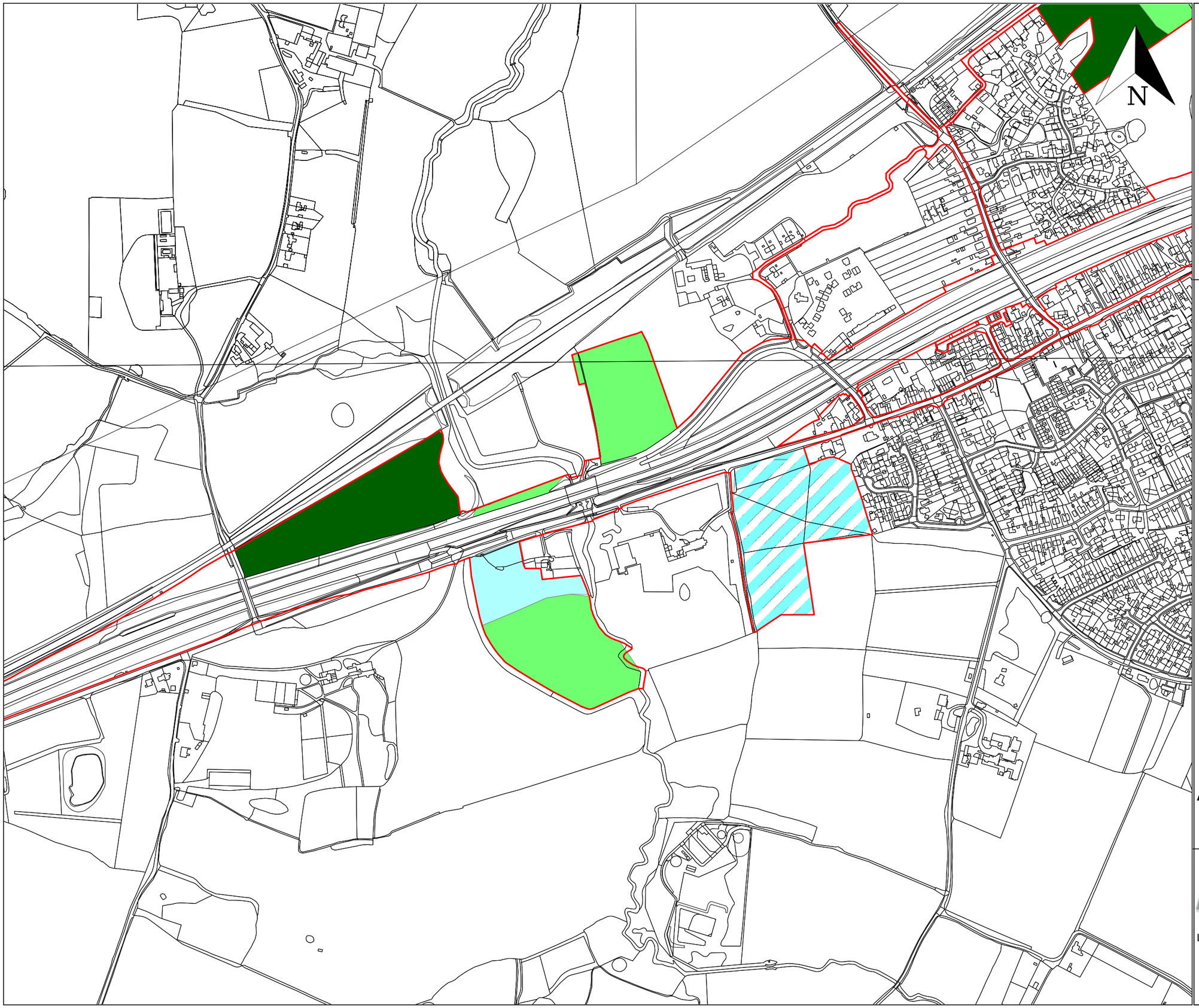
Derby DE74 2RH
01509 670570

Scale: 1:8,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

Map title:

Map 28
Agricultural Land Classification

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Scale: 1:6,000

Date: 15/10/2021

KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

Map title:

Map 27
Agricultural Land Classification

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01509 670570

Scale: 1:6,000

Date: 15/10/2021

KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

Map title:

Map 26
Agricultural Land Classification

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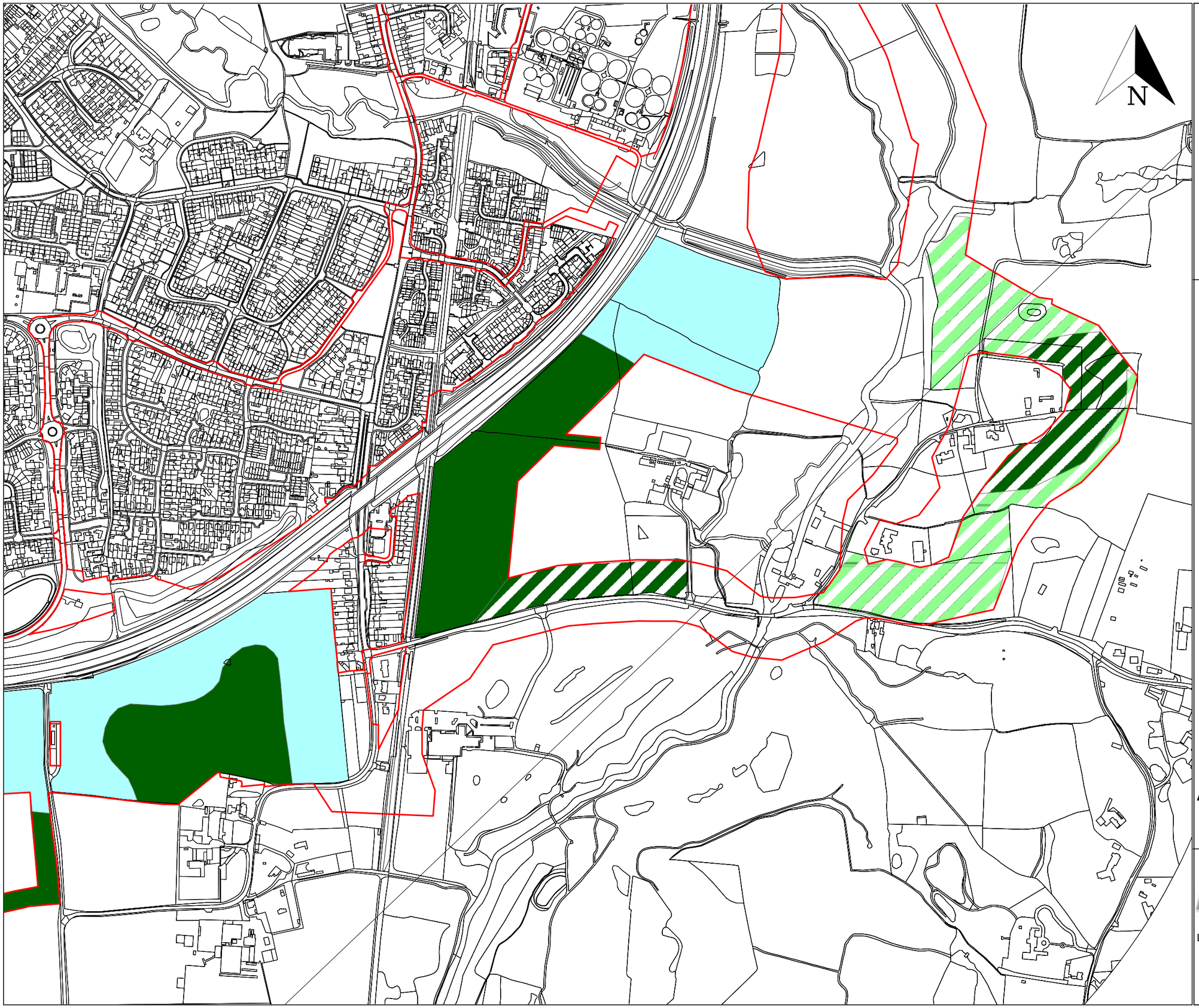
Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

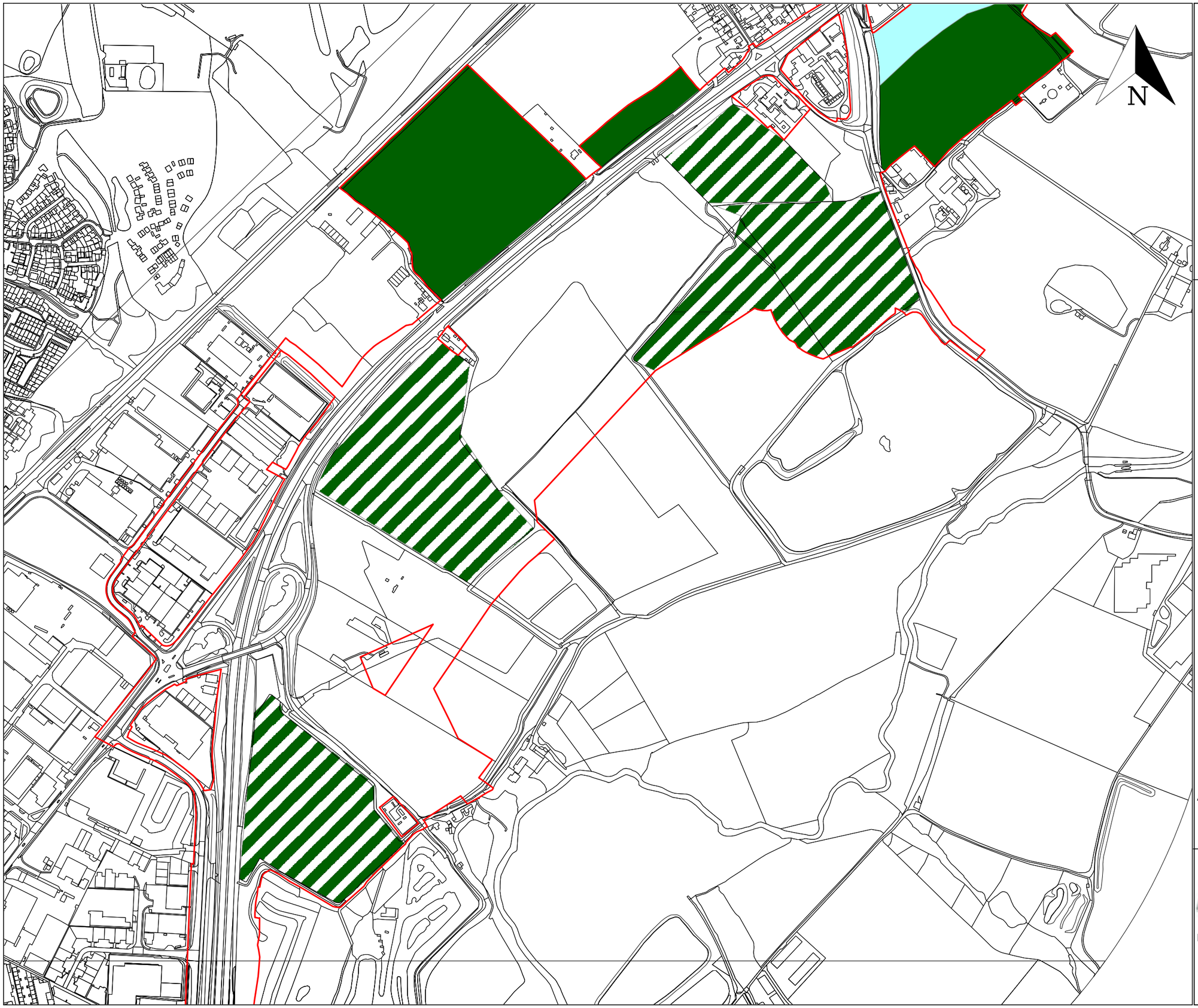
Map title:

Map 25
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

Map title:

Map 24
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021

KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

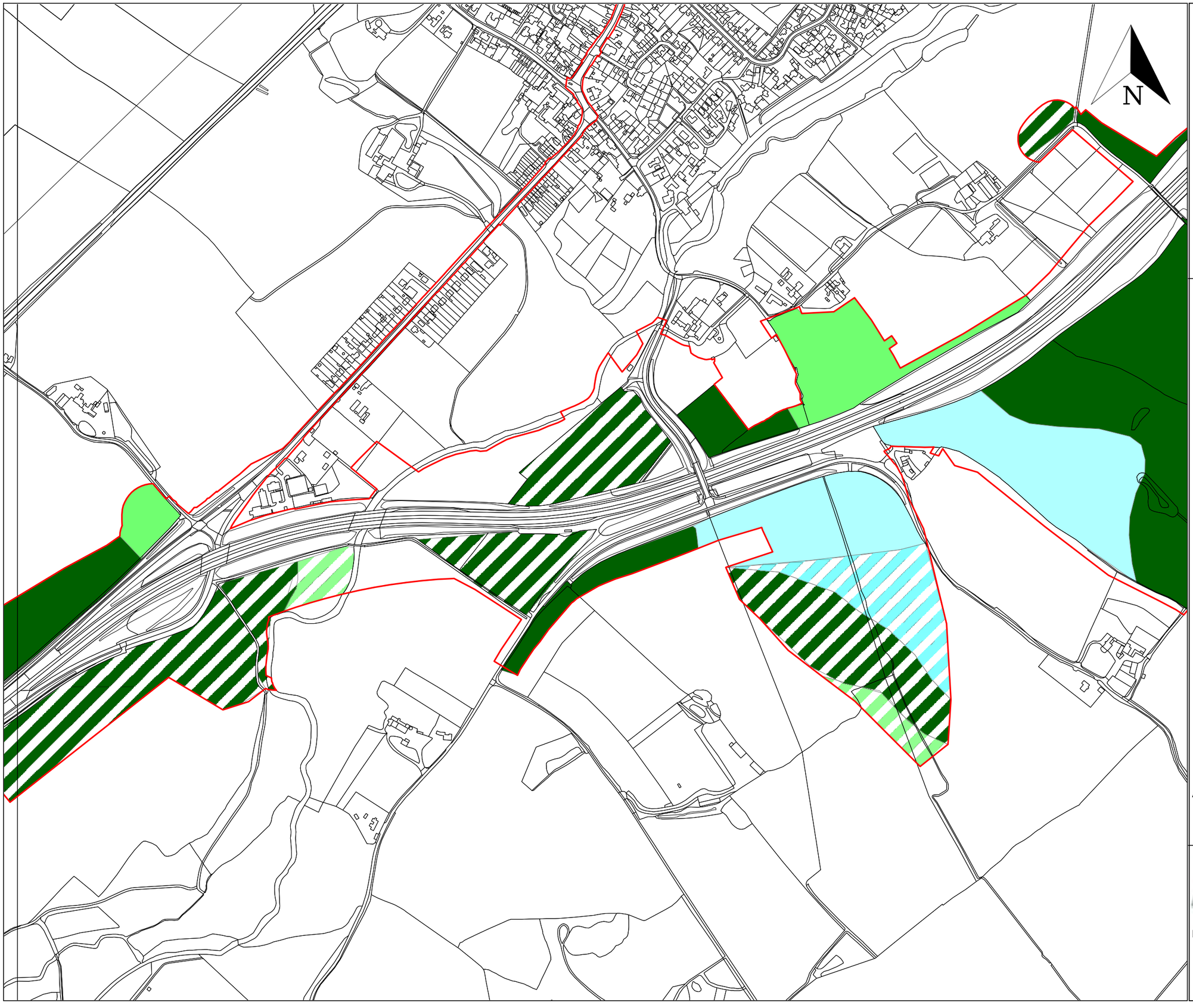
Map title:

Map 23
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

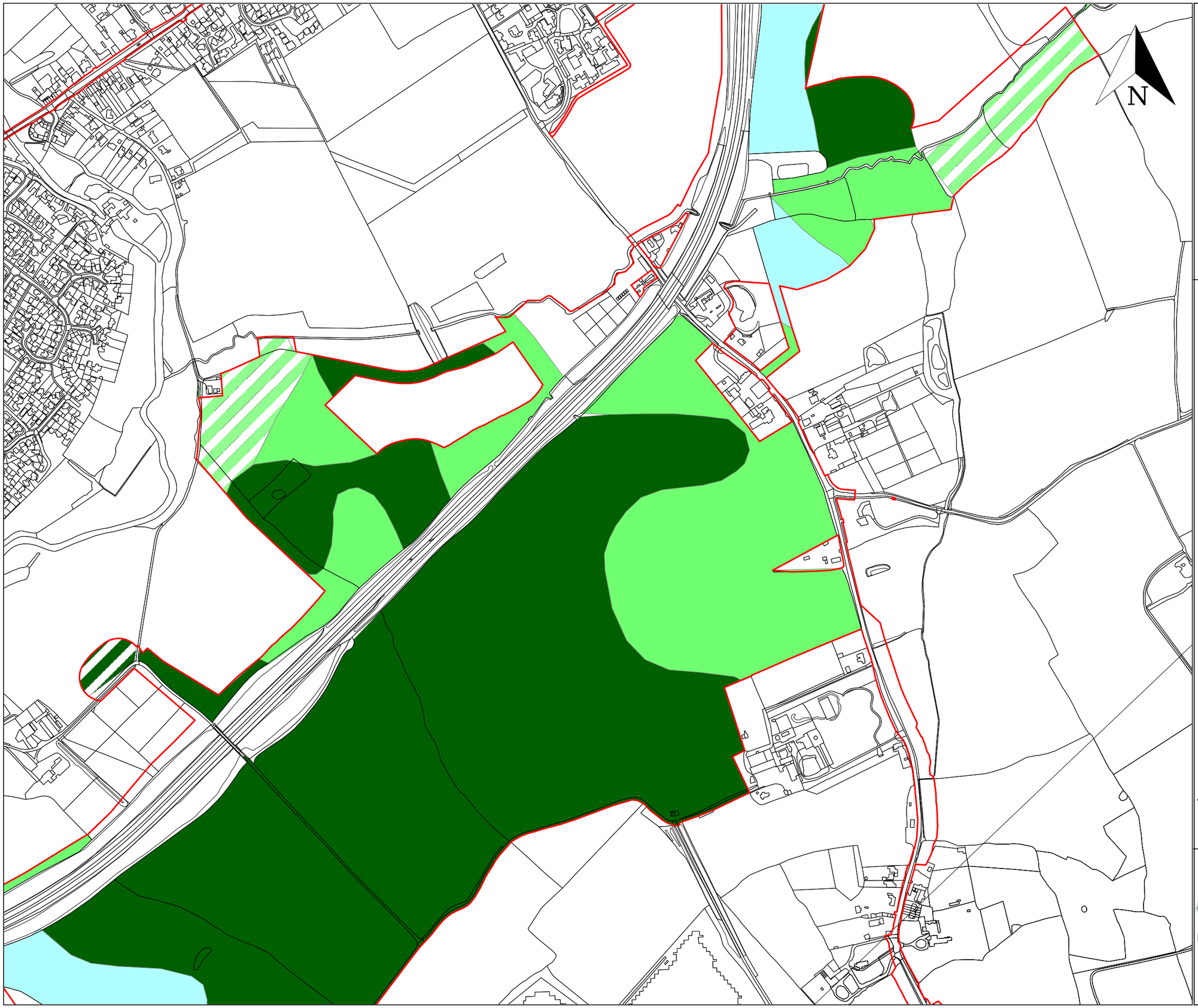
Map title:

Map 22
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

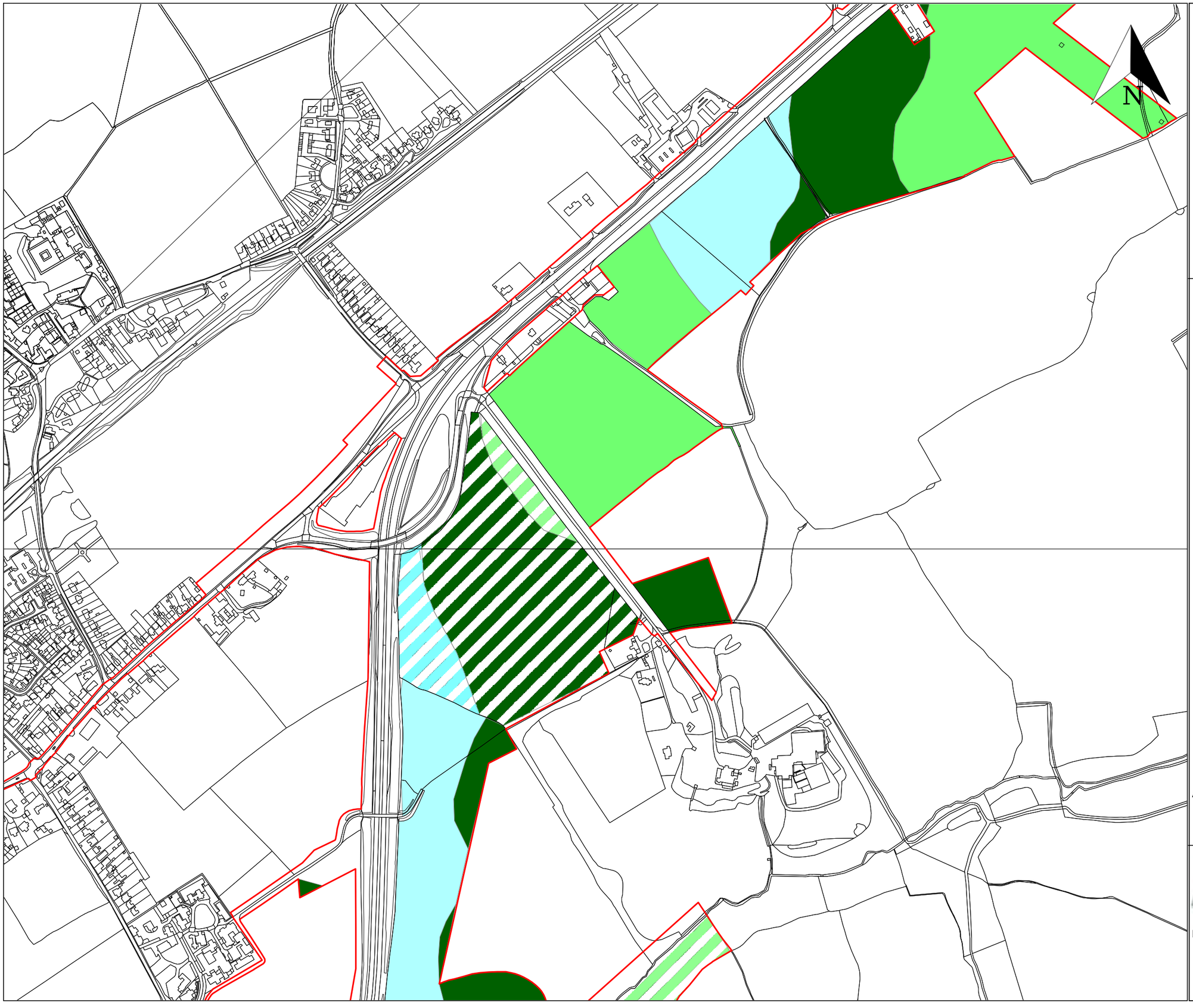
Map title:

Map 21
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated grade 2
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

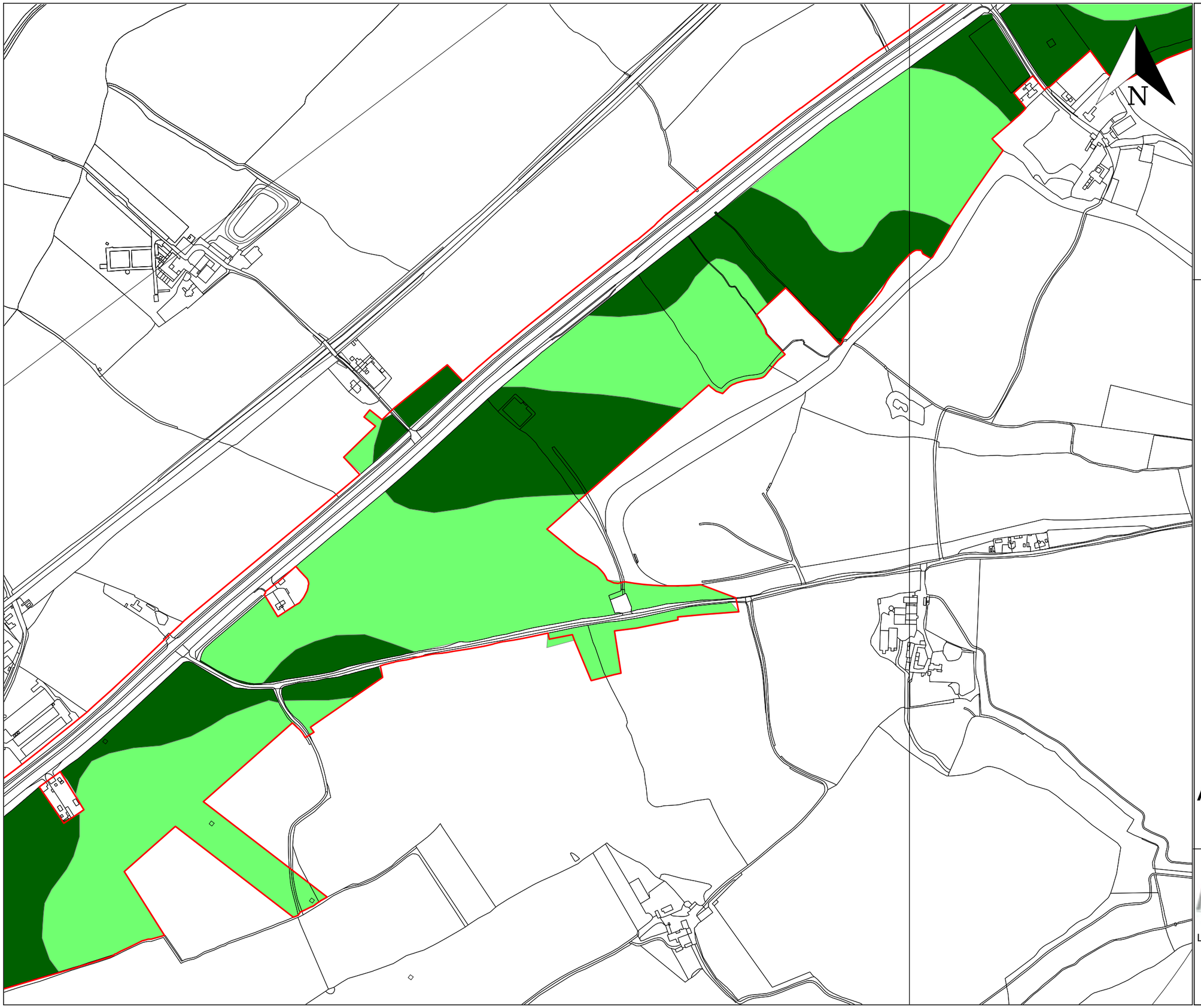
Map title:

Map 20
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Survey area

Site:

A12 Chelmsford

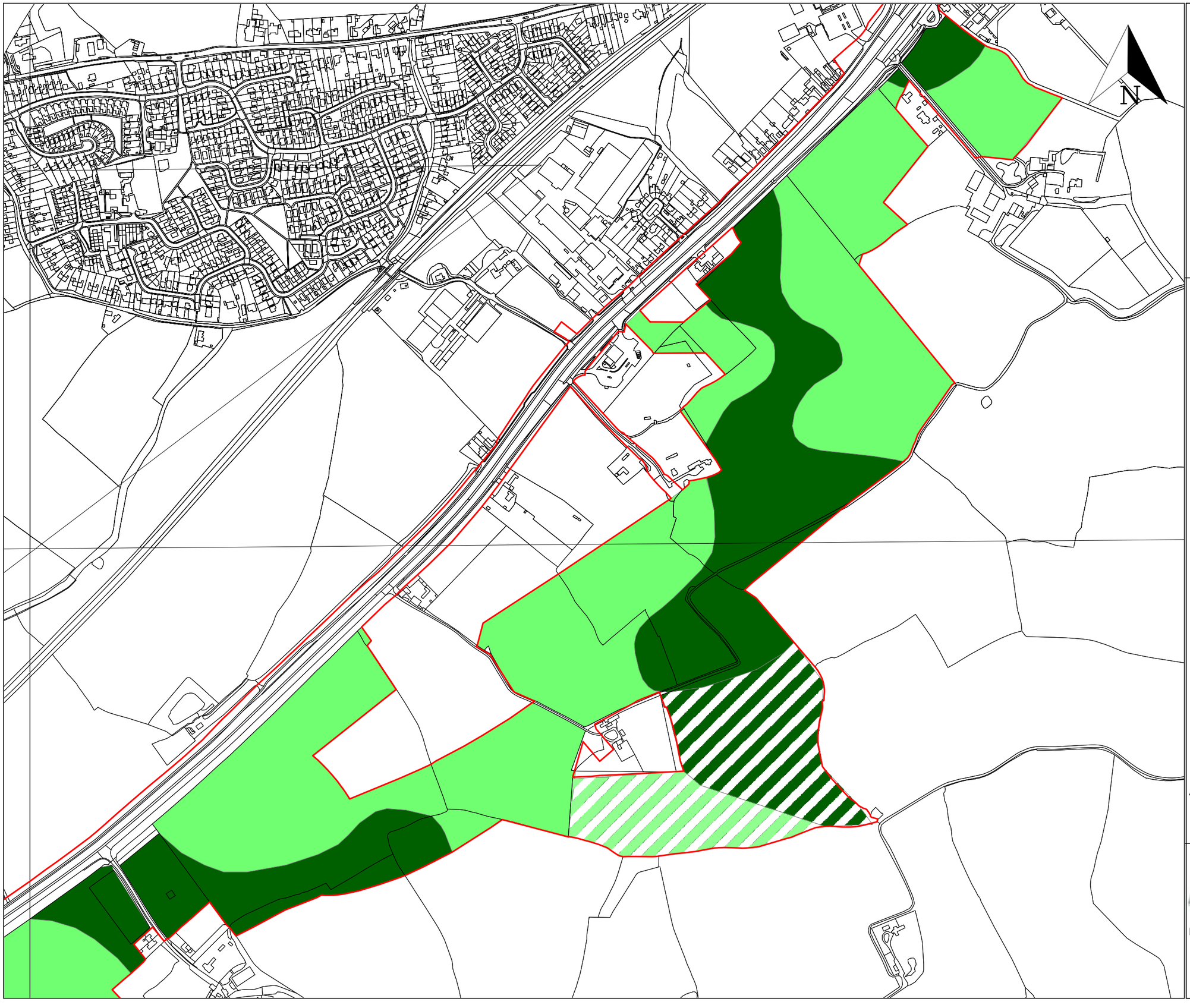
Map title:

Map 19
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021



KEY

- Grade 2
- Subgrade 3a
- Subgrade 3b
- Estimated subgrade 3a
- Estimated subgrade 3b
- Survey area

Site:

A12 Chelmsford

Map title:

Map 18
Agricultural Land Classification

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

Scale: 1:6,000

Date: 15/10/2021

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 42
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

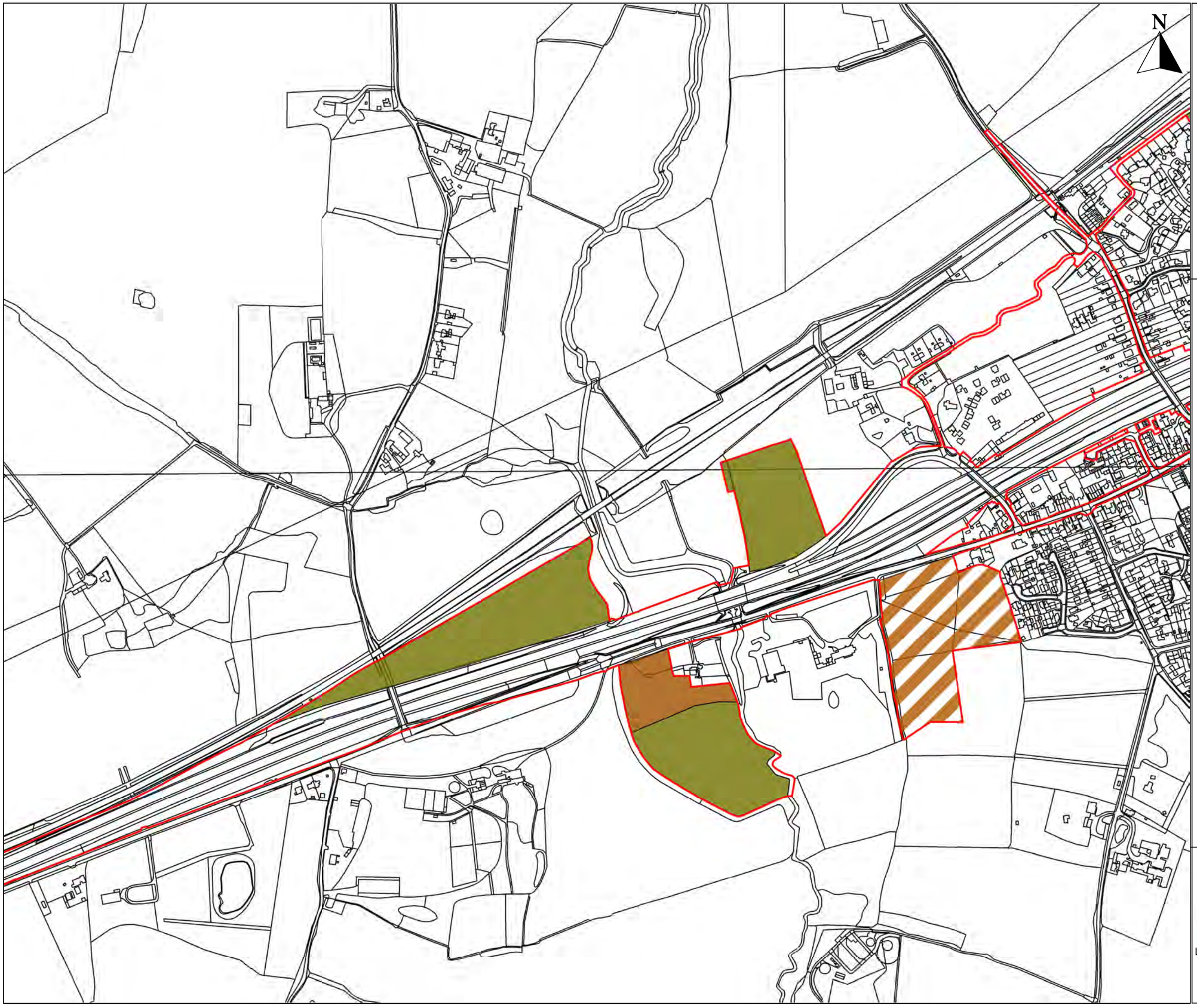
Map title:

Map 41
Soil types

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

Scale: 1:6,000

Date: 18/02/2022



KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 40
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

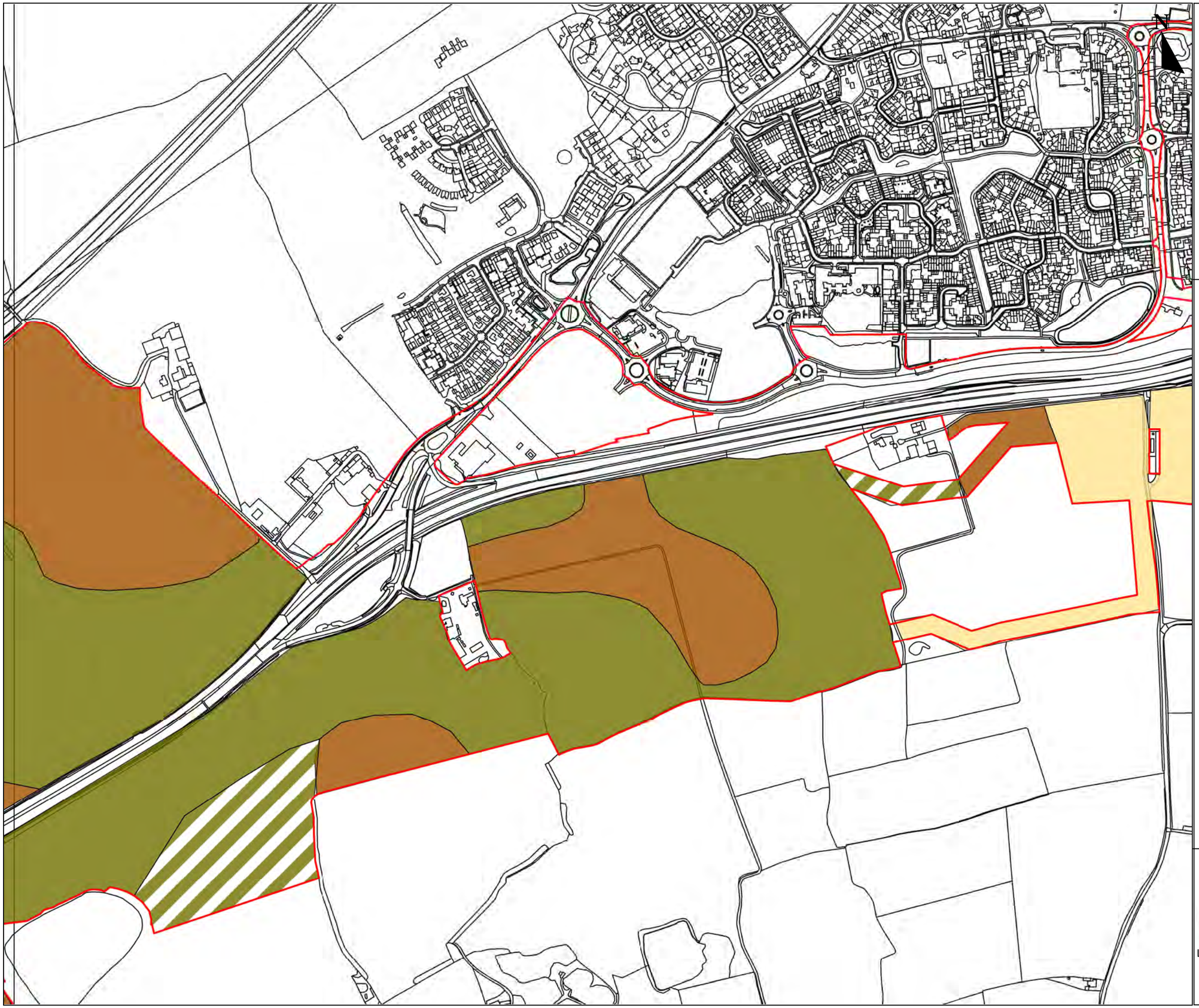
Map title:

Map 39
Soil types

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

Scale: 1:6,000

Date: 18/02/2022



KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

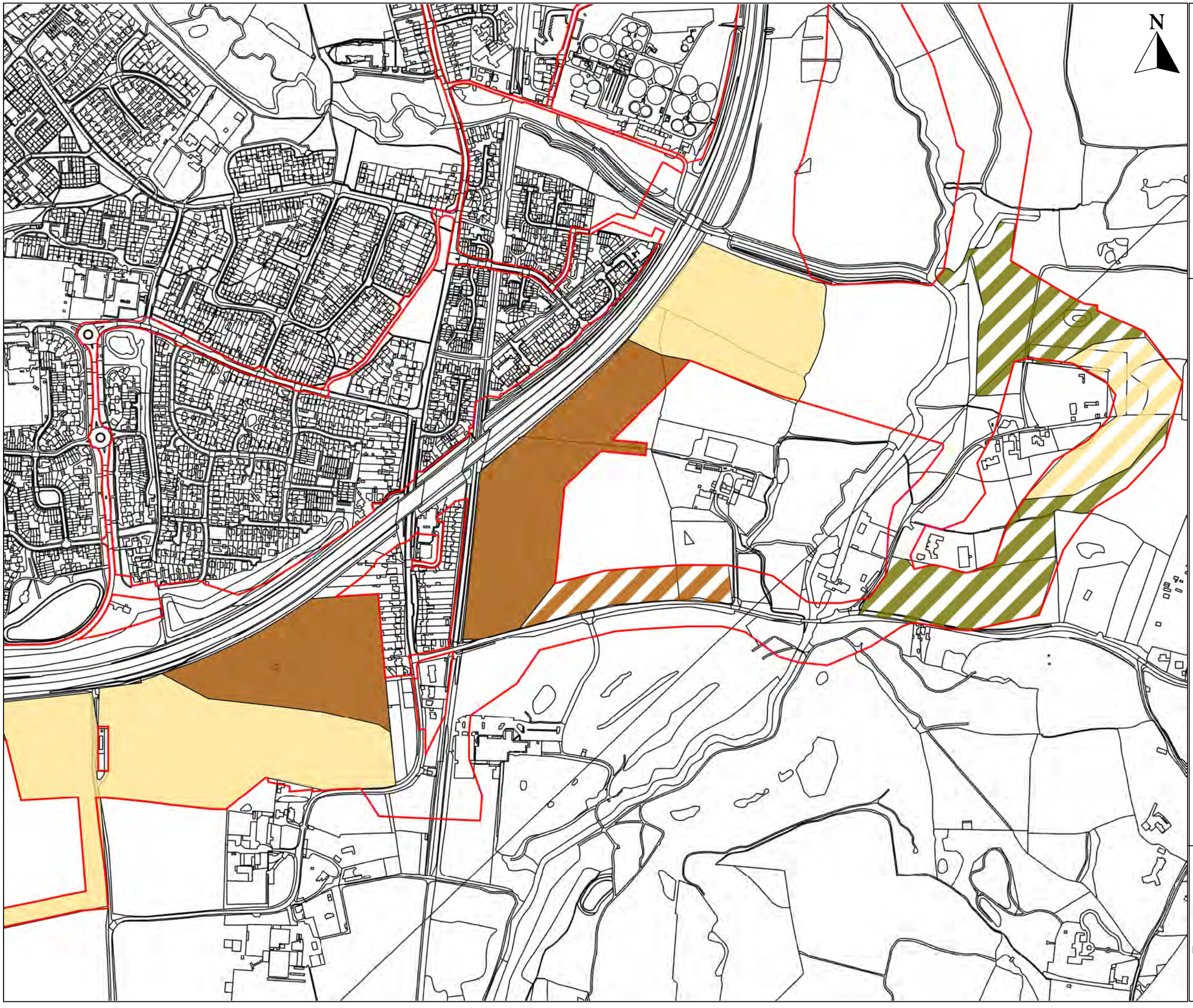
Map title:

Map 38
Soil types

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

Scale: 1:6,000

Date: 18/02/2022



KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

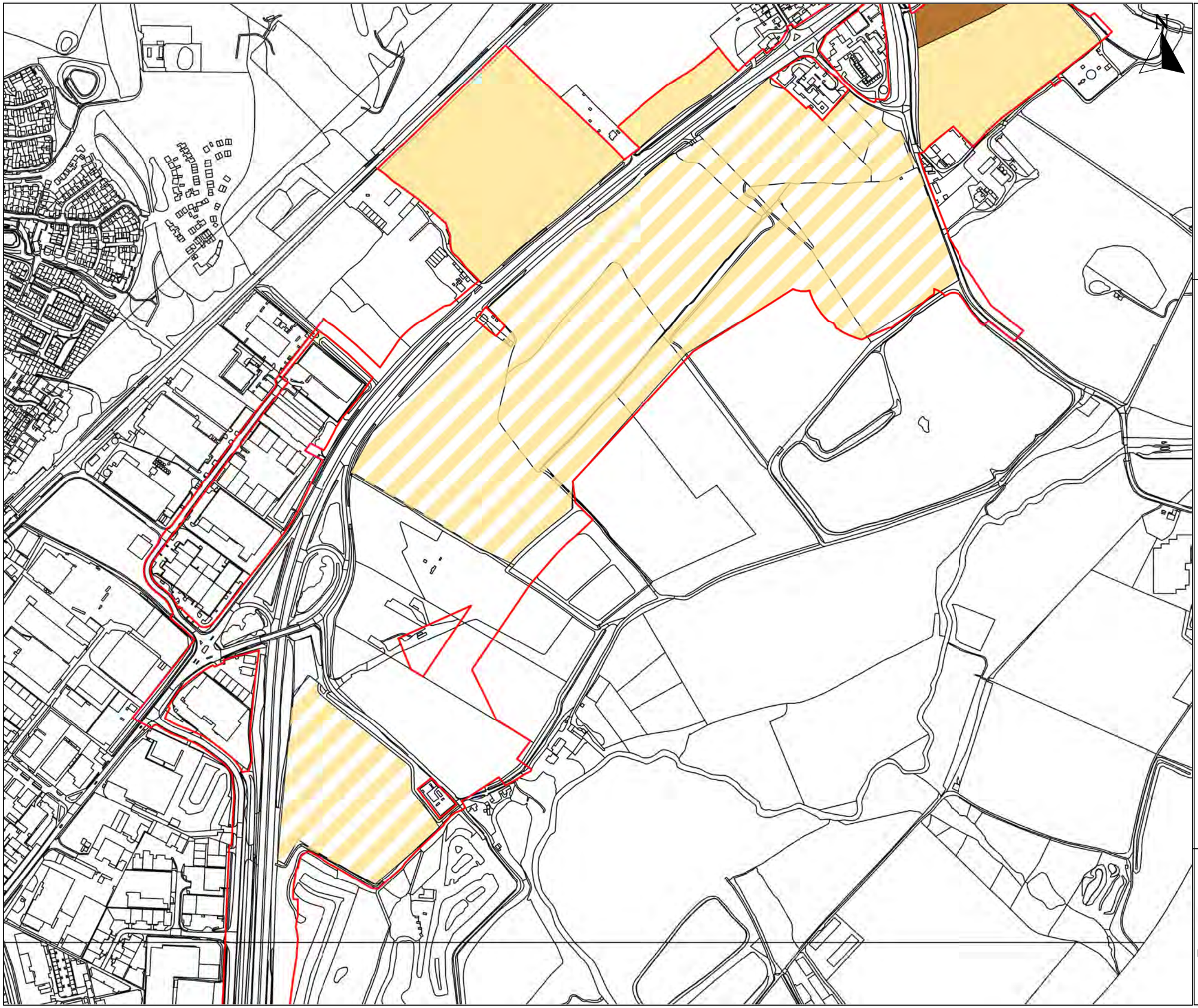
Map title:

Map 37
Soil types

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

Scale: 1:6,000

Date: 18/02/2022



KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 36
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 35
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 34
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 33
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

N

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

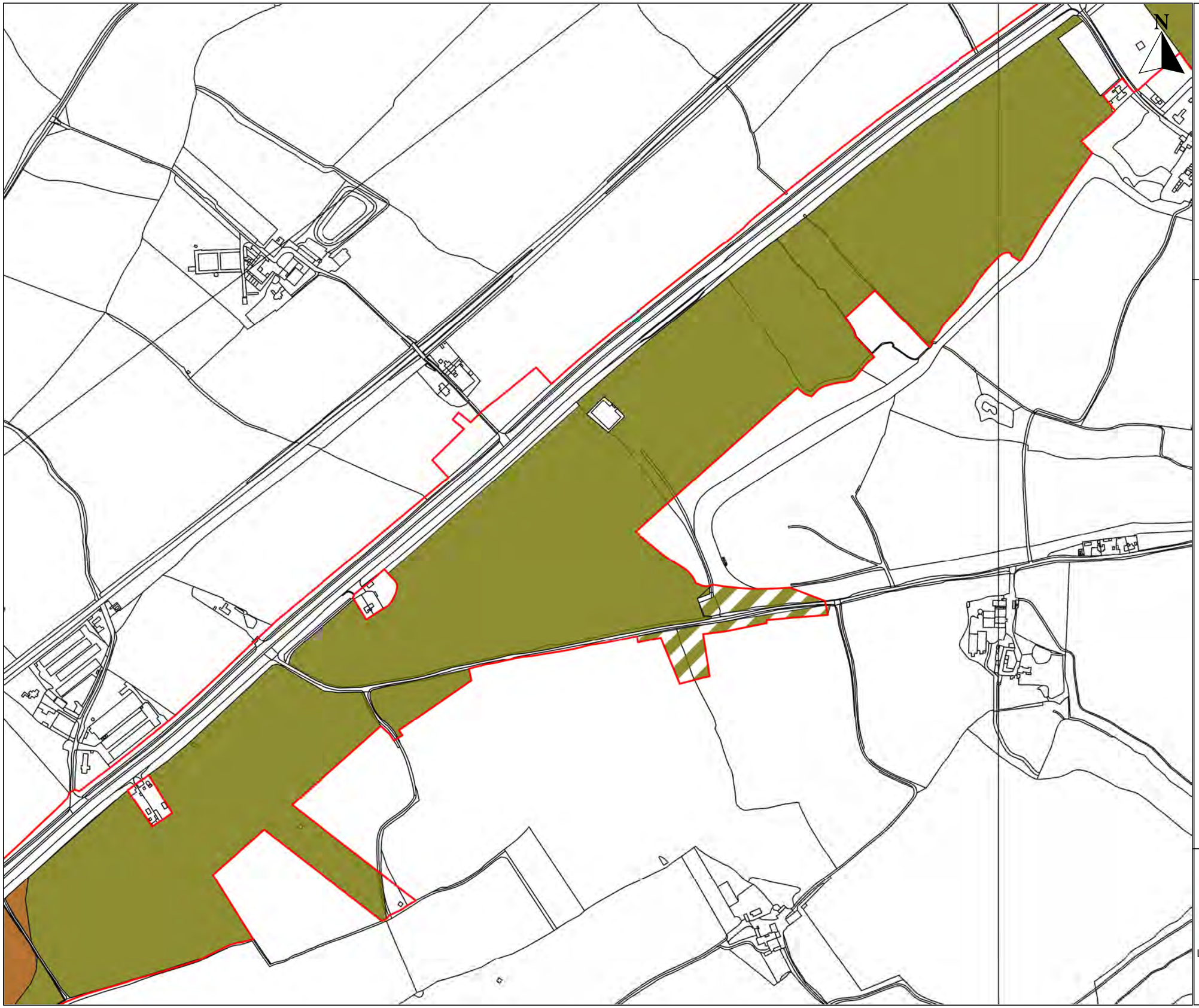
Map title:

Map 32
Soil types

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

Scale: 1:6,000

Date: 18/02/2022



KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 31
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

N

KEY

- Heavy slowly permeable soils
- Deep permeable soils
- Medium loams over gravel
- Estimated heavy slowly permeable soils
- Estimated deep permeable soils
- Estimated medium loams over gravel
- Survey area

Site:

A12 Chelmsford

Map title:

Map 30
Soil types

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

Scale: 1:6,000

Date: 18/02/2022

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
W	1	0-28	MZCL	<5	28-53	MZCL	xxx	53-81 81+	HZCL Stopped on stones	xxx	0	III	3a	W
	2	0-31	HCL	<5	31-55	HCL	xxx	55-90+	HCL	xxx	0	III/II	3b	W
	3	0-33	HCL	<5	33-56	HCL	xx(x)	56-64 64-100+	HCL C	xxx xxx	0	II	3a	W
	4	0-26	HCL	<5	26-53	HCL	xxx	53-78 78-100+	C Cchky	xxx xxx	0	III/II	3b	W
	5	0-33	MZCL	0	33-55	MZCL	xxx	55-90+	HZCL	xxx	0	III	3a	W
	6	0-25	HZCL	<5	25-54	HZCL	xxx	54-90+	HZCL	xxx	0	III	3b	W
	7	0-35	HCL	<5	35-53	HCL	xxx	53-90+	C	xxx	0	III	3b	W
	8	0-26	C	<5	26-42	C	xxx	42-66 66-90+	C Cchky	xxx xxx	1	III	3b	W
	9	0-28	HCL/C	<5	28-90+	C	xxx				1	III	3b	W
	10	0-30	HCL	<5	30-96+	C sl ca	xxx				0	III	3b	W
	11	0-27	HCL	<5	27-45	C	xx(x)	45-90+	C	xxx	0	II/III	3b	W
	12	0-31	HCL ca	<5	31-100+	C sl ca	xxx				1	III	3a	W
	13	0-30	HCL	<5	30-53	HCL	xx	53-90+	Cchky	xxx	0	III	3b	W
	14	0-29	HCL	<5	29-59+	C ca	xxx	59+	Stopped on stone/flint		1	III	3b	W
	15	0-28	HCL ca	<5	28-65+	C ca	xxx				0	III	3a	W
	16	0-28	HCL	<5	28-50	HCL	xxx	50-90+	C	xxx	0	III	3b	W
	17	0-30	HCL v sl ca	<5	30-41	HCL n ca	xxx	41-95+	Cr sl ca	xxx	0	III	3b/a	W
	18	0-31	HCL ca	<5	31-43	HCL ca	xxx	43-100+	C ca	xxx	1	III	3a	W
	19	0-30	HCLca	<5	30-42	HCL ca	xxx	42-60+	C sl ca	xxx	0	III	3a	W
	20	0-33	HCL	<5	33-38	HCL	xxx	38-85 85-100+	C Cchky	xxx xxx	0	III	3b	W
	21	0-30	HCLv sl ca	<5	30-51	HCL sl ca	xxx	51-100+	C ca	xxx	2	III	3b/a	W
	22	0-29	HCL ca	<5	29-41	HCL ca	xxx	41-65+ 65+	C ca Stopped on flint	xxx	0	III	3a	W
	23	0-32	HZCL sl ca	<5	32-41	HCL	xxx	41-100+	C	xxx	0	III	3b	W
	24	0-30	HCL ca	<5	30-65	C ca	xxx	65-100+	Cchky	xxx	1	III	3a	W
	25	0-31	HCL sl ca	<5	30-68	C sl ca	xx(x)	68-100+	Cchky	xxx	0	III	3a	W
	26	0-30	HCL ca	<5	30-58	C ca	xxx	58-100+	Cchky	xxx	0	III	3a	W
	27	0-31	HCL/C ca	<5	31-100+	C ca	xxx				1	III	3a	W
	28	0-29	HCL	<5	29-50+	C	xxx	50+	Stopped on flint		0	III	3b	W
S	1	0-32	C	<5	32-48	C	xxx	48-82 82-90+	C Cchky	xxx xxx	1	III	3b	W
	2	0-31	C	<5	31-52	C	xxx	52-90+	Cchky	xxx	0	III	3b	W
	3	0-31	HCL	<5	31-54	HCL	xxx	54-90+	C	xxx	0	III	3b	W
	4	0-26	HCL	<5	26-46	HCL	xx	46-90+	C	xxx	0	III	3b	W

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
S	5	0-35	HCL	<5	35-50	HCL	xxx	50-68 68-90+	C HCLca	xxx xxx	0	III	3b	W
	6	0-31	HCL	<5	31-72	C	xxx	72-90+	Cchky	xxx	0	III	3b	W
	7	0-28	HCL	<5	27-35	HCL	xxx	35-69 69-90+	C Cchky	xxx xxx	0	III	3b	W
	8	0-33	Cca	<5	33-90+	Cca	xxx				0	III	3a	W
	9	0-32	HCL	<5	32-52	HCL	xxx	52-90+	C	xxx	0	III	3b	W
	10	0-35	HCLca	<5	35-55	HCLca	xxx	55-90+	Cchky	xxx	1	III/II	3a	W
	11	0-36	HCL	<5	36-54	HCL	xxx	54-74 74+	HCL Stopped on stones	xxx	0	II	3a	W
	12	0-30	HCL	<5	30-51	HCL	xxx	51-90+	C	xxx	1	III	3b	W
	13	0-25	HCL	<5	25-35	HCL	xxx	35-64 64-90+	C Cchky	xxx xxx	1	III	3b	W
	14	0-30	Cslca	<5	30-65	Cslca	xxx	65-80+	Cchky	xxx	1	III	3b	W
	15	0-30	HZCL ca	5-10	30-84	Cr ca	xxx	84+	Stopped on flint		1	III	3a	W
	16	0-30	HCL sl ca	5-10	30-91+	C sl ca	xxx				1	III	3a	W
	17	0-32	HZCL	<5	32-100+	ZC	xxx				0	III	3b	W
	18	0-28	HZCL	10-15	28-100+	C ca	xxx				0	III	3a	W
	19	0-33	H/MZCL	<5	33-60	HCL	xx(x)	60-100+	Cr flinty	xx	0	II	2/3a	W
	20	0-52	Cca(dist)	<5	52-100+	Cchky	xxx				0	III	3a	W
	21	0-25	HCL ca	<5	25-40	C ca	xxx	40-90+	Cchky	xxx	0	III	3a	W
	22	0-35	Cca	<5	35-76	C	xxx	76-90+	Cchky	xxx	0	III	3a	W
	23	0-33	Cca	<5	33-55	C	xxx	55-80+	Cchky	xxx	0	III	3a	W
	24	0-30	C	<5	30-49	C	xxx	49-90+	C	xxx	0	III	3b	W
	25	0-33	C	<5	33-48	Cslca	xxx	48-90+	Cchky	xxx	0	III	3b	W
	26	0-32	HCL	<5	32-90+	C	xxx				0	III	3b	W
	27	0-35	HCL	<5	35-55	Cslca	xxx	55-90+	Cslca	xxx	0	III	3b	W
	28	0-31	C	<5	31-48	C	xxx	48-90+	C	xxx	0	III	3b	W
	29	0-30	Cca	<5	30-52	Cca	xxx	52-90+	Cchky	xxx	0	III	3a	W
	30	0-30	HCLca	<5	30-55	mstHCL	xxx	55-90+	C	xxx	1	III/II	3a	W
	31	0-28	HCL	<5	28-46	HCLca	xxx	48-90+	Cchky	xxx	0	III	3b	W
	32	0-34	HCL	<5	34-40	HCL	xxx	52-90+	C	xxx	1	III	3b	W
	33	0-30	HCL	<5	30-40	mstHCL	xxx	40+	Stopped on stones		1	?	?	?
	34	0-30	HCLslca	<5	30-52	HCLca TS/SS	xxx	46-80+	Cchky	xxx	1	III	3a	W
	35	0-25	SCL	5-10	25-47	slstHCL	xxx	47-90+	SC	xxx	2	III	3a	W
	36	0-32	HCL	<5	32-53	HCL	xxx	53-80+	C	xxx	2	III	3b	W
	37	0-32	HCL	5-10	32-43	HCL	xx	43-60 60-90+	HCL C	xxx xxx	3	II	3a	W
	38	0-25	HCL	<5	25-60+	HCL(dist)	xx				2	-	-	-

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
S	39	0-28	MCL	<5	28-58	MCL	o	58+	Stopped on stones		2	I	2	D
	40	0-35	SCL	<5	35-65	HCL	xx(x)	65-90+	C	xxx	2	II	2	W
	41	0-29	HCL	<5	29-45	HCL	xxx	45-80+	C	xxx	2	III	3b	W
	42	0-25	HCL	<5	25-55	HCL	xxx	55-64 64+	C Stopped on stones	xxx	1	III/II	3a/b	W
	43	0-25	C	<5	25-42	Cslca	xxx	42-70+	Cchky	xxx	2	III	3b	W
	44	0-28	HCL	<5	28-43	HCL	xxx	43-67 67-80+	C Cchky	xxx xxx	1	III	3b	W
	45	0-25	HCL	<5	25-56	C	xxx	56-80+	Cchky	xxx	1	III	3b	W
	46	0-34	HCL	<5	34-58	mstHCL	xxx	58-90+	HCL	xxx	1	II	3a	W
	47	0-30	HCL	<5	30-52	HCL	xxx	52-90+	C	xxx	1	III	3b	W
	48	0-26	HCL	<5	26-58	HCL	xxx	58-90+	C	xxx	1	II	3a	W
	49	0-37	Cca	<5	37-100+	C(r)	xxx				1	III	3a	W
	50	0-30	Cca	<5	30-72	Cchky	xxx	72+	Stopped on stones		0	III	3a	W
	51	0-30	HCL	10-15	30-90+	Cr	xxx				0	III	3b	W
	52													
	53	0-28	HCL	<5	28-100+	C	xxx				1	III	3b	W
	54	0-34	HCL	<5	34-45	HCL/C	xxx	45-75+	C flinty	xxx	1	III	3b	W
	55	0-30	HCL ca	<5	30-100+	C ca	xxx				1	III	3a	W
	56	0-31	HCL ca	<5	31-91+	C ca	xxx				0	III	3a	W
	57	0-33	HCL	<5	33-51	HCL	xxx	51-90+	C	xxx	0	III	3b	W
	58	0-30	HCL ca	<5	30-48	HCL	xxx	48-90+	C	xxx	0	III	3a	W
	59	0-28	HCL	5-10	28-60+	C					2	III	3b	W
	60	0-27	HCL	<5	27-48	C	xxx	48-70+	Cchky	xxx	2	III	3b	W
	61	0-29	HCL	<5	29-44	HCL	xxx	44-60+	C	xxx	2	III	3b	W
	62	0-27	HCL	<5	27-67	HCL	xxx	67-90+	HCL	xxx	2	II	3a	W
	63	0-29	HCL	<5	29-63	HCL	xxx	63-80+	HCL	xxx	0	II	3a	W
B	1	0-26	HCL	0	26-46	HCL	xxx	46-90+	C	xxx	2	III	3b	W
	2	0-30	Cca	<5	30-90+	Cchky	xxx				3	III	3a	W
	3	0-26	CSL	<5	26-66	LCS	xxx	66-90+	C	xxx	3	II	3b	D
	4	0-73	Cca(dist)	<5	73-90+	Cca	xxx				2	-	-	-
	5	0-50+	HCLslca (dist)	<5							3	-	-	-
	6	0-28	Cca	<5	28-56	slstCSL(dist)	-	56-100+	CS	o	4	-	-	-
	7	0-32	Cca	<5	32-42	C	xxx	42-56 56+	Cchky Stopped on stones		3	III	3a	W
	8	0-28	HCLca	<5	28-41	HCL	xxx	41-72 72-90+	C Cchky	xxx xxx	2	III	3a	W
	9	0-38	Cca	<5	38-90+	Cchky	xxx				3	III	3a	W

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
	10	0-34	SC	<5	34-55	slstSCL	x	55-90+	mstCSL	x	2	I	3a	D
B	11	0-30	SCL ca	5-10	30-70	SCL/CSL ca	xxx	70-100+	Cchalky	xxx	1	II	3a	D
	12	0-29	HCL	<5	29-40	HCL	xxx	40-90+	C	xxx	2	III	3b	W
	13	0-30	HCL	<5	30-80	C	xxx				1	III	3b	W
	14	0-32	HCL	<5	32-56	HCL	xxx	56-90+	HCL	xxx	2	II/III	3a/b	W
	15	0-30	HCL ca	5-10	30-54	C ca	xxx	54-90+	C chalky	xxx	1	III	3a	W
	16	0-31	HCL v sl ca	5-10	31-100+	C sl ca	xxx				1	III	3b/a	W
	17	0-31	C	<5	31-38	HCL	xxx	38-90+	C	xxx	1	III	3b	W
	18	0-25	C	<5	25-70	C	xxx	70-90+	SCchky	xxx	3	III	3b	W
	19	0-28	HCL ca	<5	28-91+	C chalky	xxx				2	III	3a	W
	20	0-29	HCL	5-10	29-50+	HCLr	o	50+	Flinty		2	I	3a	D
	21	0-31	Cslca	<5	31-43	Cca	xxx	43-80+	Cchky	xxx	0	III	3b	W
	22	0-32	HCL	<5	32-45	C	xxx	45-90+	C	xxx	0	III	3b	W
	23													
	24	0-31	SCL	5-10	31-65	SCLr	o	65-100+	SCL/MSLr	x	1	I	3a	D
	25	0-27	HCL ca	<5	27-85+	C chalky	xxx				2	III	3a	W
	26	0-31	HCL ca	10-15	31-80+	C chalky	xxx				2	III	3a	W/St
	27	0-26	SCL	<5	26-58	SCL	xx	58-100+	LMS	o	1	I	3a	D
	28	0-31	MSL	5-10	31-70+	CSL	xx	70+	Flinty		1	I	3a	D
	29	0-30	HCL/MCL	<5	30-100+	HCLr	o				0	I	2	D
	30	0-30	HCL ca	<5	30-45	HCL ca	xxx	45-80+	C sl ca	xxx	1	III	3a	W
	31	0-25	HCL ca	5-10	25-90+	C chalky	xx				1	III	3a	W
	32	0-29	HCL/SCL ca	<5	29-100+	C chalky	xxx				1	III	3a	W
	33	0-28	HCL sl ca	<5	28-54	HCL sl ca	xxx	54-100+	C chalky	xxx	1	III/II	3a	W
	34	0-30	HCL dist	<5	30-51	HCL	xxx	51-67 67-100+	C HCL	xxx xxx	0	II	3a	W
	35	0-28	SCL	5-10	28-51	SCL	xxx	51-71 71-100+	CSL Cr	xxx xxx	2	II	3a	W
	36	0-32	HCL ca	<5	32-54	C ca	xxx	54-90+	C chalky	xxx	1	III	3a	W
	37	0-28	SCL/HCL	5-10	28-56	HCL	xxx	56+	Flinty		2	II	3a	W
	38	0-32	SCL sl ca	<5	32-58	SCL ca	x	58+	Flinty		1	I	3a	D
	39	0-33	SCL	<5	33-71	SCL	xx	71-100+	HCL	xxx	2	I	2	D
	40	0-27	HCL ca	<5	27-68+	C chalky	xxx				2	III	3a	W
	41	0-30	SCL	<5	30-68	SCL	xxx	68-82 82+	SCL Flinty	xxx	1	II	2	W
	42	0-32	SCL	<5	32-64	SCL	xxx	64-100+	C	xxx	2	II	2	W
	43	0-28	HCL ca	<5	28-91+	C chalky	xxx				2	III	3a	W
	44	0-60+	SCL(dist)	5-10							3	-	-	-
	45	0-37	HCL	<5	30-47	HCL	xxx	47-80+	C	xxx	1	III	3b	W

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
	46	0-29	MCL	<5	29-56	MCL	xx(x)	56-100+	HCL	xxx	0	I/II	2	W/D
B	47	0-30	SCL	<5	30-65	SCL	xxx	65-80 80-100+	Cr SCL	xxx xxx	0	II	2	W/D
	48	0-28	SCL	<5	28-100+	SCL	x				1	I	2	D
	49	0-30	SCL dist	<5	30-58	HCL/C	xxx	58-100+	Cr ca	xxx	3	III	3a	W
	50	0-29	MCL	5-10	29-61	HCLr	o	61+	Flints		0	I	3a	D
	51	0-26	HCLca	<5	26-41	HCL	xx	41-60 60-90+	C Cchky	xxx xxx	2	III	3a	W
	52	0-26	ZC	<5	26-46	ZC	xxx	46-90+	C	xxx	0	III	3b	W
	53	0-30	M/HCL	<5	30-60	SCL	xxx	60-100+	C	xxx	1	II	2	W
	54	0-28	SCL	<5	28-61	SCLr	x	61+	Flinty		0	I	3a	D
	55	0-33	HCL ca	<5	33-65+	C ca	xxx				0	III	3a	W
	56	0-31	SCL	<5	31-54	SCL	xxx	54-100+	Cr	xxx	1	III/II	3a/2	W
	57	0-30	HCL sl ca	<5	30-70+	Cr ca	xx				1	III	3a	W
	58	0-28	HCL ca	5-10	28-50+	C chalky	xxx				0	III	3a	W
	59	0-27	HCL ca	5-10	27-60+	C chalky	xxx				1	III	3a	W
	60	0-28	HCL ca	<5	28-90+	C chalky	xxx				1	III	3a	W
	61	0-30	SCL	5-10	30-64	CSLr	o	64-100+	MSr	o	2	I	3a	D
	62	0-30	SCL	<5	30-50	SCL	50+	Flinty			2	I	3a	D
	63	0-33	HCL	<5	33-56	HCL	xxx	56-100+	HCL	xxx	3	II	3a	W
	64	0-31	HCLslca	<5	31-80+	C	xxx				2	III	3b	W
	65	0-30	Cca	<5	30-90+	Cchky	xxx				2	III	3a	W
	66	0-29	HCL/Cca	<5	29-60+	Cchky	xxx				4	III	3a	W
	67	0-60+	HCL(dist)	5-10							3	-	-	-
J	1	0-35	SCL	10-15	35+	Gravel					2	I?	3b	D
	2	0-31	SCL	5-10	31-69	slstSCL	xxx	69+	Gravel	-	1	II	3a	D
	3	0-35	SCL	5-10	35-68	CSL/Gravel	xxx	68+	Gravel	-	0	I	3a	D
	4	0-34	SCL	5-10	34-52	slstSCL	o	52+	Gravel	-	0	I	3a	D
	5	0-35	SCL	5-10	35-51	mstSCL	xx	51+	Gravel	-	1	I	3a	D
	6	0-29	H/SCL ca	5-10	29-44	HCL	xxx	44-70+ 70+	Cr Flinty	xxx	2	III	3a	W
	7	0-30	HZCL ca	5-10	30-63	HZCL ca	xx(x)	63-91+	HZCL chalky	xxx	2	II	2	W
BR	1	0-30	SCL	5-10	30-43	mstSCL	o	43+	Gravel		2	I?	3b	D
	2	0-31	HCL	5-10	31-50+	HCL	xx	50-100+	mstC	xxx	2	III	3b	W
	3	0-31	MCL	<5	31-78	MCL	xx	78-100+	slstSCL	xx	1	I	2	D

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
	4	0-35	mstSCL	5-10	35-46	mstSCL	xxx	46-61 61-68 68+	C SCL Gravel	xxx xxx -	1	III	3a	W
BR	5	0-30	C/HCL ca	5-10	30-60	Cca	xxx	60-90+	C	xxx	2	III	3a	W
	6	0-30	SCL ca	5-10	30+	Flinty					2	-		
	7	0-28	C ca	<5	28-90+	C ch	xxx				1	III	3a	W
	8	0-32	HCL ca	<5	32-55	HCLr ca	xxx	55-91+	Cr ca	xxx	2	III/II	3a/2	W
	9	0-30	HCL ca	5-10	30-53	Cr ca	xxx	53-91+	HZCL ca	xxx	3	III	3a	W
SI	1	0-29	HCL ca	<5	29-35	Cchky	xxx	35-70+	Cchky	xxx	2	III	3a	W
	2	0-35	HCL/SC	<5	35-90+	SC	xxx				2	II	3a	W
	3	0-28	HCL	5-10	28-54	SC	xx	54-80+	SC	xxx	2	II	3a	D
	4	0-41	HCLca	<5	41-90+	Cchky	xxx				2	III	3a	W
	5	0-35	HCLca	<5	35-65	Cchky	xxx	65-80+	HZCLbrashy	o	2	III	3a	W
	6	Non agr- wood												
	7	0-35	HCLca	<5	35-55	HCLca	xxx	55-90+			1	III	3a	W
	8	0-39	HCLvslca	<5	39-82	HCLbrashy	o	82-90+	C	xxx	2	I	2	D
	9	0-30	HZCL ca	<5	30-95	HZCL ca	xxx				2	II	2	W/D
	10	0-31	HZCL	<5	31-90+	HZCL	xxx				1	II	3a	W
	11	0-17	MZCL	<5	17-66	HZCLr	xx	61-100+	HZCLr	xx	0	I	2	W/D
	12	0-28	MCL	5-10	28-40	SCL	xx(x)	40+	Flinty		2	I/II	3a	D
	13	0-20	SCL	5-10	20+	Flinty					1	-	-	-
	14	0-31	HCL	<5	31-82	HCL	xx	82-100+	HCL	xxx	1	I	2	D
	15	0-32	HCL	<5	32-66	HCL	xxx	66-90+	HCL	xxx	1	II	3a	W
	16	0-35	HCL	<5	35-62	HCL	xxx	62-90+	HCL	xxx	2	II	3a	W
	17	0-32	SCL	5-10	32+	Gravel	-				1	I	3b	D
	14	0-20	SCL	5-10	20-30	SCL	xx	30+	Flinty		0	I	3b	S
BU	1	0-30	MZCL	<5	30-60	HZCL	xxx	60-100+	SCLr	xxx	0	II	2	W
	2	0-29	MZCL	5-10	29-81	MZCL	xxx	81-100+	HZCLr	xxx	0	II	2	W
	3	0-29	HZCL	<5	29-56	HZCL	xxx	56-95	SCLr	xxx	0	II	3a	W
	4	0-31	HZCL	<5	31-70	HZCLr	xxx	70-100+	Cr	xxx	0	II	3a	W
P	1	0-30	M/SCL	5-10	30-50	SCL	xxx	30+	Flinty		0	II	2	W
	2	0-30	SCL	5-10	30-40	SCL	xx(x)	40+	Flinty		0	II	2	W
U	1	0-30	C	<5	30-55	C	xxx	55-90+	Cchky	xxx	1	III	3b	W
	2	0-29	C	<5	29-44	C	xxx	44-80+	Cchky	xxx	1	III	3b	W
	3	0-30	HCL	<5	30-45	C	xxx	45-80+	Cchky	xxx	1	III	3b	W
	4	0-31	Cca	<5	31-62	Cca	xxx	62-80+	Cchky	xxx	4	III	3a	W

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
U	5	0-26	Cca	<5	26-53	C	xx	53-100+	Cchky	xxx	2	II	3a	W
	6	0-35	MZCL	0	35-70	MZCL	xx	70-120	HZCL	xx	2	I	2	D
	7	0-30	MZCL	0	30-100+	MZCL	x				1	I	2	D
	8	0-35	MZCL	0	35-65	MZCL	o	65-100+	HZCL	o	1	I	2	D
	9	0-30	MZCL	0	36-70	MZCL	xxx	70-100+	HZCL	xxx	0	II	2	D
	10	0-33	MZCL	0	33-68	MZCL	xxx	68-100+	HZCL	xxx	0	II	2	D
	11	0-28	Cca	<5	28-43	Cca	xxx	43-50+	Cchky	xxx	0	III	3a	W
	12	0-35	MZCL	<5	35-62	HCL	xxx	62-100+	HCL	xxx	1	II	2	W/D
WO	1	0-28	HCL	5-10	28-47	S/MCL	xx(x)	47+	Stopped on stone		0	I/II	2/3a	D
	2	0-32	HCL	<5	32-61	HCLr	x	61-90+	HCLr	xxx	1	I	2	D
	3	0-31	HCL ca	5-10	31-68	HCL ca	xxx	68-100+	C ca	xxx	0	II	2	W
	4	0-26	SCL	<5	26-72	SCL	x	72-84 84+	mstSCL Stopped on stones	x	0	I	2	D
	5	0-31	SCL	<5	31-66	SCL	o	66-76 76+	mstSCL Stopped on stones	o	0	I	3a	D
	6	0-29	SCL	5-10	29-51	SCL pebbly	xx	51+	Stopped on stone		0	I	3a	D
	7	0-30	M/SCL	5-10	30-70	SCLr	x	70+	Stopped on stone		0	I	2	D
	8	0-30	HCL	<5	30-51	HCL	xxx	51+	Stopped on stone		0	II	3a	W
	9	0-25	SCL	<5	25-53	SCL	o	53+	Stopped on stones		1	I	3a	D
	10	0-35	HCL	<5	35-66	HCL	xxx	66+	Stopped on stones		1	II	2	D
	11	0-30	SCL	<5	30-59	mstSCL	o	59+	Stopped on stones		0	I	3a	D
	12	0-30	MCL	<5	30-46	MCL	xx	46+	Stopped on stones		0	I	3a	D
	13	0-33	Cca	<5	33-51	Cca	xxx	51-80+	Cchky	xxx	I	III	3a	W
	14	0-32	HCLvslca	<5	32-51	HCLslca	xxx	51-73 73-90+	C Cchky	xxx xxx	I	III	3b	W
	15													
	16	0-30	HCL	<5	30-91+	HZCLr	xxx				0	II	3a	W
	17	0-30	HCL	<5	40-100+	C ca	xxx				0	III	3a	W
	18	0-32	MZCL	0	32-48	MZCL	o	48+	Stopped on stones		0	I	2/3a	D
	19	0-31	HCL	<5	31-46	HCL	xxx	46-60 60-90+	HCL C	xxx xxx	1	III/II	3a/b	W
	20	0-30	SCL	<5	30-48	SCL	o	48+	Stopped on stones		1	I?	2/3a	D
	21	0-31	HZCL	<5	31-100+	HZCL	xxx				0	III	3a	W
	22	0-30	HCL ca	<5	30-50	HCL ca	xxx	50-63 63-100+	C ca C chalky	xxx xxx	0	III	3a	W
CO	1	0-34	Cslca	<5	34-50	Cslca	xxx	50-90+	Cvslca	xxx	0	III	3b	W
	2	0-28	HCL	<5	28-65	HZCL	xxx	65-100+	C	xxx	0	II	3a	W
CR	1	0-30	HCL	<5	30-44	HCL	xxx	44-90+	C	xxx	1	III	3b	W
F	1	0-32	SCL	5	32-48	slstSCL	o	48-100+	SCL/Gravel	o	0	I	3a	D
R	1	0-25	MZCL	<5	25-100+	HZCL	o				1		2	D

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
	2	0-25	C	0	25-56	C	xxx	56+	Stopped on stones		0	III	3b	W
	3	0-30	HZCL	0	30-44	HZCL	xxx	44-60 60-100+	HZCL MZCL	xxx xxx	0	III	3b	W
RA	1	0-26	MZCL	0	26-60	MZCL	o	60-100+	MZCL	o	2	I	2	D
	2	0-29	MZCL	0	29-100	MZCL	o				1	I	2	D
	3	0-34	MZCL	0	43-71	MZCL	xx	71-100+	MZCL	xxx	2	I	2	D
	4	0-35	HCLca	<5	35-52	HCL	xx	52-90+	C	xxx	1	III	3a	W
	5	0-28	MZCL	0	28-58	MZCL	o	58-100+	HZCL(r)	o	1	I	2	D
	6	0-31	MZCL	0	31-62	MZCL	xx	62-100+	MZCL	xxx	1	I	2	D
	7	0-29	HCLca	<5	29-90+	Cchky	xxx				1	III	3a	W
	8	0-34	Cvslca	<5	34-45	Cca	xxx	45-80+	Cchky	xxx	1	III	3b	W
	9	0-33	HCL	<5	33-80+	C	xxx				1	III	3b	W
	10	0-32	MZCL	0	32-100+	MZCL	xx				1	I	2	D
	11	0-34	HZCL	<5	34-64	HZCL	xx	64-90+	HZCL	xxx	1	II	3a	W
	12	0-32	HCLvslca	<5	32-49	C	xxx	49-80+	Cchky	xxx	1	III	3b	W
	13	0-32	HCLca	<5	32-42	HCLca	xx	42-80+	Cchky	xxx	1	II	3a	W
	14	0-32	Cca	<5	32-90+	Cchky	xxx				1	III	3a	W
	15	0-24	HCLca	<5	24-34	HCL	xx	34-90+	C	xxx	1	III	3a	W
	16	0-32	HCLca	<5	32-48	HCLca	xx	48-80+	Cchky	xxx	1	III	3a	W
	17	0-33	HCL	<5	33-54	HZCL	xxx	54-90+	HZCL	xxx	1	II	3a	W
	18	0-32	Cca	<5	32-49	Cchky	xxx	49-80+	Cchky	xxx	1	III	3a	W
	19	0-30	Cca	<5	30-90+	Cchky	xxx				2	III	3a	W
	20	0-31	Cca	<5	31-68	C	xxx	68-80+	Cchky	xxx	1	III	3a	W
	21	0-28	HCLslca	<5	28-44	Cchky	xxx	44-80+	Cchky	xxx	2	III	3b	W
	22	0-32	HCLslca	<5	32-46	HCL	xxx	46-80+	C	xxx	1	III	3b	W
	23	0-32	MZCL	0	32-44	MZCL	o	44-100+	HZCL	o	1	I	2	D
	24													
	25	0-31	Cca	<5	31-41	Cslca	xxx	41-90+	Cchky	xxx	2	III	3a	W
	26	0-25	Cslca	<5	25-35	Cca	xxx	35-90+	Cchky	xxx	0	III	3b	W
	27	0-27	Cca	<5	27-80+	Cchky	xxx				0	III	3a	W
	28	0-28	C	0	28-90+	C	xxx				1	III	3b	W
	29	0-25	MZCL	0	25-60	MZCL	o	60-100+	HZCL	o	1	I	2	D
	30													
	31	0-32	HCL	<5	32-48	HCL	xx	48-80+	HCL	xxx	5	III	3b	W
	32	0-25	MZCL	<5	25-80+	ZC	xxx				4	III	3a	W
	33	0-30	HCLslca	<5	30-46	HCL	xxx	46+	Stopped on stones		2	?	?	?
	34	0-31	MZCL	0	31-71	MZCL	o				1	I	2	D
	35	0-31	HZCL	0	31-100+	HZCL	o				1	I	2	W/D
	36	0-31	C	<5	31-71	C	xxx	71-80+	Cchky	xxx	1	III	3b	W

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
	37	0-31	HZCL	<5	31-58	HZCL	xx	58-90+	C	xxx	0	II	3a	W
	38	0-15	C	<5	15-50+	C(dist)	-				2	IV	3b	W
	39	0-27	mstSCL/HCL	5-10	27-44	mstHCL	xxx	44-80+	C	xxx	5	III	3b	W
BO	1													
	2	0-32	HCL	5-10	32-48	HCL	xxx	48+	Stopped on stones		2	II	3a	W
	3	0-30	M/HCL	<5	30-51	HCL	xx	51-100+	HCL	xxx	5	I	2	D
	4	0-26	M/HCL	5-10	26-47	HCL	xxx	47+	Stopped on stones		1	II	2/3a	D
	5	0-31	HCL ca	<5	31-90+	C xca	xxx				0	III	3a	W
	6	0-30	MCL	5-19	30-56	MCL	xx	56-90+	HCL	xx	1	I	2	D
	7	0-30	MCL ca	<5	30-70	HCL ca	xxx	74-90+	HCL ca	xxx	1	II	2	W
	8	0-31	HCL	<5	31-51	HCL	xxx	51-90+	HCL	xxx	0	III	3b	W
	9	0-34	HCLca	<5	34-55	HCL	xxx	55-65 65+	HCL/C Stopped on stones	xxx	1	II/III	2/3a	W
	10	0-29	HCL	<5	29-55	HCL	xxx	55-72 72+	HCL Stopped on stones	xxx	1	II	3a	W
	11	0-33	MZCL	<5	33-62	HZCL	xxx	62-90+	C	xxx	1	II	2	W/D
	12	0-32	HZCL	<5	32-100+	HZCL	xxx				1	II	3a	W
	13	0-31	MZCL	<5	31-100+	MZCL ca	xxx				0	II	2	D
	14	0-31	HZCL	<5	31-55	HZCL	xxx	55-75 75-90+	HZCL HZCL ca	xxx xxx	0	II/III	3a/b	W
	15	0-28	MCL ca	5-10	28-55	HCL ca	xxx	55-90+	C ca	xxx	1	II/III	2/3a	W
	16	0-32	HCL ca	<5	32-90+	C ca	xxx				0	IV	3a	W
	17	0-3	HCL	<5	30-56	HCL	xxx	56-80 80-100+	C SCL	xxx xxx	1	II/III	3a/b	W
>	V1	0-32	MCL ca	<5	32-66	HCL ca	xxx	66+	Stopped on stone		1	II	2	W/D

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture and stoniness	Mottling	Depth (cm)	Texture and stoniness	Mottling	(°)	Class	Grade	Main limitation
	V2	0-33	HCL ca	<5	33-90+	C chalky	xxx				1	III	3a	W
	V3	0-32	MCL	<5	32-68	MCL	x	68-90+	MCL	xx	3	I	2	D
	V4	0-31	MCL	<5	31-58	MCL	xx	58-90+	MCL	xx(x)	2	I	2	D
	V5	0-31	HCL ca	<5	31-80+	C ca	xxx				1	III	3a	W
	V6	0-30	HCL ca	<5	31-59	C ca	xxx	59-100+	C chalky	xxx	0	III	3a	W
	V7	0-35	HCLca	<5	35-61	HCLvslca	xxx	61-90+	C	xxx	3	II	2	W
	V8	0-34	HCLca	<5	34-58	HCLchky	xx	58-90+	HCLchky	xx(x)	3	II	2	W
	V9	0-29	HCLslca	<5	29-45	HCL	xxx	45-90+	C	xxx	1	III	3b	W
	V10	0-28	HCLca	<5	28-53	HCLslca	xxx	53-80+	Cchky	xxx	2	III	3a	W
	V11	0-30	HCL ca	<5	30-60 ca	HCL ca	x	60-75 75-100+	HCL ca C ca	xxx xxx	1	II	2	W/D
	V12	0-31	HCL ca	<5	31-90+	C ca	xxx				1	III	3a	W
	V13	0-28	HCLslca	<5	28-36	HCL	xx	36-70+	C	xxx	3	III	3b	W
	V14	0-50+	HCLca(dist)	<5							3	-	-	-
	V15	0-33	MCL	<5	28-57	HCL	xx	57-90+	HCL	xxx	3	II	2	W
	V16	0-32	MCL	<5	32-100+	MCL	o				2	I	2	D
	V17	0-30	HCL	<5	30-58	HCL	xxx	58-100+	C	xxx	0	II	3a	W
	V18	0-31	HCL ca	<5	31-60	Cr ca	xxx	60+	Stopped on stone		0	III	3a	W
CW	CW 1	0-33	SCL	<5	33-67	SCL	o	67-90+	SCL	xx	1	I/II	2	D
	CW 2	0-30	SCL	<5	30-59	SCL/MSL	o	59-100+	MS	o	1	I	3a	D
	CW 3	0-29	SCL	<5	29-53	LCS	o	53-90+	CS	o	2	I	3b	D

	Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
Prefix	**No**	**Depth (cm)**	**Texture**	**Stones >20 mm (%)**	**Depth (cm)**	**Texture and stoniness**	**Mottling**	**Depth (cm)**	**Texture and stoniness**	**Mottling**	**(°)**	**Class**	**Grade**	**Main limitation**
	CW 4	0-31	SCL	<5	31-64	SCL	x	64-90+	SCL	xx	1	I/II	2	D
	CW 5	0-32	SCL	<5	32-51	SCL	xxx	51-81 81-90+	SC C	xxx xxx	2	III	3a	W
	CW 6	0-31	HCL ca	<5	31-95+	HCL/C ca	xxx				1	II	2/3a	W
	CW 7	0-33	SCL	<5	33-80	SCL	xx	80-100+	mstSCL	xxx	3	I	2	D
	CW 8	0-30	HCL	<5	30-66	HCL	xxx	66-100+	C	xxx	2	II	3a	W
	CW 9	0-28	HCL	<5	28-70	HCL	xxx	70-100+	HCL	xxx	2	II	3a	W
	CW 10	0-33	HCL	<5	33-50	HCL	xxx	50-100+	HCL	xxx	3	III	3b	W
	CW 11	0-34	SCL	<5	34-54	SCL	o	54-81 81+	mstSCL Stopped on stones	o	3	I	2	D
	CW 12	0-30	SCL	<5	30-62	SCLr	x	62+	Stopped on stone		2	I	2	D

A12 pit logs

Pit S23 (see Map 1)

0-29 cm	Dark greyish brown (10YR 4/2) heavy clay loam; very slightly stony (small subangular flints); moderately developed very coarse sub-angular blocky structure; firm; few fine fibrous roots; calcareous smooth clear boundary to:
29-44 cm	Light yellowish brown (2.5Y 6/4) heavy clay loam with 5% distinct fine yellowish brown (10YR 5/6) mottles; very slighty stony; moderately developed medium and coarse sub-angular blocky structure; friable; many fine fissures; medium packing density; few fine fibrous roots; smooth gradual boundary to:
44-65 cm	Light brownish grey (2.5Y 6/2) clay with 10% distinct fine yellowish brown (10YR 5/6) mottles and fine very dark grey (7.5YR 3/1) ferri-manganiferous concentrations; very slightly stony; moderately developed very coarse angular blocky structure; very firm; porous; no roots or macropores (high packing density); very slightly calcareous; smooth diffuse boundary to:
65-120 cm	Light brownish grey (2.5Y 6/2) clay with 20% distinct fine olive yellow (2.5Y 6/8) mottles; moderately stony (small soft chalk); weakly developed very coarse angular blocky structure to structureless (massive); very firm; no roots or macropores (high packing density); calcareous.

Pit BR1 (see Map 1)

0-35 cm	Dark greyish brown (10YR 4/2) sandy clay loam; very stony (40 to 50% small and medium quartz gravel); weakly developed fine sub-angular blocky structure; very friable; non calcareous; common fine fibrous roots; smooth gradual boundary to:
35-40 cm	Quartz gravel (80% stones); few fine fibrous roots; structureless (single grain).
40 cm+	Impenetrable.

Pit WO15 (see Map 1)

0-26 cm	Dark greyish brown (10YR 4/2) clay; slightly stony (small and medium subangular flints); moderately developed very coarse sub-angular blocky structure; very firm; calcareous; smooth clear boundary to:
26-38 cm	Light yellowish brown (2.5Y 6/4) clay with 10% faint fine light olive brown (2.5Y 6/8) mottles and 2-3% very dark grey (10YR 3/1) ferri-manganiferous concentrations; slightly stony; moderately developed very coarse sub-angular blocky structure; firm; porous; medium packing density; calcareous; smooth gradual boundary to:
38-120 cm	Pale brown (2.5Y 7/4) clay with 25% distinct fine light olive brown (2.5Y 6/8) mottles; moderately stony (small soft chalk); weakly developed very coarse angular blocky structure to structureless (massive); very firm; porous; no roots or macropores (high packing density); calcareous.

Pit U6 (see Map 1)

0-35 cm	Dark greyish brown (10YR 4/2) medium silty clay loam; stoneless; moderately developed coarse sub-angular blocky structure; friable;; smooth clear boundary to:
35-70 cm	Brown (7.5Y 5/4) medium silty clay loam with paler brown (7.5Y 5/3) ped faces and 10% faint fine light brown (7.5YR 6/3) mottles; stoneless; weakly

developed coarse sub-angular blocky structure; friable; porous; low packing density; calcareous; smooth diffuse boundary to:

70-120 cm Brown (7.5Y 5/4) heavy silty clay loam with 3-4% fine very dark grey (10YR 3/1) ferri-manganiferous concentrations stoneless; moderately developed very coarse sub-angular blocky structure; firm; porous; no macropores; medium packing density.

Pit FR1 (see Map 1)

0-32 cm Dark greyish brown (10YR 4/2) sandy clay loam; 10% small and medium quartz pebbles and subangular flints; moderately developed medium sub-angular blocky structure; friable; common fine fibrous roots; smooth gradual boundary to:

32-48 cm Brown (7.5Y 5/4) sandy clay loam; 10-15% stones; moderately developed coarse sub-angular blocky structure; friable; few fine fibrous roots; low packing density; smooth diffuse boundary to:

48-100 cm+ Strong brown (7.5Y 4/6) sandy clay loam; 50-60% coarse gravel; weakly developed fine sub-angular blocky structure; loose; no roots; low packing density.

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0-30 cm Dark greyish brown (10YR 4/2) sandy clay loam; 10-15% medium subangular flints; moderately developed medium sub-angular blocky structure; friable; common fine fibrous roots; smooth gradual boundary to:

30-100 cm Light yellowish brown (10YR 6/4) heavy clay loam; moderately stony (small soft chalk) weakly developed medium sub-angular blocky structure; friable; calcareous.

Pit W9 (see Map 1)

0-30 cm Brown (7. 5YR 4/2) medium clay loam; 5% small and medium quartz pebbles and subangular flints; moderately developed medium sub-angular blocky structure; friable; non calcareous; common fine fibrous roots; smooth clearl boundary to:

30-41 cm Brown (7.5Y 5/2) medium clay loam with 20% diffuse medium reddish yellow (7.5Y 6/6) ; moderately stony; weakly developed medium angular blocky structure; friable; few very fine fibrous roots; medium packing density; 1% macropores; smooth gradual boundary to:

41-100 cm Light brown (7.5Y 6/2) sandy clay loam with 10% medium diffuse reddish yellow (7.5Y 6/6) mottles; moderately stony; weakly developed medium angular blocky structure; 1% fissures; medium packing density; very slightly calcareous; smooth gradual boundary to:

100-120 cm Light brown (7.5Y 6/2) sandy clay loam with 10% medium diffuse reddish yellow (7.5Y 6/6) mottles moderately stony; weakly developed coarse prismatic structure; very firm; no roots; high packing density.

Pit BO2 (see Map 1)

0-32 cm Dark greyish brown (10YR 4/2) medium clay loam; 10-15% small and medium quartz pebbles and subangular flints (5-10% >20 mm); moderately developed coarse and very coarse sub-angular blocky structure; firm; few medium fibrous roots; smooth clear boundary to:

32-39 cm Pale brown (10YR 6/3) medium clay loam with 20% distinct fine and medium reddish yellow (7.5YR 6/8) mottles; 15-20% stones; moderately developed

	coarse sub-angular blocky structure; firm (dry); few fibrous roots; medium packing density; smooth gradual boundary to:
39-62 cm	Brown (7.5Y 5/3) coarse sandy loam with 15% yellowish brown (10YR 5/6) mottles; 50-60% s and quartz small and medium flints and quartz pebbles; weakly developed fine sub-angular blocky structure; very friable; no roots; low packing density; smooth diffuse boundary to:
48-100 cm+	Greyish brown (10YR 5/2) loamy coarse sand; 60% coarse gravel; single grain; loose; no roots; low packing density.