

Central Lincolnshire Joint Planning Unit  
**Green Infrastructure Study  
for Central Lincolnshire**  
Volume 2 - Audit & Assessment





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Approved

A handwritten signature in black ink, appearing to read 'D. Watkins', with a large, stylized loop at the end.

Dominic Watkins

Position

Director

Date

20<sup>th</sup> December 2011

Revision

Final

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## **1.0 INTRODUCTION**

### **1.1 Background**

- 1.1.1 Central Lincolnshire refers to the combined area covered by the City of Lincoln, North Kesteven and West Lindsey. These three councils have come together in a formal partnership with Lincolnshire County Council to prepare a joint Local Development Framework (LDF) for the area. The Central Lincolnshire Joint Planning Unit (CLJPU) has been set up to carry out this work, and a new strategic joint committee established with representatives from each of the four partner Councils. The name Central Lincolnshire the centrality of Lincoln within the historic county of Lincolnshire, and the area's geographical location between North Lincolnshire and the more southern Lincolnshire districts of South Kesteven and South Holland.
- 1.1.2 The CLJPU is being supported by Communities and Local Government (CLG) as part of the second wave Eco-town programme to test the viability of delivering Eco-town Planning Policy Statement Standards for development through spatial policies of the Central Lincolnshire LDF. A strategic understanding of the opportunities that a well-planned green infrastructure (GI) network represents in this respect has been recognised as being important to achieving this objective.
- 1.1.3 In April 2011, the CLJPU and its partners commissioned environmental planning consultants Chris Blandford Associates to undertake a study to produce a strategic framework for the delivery of GI across Central Lincolnshire over the next 15-20 years.
- 1.1.4 The main objectives<sup>1</sup> of the Central Lincolnshire GI Study are to:
- Spatially identify the existing assets and attributes that contribute to the GI in Central Lincolnshire.
  - Identify, assess and map aspects of the existing network that need protection; what areas are likely to be sensitive to change, including development; and opportunities for potential new and enhanced assets that are required to improve the functionality of the GI network, including reference to delivering the aims of the Eco-town PPS on GI in developments.
  - Spatially set out a draft vision and strategic principles for the conservation and enhancement of the biodiversity, landscape, heritage, leisure and recreational assets of the existing GI network.
  - Spatially identify opportunities for how the GI network can support the delivery of other eco-development objectives in respect of flood risk and water management, micro climate management, sustainable energy and food production, and support objectives for improved health and well-being of existing and future communities.

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<sup>1</sup> As set out in the Project Specification - Green Infrastructure Study for Central Lincolnshire (January 2011)

- Advise on appropriate draft GI policies for inclusion in the Central Lincolnshire LDF, to ensure sustainability of the required GI network and identify priority opportunities for investment.
- Identify how the Green Infrastructure Strategy can best support the delivery of the Growth Strategy and Infrastructure Delivery Plan being planned for through the LDF for Central Lincolnshire, including the opportunities presented by the development of the Witham Valley Sub-Regional Country Park, the Lincolnshire Wolds Area of Outstanding Natural Beauty, other major GI assets, and the opportunities associated with emerging new strategic development sites such as potential urban extensions to Lincoln, Sleaford and Gainsborough.
- Provide recommendations on how best to achieve the PPS1 Eco town supplement target of 40% green space provision within proposed new development sites (eco-town standard ET14) and consider how this standard could be applied to the range of communities that make up Central Lincolnshire, and to Central Lincolnshire as a whole.
- In general terms, evaluate options for being able to achieve sustainable infrastructure management and governance of current and future GI assets, and identify best practice from other parts of the country with regard to management and governance.

1.1.5 The Study is to be used as part of the evidence base to inform and support the development of spatial planning policy through the Central Lincolnshire LDF.

## 1.2 Study Area and Context

1.2.1 The Study Area is located within the East Midlands region of England. It is bordered by East Lindsey District, Boston Borough and South Kesteven District within the County of Lincolnshire to the east and south. Newark & Sherwood District and Bassetlaw District in Nottinghamshire are located to the west of the Study Area, with North Lincolnshire and North East Lincolnshire to the north.

1.2.2 The overall Study Area shown on **Figure 1.1** is contiguous with the boundary of the Central Lincolnshire HMA. The Central Lincolnshire HMA has a population of 282,800<sup>2</sup>, and encompasses the City of Lincoln, North Kesteven District and West Lindsey District. With the exception of the main built up area of Lincoln, the Study Area is predominantly rural comprising numerous villages and market towns of various sizes, with the main ones being Sleaford and Gainsborough.

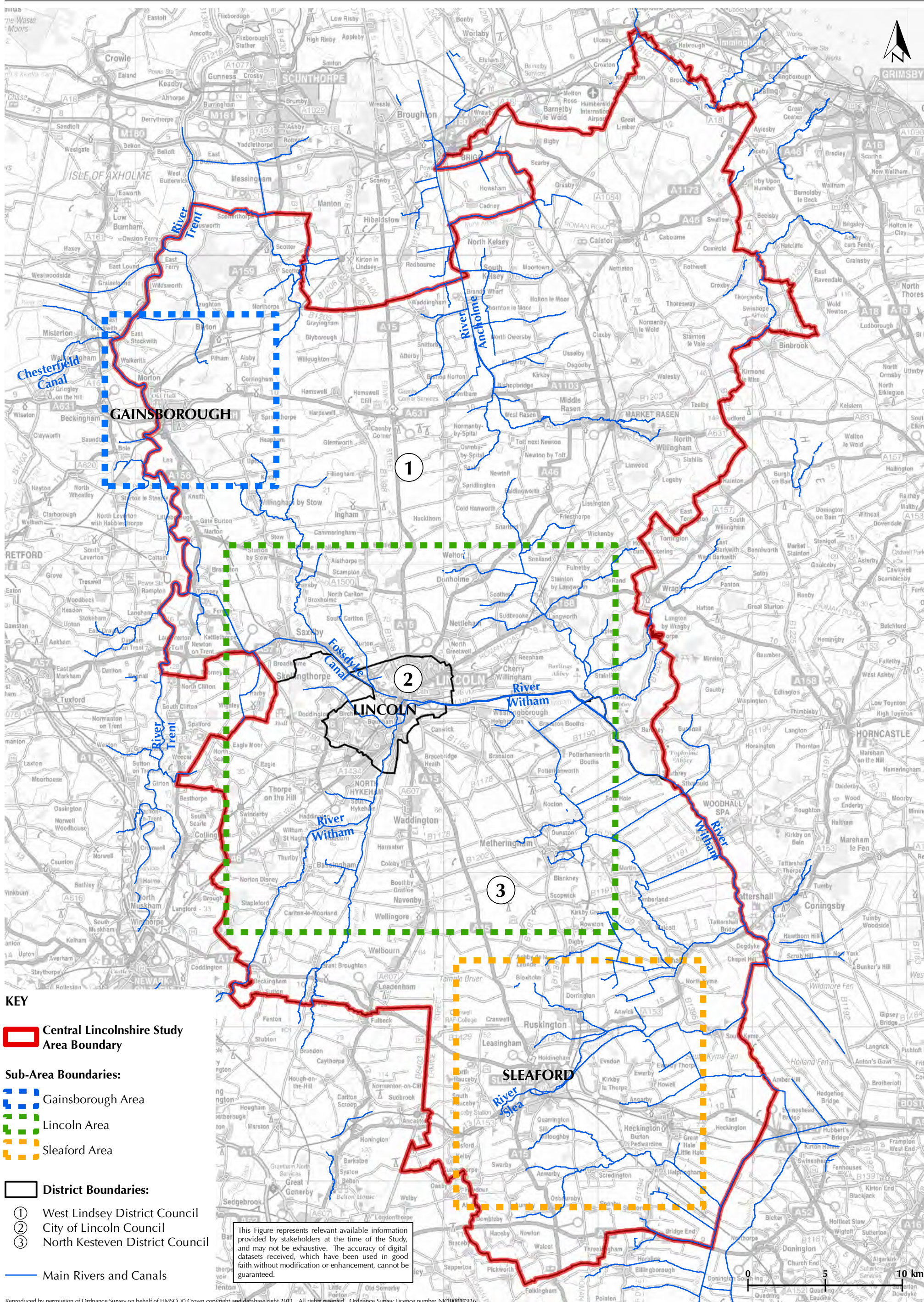
1.2.3 For the purposes of the Study, three Sub-Areas<sup>3</sup> have been broadly defined (see **Figure 1.1**) to facilitate more detailed assessment of GI assets, needs and opportunities around Gainsborough, Lincoln and Sleaford where options for planned growth are currently focussed.

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<sup>2</sup> Population estimate provided in the Central Lincolnshire Core Strategy Issues and Options Consultation Document (October 2010, CLJSPC)

<sup>3</sup> The extent of the Gainsborough, Lincoln and Sleaford Sub-Areas is based on the indicative areas defined in the Central Lincolnshire Core Strategy Issues and Options Consultation Document (October 2010, CLJSPC). Hereafter, the Sub-Areas are referred to as the Gainsborough, Lincoln and Sleaford Areas





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## 1.3 Study Outputs

1.3.1 The Study is presented as two volumes:

- **Volume 1** - GI Strategy.
- **Volume 2** - GI Audit and Assessment (this report).

1.3.2 **Volume 1** sets out the proposed GI Strategy for Central Lincolnshire, which should be read in conjunction with the baseline GI Audit and Assessment set out in Volume 2. The remainder of this GI Audit and Assessment report is structured as follows:

- **Section 2.0** presents an audit of the environmental and cultural assets, and social and economic influences, that are considered to be a key influence in defining the existing network of strategic greenspaces in Central Lincolnshire.
- **Section 3.0** provides an analysis of key needs and opportunities for provision of GI across Central Lincolnshire as a whole within the context of GI functions.
- **Section 4.0** provides an analysis of key needs and opportunities for provision of GI in Central Lincolnshire within the context of 30 specific 'GI Zones' defined for the purposes of the Study on the basis of common environmental characteristics and assets.

1.3.3 Additional supporting information is provided in the following appendices:

- **Appendix A1** Record of Datasets Used.
- **Appendix A2** List of Stakeholders.
- **Appendix A3** Stakeholder Workshop Report.
- **Appendix A4** Consultation Feedback on the Interim Report.
- **Appendix A5** Consultation Feedback on the Consultation Draft Reports.
- **Appendix A6** Agricultural Land Classification (Post 1988 Survey Data).
- **Appendix A7** Lincoln Townscape and Growth Point Character Area Names.
- **Appendix A8** Historic Landscape Character Information.
- **Appendix A9** Open Space, Sport and Recreation GIS Data Capture Methodology.
- **Appendix A10** Key Leisure and Tourism Attractions.
- **Appendix A11** East Midlands Woodlands Opportunity Mapping.
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- **Appendix A13** Trent Floodplain Biodiversity Opportunity Mapping.
- **Appendix A14** Wetland Opportunity Map.
- **Appendix A15** Biodiversity Action Plan Habitats Targets within Central Lincolnshire.
- **Appendix A16** Accessible Natural Greenspace Assessment Methodology and Findings.
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- **Appendix A18** Catchment Flood Management Plan Boundaries.
- **Appendix A19** Guidance from the Environment Agency on Managing Surface Water and Using Water Wisely.
- **Appendix A20** Suitability of Natural Adaptation Interventions in the East Midlands.
- **Appendix A21** Higher Level Stewardship Target Area Statements.
- **Appendix A22** Glossary.

1.3.4 GIS datasets/database will also be provided as part of the Study outputs. A separate Executive Summary is also available.



## 2.0 CENTRAL LINCOLNSHIRE GREEN INFRASTRUCTURE AUDIT

### 2.1 General

2.1.1 This section provides an audit of the environmental and cultural assets, and social and economic influences, that are considered to be a key influence in defining the existing network of strategic greenspaces in Central Lincolnshire. The scope of the audit includes:

- Ecosystem Services;
- Biodiversity;
- Landscape and Townscape Character;
- Historic Environment;
- Access and Recreation;
- Strategic Greenspace;
- Existing GI Initiatives;
- Social and Economic Character; and
- Growth Areas – Issues and Options.

2.1.2 The audit draws on datasets and information available at the time of the Study and may not be exhaustive. The mapping should therefore not be used to inform detailed GI work without validation to check the accuracy at the local level.

### 2.2 Ecosystem Services

Key Sources of Information
Datasets as listed in <b>Appendix A1</b>
Adapting through Natural Interventions (2010, AECOM for Climate East Midlands)
Adapting to Climate Change, Future World Images, Defra <a href="http://www.defra.gov.uk/adaptation">http://www.defra.gov.uk/adaptation</a>
Central Lincolnshire Core Strategy Issues and Options Consultation Document (October 2010, CLJSPC)
Central Lincolnshire Water Cycle Study Detailed Strategy (2010, City of Lincoln, West Lindsey District Council and North Kesteven District Council)
Delivering a Sustainable Future for Central Lincolnshire: Portrait of Place (April 2011, AECOM)
East Midlands Environmental Evidence Base (June 2010, Chris Blandford Associates for The East Midlands Defra Network)
East Midlands Regional Flood Risk Appraisal (Consultation Report) (2009, AECOM Report prepared for and on behalf of the East Midlands Regional Assembly)
Flood Risk Management (date unknown, D. Hickman, and LCC) <a href="http://www.climate-em.org.uk/images/uploads/Climate_Change_Flooding.pdf">http://www.climate-em.org.uk/images/uploads/Climate_Change_Flooding.pdf</a>
Gainsborough Water Cycle Study Detailed Strategy (2010, AECOM for West Lindsey District Council)
Grimsby and Ancholme Catchment Flood Management Plan (2009, Environment Agency)
Lincoln Integrated Urban Drainage Pilot SLD2309 Final Report (2008, F. Maunsell)
Lincoln Policy Area Strategic Flood Risk Assessment (2010, JBA Consulting)
North Kesteven Strategic Flood Risk Assessment (2008 Revision, North Kesteven District Council)
Public Service Agreement 28: Secure a healthy natural environment for today and the future,

Key Sources of Information
(2007, HMSO HM Treasury)
River Trent Catchment Flood Management Plan, Summary Report (2010, Environment Agency)
River Witham Catchment Abstraction Management Strategy (2004, Environment Agency)
River Witham Catchment Flood Management Plan (2009, Environment Agency)
The Trent Corridor Catchment Abstraction Management Strategy (2003, Environment Agency)
The UK National Ecosystem Assessment: Understanding Nature's Value to Society (2011, UK NEA)
West Lindsey Strategic Flood Risk Assessment (July 2009, West Lindsey District Council)

2.2.1 Natural ecosystems provide a range of benefits in terms of resources or processes, known collectively as 'Ecosystem Services'. Examples of ecosystem services include:

- **Provisioning** - such as food and energy crops
- **Regulating** – such as flood control, water purification, air quality maintenance, countering the urban 'heat island' effect, and pollination;
- **Cultural** – non-material benefits that people obtain from the natural environment; and
- **Supporting** – services necessary for the production of all other ecosystem services, such as nutrient recycling and soil formation.

2.2.2 The UK National Ecosystem Assessment: Understanding Nature's Value to Society<sup>4</sup> highlights the importance of Ecosystem Services within the UK:

*'The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being. Ecosystems and the services they deliver underpin our very existence. We depend on them to produce our food, regulate water supplies and climate, and breakdown waste products. We also value them in less obvious ways: contact with nature gives pleasure, provides recreation and is known to have a positive impact on long-term health and happiness'.*

*'Ecosystems and ecosystem services, and the ways people benefit from them, have changed markedly in the past 60 years, driven by changes in society. During the second half of the 20th Century, the UK's population grew by roughly a quarter to nearly 62 million, living standards greatly increased and technological developments and globalisation had major effects on behaviour and consumption patterns. The production of food from agriculture increased dramatically, but many other ecosystem services, particularly those related to air, water and soil quality, declined. The UK's ecosystems are currently delivering some services well, but others are still in long-term decline. Reductions in ecosystem services are associated with declines in habitat extent or condition and changes in biodiversity, although the exact relationship between biodiversity and the ecosystem services it underpins is still incompletely understood'.*

2.2.3 The following elements/functions contribute to the Ecosystem Services aspects of the GI network for Central Lincolnshire.

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<sup>4</sup> Synthesis of Key Findings (June 2011)

## Food Production

- 2.2.4 Agriculture plays an important role in the economy and to food security. Central Lincolnshire, and more widely Lincolnshire and the East Midlands, are amongst the most agriculturally productive areas of the country. The National Farmers' Union states that<sup>5</sup>:

*'Lincolnshire is considered to be one of the premier food producing counties of England. It produces more than 40% of the daffodils (both cut flowers and bulbs) in the country; nearly 30% of the field vegetable crop of England and it is the second largest potato producing area. Lincolnshire's half a million hectares also support livestock, arable, dairying and outdoor pig production as well as an enormous number of poultry.'*

- 2.2.5 As set out in **Table 2.2a** below, Central Lincolnshire contains approximately one third of cereal, pig/poultry and lowland cattle and sheep farms within the County. Lincolnshire County contains a relatively high percentage of general crops, cereals and horticulture farms in comparison to England as a whole, reflecting the high agricultural potential of the land within the Study Area.

- 2.2.6 As noted in 'Delivering a Sustainable Future for Central Lincolnshire'<sup>6</sup>:

*'Communities in Central Lincolnshire are closely linked socially and economically to the agricultural industry. Farmers' markets and farm shops are common place, and people in rural places particularly benefit from fresh and local food sources. Websites, such as [www.landshare.net](http://www.landshare.net) aim to connect food growers with people who have spare land capacity. They also provide a forum to connect local growers with customers who are looking to purchase locally grown food. Results for Central Lincolnshire suggest there is significant interest within the community, with local people, particularly around more urban areas seeking land to grow their own food.'*

- 2.2.7 Natural England's Technical Information Note on the Agricultural Land Classification (ALC)<sup>7</sup> states that:

*'Land quality varies from place to place. The ALC provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. It helps underpin the principles of sustainable development. The ALC system classifies land into five grades, with Grade 3 subdivided into Subgrades 3a and 3b. **The best and most versatile land is defined as Grades 1, 2 and 3a** by policy guidance (see PPS7). This is the land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals.'*

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<sup>5</sup> <http://www.nfuonline.com/regions/east-midlands/>

<sup>6</sup> Delivering a Sustainable Future for Central Lincolnshire: Portrait of Place (April 2011, AECOM)

<sup>7</sup> Natural England Technical Information Note TIN049 - Agricultural Land Classification: protecting the best and most versatile agricultural land (2009, Natural England)

2.2.8 **Figure 2.1a** illustrates land quality across Central Lincolnshire (Grades 1-5 of the ALC). It is important to note that it does not show the subdivision of Grade 3 land into Grade 3a and 3b<sup>8</sup>, as this information is not available consistently across the Study Area (see **Appendix A6** for further details)<sup>9</sup>. 92% of the Study Area falls within ALC grades 1-3 (Grade 1: 1.2%; Grade 2: 28.7%; and Grade 3: 62.9%). The percentage total of ALC Grades within each District is set out within **Table 2.2b** below.

**Table 2.2a: Comparison of Farm Types within Central Lincolnshire (excluding Lincoln City), Lincolnshire County, the East Midlands Region and England<sup>10</sup>**

	Cereals	General Crops	Horticulture	Pigs & Poultry	Dairy <sup>11</sup>	Lowland Grazing (cattle & Sheep)	Mixed
<b>% of Farm Type within each District compared to Lincolnshire County</b>							
North Kesteven	17.2%	12.5%	4.4%	14.4%	0%	14.6%	9.13%
West Lindsey	19.6%	9.8%	8.8%	20%	12.4%	21.4%	24.3%
Central Lincolnshire (excluding Lincoln City)	<b>36.8%</b>	<b>22.3%</b>	<b>13.3%</b>	<b>34.4%</b>	<b>12.4%</b>	<b>36%</b>	<b>33.5%</b>
<b>% of Farm Type within Lincolnshire County compared to East Midlands Region</b>							
	42.4%	76%	63%	39%	6.4%	13.1%	23.5%
<b>% of Farm Type within Lincolnshire County compared to England as a whole</b>							
	7.9%	14.5%	6.3%	3.6%	0.4%	1.13%	2.7%

**Table 2.2b: Percentage of ALC Grades within each District**

	City of Lincoln	West Lindsey	North Kesteven
<b>Grade 1</b>	0%	0.6%	0.6%
<b>Grade 2</b>	0.1%	11.4%	17.3%
<b>Grade 3</b>	0.4%	39%	23.7%
<b>Grade 4</b>	0%	1.2%	0.5%
<b>Non Agricultural</b>	0.4%	2.3%	0.5%
<b>Urban</b>	0.9%	0.3%	0.4%

2.2.9 The most versatile (Grade 1) agricultural land occurs in two relatively small areas, to the northwest of Gainsborough; and southeast of Sleaford (associated with the wider Fenland landscapes). Grade 2 agricultural land within the Study Area broadly follows the Limestone Scarps and Dipslopes which run north-south across the Study Area, to the north and south of Lincoln. Fen and Marsh Farmlands and the margins of the Fens to the south-east of Lincoln are also classified as Grade 2 agricultural land. The remainder of the Study Area is classified as

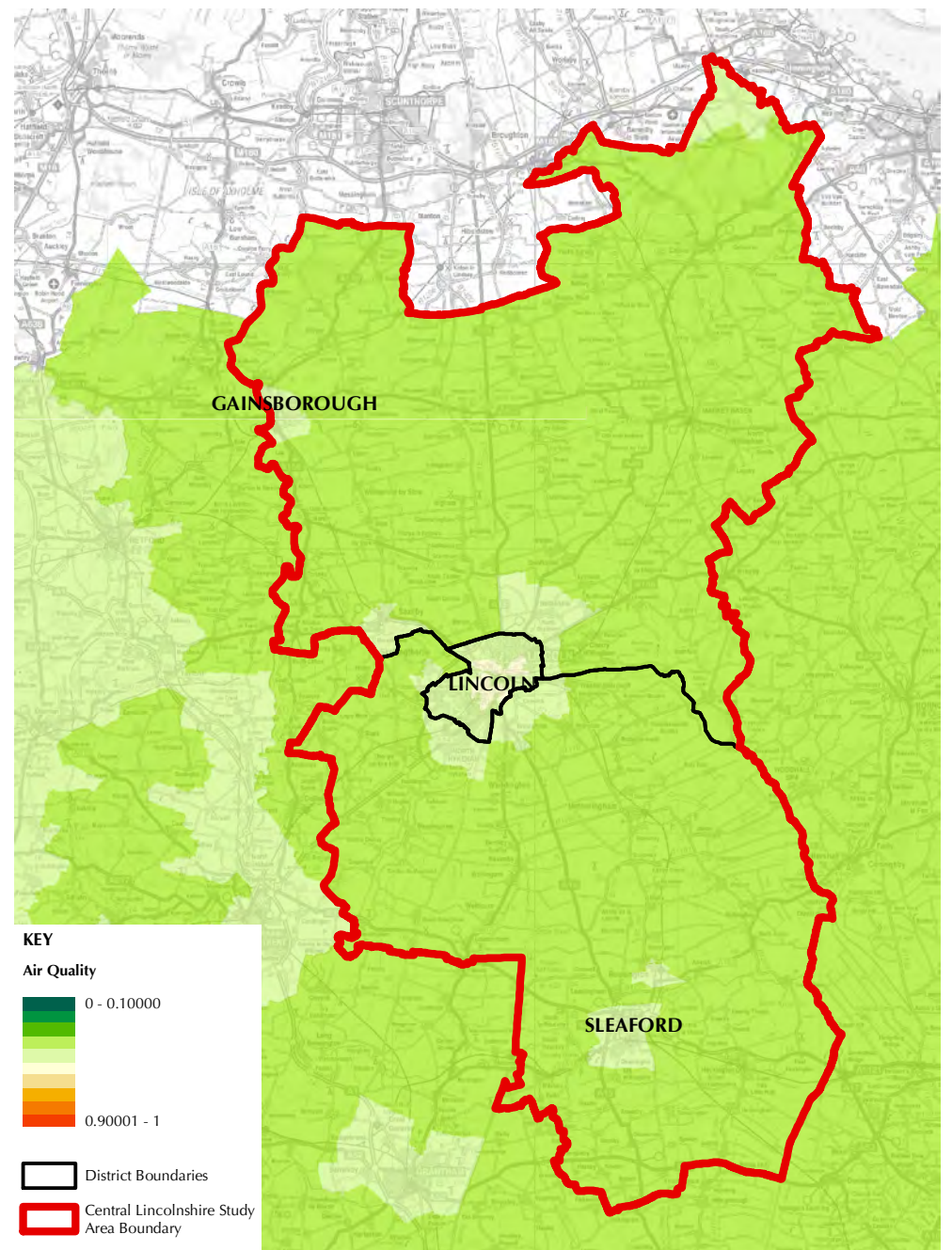
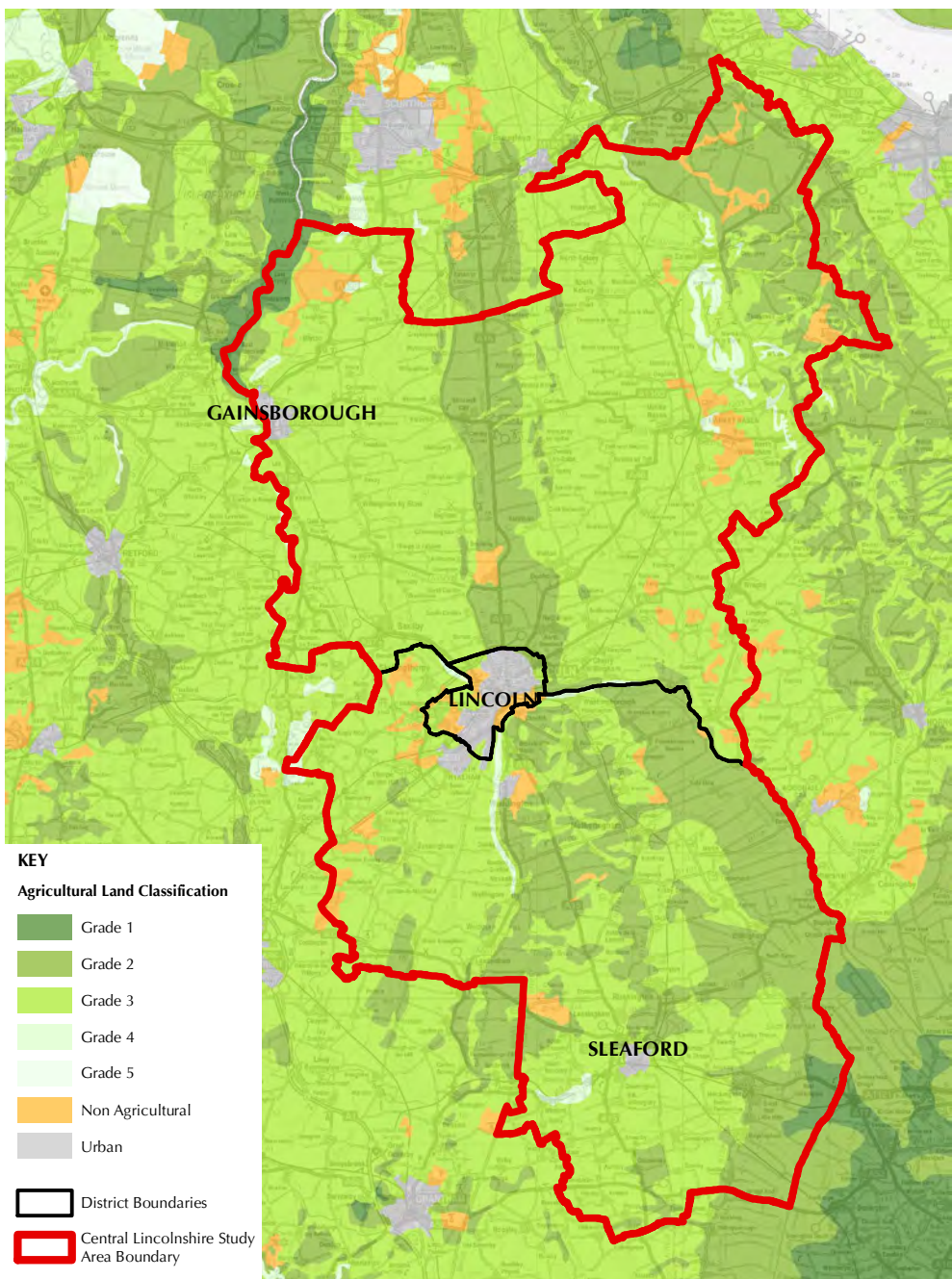
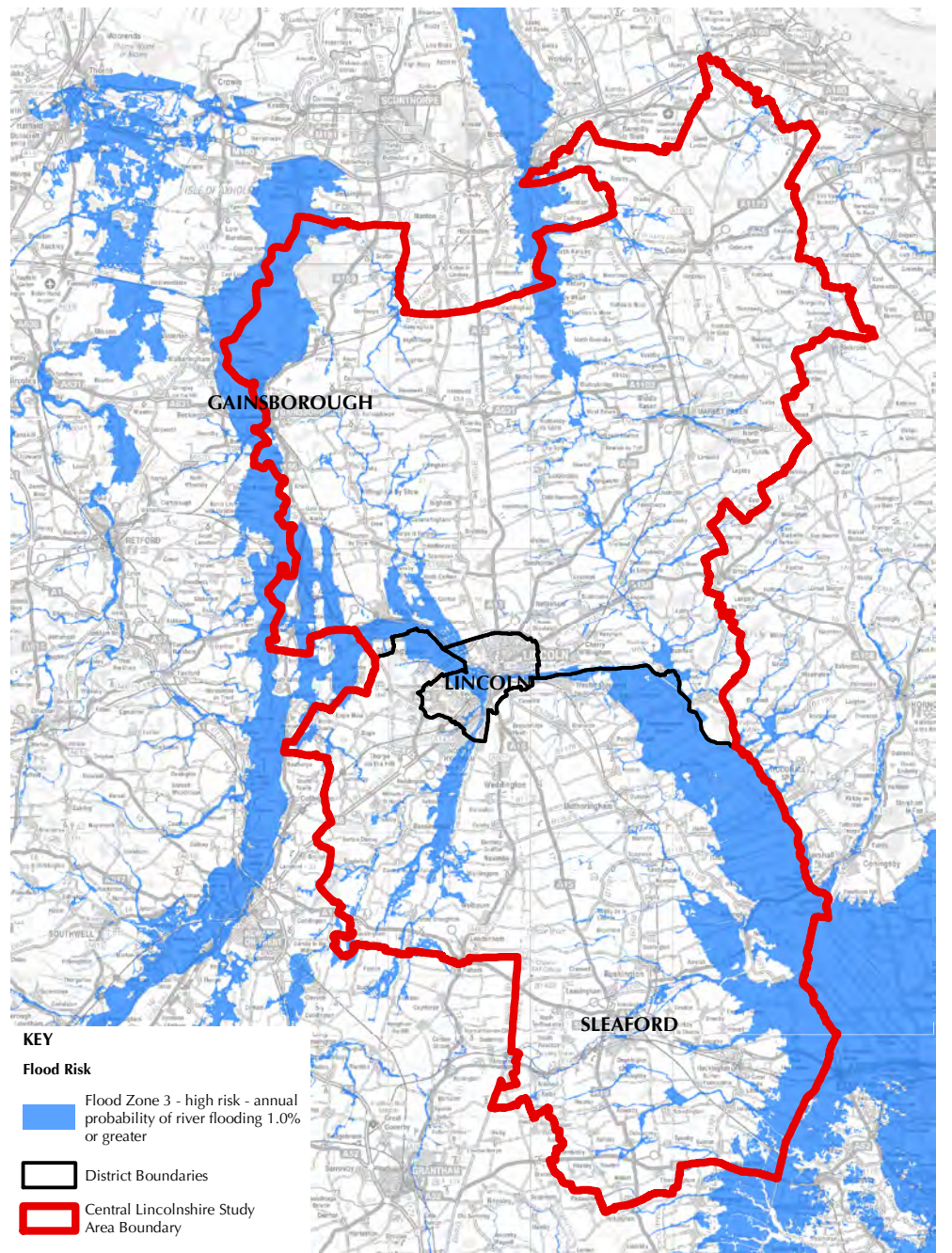
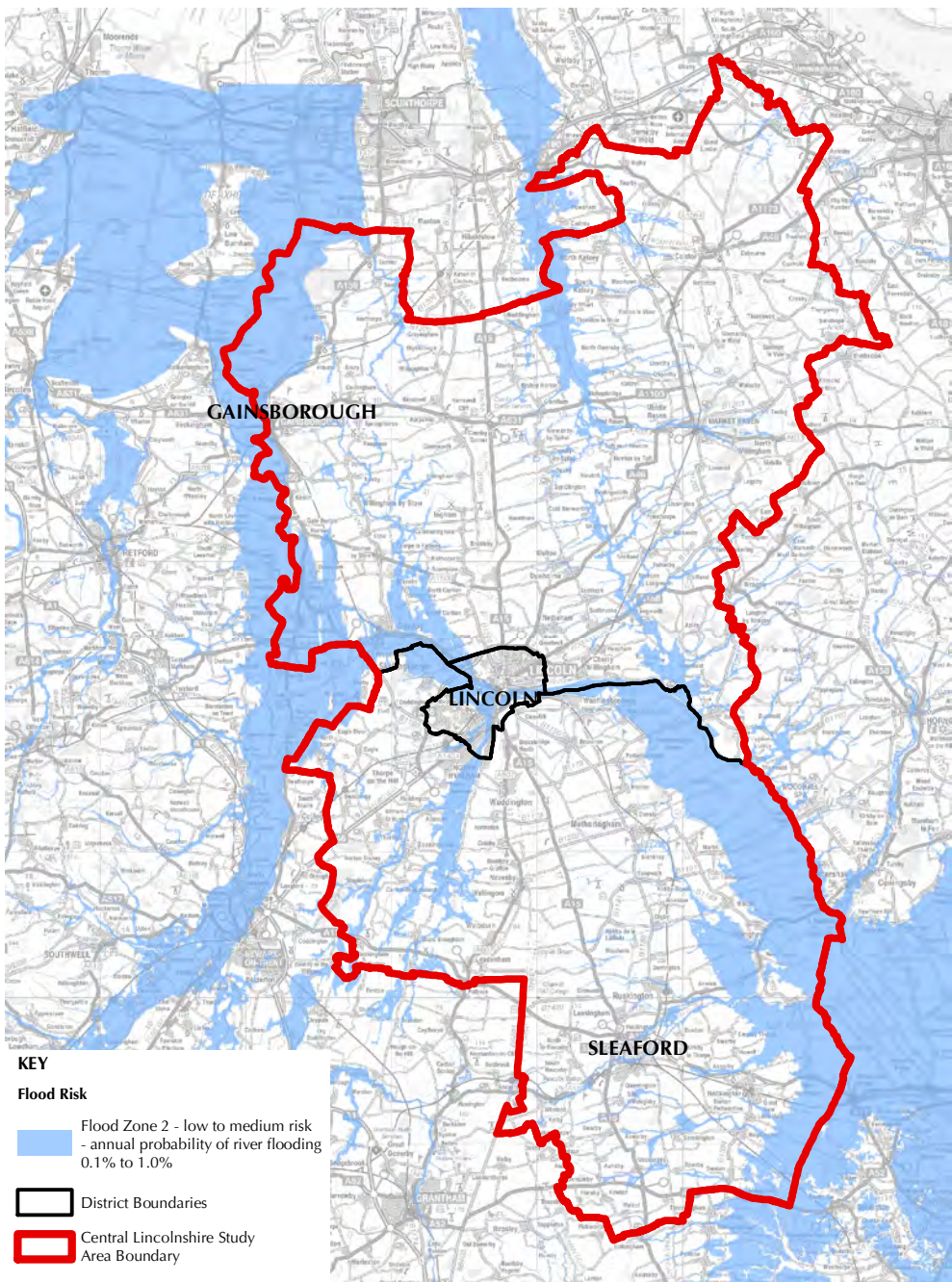
<sup>8</sup> Guidelines introduced in 1988 with improved criteria for climatic limitations and climate-soil interactions adopted two subgrades for Grade 3: Grade 3a and 3b. However, in some parts of the country, including Central Lincolnshire, only very small percentages of the land have been surveyed under the modern Post-1988 criteria

<sup>9</sup> Grade 3b should not be allowed to enter the 'best' figure and calculations derived it

<sup>10</sup> Information from DEFRA June Survey of Agriculture and Horticulture - Local Authority level crop areas/livestock numbers/labour force: 2007 (latest available) <http://www.defra.gov.uk/statistics/foodfarm/landusellivestock/junesurvey/junesurveyresults/>

<sup>11</sup> The NFU advise that dairying has almost left the county and would only return if large units were permitted as these are the only viable dairy unit





This Figure represents relevant available information provided by stakeholders at the time of the Study, and may not be exhaustive. The accuracy of digital datasets received, which have been used in good faith without modification or enhancement, cannot be guaranteed.

0 5 10 km



predominantly Grade 3 agricultural land, with small, scattered pockets of non-agricultural and Grades 4 and 5 agricultural land.

- 2.2.10 The Gainsborough Area encompasses predominantly Grade 3 agricultural land (8357.1ha), with a cluster of Grade 1 and 2 agricultural land to the northwest of Gainsborough (708.5ha) and narrow belts of Grade 4 agricultural land (146.5ha) within the fringes of the town (see **Figure 2.1b**).
- 2.2.11 The western half of the Lincoln Area is classified as predominantly Grade 3 agricultural land (38.255.8ha<sup>12</sup>); interspersed with pockets of Grade 2 agricultural land, non-agricultural land and belts of Grade 4 agricultural land (see **Figure 2.1c**). To the north of Lincoln, a relatively wide belt of Grade 2 agricultural land roughly follows the Limestone Scarps and Dipslopes, encompassing Nettleham and Dunholme. The south-eastern part of the Lincoln Area encompasses a mottled patchwork of predominantly Grade 2 agricultural land (including the Fenland landscapes), interspersed with Grade 3 and non-agricultural land.
- 2.2.12 The Sleaford Area is predominantly covered by Grade 3 agricultural land (16555.8ha), with pockets of Grade 2 agricultural land (8.6ha) to the north and southeast of the town (see **Figure 2.1d**).
- 2.2.13 The relatively intensive nature of the agriculture within the area can have a number of negative impacts on the natural environment. With the aim of reducing these impacts the government has, for a number of years, operated agri-environment schemes (such as Countryside Stewardship and Environmental Stewardship) that provide incentives for the implementation of sensitive farming methods.
- 2.2.14 In addition to agriculture, allotments, community gardens, urban farms and traditional orchards represent an important means of local food production (see **Table 2.2c**). *‘Lincoln City provides and manages over 900 allotment plots covering 19 sites, and has three active allotment associations that help to operate and manage the allotments. Demand for allotments in the area is significant and residents often need to join a waiting list for a long period of time<sup>13</sup>’*. These sites form an important component of the GI network (see **Section 2.7**).
- 2.2.15 Demand for locally produced food is relatively high<sup>14</sup>, with a number of markets being held locally, including a traditional market held in Gainsborough every Tuesday and Saturday/now at Marshall's Yard every second Saturday (hosting a ‘meet the local farmers and producers

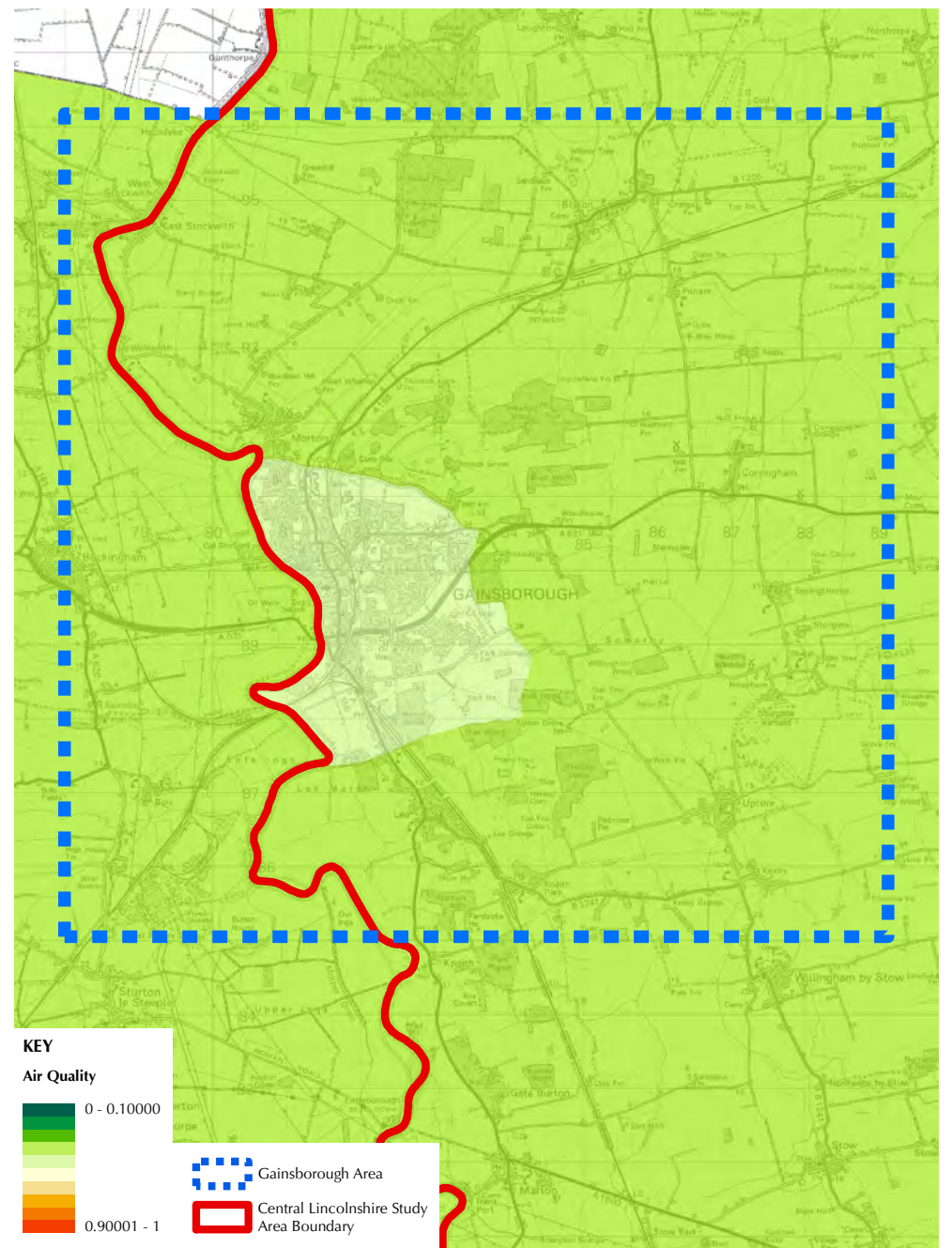
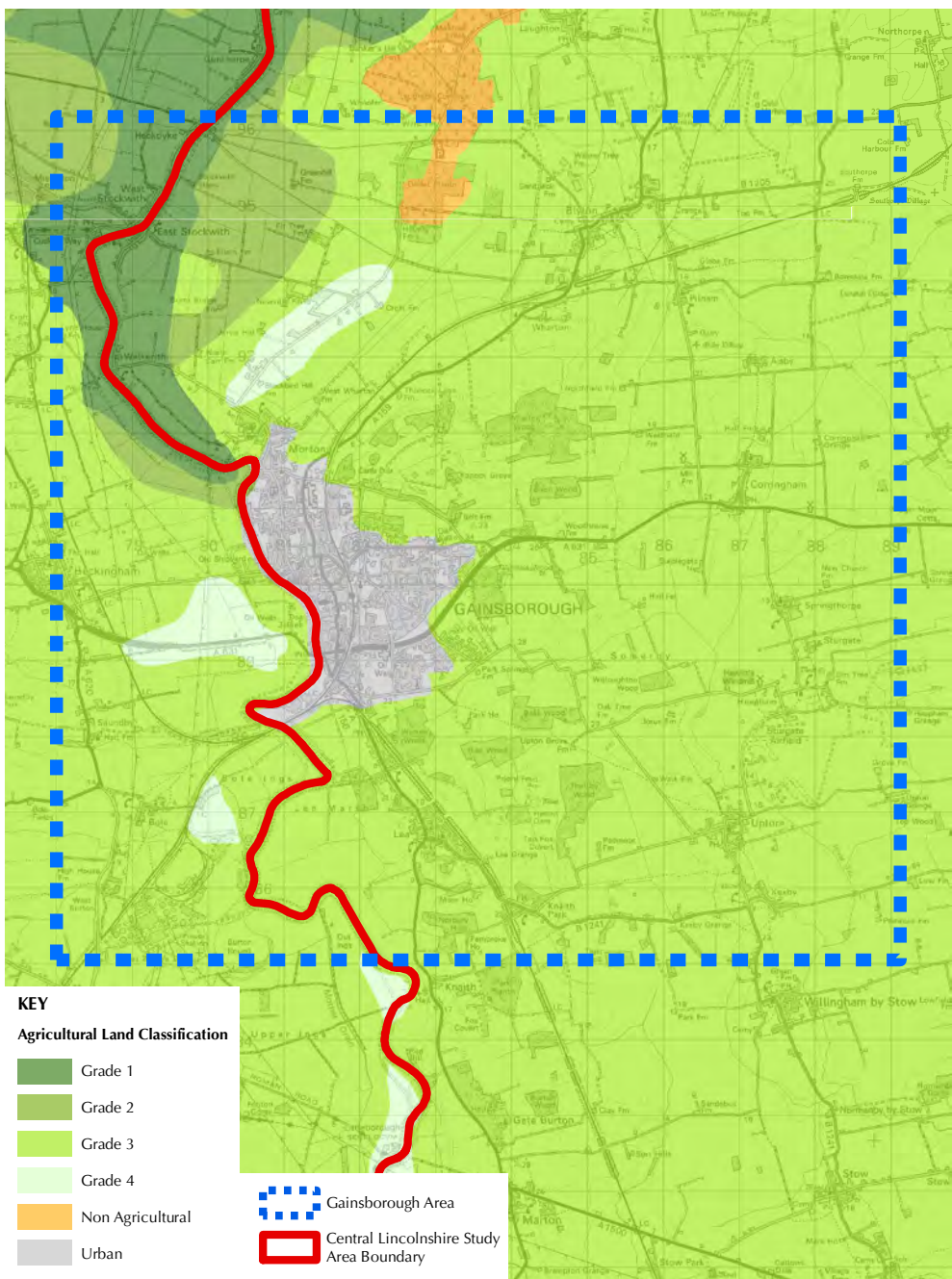
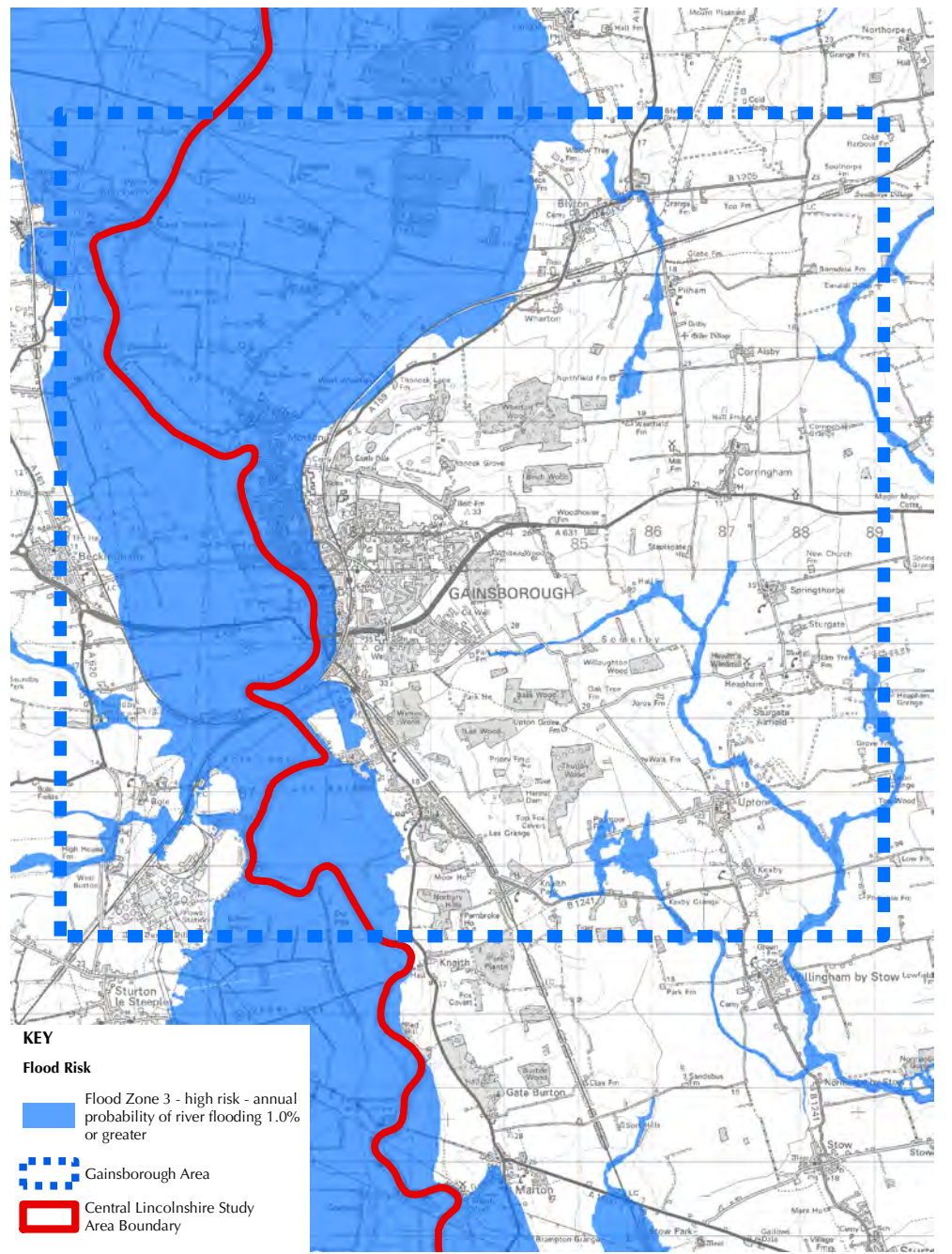
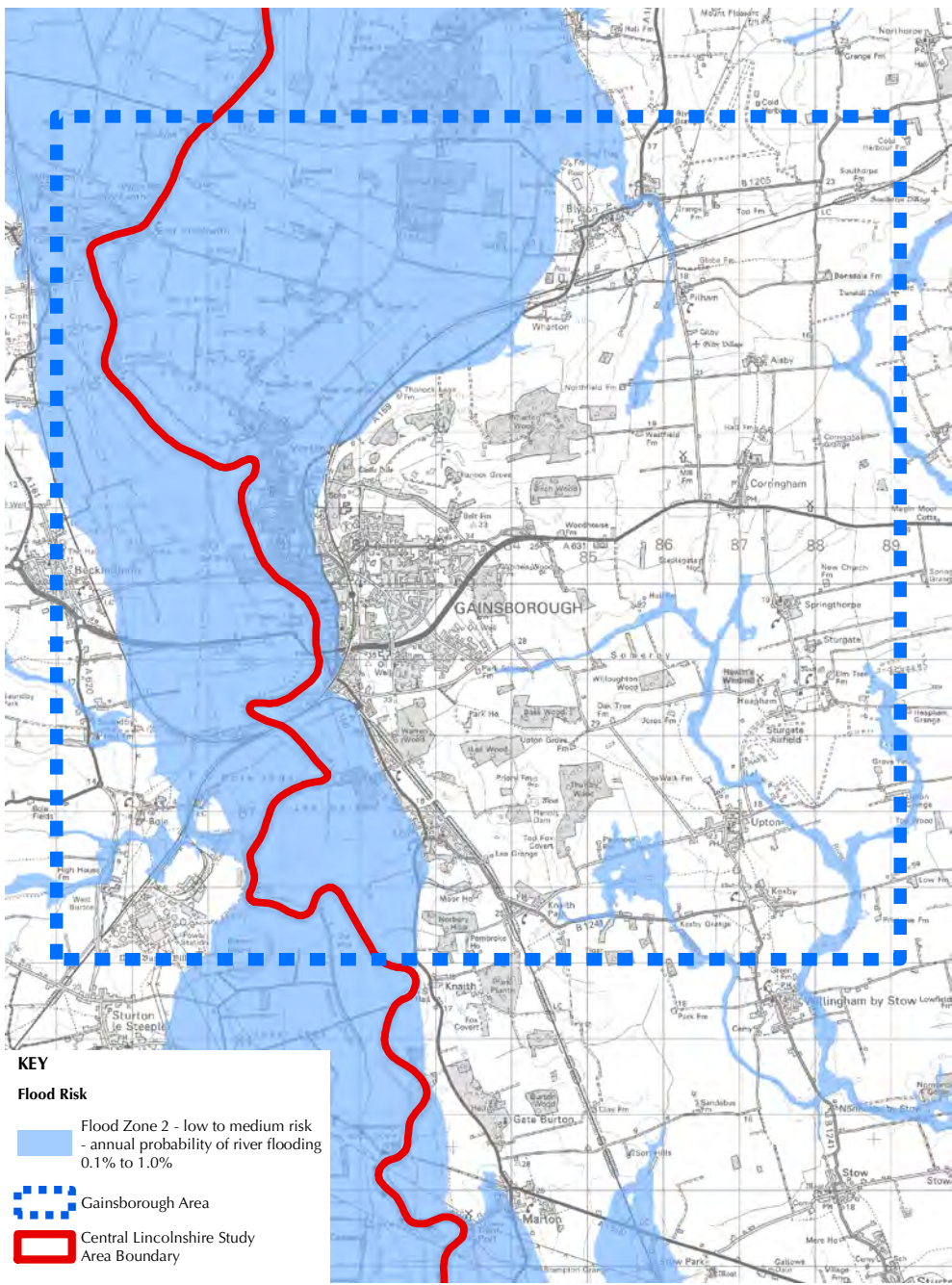
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<sup>12</sup> Within the growth area as a whole

<sup>13</sup> Delivering a Sustainable Future for Central Lincolnshire: Portrait of Place (April 2011, AECOM)

<sup>14</sup> Delivering a Sustainable Future for Central Lincolnshire: Portrait of Place (April 2011, AECOM)

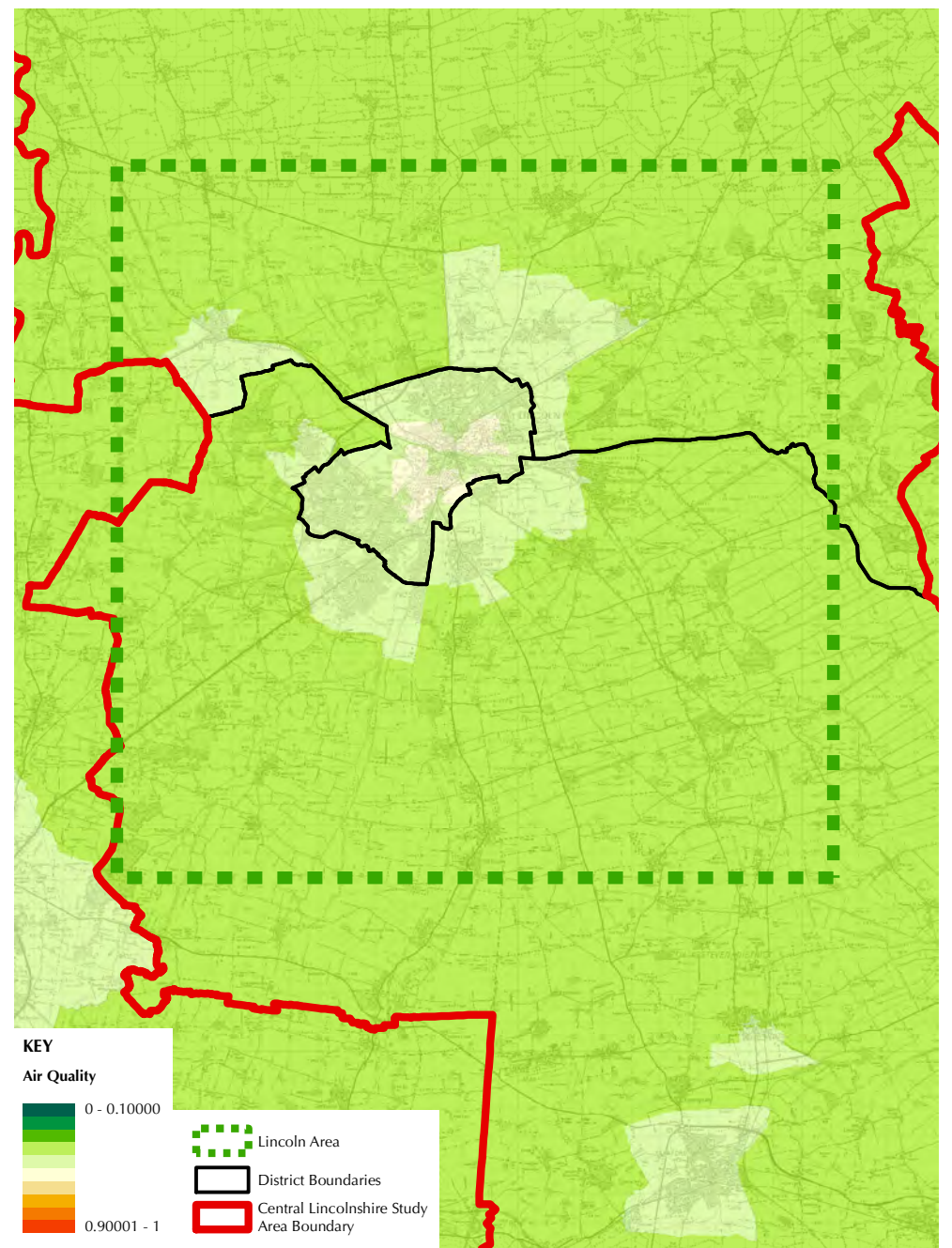
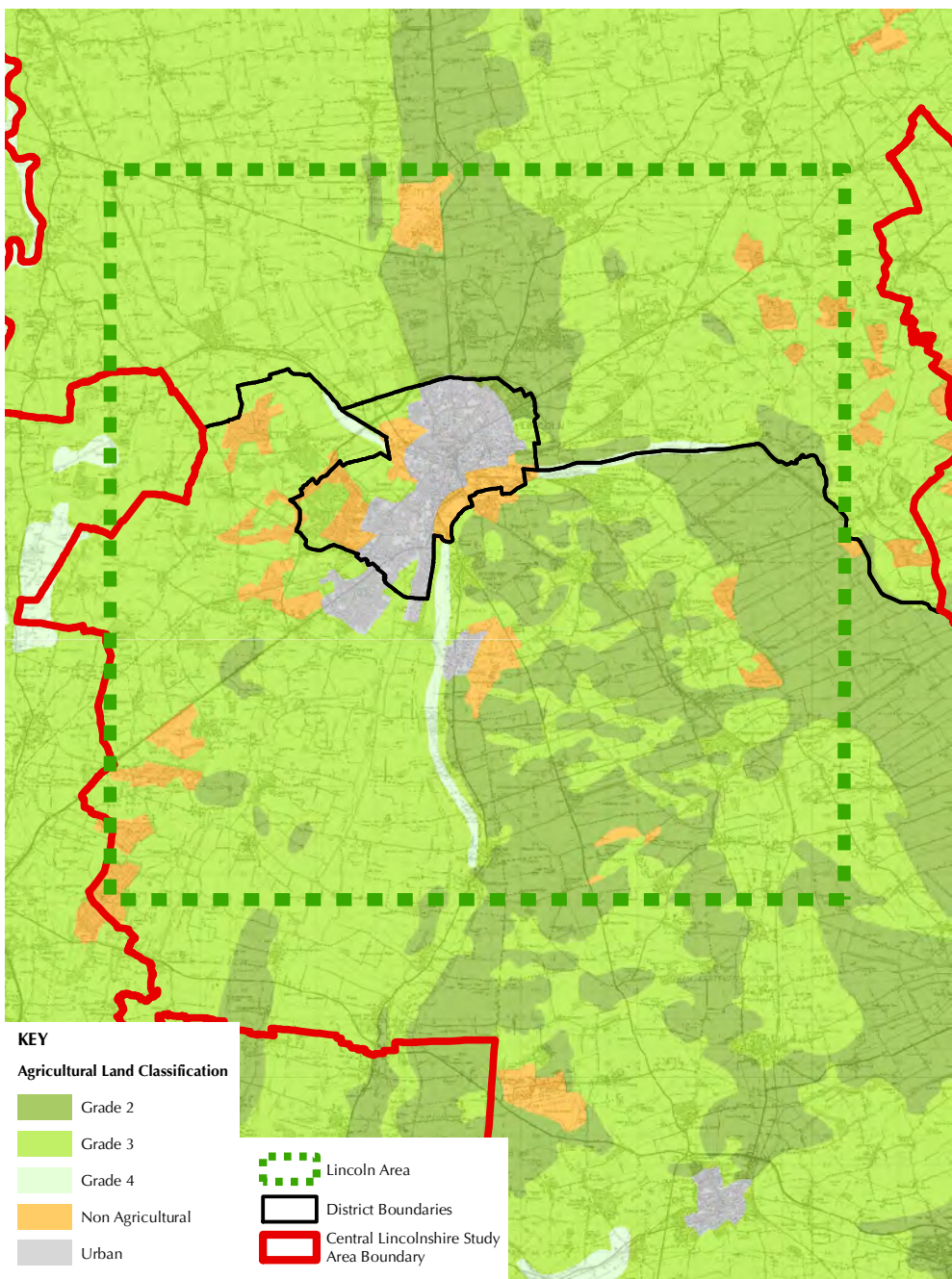
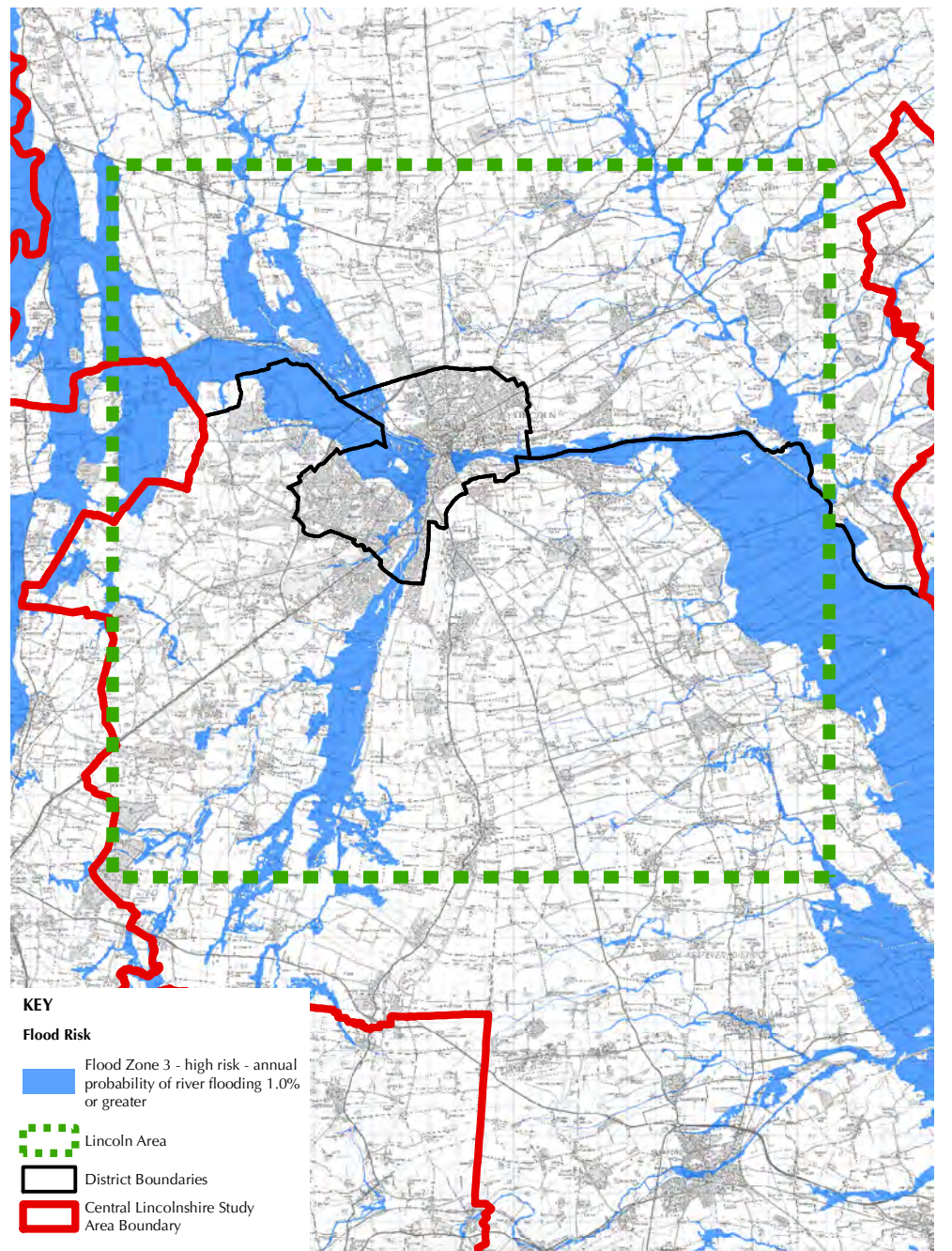
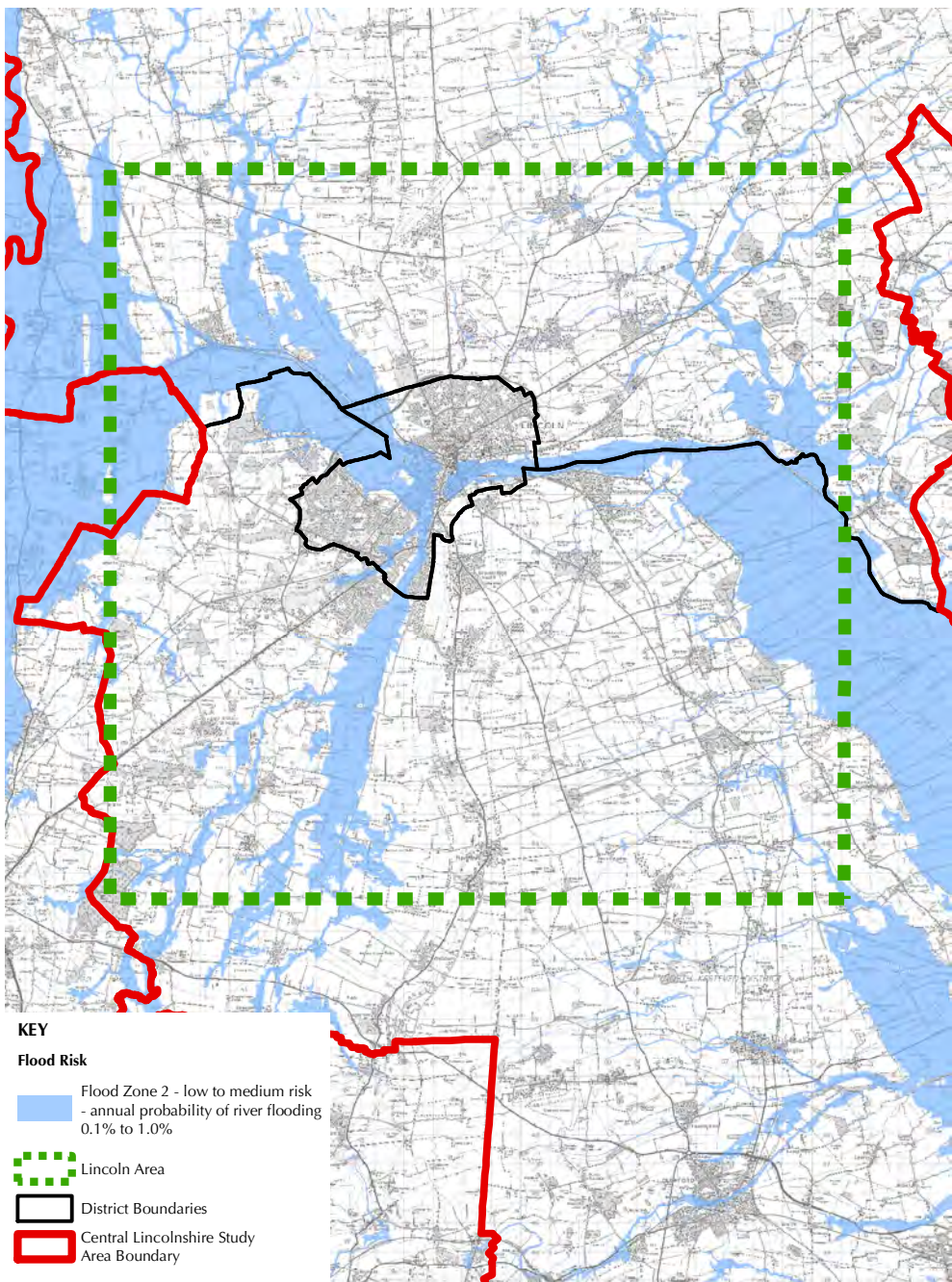




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0 1 2 km

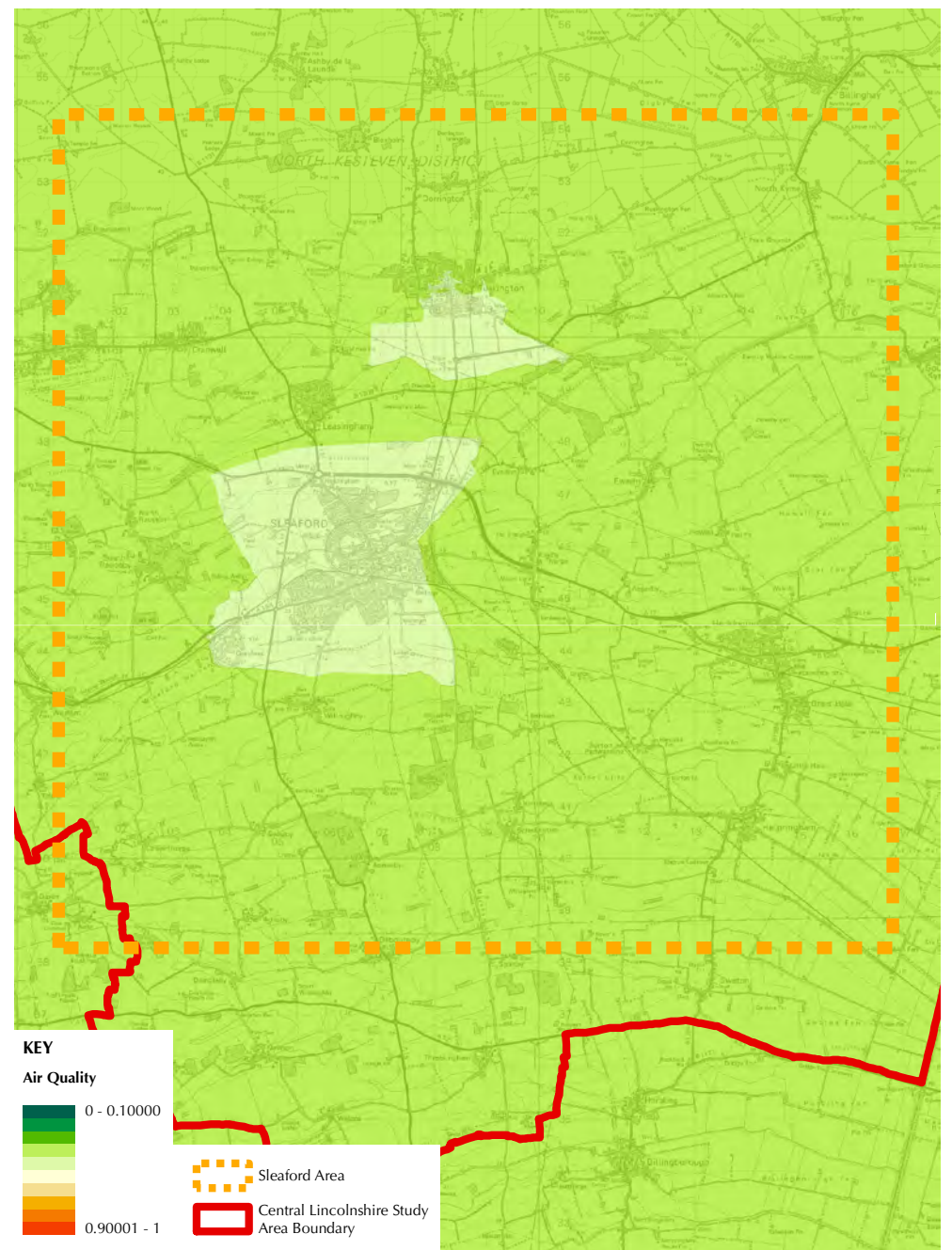
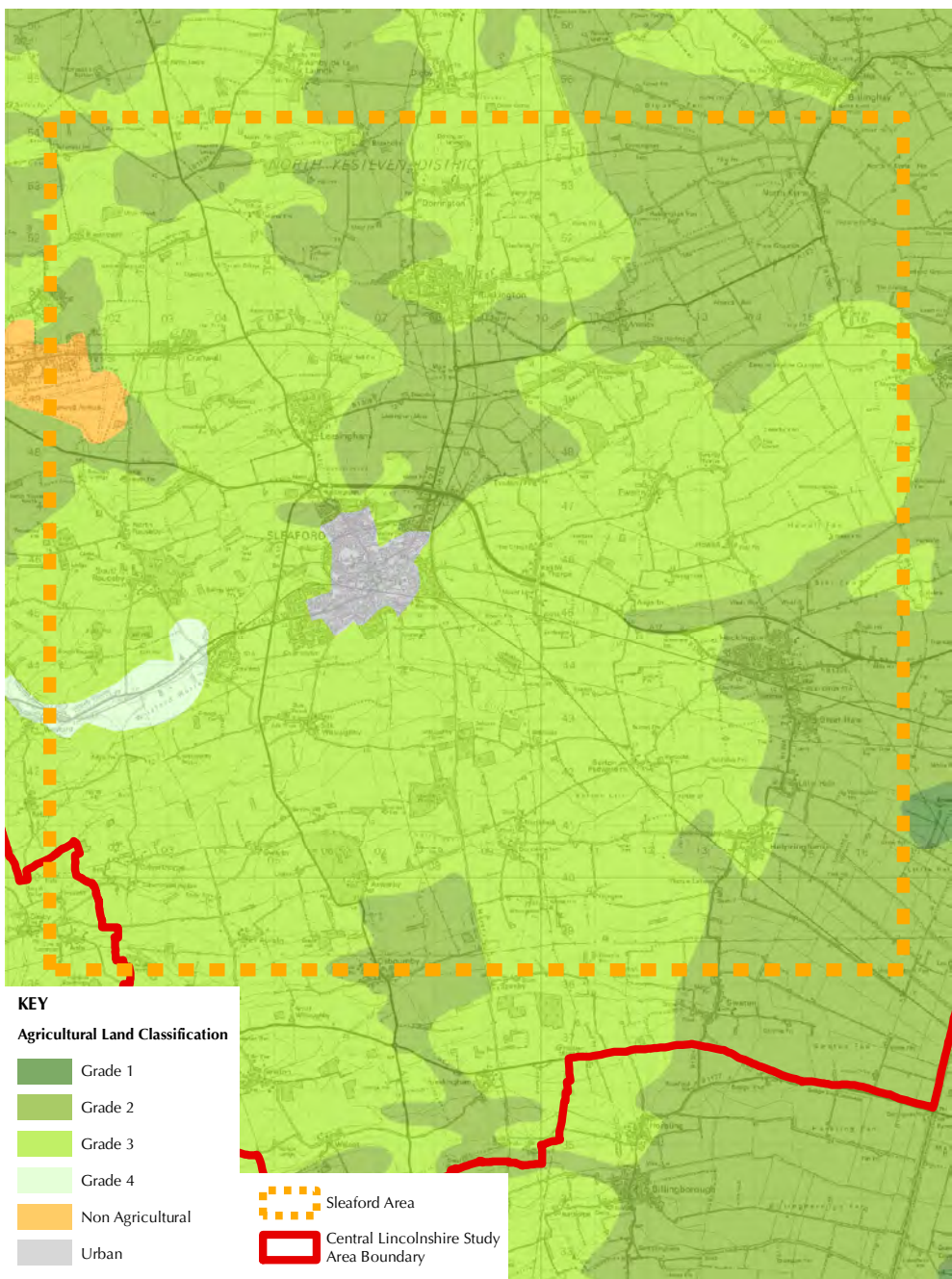
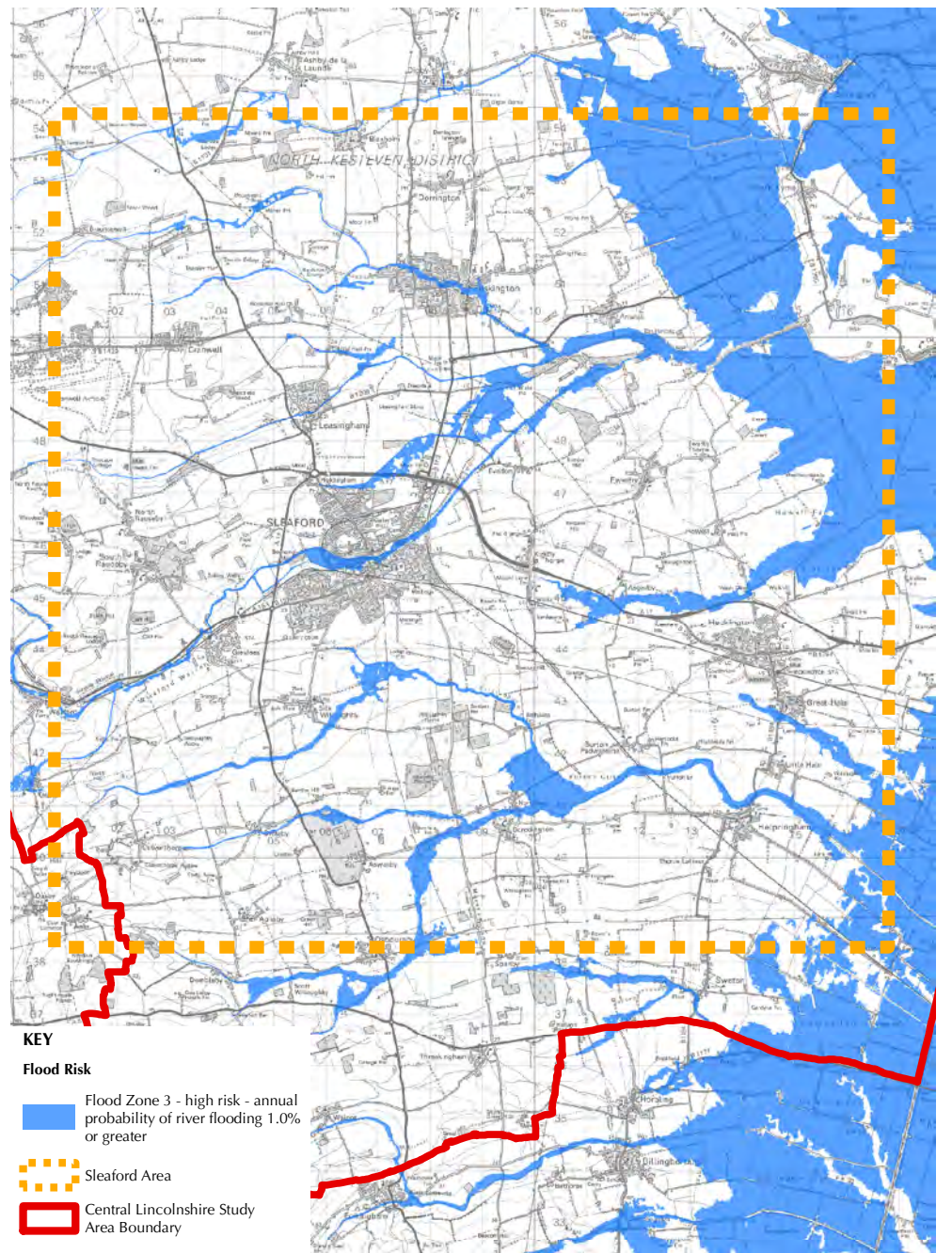
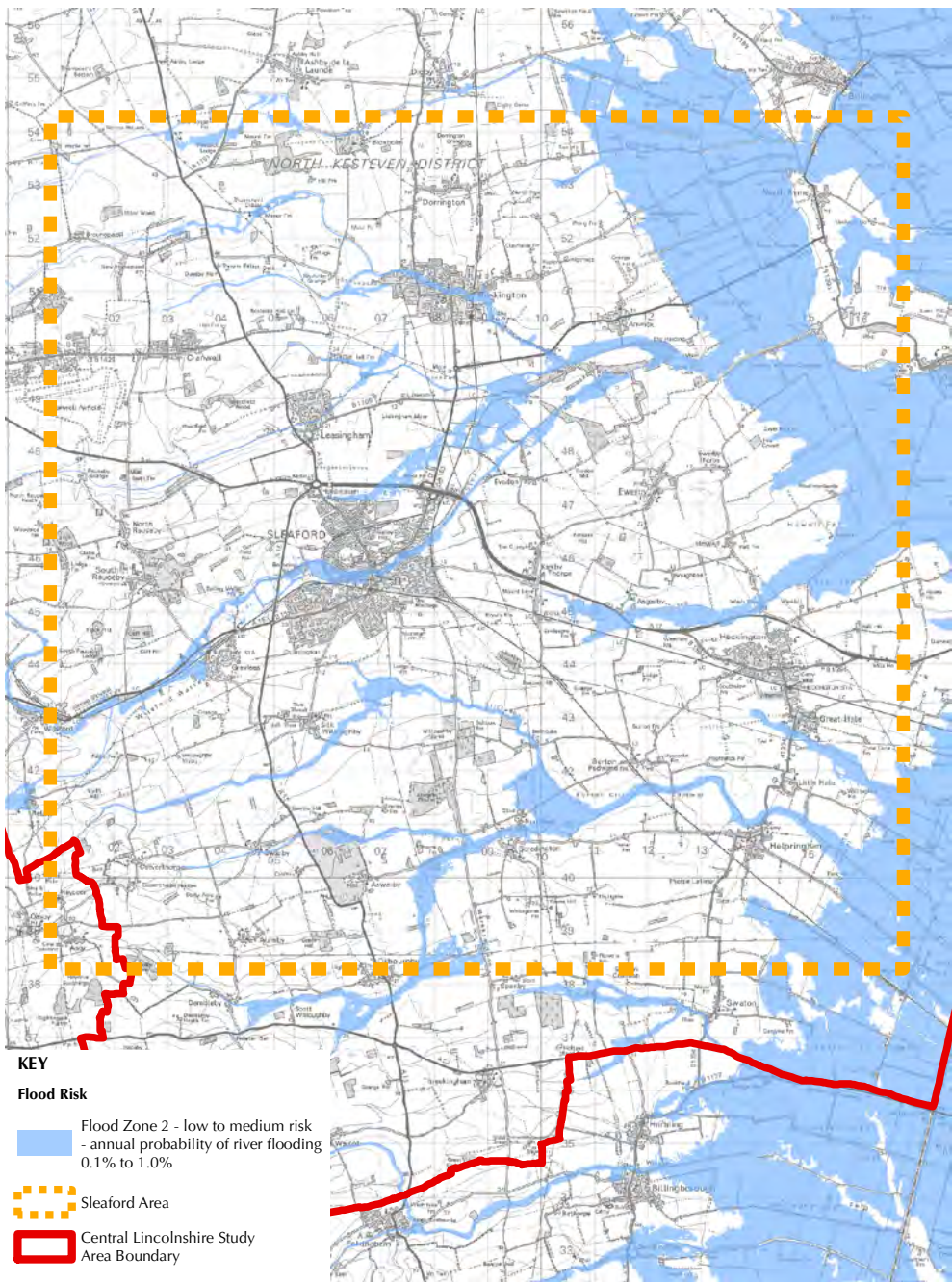




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0 2 4 km





This Figure represents relevant available information provided by stakeholders at the time of the Study, and may not be exhaustive. The accuracy of digital datasets received, which have been used in good faith without modification or enhancement, cannot be guaranteed.

0 1 2 km



event'), Sleaford markets on Mondays, Fridays and Saturdays, with a Farmers' Market on the first Saturday of every month; the Regional Food Fair at St Marks, Lincoln, which is held the first Saturday of every month and the Lincoln Farmers' Market which is held the first Friday of every month.

2.2.16 Examples of traditional orchards within the Study Area include:

- **Lincolnshire Life Museum Orchard** - the museum has a recently planted an orchard containing a collection of Lincolnshire varieties;
- **Cross O'Cliff Orchard Local Nature Reserve**, on the edge of Lincoln, is an old standard orchard thought to be 150 years old. Once part of the grounds of a house, the orchard was adopted as a Local Nature Reserve in the 1990s and is managed by the County Council and local residents. The fruit is collected and used by local residents; and
- **Hill Holt Wood**, at Norton Disney, is a 5.6ha woodland run as a social enterprise with a small orchard. Management of the wood is controlled by a board of voluntary directors representing local communities, local councils and businesses. Although it is a small wood, a large number of people are employed through income generated by vocational training given to excluded, at risk or unemployed young people.

**Table 2.2c: Area of allotments, community gardens, urban farms and traditional orchards within Central Lincolnshire and Districts**

	Study Area	Gainsborough Area	Lincoln Area	Sleaford Area
<b>Traditional Orchards</b>	46.55 ha	6.22 ha	11.46 ha	6.38 ha
<b>Allotments, community gardens &amp; urban farms</b>	79 ha	19 ha	46 ha	10 ha

## Flood Risk

2.2.17 The Rivers Trent, Witham (Upper and Lower) and Ancholme are the dominant fluvial systems within Central Lincolnshire (see **Figure 1.1 and 2.4a**) with the Fosdyke Canal connecting the River Trent (at Torksey) to the River Witham (in the centre of Lincoln); and the River Slea, which rises near West Willoughby, connecting Sleaford to the River Witham (at Chapel Hill). The River Trent enters Central Lincolnshire near North Clifton and meanders northwards following the Study Area's western boundary. The River Ancholme, which rises south of Bishopbridge (in Central Lincolnshire), flows north towards Brandy Wharf where it leaves the Study Area. The Upper Witham crosses into Central Lincolnshire close to Barnby-in-the-Willows and flows north into Lincoln's Brayford Pool. There, it changes to the Lower Witham, which flows east out of Lincoln and subsequently south-east, leaving the Study Area at Chapel Hill.

2.2.18 In addition to the main rivers, there are numerous secondary rivers tributaries and streams which provide an interconnected network across the Study Area (see **Figure 1.1**)

- 2.2.19 Appropriately managed GI habitats in undeveloped floodplain can store flood water, which can help to protect adjoining urban areas from flooding. For example, the potential for upstream flood storage to reduce costs associated with other flood risk management strategies is identified in the Environment Agency's River Witham Catchment Flood Management Plan<sup>15</sup>. The productive functioning of waterways can also have a substantial impact on the health of ecosystems as a whole<sup>16</sup>.
- 2.2.20 In addition, land use and land cover also significantly affect factors such as interception of rainfall by vegetation, evaporation levels and surface permeability. These have significant effects on the rate of discharge within watercourses, i.e. the rate at which water moves through a catchment. For example, woodland tends to intercept and transpire relatively large quantities of rainfall/water due to the greater surface area of its foliage than other vegetation of un-vegetated areas. Through their effect on the discharge rate all these factors can significantly influence flood risk.
- 2.2.21 **Figure 2.1a** illustrates the extent of flood risk zones within the Study Area. Flood risk zones 3 (high risk – annual probability of river flooding 1.0% or greater<sup>17</sup>) and 2 (low to medium risk – annual probability of river flooding 0.1% to 1.0%<sup>18</sup>) are shown. The extent of flood risk zones 3 and 2 is very similar, with localised variations at the edges of floodplains. The highest risk of flooding (zone 3 and subsequently zone 2) is apparent along the floodplain of the River Trent and at the point at which it joins the Fossdyke navigation to the west of the Lincoln. The floodplain of the Fossdyke navigation also falls within these flood risk zones, including the network of tributaries which feed in from the north.
- 2.2.22 The floodplain of the River Ancholme also falls within zones 3 and 2. Similarly, the floodplain of the River Witham, both to the southwest of Lincoln (Upper Witham) and in the southeast (Lower Witham) of the Study Area (where it is wide in nature, encompassing the associated fenland landscapes) is classified as flood risk zones 3 and 2. The River Sleas, a tributary of the River Witham, and numerous other smaller tributaries rivers and streams also fall within flood risk zones 3 and 2 (see **Figure 2.1a**).
- 2.2.23 Most of the western half of the Gainsborough Area, following the floodplain of the River Trent (see **Figure 2.1b**) falls within flood risk zones 3 and 2, denoting a high or low to medium risk of flooding. Flood risk zones 3 and 2 extend across parts of the western urban edge of the town, with zone 2 also covering urban areas at the western edge of Lea to the south of Gainsborough.

<sup>15</sup> River Witham Catchment Flood Management Plan (2009, Environment Agency)

<sup>16</sup> Delivering a Sustainable Future for Central Lincolnshire: Portrait of Place (April 2011, AECOM)

<sup>17</sup> Flood Zone 3 comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of sea flooding (>0.5%) in any year

<sup>18</sup> Flood Zone 2 comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year

The floodplain of the River Till (a tributary of the Fossdyke navigation) running to the east of Upton is also classified as flood risk zones 3 and 2, denoting a high or low to medium risk of flooding.

- 2.2.24 Within the Lincoln Area, the floodplain of the River Witham is classified as flood risk zones 3 and 2, including the narrow tributaries that feed into the river and the wider floodplain of Barlings Eau which from Langworth to Low Barlings (see **Figure 2.1c**). Within this floodplain, zone 3 extends into the southern part of the City of Lincoln urban area and flood zone 2 covers much of the south-eastern edge of the urban area. To the northwest, the wide floodplain of the Fossdyke navigation, running southeast from Saxilby to Lincoln (including parts of Lincoln urban area) is classified as flood risk zones 3 and 2, denoting a high or low to medium risk of flooding. To the southwest of the city, the relatively wide floodplain of the Upper River Witham also falls within flood risk zones 3 and 2, in very close proximity to the urban edges of North Hykeham
- 2.2.25 Much of the Sleaford Area falls outside flood risk zones 3 and 2 (see **Figure 2.1d**) other than the narrow floodplains of the east-west running tributaries of the Lower River Witham, including the corridor of the River Slea which runs through Sleaford and includes parts of the urban area within the town centre.

### **Land Drainage**

- 2.2.26 There are over 230 Drainage Districts of varying sizes in England and Wales, all in low lying areas of the country where flood prevention and land drainage are sensitive issues. Most Drainage Districts are administered by an Internal Drainage Board (IDB), a single purpose local Drainage Authority that deals with the drainage of clean water only. Most IDBs today were established by National Government following the passing of the Land Drainage Act 1930. The activities and responsibilities of the Boards are controlled by this and subsequent Land Drainage Acts, and other subordinate legislation. Each Drainage District has a defined area, and the Board only has powers to deal with matters affecting that area only. The following seven IDBs fall partly/wholly within Central Lincolnshire:

- Ancholme IDB
- Black Sluice IDB
- Gainsborough IDB
- Newark IDB
- Upper Witham IDB
- Witham 1<sup>st</sup> IDB
- Witham 3<sup>rd</sup> IDB



- 2.2.27 Each IDB has duties to “exercise a general supervision over all matters relating to the drainage of land within its District”. They have permissive powers to maintain watercourses within their District and powers to construct new or improve existing works, but do not maintain every individual drain. IDBs can have their own labour force who carry out maintenance and improvement works. These works can include the operation of pumping stations, flail mowing, removing silt and obstructions, repairing slips and looking after flood defence structures<sup>19</sup>.
- 2.2.28 Liaison is maintained with Natural England and other conservation bodies, in order that all works are completed in an environmentally sensitive manner. IDBs have a statutory duty, when considering their own works and consent applications etc, to take into account potential environmental effects. Each IDB produces a Biodiversity Action Plan<sup>20</sup> to demonstrate their commitment to fulfilling their duty as a public body under the Natural Environment and Rural Communities Act 2006 to conserve biodiversity. Biodiversity Action Plans help the IDBs to maximise the biodiversity benefits from their activities and demonstrate their contribution to the Government’s UK Biodiversity Action Plan targets. Many of an IDB’s activities have benefits for biodiversity, no least its water level management and ditch maintenance work.
- 2.2.29 Planning Authorities consult with IDBs in relation to drainage matters. An IDB is a non-statutory consultee but has its own statutory powers, which may determine whether a development may proceed. In addition to the Land Drainage Act, IDBs have powers to make Byelaws to assist in controlling activities adjacent to watercourses. These Byelaws are approved by the Department for Environment, Food and Rural Affairs (DEFRA). IDBs consult with the Planning Authorities on Drainage Matters and comments are returned incorporating Engineering Advice where necessary. Many IDBs have their own labour force who carry out maintenance and improvement works. These works include operating pumping stations, flail mowing, removing silt and obstructions, piling slipping banks, and maintaining grids, culverts and other flood defence structures.

## **Water Resources**

- 2.2.30 Water resources are essential for a range of human uses, including domestic water supply and industrial and commercial uses, and water is abstracted from watercourses and groundwater (aquifers) to meet these demands. The amount of water within watercourses, in terms of

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<sup>19</sup> Information from Guidance Notes for Developers and Householders with Land next to a Ditch (Upper Witham Internal Drainage Board)

<sup>20</sup> Ancholme IDB BAP (2009) – see <http://www.shiregroup-idbs.gov.uk/Admin/Environmental/Ancholme%20IDB%20BAP%20-%20Final.pdf>; Black Sluice IDB BAP (revised June 2011) – see <http://www.blacksluiceidb.gov.uk/document/71/black-sluice-idb-bap-revised-june-2011.pdf>; Gainsborough IDB BAP (2010) – see <http://www.gidb.co.uk/pdf/GainsboroughBiodiversityActionPlan.pdf>; Newark IDB BAP (2010) – see <http://www.naidb.co.uk/uploads/file/Newark%20Area%20IDB%20Biodiversity%20Action%20Plan%202010.pdf>; Upper Witham IDB BAP (2010) – see <http://www.uwidb.co.uk/forms/bap.pdf>; Witham 1<sup>st</sup> IDB BAP (2010) – see <http://www.witham-1st-idb.co.uk/conservation.php?fs=;> and Witham 3<sup>rd</sup> IDB BAP (2010) – see <http://www.witham-3rd-idb.co.uk/conservation.php>

volume and variability of flow, is also critical to their ecological condition and the status of the species that depend on them.

- 2.2.31 As noted above, land use within catchments can have significant effects on the rate of discharge within watercourses. This affects the stability or variability of flows in a watercourse and can in turn reduce the water resource available for use as well as having impacts on the ecosystem. Features of land use such as removal of vegetation and extensive drainage systems, often associated with intensive agriculture, tend to increase the discharge rate and therefore the variability or volatility of flow within watercourses. GI land uses have the potential to increase surface permeability and water storage capacity within catchments and therefore decrease discharge rate.
- 2.2.32 Within the Study Area water resources within the River Witham have been identified by the Environment Agency as being 'over licensed'<sup>21</sup>. This indicates that under the full licensed scenario (i.e. if all licenses for abstraction were fully utilised), ecological damage could occur. In addition, the upper reaches of the River Witham are recognised as suffering from seasonal flow stress, with very low flows or near drying out of the tributaries in some summers. This has the potential to have significant negative impacts on the ecology of the river, including for example, the nationally important population of native white-clawed crayfish.
- 2.2.33 In contrast, the River Trent has been identified as 'water available'<sup>22</sup>, which denotes that water is likely to be available at all flows, including low flows. The Trent provides an important supply of water to many licensed abstractions including power generation and public water supply<sup>23</sup>. Within the Study Area there is also a licence relating to the abstraction for public water supply from the Trent at Torksey:

*'Trent water is transferred via a pumping station into the Fossdyke Navigation from where the water is passed into the Witham and the Ancholme. The scheme, known as the Trent-Witham-Ancholme Scheme, is used mostly during the summer months, with larger volumes abstracted during drier years'<sup>24</sup>.*

## **Water Quality**

- 2.2.34 Water quality in rivers can be negatively affected by diffuse pollution sources associated with adjoining land uses, such as nitrates and phosphates in fertilizer run-off and silt from soil erosion. Agricultural practices can contribute to these sources and the catchments of the River Witham, Trent and Ancholme in the Study Area are dominated by intensive arable agriculture.

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<sup>21</sup> River Witham Catchment Abstraction Management Strategy (2004, Environment Agency)

<sup>22</sup> The Trent Corridor Catchment Abstraction Management Strategy (2003, Environment Agency)

<sup>23</sup> The Trent Corridor Catchment Abstraction Management Strategy (2003, Environment Agency)

<sup>24</sup> The Trent Corridor Catchment Abstraction Management Strategy (2003, Environment Agency)

- 2.2.35 The ecological status of the Lower River Witham, Fossdyke navigation and most of the narrow river/stream corridors within the Study Area is moderate<sup>25</sup>. To the southwest of Lincoln, the Upper River Witham is identified as bad quality. The Trent and Ancholme Rivers are identified as poor quality<sup>26</sup>. The Trent receives a large volume of treated sewage effluents indirectly from discharges made to its tributaries. Only slightly smaller are the discharges by the coal-fired power stations, which consist of Trent water being returned to the river after being used for cooling. The water quality of the River Trent has greatly improved in recent years, mainly due to investment to improve sewage works, a reduction in the number of combined sewer overflows and tighter regulations on discharges<sup>27</sup>.
- 2.2.36 Low input land uses within catchments, including GI components, can help to reduce levels of diffuse pollution and such land uses located in areas adjoining watercourses can help to buffer them from the potential negative effects of more intensive land uses.

### Air Quality

- 2.2.37 Air Quality is included as Indicator 3 of the Government's PSA 28 Delivery Agreement<sup>28</sup>. The PSA management for air quality is based on the UK's Air Quality Strategy<sup>29</sup>, which has identified eight key pollutants for measuring air quality. Poor air quality can have detrimental effects on human health, for example, respiratory and cardiovascular illness and can also interfere with photosynthesis and respiration in vegetation. Conversely, vegetation, especially trees and woodland, as a component of GI can help in moderating problems of poor air quality, for example by capturing pollutants such as particulates<sup>30</sup>.
- 2.2.38 There are local air quality issues in parts of Lincoln (see **Figures 2.1a and 2.1c**) and two Air Quality Management Areas (based on recorded exceedence of standards for a range of different pollutants<sup>31</sup>) have been declared in the city<sup>32</sup>.
- 2.2.39 As the majority of Central Lincolnshire is rural hinterland, air pollution issues are concentrated in Lincoln and along the major road routes, and are mainly due to transport emissions<sup>33</sup>. Most of the Study Area is identified as moderate air quality (see **Figure 2.1a**), whilst Gainsborough, Sleaford and Saxilby have slightly lower air quality (but not as low as the centre of Lincoln) (see **Figures 2.1b-d**).

<sup>25</sup> Environment Agency: Water Framework Directive Rivers Ecological Status (Baseline Data).

<sup>26</sup> Environment Agency: Water Framework Directive Rivers Ecological Status (Baseline Data).

<sup>27</sup> The Trent Corridor Catchment Abstraction Management Strategy (2003, Environment Agency)

<sup>28</sup> PSA Agreement 28: Secure a healthy natural environment for today and the future, HMSO (2007, HM Treasury)

<sup>29</sup> The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1, HMSO (2007, Defra)

<sup>30</sup> Urban Woodland and the Benefits for Local Air Quality. Research for Amenity Trees. No. 5 (1996, Department of the Environment)

<sup>31</sup> <http://www.airquality.co.uk/standards.php#std>

<sup>32</sup> [http://aqma.defra.gov.uk/maps.php?la\\_id=242](http://aqma.defra.gov.uk/maps.php?la_id=242)

<sup>33</sup> Delivering a Sustainable Future for Central Lincolnshire: Portrait of Place (April 2011, AECOM)

## Pollination

- 2.2.40 Pollination is a vital process for plant reproduction and much pollination is carried out by pollinators, most of which are insects, especially bees. Pollination is also vital for a range of crops. For example, in the UK the annual value of honeybee pollination alone has been estimated to be in the order of £120-200 million<sup>34</sup> and the value of all pollination has been estimated at £440 million<sup>35</sup>.
- 2.2.41 There has been considerable concern in recent years as a result of the decline in the abundance and diversity of pollinators. Such a decline has been recorded in the abundance and diversity of wild bees<sup>36</sup>, one of the most important pollinator groups in the UK - declines in bumblebees have been especially pronounced in the English Midlands<sup>37</sup>. These declines have been largely attributed to changes in land use, especially habitat loss<sup>38</sup> and the intensification of agriculture in recent decades<sup>39</sup>. In order to address some of these issues there is potential for habitats and resources which would help to support pollinator species and populations, such as floral resources, to be provided as part of GI.

## Energy Resources

- 2.2.42 The report '*Delivering a Suitable Future for Central Lincolnshire – Portrait of Place*'<sup>40</sup> provides the following overview of energy resources in Central Lincolnshire:

*'Similar to much of the UK, Central Lincolnshire is in the process of changing how it supplies energy to residents and businesses. Obtaining energy from renewable sources has been a focus for most areas of the country. In Central Lincolnshire, there are a number of projects that are in the planning process. Three wind farms to the east of Central Lincolnshire, all around Orby Marsh, suggest that this particular area is well suited for wind development. While Central Lincolnshire does rank well relative to the other Housing Market Areas, its vast area of open landscape lends itself to many more opportunities for alternative forms of energy.'*

*As of 2006, Central Lincolnshire managed to reduce its carbon emissions from energy production by approximately 3%, placing it in the top third of Housing Market Areas in the East Midlands in terms of performance. This is also substantially more than the 1% average for the region. A renewable energy plant which uses straw as a fuel to produce electricity for the equivalent of 65,000 homes was granted planning permission in 2010. The plant is proposed just outside Sleaford in the village of Kirkby-la-Thorpe. The North Hykeham*

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<sup>34</sup> <http://www2.defra.gov.uk/food-farm/crops/bee-health>

<sup>35</sup> Postnote number 348; Insect Pollination.(2010, Wentworth, J., for the Parliamentary Office of Science and Technology)

<sup>36</sup> Parallel declines in pollinators and insect-pollinated plants in Britain and the Netherlands. *Science* **313**, 351-354. (2006, Biesmeijer, J. C., Roberts, S. P. M., Reemer, M., Ohlemueller, R., Edwards, M., Peeters, T., Schaffers, A. P., Potts, S. G., Kleukers, R., Thomas, C. D., Settele, J., Kunin, W. E.)

<sup>37</sup> Bumblebee vulnerability and conservation worldwide. *Apidologie* **40**, 367-387 (2009, Williams, P.H. and Osborne, J.L)

<sup>38</sup> The conservation of bees: a global perspective. *Apidologie* **40**, 410-416 (2009, Brown, M.J.F. and Paxton, R.J)

<sup>39</sup> Bumblebees, their ecology and conservation. Oxford: Oxford University Press (2003, Goulson, D)

<sup>40</sup> Delivering a Suitable Future for Central Lincolnshire – Portrait of Place' (April 2011, AECOM)

*energy from waste plant with links to Tealby has also been proposed. Opportunities like these take advantage of the strong agricultural sector in the area, using locally grown renewable resources and wastes. While the Kirkby la Thorpe plant produces electricity, it is currently not proposed to supply local homes with heat using waste process heat from the power generation. The delivery of renewable heat and district heating networks still remains low in the area, while interest in solar energy farms has increased recently.'*

## 2.3 Biodiversity

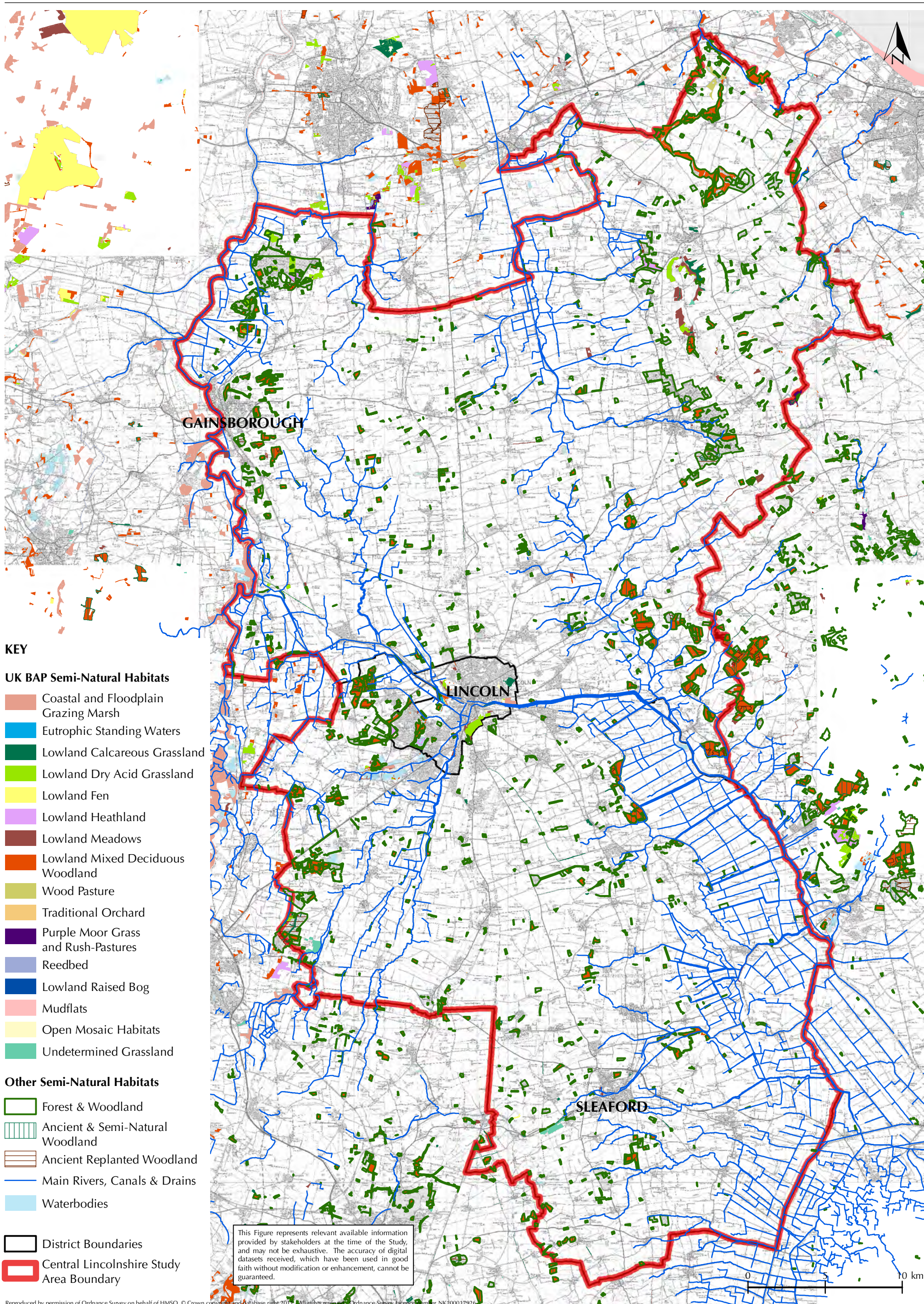
Key Sources of Information
Datasets as listed in <b>Appendix A1</b>
A vision for the Lincolnshire and Rutland Limestone Natural Area – opportunities for protecting limestone grassland, geology and landscape (2005, The Wildlife Trusts and English Nature)
Central Lincolnshire Core Strategy Issues and Options Consultation Document (October 2010, CLJSPC)
East Midlands Environmental Evidence Base (2010, CBA for the East Midlands Defra Network)
Lincolnshire Biodiversity Action Plan: action for wildlife in Lincolnshire. 2nd edition. (2006, Lincolnshire Wildlife Trust)
Making Space for Nature: a review of England's wildlife sites and ecological network. Report to Defra (2010, Lawton, J.H., <i>et al</i> )
River Basin Management Plans, Humber and Anglian River Basin Districts (2009, Environment Agency)
The East Midland Woodland Opportunity Mapping Guidance (2010, LDA Design for Natural England)
Wildlife corridors in the Lincolnshire Limewoods: Habitat creation and opportunities and constraints map (2008, Ecological Services Ltd for the Lincolnshire Wildlife Trust and Lincolnshire Limewoods Project)

### Habitats

- 2.3.1 Based on available data, the distribution of semi-natural habitats in Central Lincolnshire, including UK Biodiversity Action Plan (BAP) habitats, is illustrated in **Figure 2.2a**. It should be noted that this figure illustrates the extent of mapped habitats at present and not the whole resource<sup>41</sup>. Based on this, woodland appears to be the most abundant and widespread terrestrial habitat throughout the Study Area but there are smaller amounts of other habitats, including grassland, heathland and wood pasture and parkland. There are a number of important rivers and watercourses, notably the Trent and Witham, and areas of standing water, mostly on old gravel extraction sites.
- 2.3.2 The Study Area is an important and productive agricultural area and historic processes of agricultural intensification have led to widespread habitat loss, so that the area is dominated by arable and agriculturally improved grassland. Other factors such as development and the

<sup>41</sup> There are more BAP habitats in Lincolnshire than what has currently been mapped





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planting of conifer plantations on heathland have also contributed to the loss of habitats in the area. As a result, semi-natural habitats (mapped from the data available) tend to be highly fragmented, being few in number and small in extent, and many remaining areas of habitat are very isolated. In the Study Area as a whole currently mapped BAP habitats cover an area of 6051ha, which represents 2.86% of the Study Area. This compares with a figure of approximately 6.5% cover for the East Midlands as a whole (excluding coastal and marine habitats)<sup>42</sup>.

- 2.3.3 This fragmented distribution of habitats is especially pronounced in a zone running north to south through the centre of the Study Area, where habitats mostly comprise scattered small woods and a small number of areas of unimproved grassland, including both limestone grassland and meadows. Some areas, notably in the Fens, which is one of the most productive agricultural areas in the country, support very little in the way of semi-natural habitat at all.
- 2.3.4 However, there are significant clusters of habitat on both the western and eastern edges of the Study Area. In the west these include clusters of woodland to the west and southwest of Lincoln and in the Gainsborough Area. In the Loughton area there are still remnant areas of heathland and acid grassland despite widespread inter-war planting of conifer plantations on these habitats. To the east these include woodlands in the Lincolnshire Limewoods area, which are one of the few areas of woodlands characterised by small leaved lime (*Tilia cordata*) remaining in Britain. Many of the woods have ancient origins and are collectively designated as the Bardney Limewoods National Nature Reserve in recognition of their importance for nature conservation. Further north there are remnant areas of heath and acid grassland amongst conifer plantations to the east of Market Rasen and grassland and woodland in the Lincolnshire Wolds.
- 2.3.5 Apart from the Fens and parts of the Trent Valley, hedgerows are widespread throughout the Study Area, and in parts include significant numbers of hedgerow trees. Whilst the integrity of much of the hedgerow network has been reduced through hedgerow removal, neglect and poor management, there has been a concerted effort in many parts of Central Lincolnshire to replace hedgerows, for example in the Lincolnshire Limewoods area 25km of new hedgerows have been planted to restore links between important wildlife habitats.
- 2.3.6 There are a large number of watercourses throughout Central Lincolnshire, from large rivers such as the Trent and Witham through to small streams, such as the chalk streams of the Lincolnshire Wolds and the limestone streams which drain the Limestone dip slope to the west. In the Fens and floodplains of many of the larger rivers there are widespread networks of drainage ditches. Standing water is limited in the area, although there are concentrations in the

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<sup>42</sup> East Midlands Environmental Evidence Base (2010, Chris Blandford Associates for the East Midlands Defra Network)

Witham Valley to the southwest of Lincoln in old gravel pits and scattered ponds throughout. Many of Central Lincolnshire's watercourses are fragmented. Due to their linear character rivers and other watercourses, as well as features such as railway and road verges and embankments, can or may be significant ecological corridors, linking habitats over relatively large distances.

## Nature Conservation Designations

- 2.3.7 **Figure 2.3a** illustrates the distribution of sites designated for their nature conservation interest. This includes both statutorily designated sites (Sites of Special Scientific Interest {SSSIs} and National Nature Reserves {NNRs}) and non-statutory sites (Sites of Nature Conservation Interest {SNCI} and Local Wildlife Sites {LWSs}). SNCI was the original non-statutory designation in Lincolnshire and many SNCI were designated up to several decades ago. It should be noted that in North Kesteven's Local Plan, SNCI are referred to as County Wildlife Sites (CWSs). LWS is the new non-statutory designation for which published selection criteria have been developed by the Lincolnshire Biodiversity Partnership<sup>43</sup>. Ultimately the aim is for SNCI to be superseded by LWSs, through a process of re-survey and evaluation against LWS selection criteria. Whilst this process has been completed in Lincoln it still has some way to go in West Lindsey and there are additional candidate LWSs in North Kesteven. In North Kesteven, all CWS have now been reviewed and 175 sites surveyed over a 3 years period (2008/9, 2009/10, 2010/11)<sup>44</sup>. 88 of the sites surveyed were recommended for adoption as LWSs by the Lincolnshire Biodiversity Partnership Steering Group. In addition to the review of SNCI, further LWSs are being or may be designated in the light of new information, for example from surveys.
- 2.3.8 The distribution and extent of designated sites broadly follows that of UK BAP habitats described above. There are notable concentrations of sites in the Lincolnshire Limewoods area, around Lincoln and Gainsborough and to the east and north of Market Rasen. The area and percentage cover of SSSIs and non-statutory sites (SNCI and LWSs) within the Study Area, and a comparison with cover for such sites in the East Midlands<sup>45</sup> is set out in **Table 2.3a** below.
- 2.3.9 Percentage cover of SSSIs in the Study Area is significantly lower than that for the East Midlands as a whole and is still only approximately half that for the East Midlands outside The Peak District National Park and a number of large coastal sites (1%). Indeed percentage cover of SSSIs in the East Midlands is relatively low compared to England as a whole, which has 8.2%

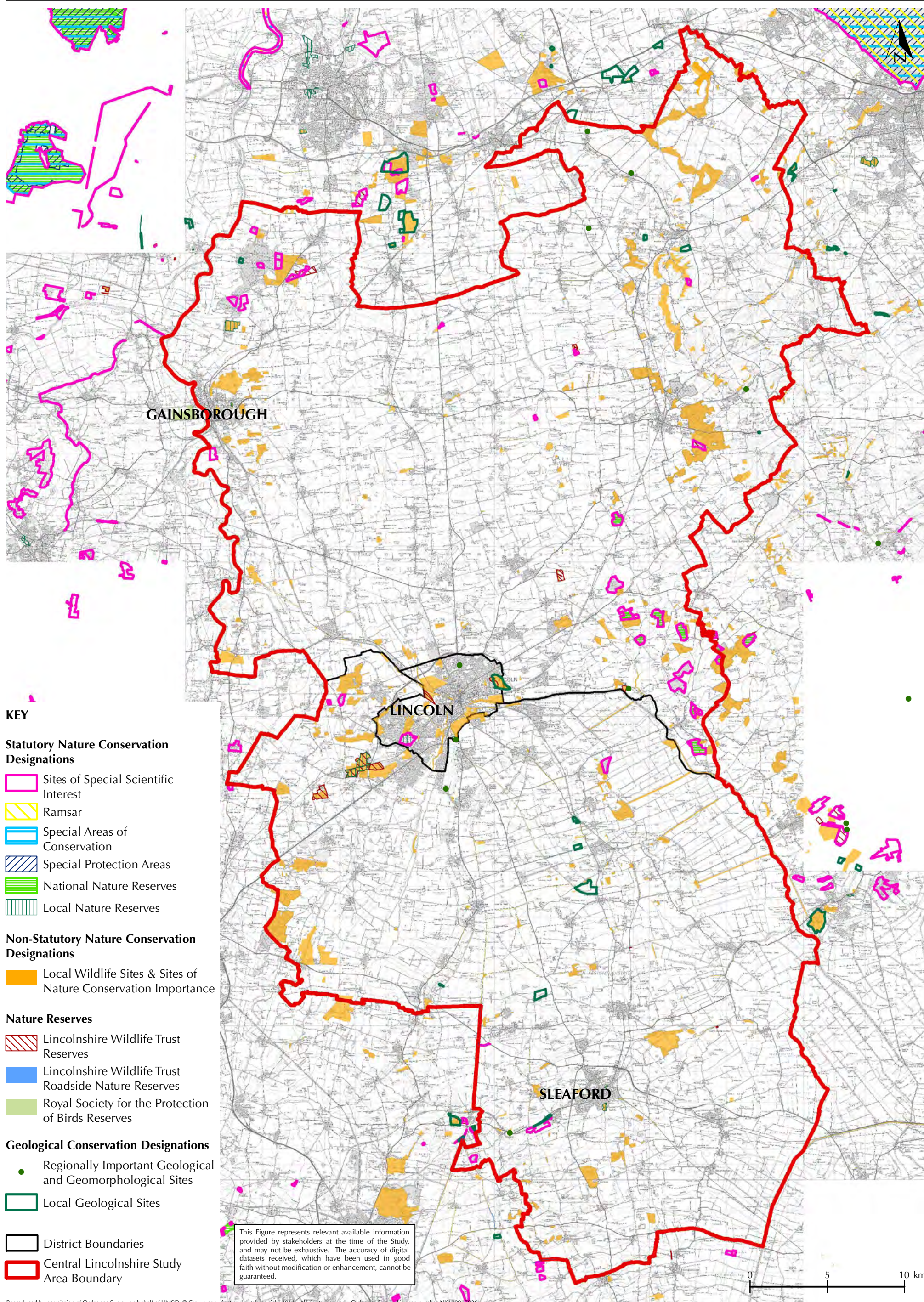
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<sup>43</sup> [www.lincsbiodiversity.org.uk](http://www.lincsbiodiversity.org.uk)

<sup>44</sup> This include all high priority and medium priority sites identified by the Lincolnshire Biodiversity Partnership

<sup>45</sup> East Midlands Environmental Evidence Base (2010, Chris Blandford Associates for the East Midlands Defra Network)





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cover. In contrast the cover of non-statutory sites is somewhat higher in the Study Area than in the East Midlands, and significantly above that for Lincolnshire, which has the lowest cover, at 1%, of such sites of all counties in the region. Indeed, Lincoln has a particularly high cover of such sites

**Table 2.3a: Designated Nature Conservation Sites in the Study Area and East Midlands**

	Non-statutory sites	% cover non-statutory sites	SSSIs	% cover SSSIs
City of Lincoln	625ha	17.5%	101ha	2.8%
North Kesteven	2979ha	3.2%	147ha	0.2%
West Lindsey	4695ha	4.1%	771ha	0.7%
Central Lincolnshire	8299ha	3.9%	1019ha	0.5%
East Midlands <sup>46</sup>	-	3.07%	-	4.17%

### Gainsborough Area

2.3.10 Habitats and sites designated for their nature conservation interest within the Gainsborough Area are illustrated on **Figure 2.2b** and **2.3b**. The River Trent and its floodplain lie along the western side of Gainsborough and extend to the north and south of the Town. Although the river itself and its floodplain are both highly modified they still retain value for wildlife and nature conservation. Lea Marsh SSSI, for example, which lies to the south of the Town, supports one of the only remaining areas of unimproved floodplain grassland, including meadow and wet pasture in the area.

2.3.11 In an arc on the eastern and south eastern sides of the Town there are a relatively large number of woodlands including that around Gainsborough Golf Club, as well as Wharton, Birch, White's, Bass, Thurlby, Lea and Warren Woods. Some of these are Ancient Woodlands, although parts have been converted to plantations. All of these woods are non-statutory designated nature conservation sites. The area and percentage cover of non-statutory sites (SNCLs and LWSs) and SSSIs within the Gainsborough, Lincoln and Sleaford Areas is set out in **Table 2.3b**.

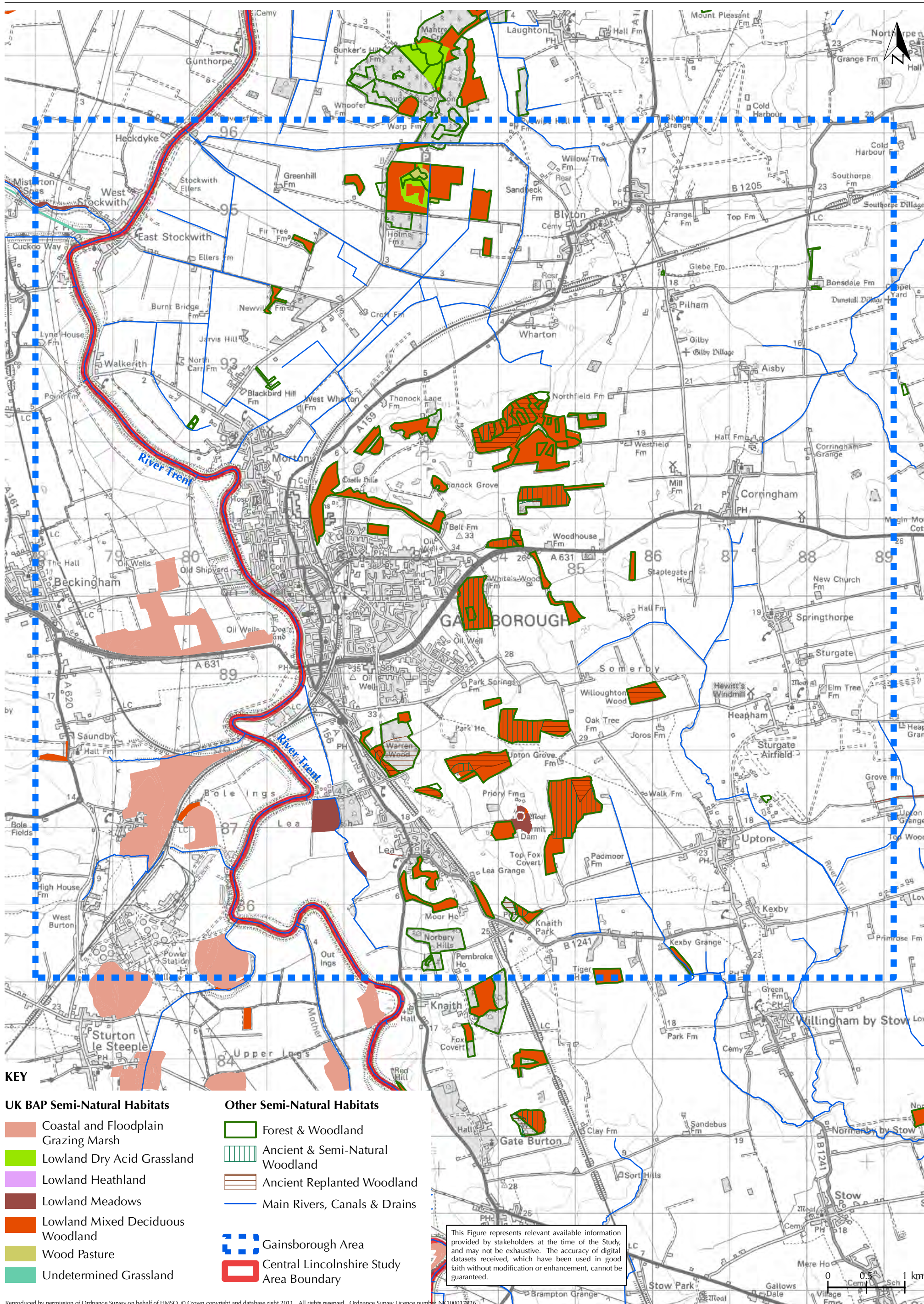
### Lincoln Area

2.3.12 Habitats and sites designated for their nature conservation interest within the Lincoln Area are illustrated on **Figure 2.2c** and **2.3c**. The Lincoln Area includes a range of important habitats,

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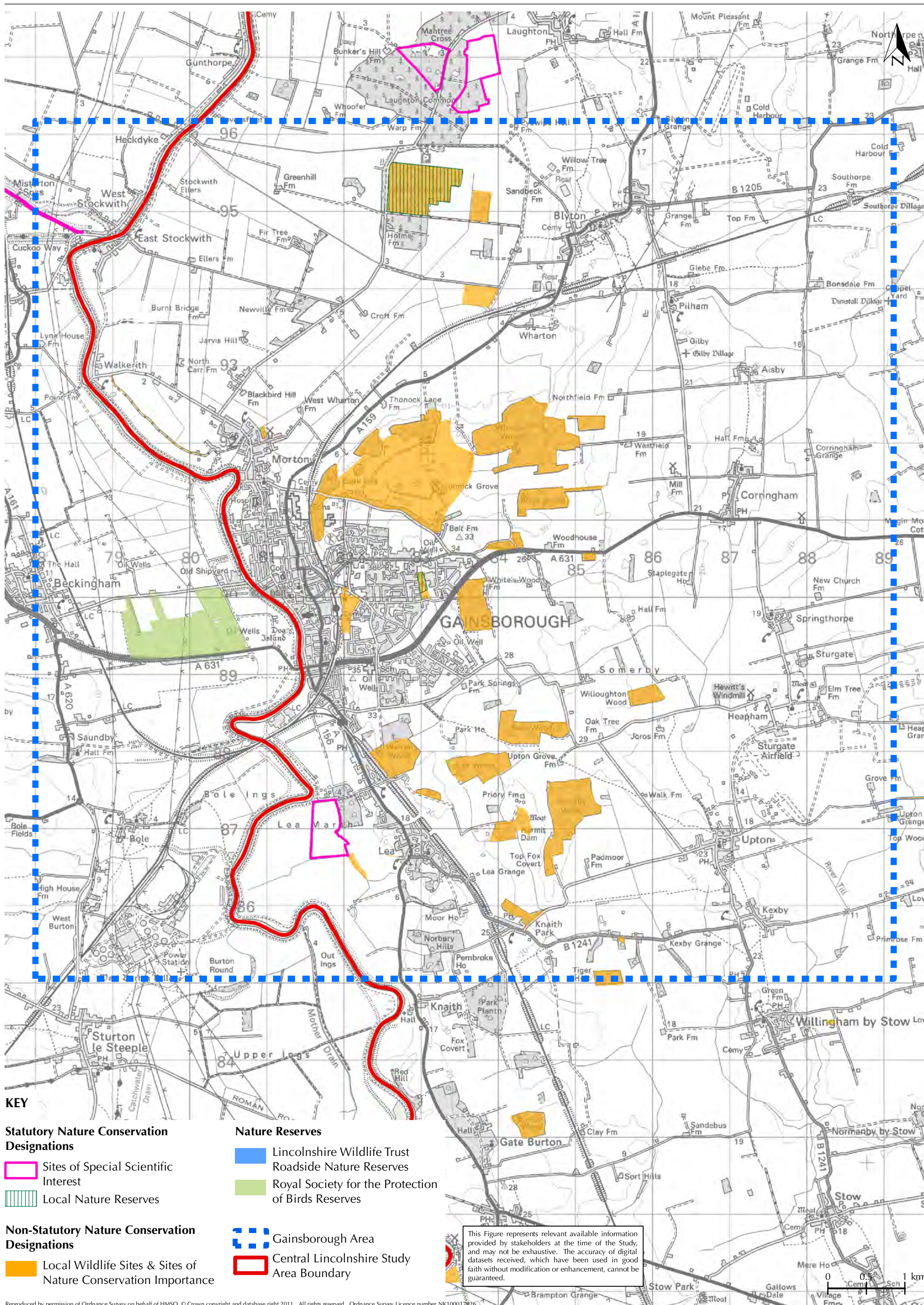
<sup>46</sup> SSSI cover in the East Midlands is strongly skewed by large sites on the Lincolnshire coast and in the Peak District National Park. Percentage cover of SSSIs in the East Midlands outside the Peak District National Park and excluding coastal sites is 1.01%.





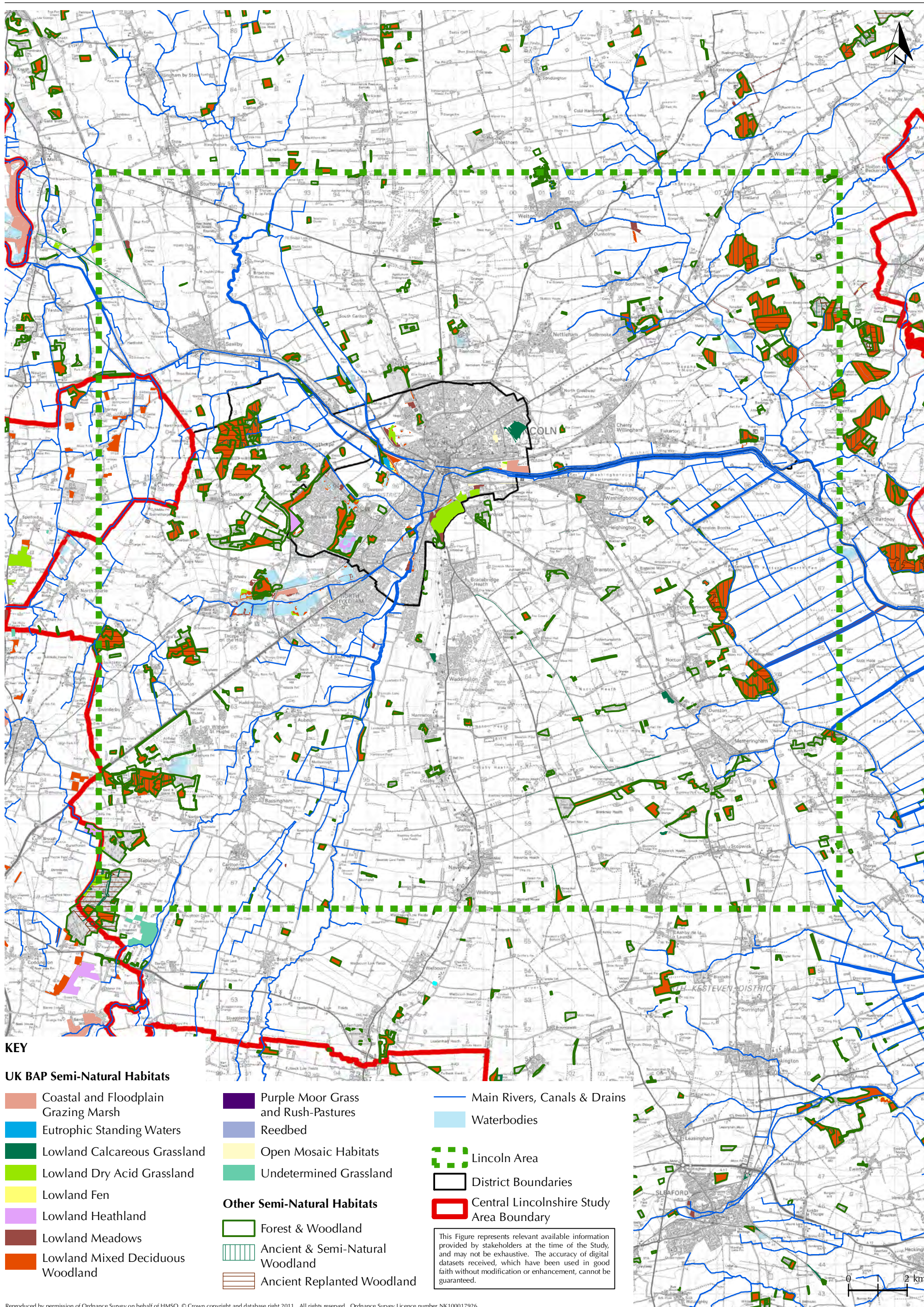
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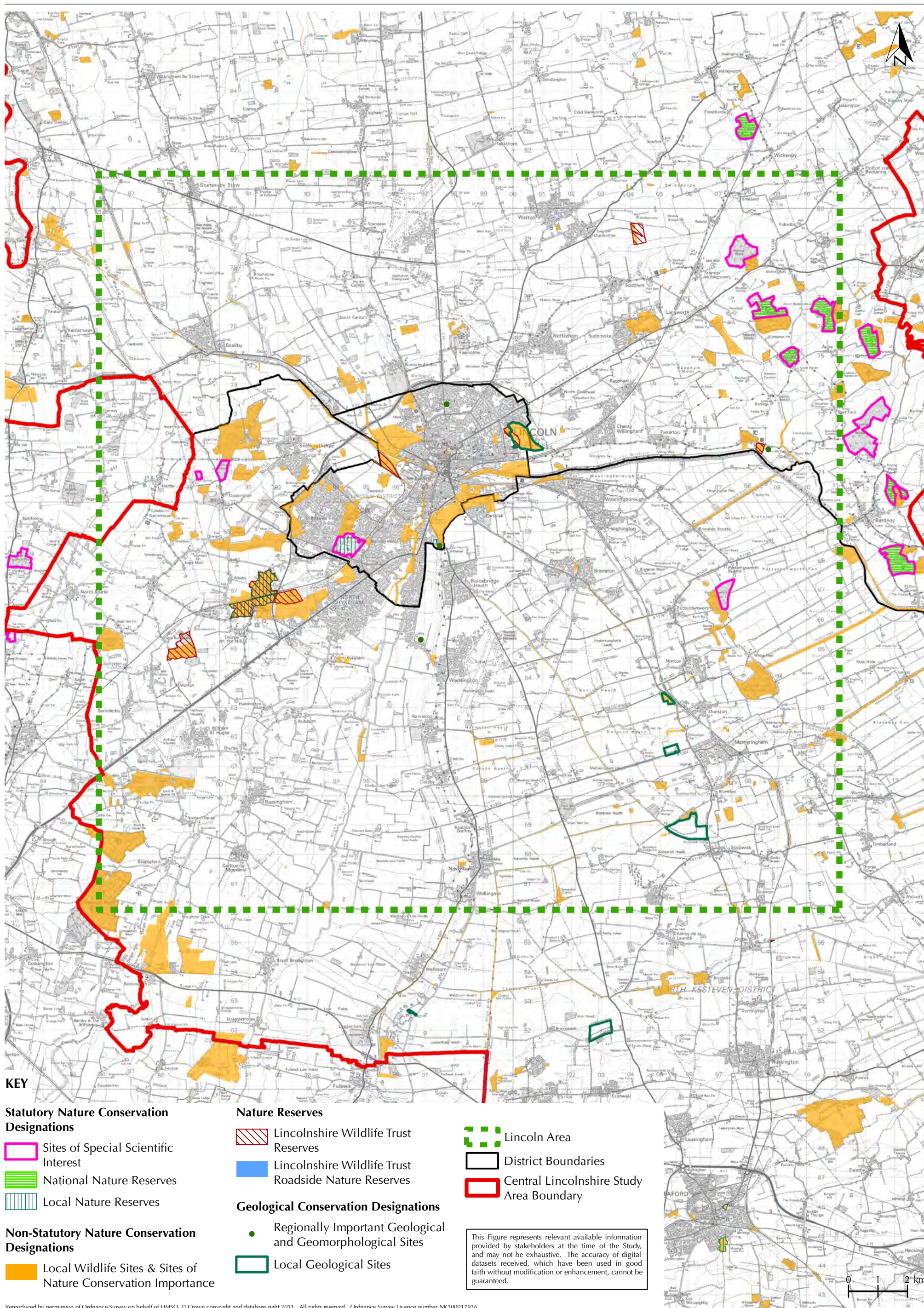
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including woodland, grassland, wetland and open water. Woodland is found within the city at Hartsholme Country Park, and there are important areas of woodland, including Ancient Woodland to the west and south west of the city near Skellingthorpe and Swinderby. Part of the Lincolnshire Limewoods area, which comprises the most important concentration of small-leaved lime woodlands remaining in Britain, lies to the east. Some of these woods have been converted to plantation. Current management includes commercial forestry and the restoration of coppice cycles where appropriate. There is a long-term objective of returning areas of maturing conifer plantation to broadleaved woodland.

- 2.3.13 There are areas of limestone grassland, for example on the Lincolnshire Edge escarpment, within the ex-quarry site of Greetwell Hollow SSSI (a Lincolnshire Wildlife Trust Reserve) and along road side verges<sup>47</sup>. Open water and wetland are present in a number of ex-mineral extraction sites, including Swanholme Lakes Local Nature Reserve and Whisby Nature Park and Local Nature Reserve. Elsewhere within the Lincoln Area habitats are largely small and scattered.

#### Sleaford Area

- 2.3.14 Habitats and sites designated for their nature conservation interest within the Sleaford Area are illustrated on **Figure 2.2d** and **2.3d**. There are scattered small woodlands on the edge of Sleaford, but the most substantial concentrations of woodland are at Aswarby Thorns and adjoining small woods to the south of the Town and south of Anwick to the north east. Parts of these are Ancient Woodland although some has been converted to plantation.
- 2.3.15 To the west of the town Wilsford and Rauceby Warrens SSSI, part of which comprises the Rauceby Warren Lincolnshire Wildlife Trust Reserve, supports the most substantial remaining area of limestone heath in south Lincolnshire. There is also parkland at Aswarby and South Rauceby. Elsewhere within the Sleaford Area habitats are largely small and scattered.

**Table 2.3b: Designated Nature Conservation Sites in the Gainsborough, Lincoln and Sleaford Areas**

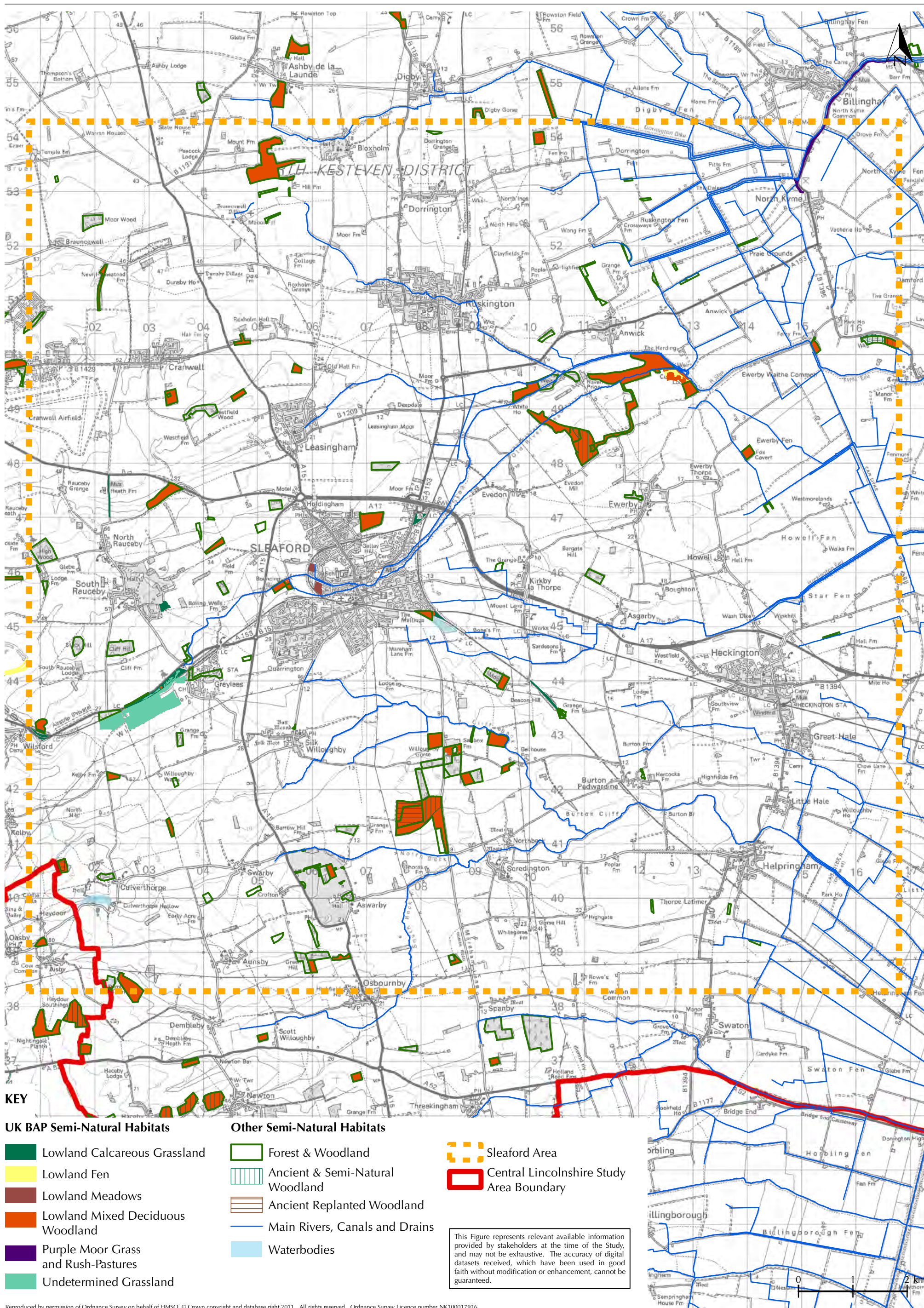
	Non-statutory sites	% cover non-statutory sites <sup>48</sup>	SSSIs	% cover SSSIs <sup>49</sup>
Gainsborough Area	551ha	4.45%	28ha	0.22%
Lincoln Area	2712ha	4.29%	383ha	0.61%
Sleaford Area	626ha	2.44%	57ha	0.22%

<sup>47</sup> As identified by the surveys carried out as part of the Life on Verge Project – see <http://www.lifeontheverge.org.uk/index.php>

<sup>48</sup> This represents the percentage cover of non-statutory sites in relation the to extend of individual sub-areas

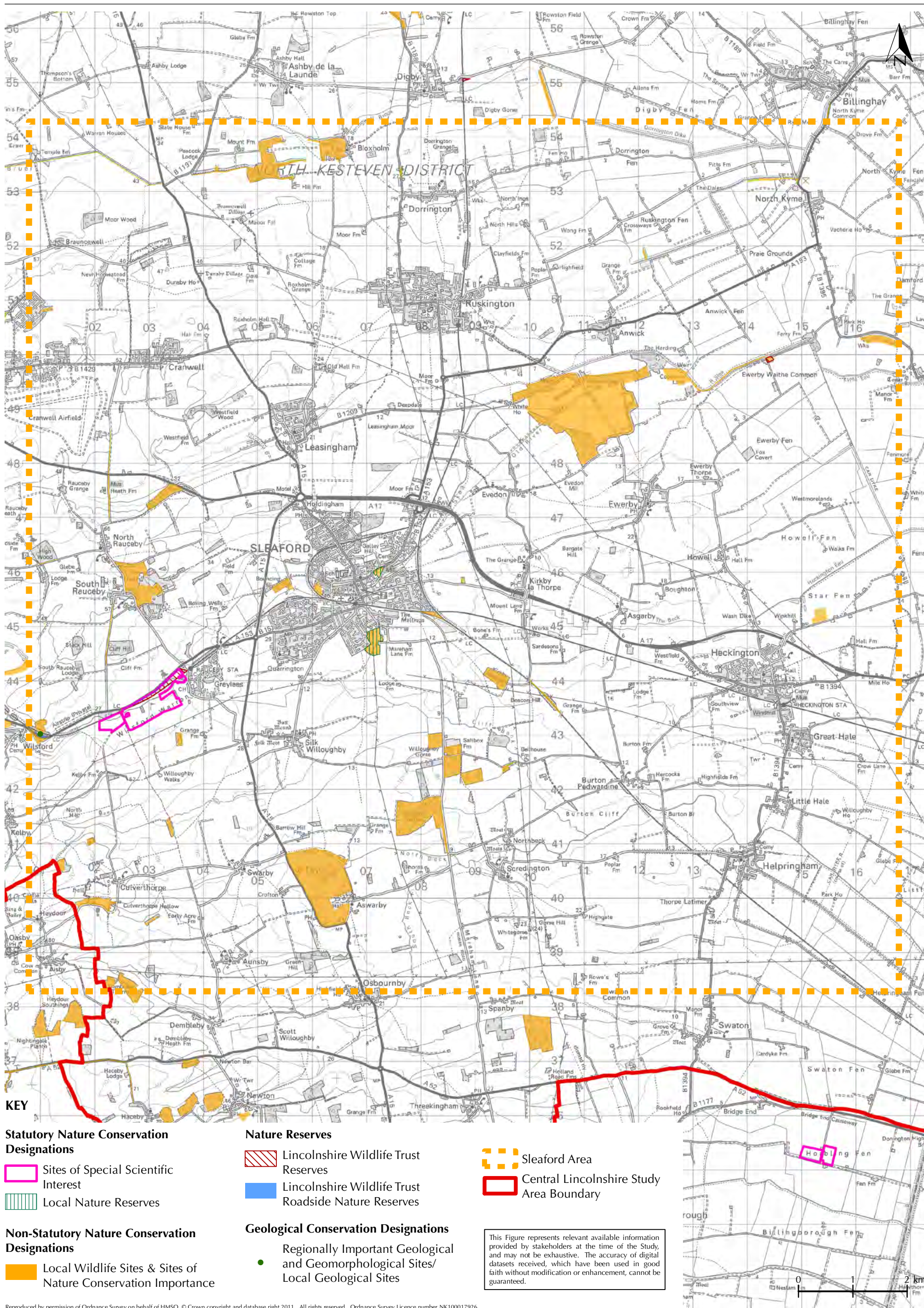
<sup>49</sup> This represents the percentage cover of non-statutory sites in relation the to extend of individual sub-areas





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## Geological Conservation Designations

- 2.3.16 Regionally Important Geological/Geomorphological Sites (RIGS) and Local Geological Sites (LGSs) within the Study Area and the sub-areas are shown on **Figures 2.3a-d**. Nine RIGS are located within Central Lincolnshire, four of which fall within the Lincoln Area (Cathedral Quarry, Cross O' Cliff Quarry, Short Ferry Clay Pit and Waddington Brick Pits) and one within the Sleaford Area (Wilsford Road Cutting). 12 LGSs have so far been identified across Central Lincolnshire as a whole, four of which fall within the Lincoln Area (Dunston Quarry, Metheringham Heath Quarry, Longwood Quarry and Greetwell Hollow Quarry) and two within the Sleaford Area (Brauncewell Quarry and Rauceby Warren). It should be noted that the term RIGS is being phased out and geological locations of importance are now being called LGSs. Survey work on previously identified RIGS and potential new geological sites of interest is currently on-going with the introduction of rigorous criteria for selecting LGSs as recommended by Defra<sup>50</sup>.

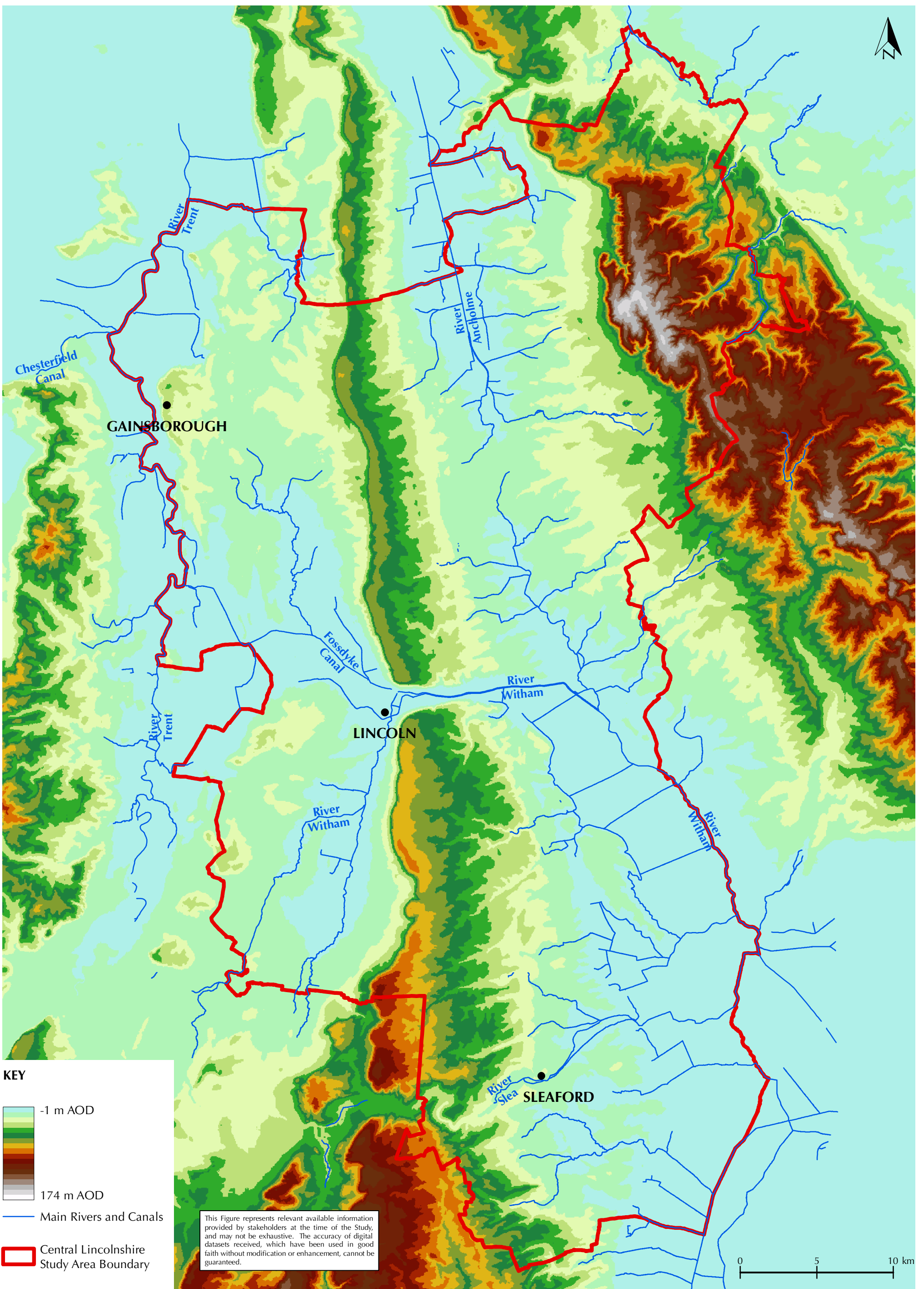
## 2.4 Landscape and Townscape Character

Key Sources of Information
Character of England Map (updated 2006, Countryside Agency, English Nature, RDS, English Heritage)
East Midlands Regional Landscape Character Assessment (2010, LDA Design for East Midlands Landscape Partnership)
Lincoln Fringe Assessment/Growth Points Characterisation Project: Overview Statement (August 2011, APS for City of Lincoln)
Lincoln Townscape Assessment (2007, City of Lincoln Council)
Lincolnshire Historic Characterisation Assessment Data: <a href="http://www.lincolnshire.gov.uk/residents/environment-and-planning/conservation/archaeology/lincolnshire-historic-landscape-characterisation-project/">http://www.lincolnshire.gov.uk/residents/environment-and-planning/conservation/archaeology/lincolnshire-historic-landscape-characterisation-project/</a>
North Kesteven Landscape Character Assessment (2007, David Tyldesley and Associates for North Kesteven District Council)
West Lindsey Landscape Character Assessment (1999, Environmental Resources Management for West Lindsey District Council)

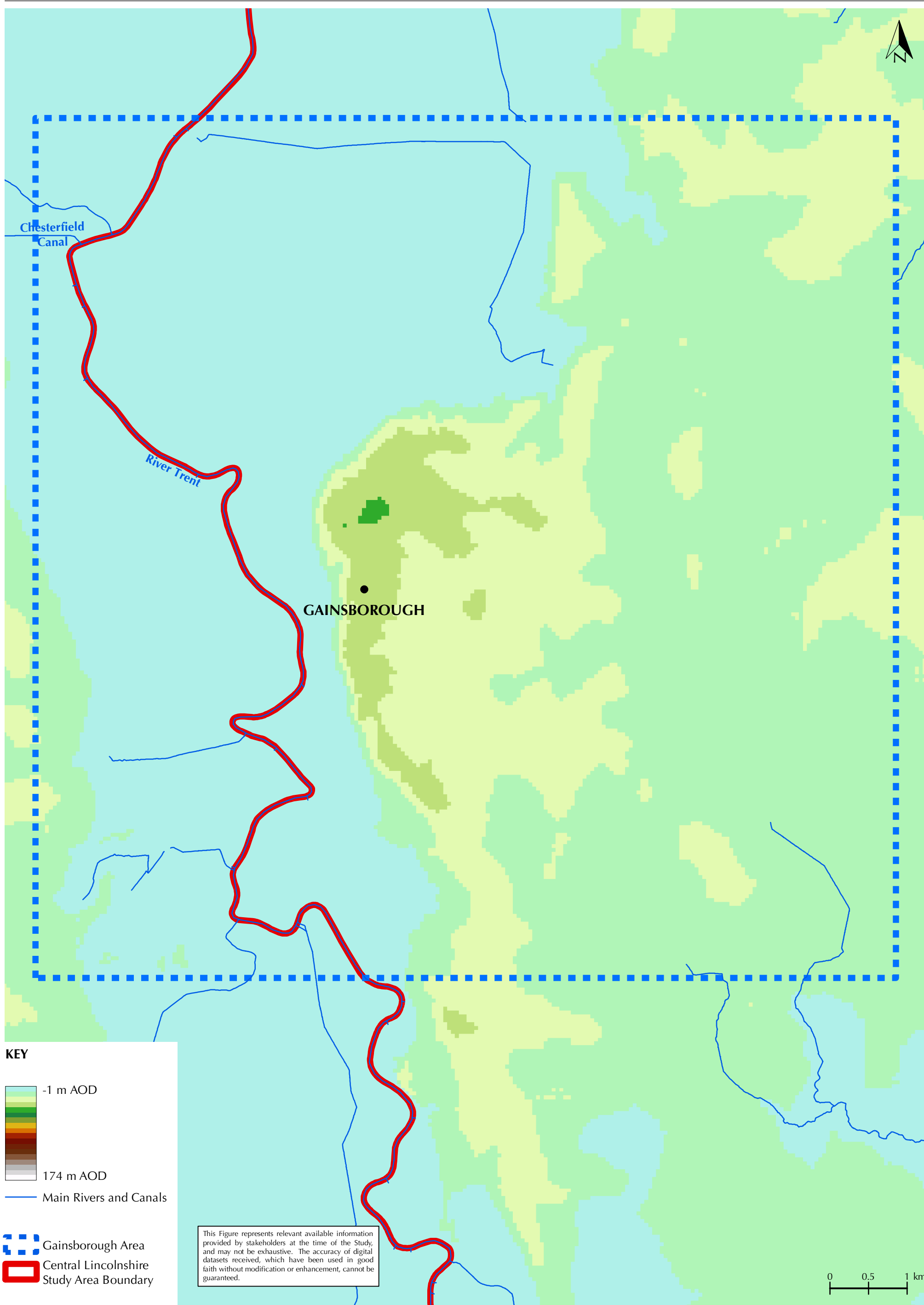
### Topography

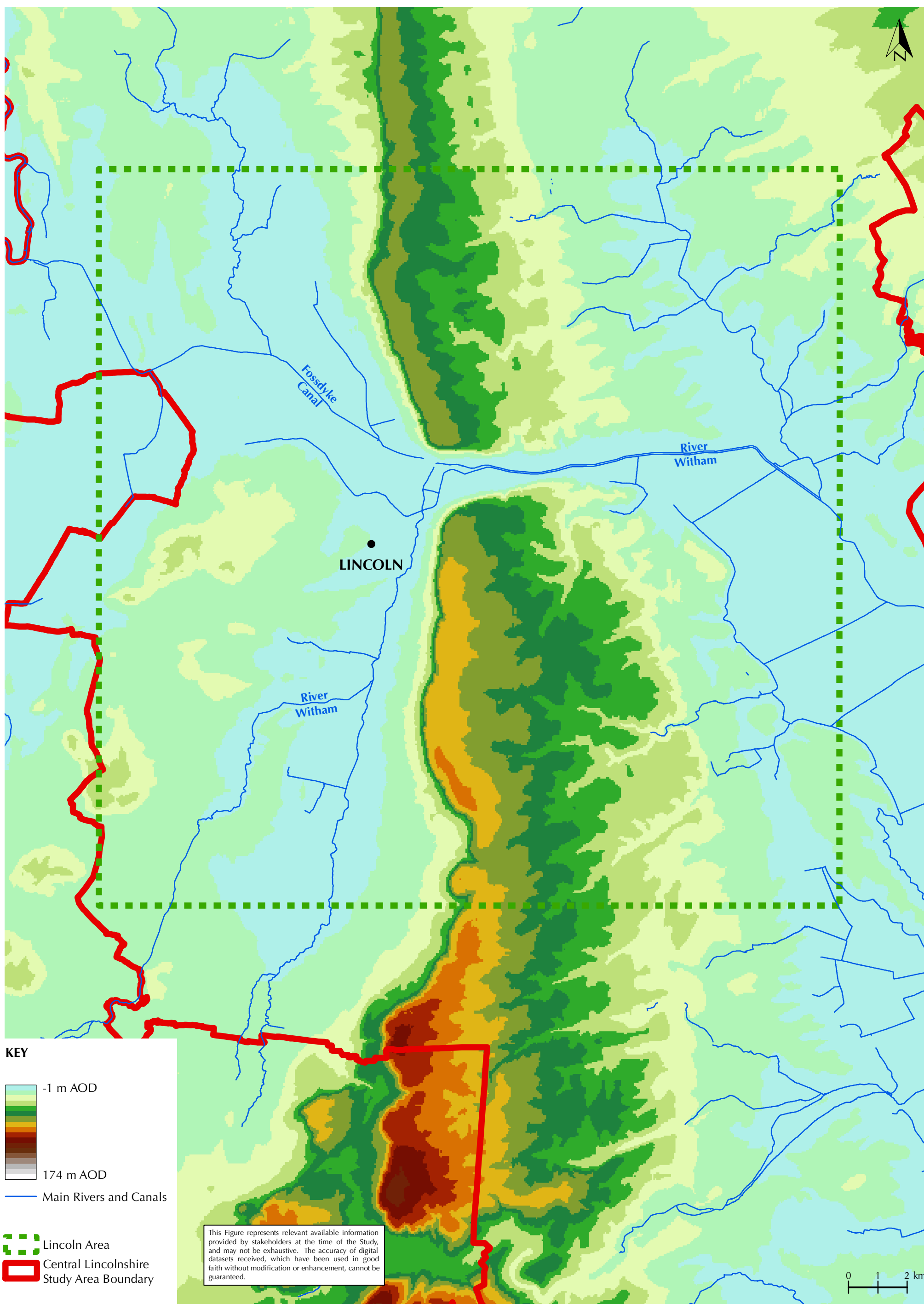
- 2.4.1 The topography of Central Lincolnshire is illustrated on **Figure 2.4a-d**. The highest land within the north eastern corner of the Study Area encompasses a ridge which runs north-south between Caistor and Normanby le Wold, rising to approximately 174m AOD and forming part of the Lincolnshire Wolds. This ridge of high land continues outside the Study Area boundary, encompassing the Lincolnshire Wolds range and associated hills and valleys. Land slopes

<sup>50</sup> See Local Geological Sites: Guidelines for their Identification and Selection Guidelines in the Historic County of Lincolnshire (Lincolnshire, North Lincolnshire and North East Lincolnshire), 1st Edition (Lincolnshire Biodiversity Partnership)

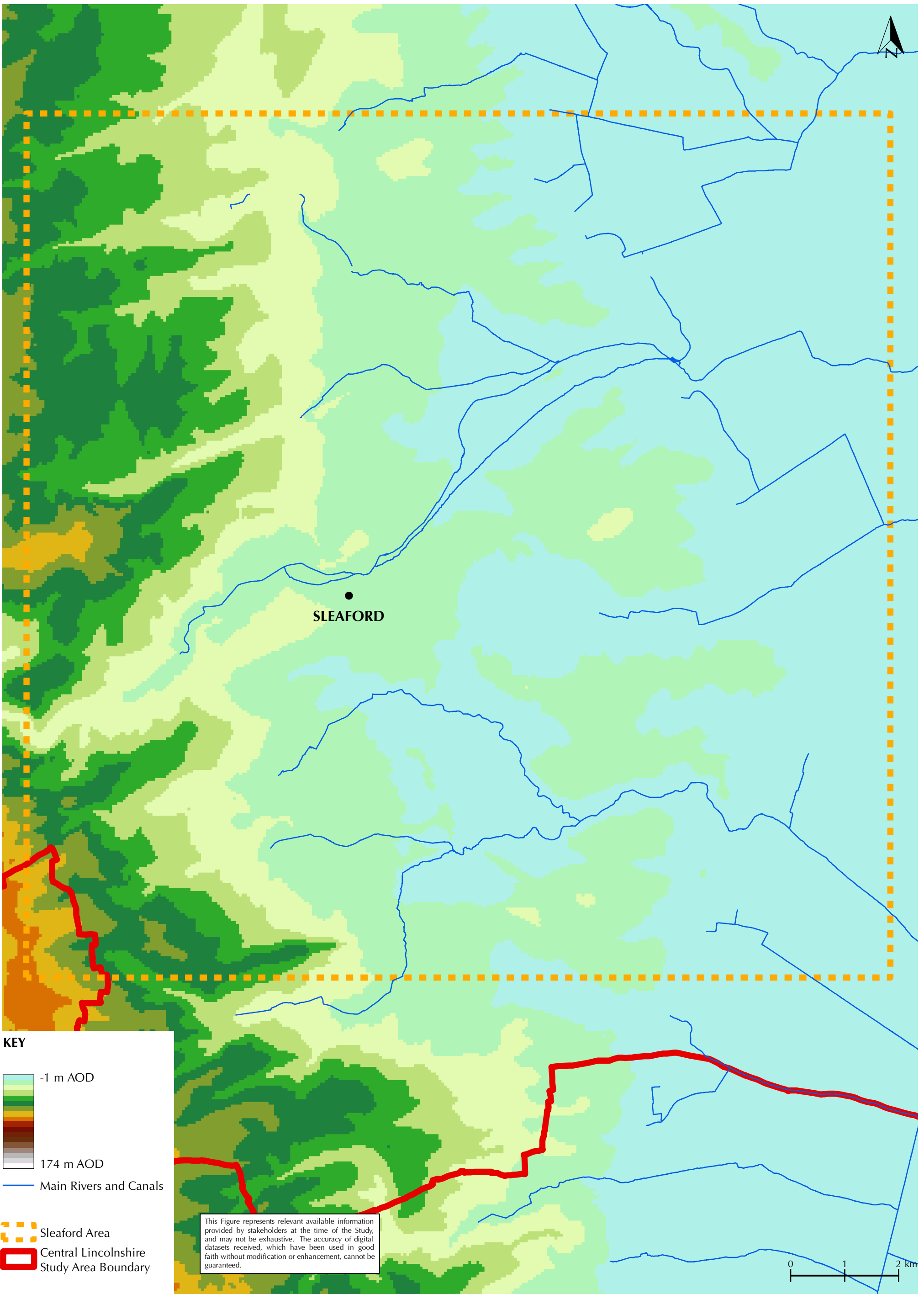












gradually downwards from the ridge from east to west, forming the footslopes of the Wolds towards the lower lying Ancholme and Witham River valleys.

- 2.4.2 Within the northern part of the Study Area (West Lindsey District), the Ancholme river valley and the northern part of the Witham river valley are relatively broad and encompass low-lying land between approximately 28-60m AOD. As the Witham valley continues southwards across the Study Area (into North Kesteven District, it becomes broader and lower lying, encompassing land below sea level (at -1m AOD) which forms part of the wider network of drained fen landscapes which continues to the east of the Study Area boundary. A similar area of low lying land is situated in the north-western corner of the Study Area in close proximity to the River Trent around East Stockwith and Wildsworth.
- 2.4.3 A prominent ridge of higher land (known locally as the Lincoln Cliff) dissects the Study Area, running north south and rising from approximately 86m AOD in the north (close to Bigby) to approximately 180 metres in the south (close to Leadenham). The east-west running, lower lying corridor of the River Witham truncates this ridge to the north and south of Lincoln. To the east and west of the ridge, land slopes relatively steeply downwards towards the adjacent lower lying river corridors.
- 2.4.4 To the west of the Lincoln Cliff, lower lying land encompasses the corridor of the River Witham valley, and further west, the broader valley corridor of the north-south orientated River Trent (between approximately -1 and 30mAOD). Within North Kesteven District (to the west of the Lincoln Cliff) several isolated hills of higher land (between approximately 30-100m AOD) provide separation between the Witham and Trent Valley corridors.
- 2.4.5 The western half of the Gainsborough Area encompasses land between approximately 28 and -1m AOD, within the valley of the River Trent. In contrast, the eastern half of the Gainsborough Area rises to higher land between 30-50m AOD.
- 2.4.6 The central part of the Lincoln Area is dominated by the Lincoln Cliff Ridge, rising to between 50 and 80 metres AOD and its adjacent slopes. As mentioned above, the east-west running, lower lying corridor of the River Witham cuts this ridge to the north and south of Lincoln. To the west of the ridge, land is much lower lying (at approximately 30-40m AOD) within the valley of the River Witham and along the corridor of the Fossdyke Canal. To the east of the ridge, land slopes gradually downwards towards the low lying Witham valley and associated low lying fenland (below sea level at -1m metres AOD).



- 2.4.7 The western part of the Sleaford Area encompasses the eastern slopes of the Lincoln Cliff ridge and part of the top of the ridge, whilst the eastern part is much lower lying, encompassing the western gentle slopes of the valley of the River Witham (at approximately 28m AOD).

### **Landscape Character Assets**

#### **Overview**

- 2.4.8 Central Lincolnshire is predominantly rural in character, with the majority of the population living in towns and villages. The City of Lincoln is the largest urban area within the Study Area, with the historic market towns of Gainsborough and Sleaford providing local services to West Lindsey and North Kesteven Districts respectively.
- 2.4.9 The landscape character of the Study Area essentially comprises a linear pattern of vales, scarps and dipslopes, ridges and valleys which support a dynamic mixture of arable and pastoral farming, towns and villages. Running north-south, the Limestone Scarps and Dipslopes dominate the centre of the Study Area, encompassing prominent scarps and adjacent dipslopes which facilitate dramatic views across adjacent areas of lower-lying wooded and unwooded vales. A pattern of productive mixed agriculture is superimposed by stone built villages on the scarp slopes, whilst the City of Lincoln dominates the top of the scarp, overlooking the Witham Valley.
- 2.4.10 The Lincolnshire Chalk Wolds and adjacent Scarps, Ridges and Valley dominate landscape character in the northeast of the Study Area encompassing open and elevated rolling plateau, broad sweeping views, intensively managed arable land and a network of steep valleys which dissects the plateau.
- 2.4.11 In contrast, the southeast of the Study Area is dominated by the low lying terrain of the Fens and Marshes and adjacent margin farmlands. The Fens encompass a rigid geometry of field drainage ditches, roads, extensive arable farms, with limited settlement, whilst the adjacent farmlands are predominantly rural, with a patchwork of medium sized fields enclosed by hedgerows and ditches and interspersed with woodlands, copses and plantations.
- 2.4.12 The eastern edges of the Trent Valley influence the western edge of the Study Area, introducing a pattern of pasture, riverside meadows, arable and silage production and sand and gravel extraction adjacent to the river corridor.



## National Character

2.4.13 The Character of England Map<sup>51</sup> identifies seven broadly-defined 'National Character Areas', which fall wholly or partially within the Study Area. These are:

- Humberhead Levels (39);
- Lincolnshire Wolds (43);
- Central Lincolnshire Vale (44);
- Northern Lincolnshire Edge with Coversands (45);
- The Fens (46);
- Southern Lincolnshire Edge (47); and
- Trent and Belvoir Vales (48).

2.4.14 The character of the natural and man-made landscape of the above National Character Areas is described within Countryside Character Volume 4: East Midlands<sup>52</sup> and Volume 6: East of England<sup>53</sup>. These areas provide a framework for the following more detailed published assessments of landscape character undertaken at the regional and sub-regional scale within the Study Area.

## Regional Landscape Character

2.4.15 The East Midlands Regional Landscape Character Assessment (EMRLCA)<sup>54</sup>, commissioned by Natural England was published in 2010. The aim of the EMRLCA is to increase understanding of the region's varied landscapes by identifying distinctive, rare or special characteristics. The EMRLCA presents objective, non-technical descriptions of each of the 31 regional landscape character types. It also considers the implications of forces for change in the landscape and provides guidance to counter adverse impacts and promote positive change.

2.4.16 The innovative approach to this study has pioneered new methods of assessment and has been undertaken in line with the most up-to-date guidance and methodologies. The report and accompanying illustrations provide an accessible overview of the region's diverse landscape, as well as informing strategic initiatives and decision making which may have an impact on the character and identity of the landscape. The assessment is anticipated to act as a stimulus for a range of positive initiatives and to raise awareness of environmental issues, helping decision-makers and stakeholders to demand higher standards of design and development across the region in the future. Together with the District level Landscape Character Assessment (see following paragraphs), the Regional Landscape Character Assessment will provides decision-

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<sup>51</sup> Character of England Map (Updated 2006, Countryside Agency, English Nature, RDS, English Heritage)

<sup>52</sup> Countryside Character Volume 4: East Midlands (1997, Countryside Agency )

<sup>53</sup> Countryside Character Volume 6: East of England (1997, Countryside Agency)

<sup>54</sup> East Midlands Regional Landscape Character Assessment (April 2010, LDA Design for East Midlands Landscape Partnership)



makers in Central Lincolnshire with information and guidance to inform the design of GI networks.

- 2.4.17 As shown on **Figures 2.5a-d**, the following Regional Landscape Character Types fall within the Central Lincolnshire, Gainsborough, Lincoln and Sleaford Areas (see **Table 2.4a**):

**Table 2.4a – East Midlands Regional Landscape Character Types within the Study Area and the Gainsborough, Lincoln and Sleaford Areas**

<b>East Midlands Regional Landscape Character Types</b>	<b>Central Lincolnshire</b>	<b>Gainsborough Area</b>	<b>Lincoln Area</b>	<b>Sleaford Area</b>
2b: Planned and Drained Fens and Carrlands	✓	✓		
2c: Fen and Marsh Margin Farmlands	✓		✓	✓
3a: Floodplain Valleys	✓	✓	✓	
4a: Unwooded Vales	✓	✓	✓	
4b: Wooded Vales	✓	✓	✓	
6a: Limestone Scarps and Dipslopes	✓		✓	✓
7a: Chalk Wolds	✓			
7b: Wolds Scarps and Ridges and Valleys	✓			
10a: Forest Hills and Ridges	✓			

### **District Landscape Character**

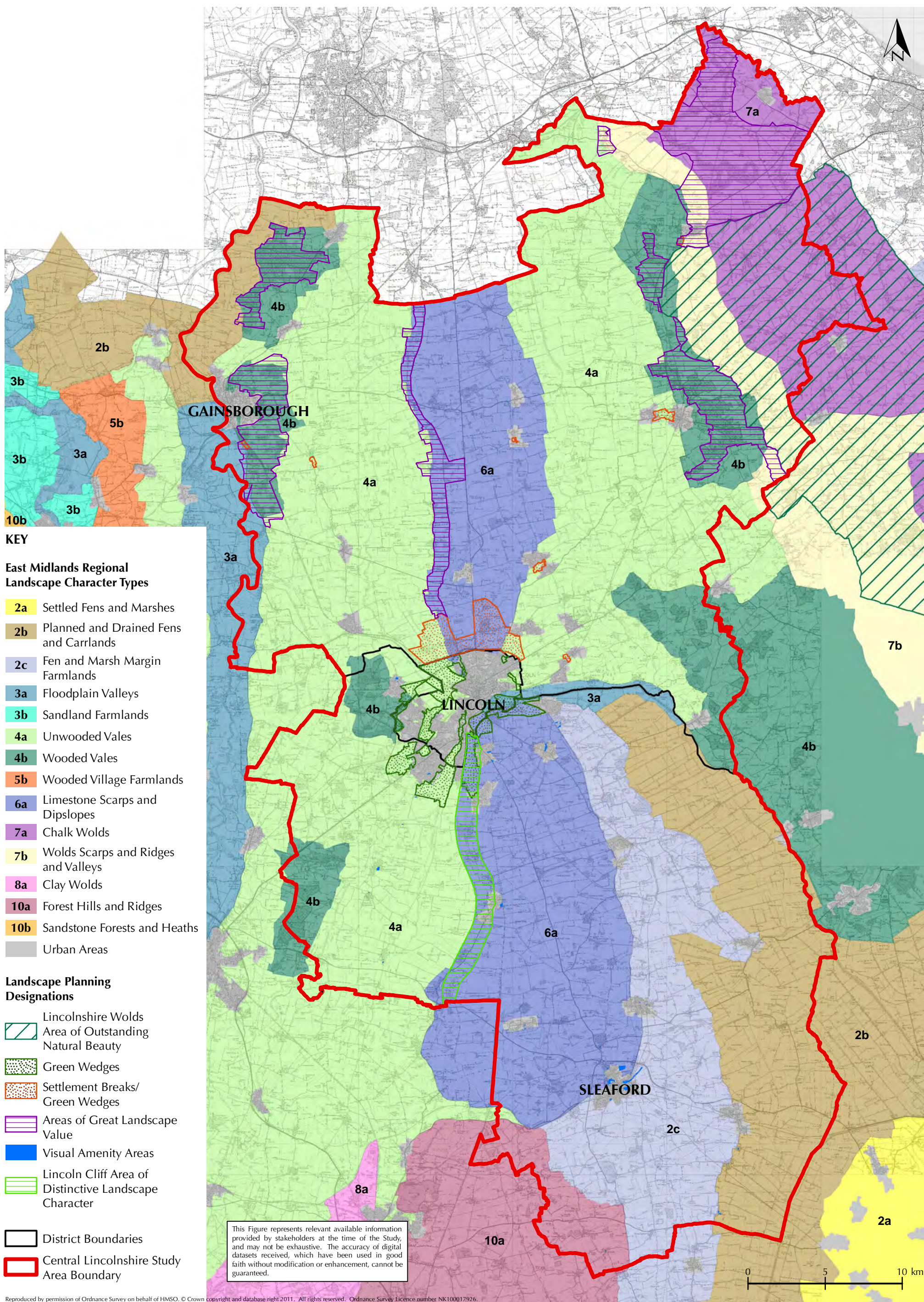
- 2.4.18 Landscape Character Assessments published for West Lindsey and North Kesteven Districts define Landscape Character units at the District level.

*West Lindsey Landscape Character Assessment*<sup>55</sup>

- 2.4.19 Within the context of the seven Regional Landscape Character Types that cover the District of West Lindsey, the West Lindsey Landscape Character Assessment identifies four Broad Landscape Character Areas and 14 Landscape Character Areas (see **Figure 2.6a**). As listed in **Table 2.4b** and shown on **Figures 2.6a-c** the following West Lindsey Landscape Character Areas fall within the Central Lincolnshire, Gainsborough and Lincoln Areas.

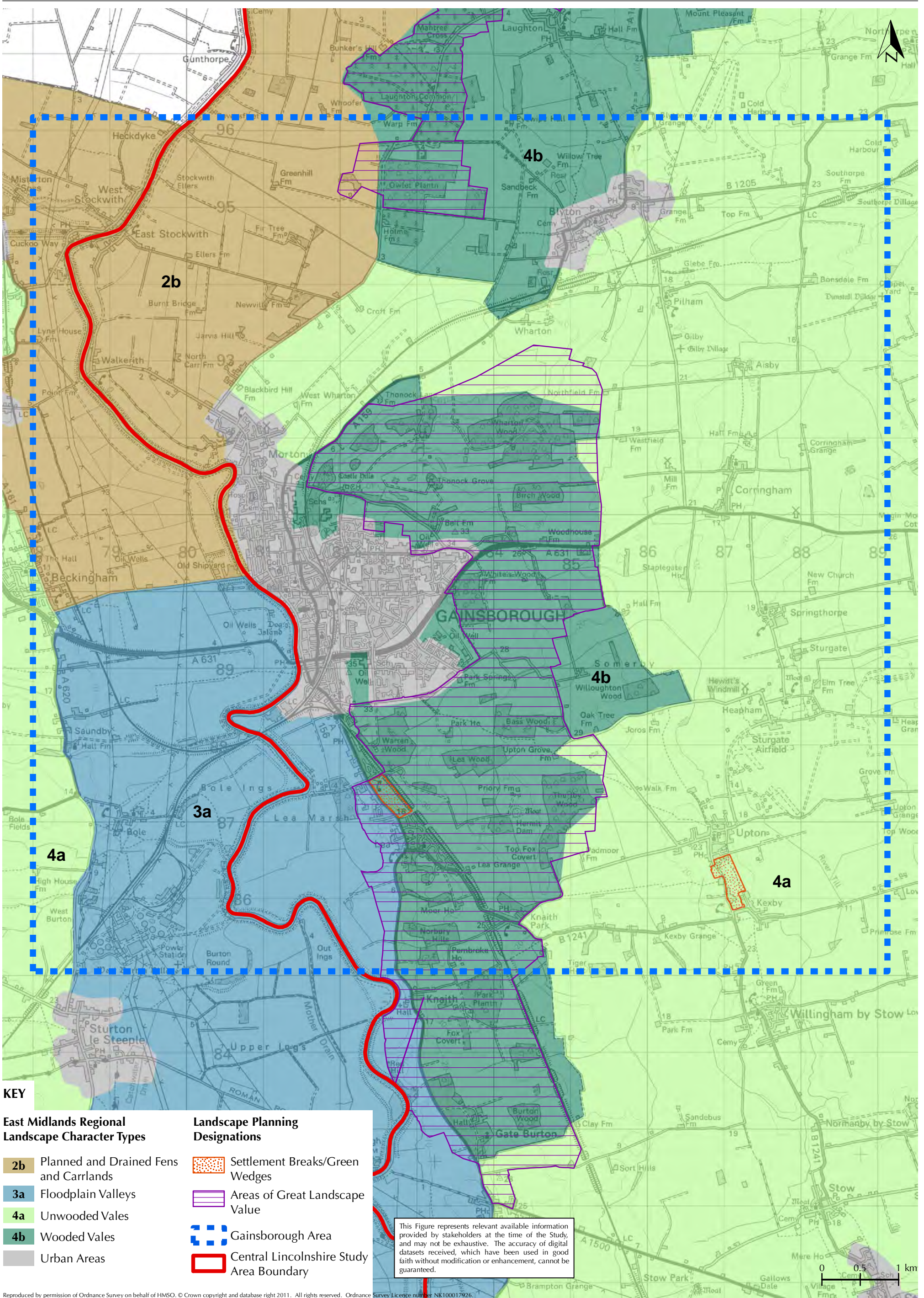
<sup>55</sup> West Lindsey Landscape Character Assessment (August 1999, Environmental Resources Management for West Lindsey District Council)





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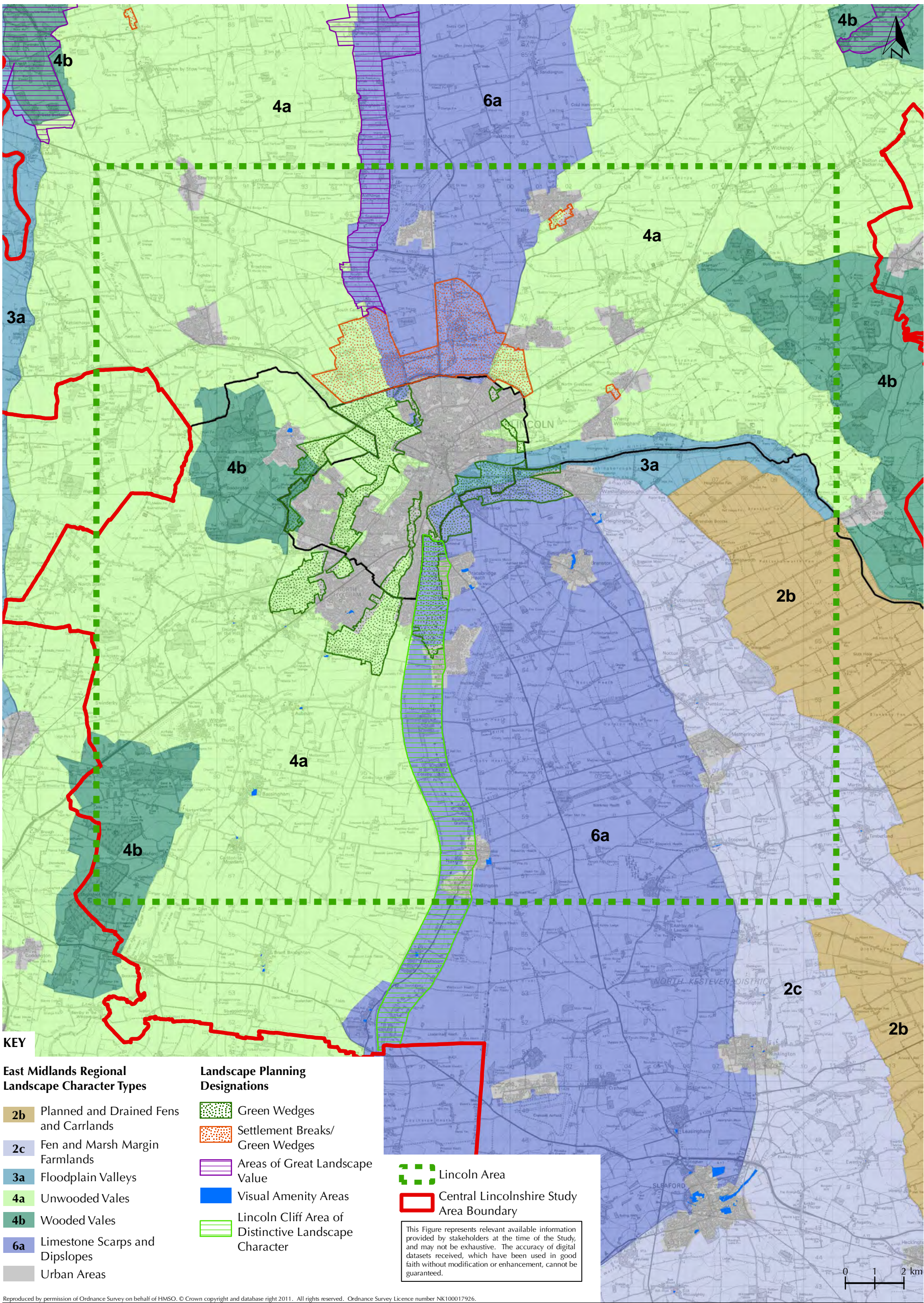


CHRIS BLANDFORD ASSOCIATES  
environment landscape planning

# GREEN INFRASTRUCTURE STUDY FOR CENTRAL LINCOLNSHIRE Volume 2: Audit & Assessment

**FIGURE 2.5b**  
Landscape Character -  
Gainsborough Area





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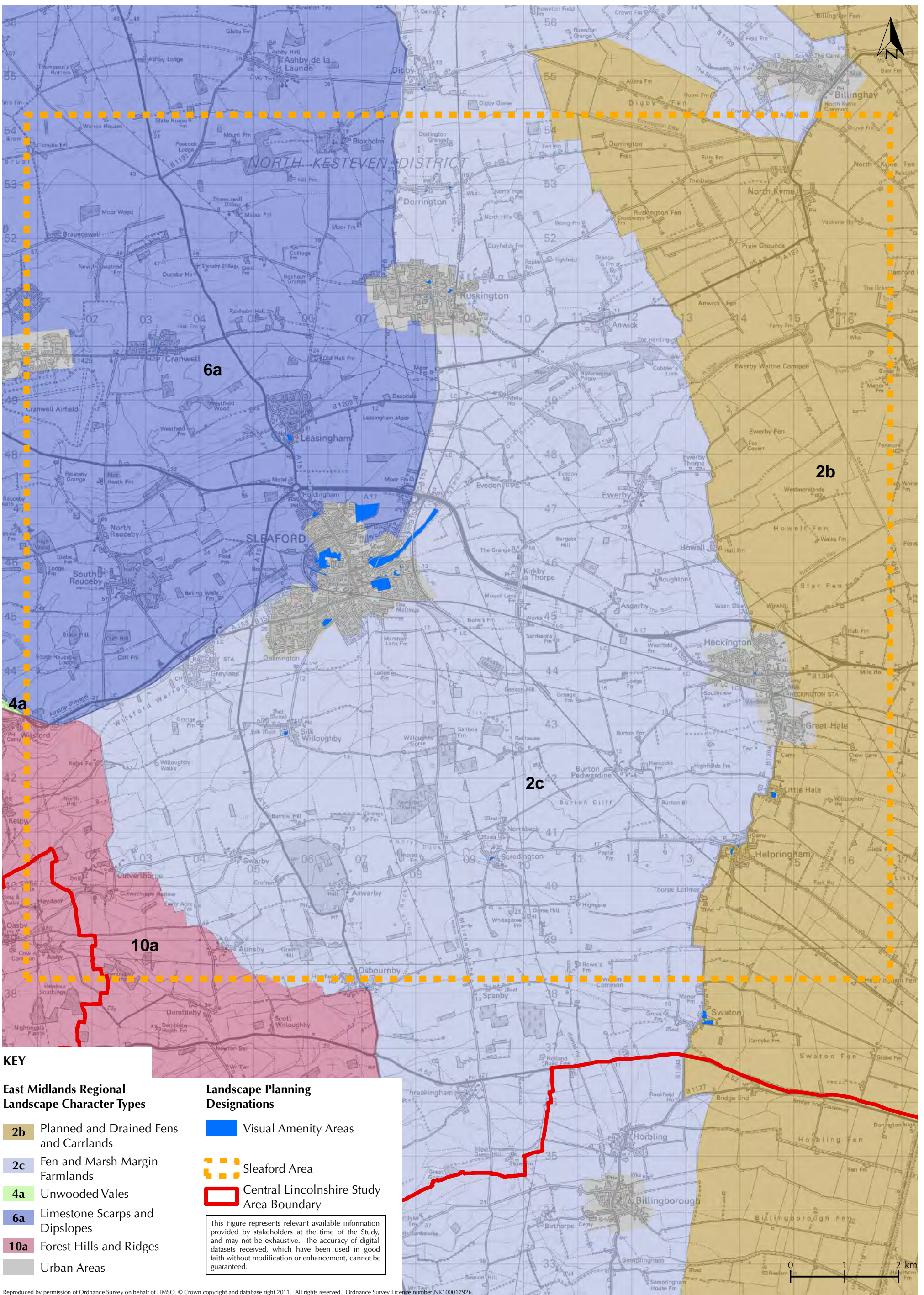
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**FIGURE 2.5c**  
Landscape Character - Lincoln Area

NOVEMBER 2011





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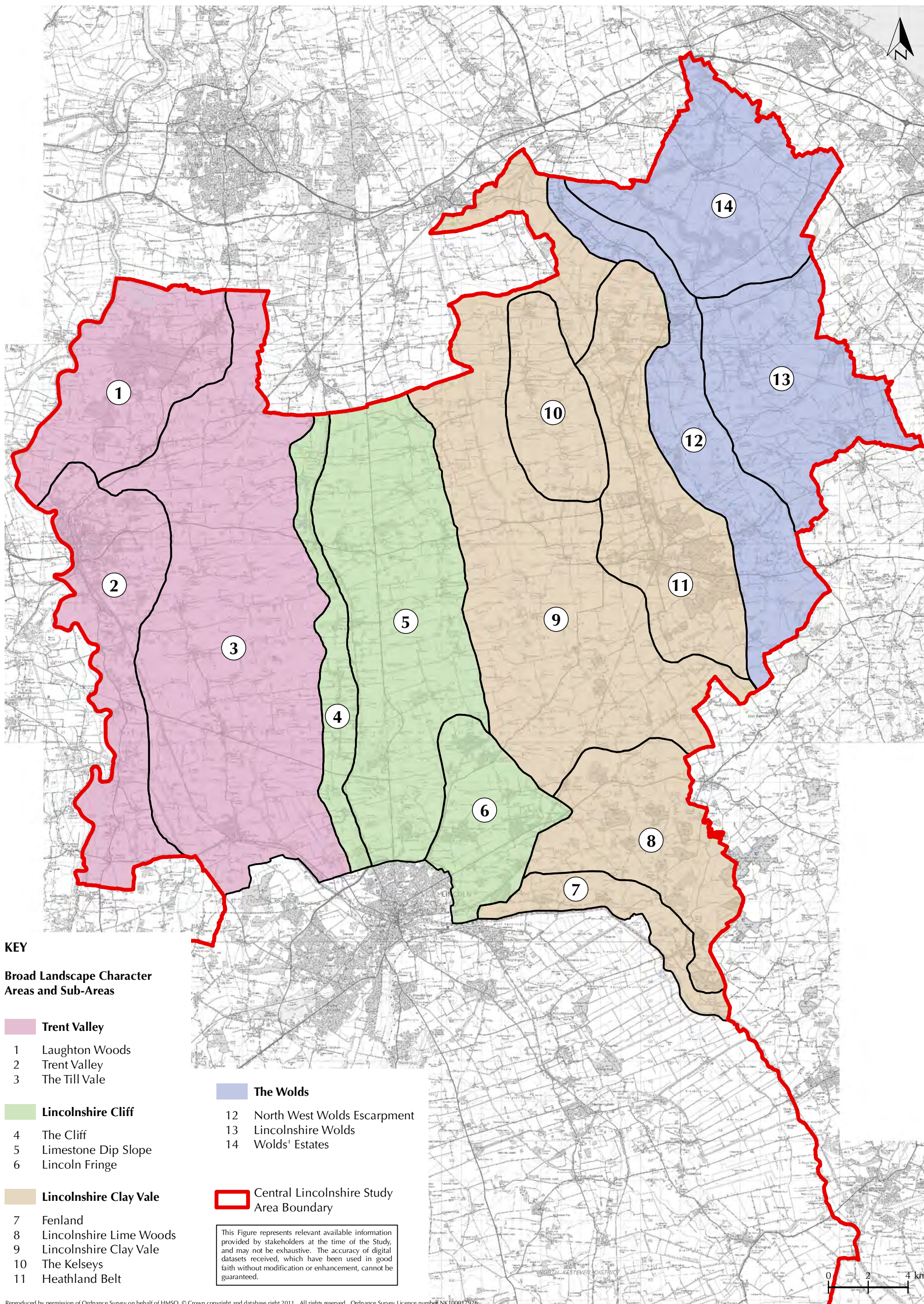
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environment landscape planning

GREEN INFRASTRUCTURE STUDY FOR CENTRAL LINCOLNSHIRE  
Volume 2: Audit & Assessment

FIGURE 2.5d  
Landscape Character -  
Sleaford Area

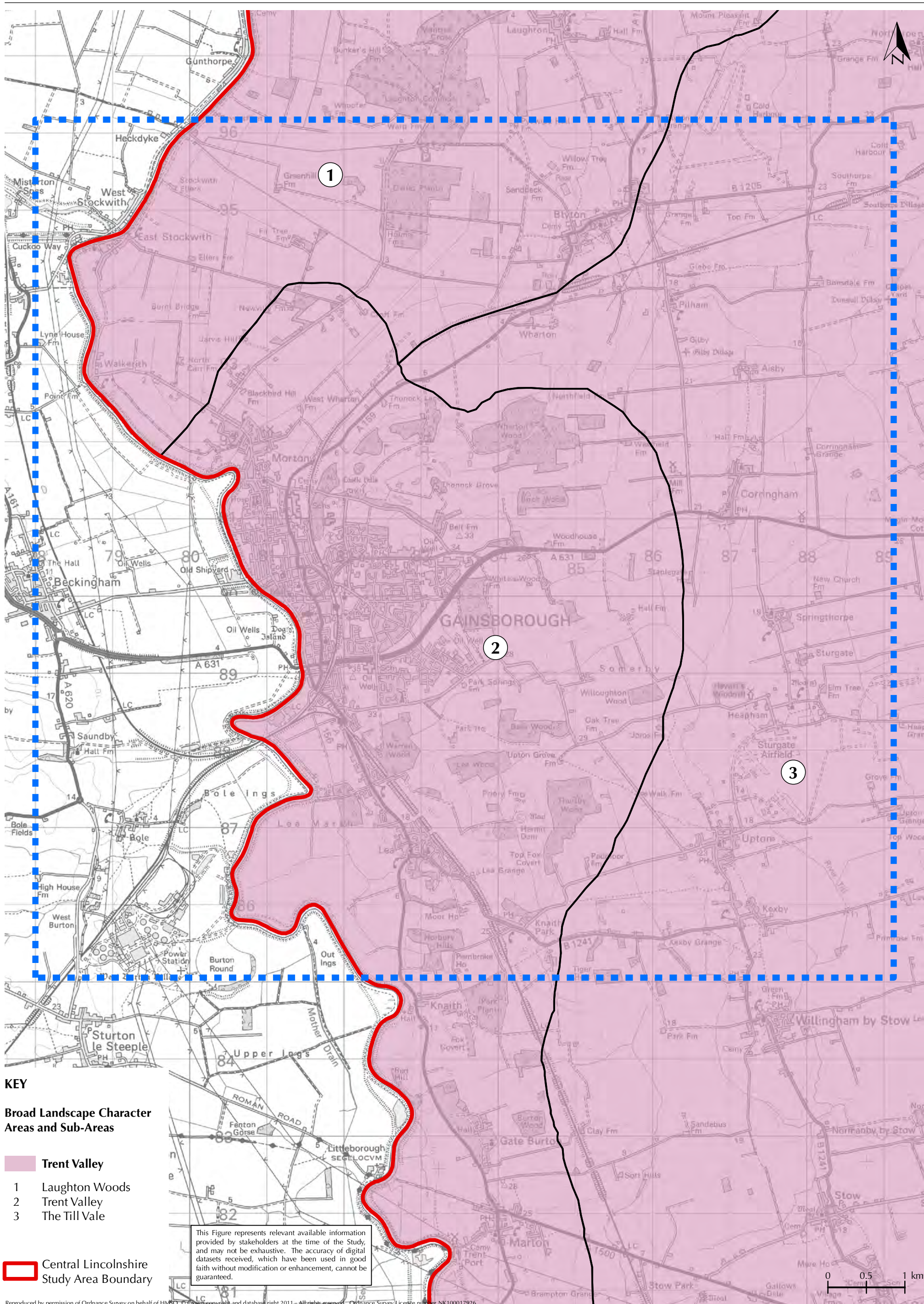
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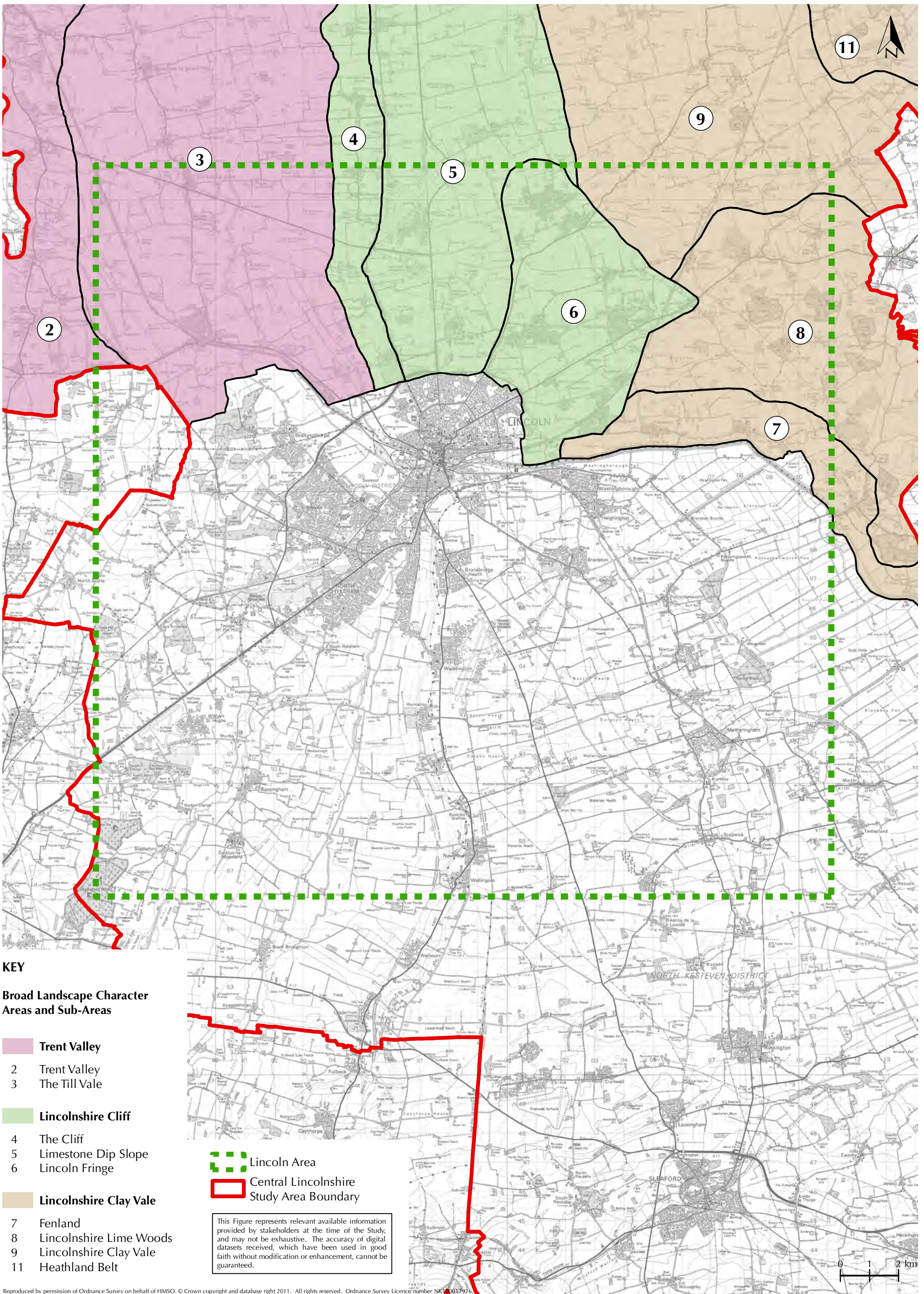


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**CHRIS BLANDFORD ASSOCIATES**  
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**FIGURE 2.6c**  
Local Landscape Character:  
West Lindsey - Lincoln Area



**Table 2.4b – West Lindsey Landscape Character Areas which Fall within the Study Area and Gainsborough and Lincoln Areas**

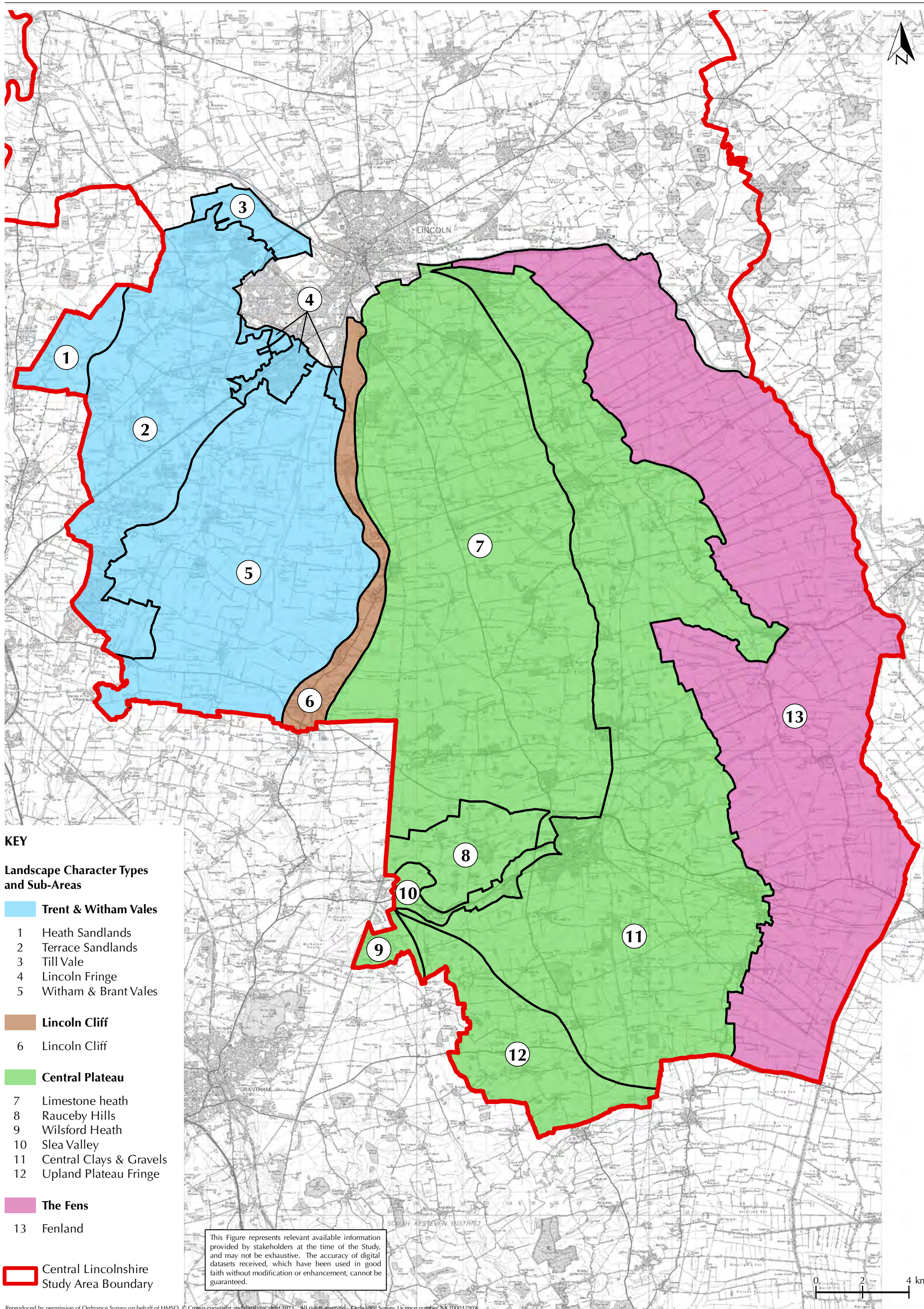
East Midlands Regional Landscape Character Types	West Lindsey Landscape Character Areas	Central Lincolnshire	Gainsborough Area	Lincoln Area
2b: Planned and Drained Fens and Carrlands	1: Loughton Woods	✓	✓	✓
3a: Floodplain Valleys	2: Trent Valley	✓	✓	
	7: Fenland	✓		
4a: Unwooded Vales	2: Trent Valley	✓		
	3: The Till Vale	✓	✓	✓
	6: Lincoln Fringe	✓		✓
	8: Lincolnshire Limewoods	✓		✓
	9: Lincolnshire Clay Vale	✓		
	10: The Kelseys	✓		
	11: Heathland Belt	✓		
4b: Wooded Vales	1: Loughton Woods	✓	✓	✓
	2: Trent Valley	✓	✓	
	8: Lincolnshire Limewoods	✓		✓
	11: Heathland Belt	✓		
6a: Limestone Scarps and Dipslopes	4: The Cliff	✓		✓
	5: Limestone Dip Slope	✓		✓
	6: Lincoln Fringe	✓		✓
7a: Chalk Wolds	13: Lincolnshire Wolds	✓		
	14: Wolds' Estates	✓		
7b: Wolds Scarps and Ridges and Valleys	11: Heathland Belt	✓		
	12: North West Wolds Escarpment	✓		
	13: Lincolnshire Wolds	✓		
	14: Wolds' Estates	✓		

*North Kesteven Landscape Character Assessment<sup>56</sup>*

2.4.20 Within the context of the seven Regional Landscape Character Types that cover the District of North Kesteven, the North Kesteven Landscape Character Assessment identifies four Landscape Character Types and 13 Landscape Character Areas (sub-areas) (see **Figure 2.7a**). As listed in **Table 2.4c** and shown on **Figures 2.7a-c** the following North Kesteven Landscape Character Areas fall within the Central Lincolnshire, Lincoln and Sleaford Areas.

<sup>56</sup> North Kesteven Landscape Character Assessment (September 2007, David Tyldesley and Associates for North Kesteven District Council





# KEY

## Landscape Character Types and Sub-Areas

### Trent & Witham Vales

- 1 Heath Sandlands
- 2 Terrace Sandlands
- 3 Till Vale
- 4 Lincoln Fringe
- 5 Witham & Brant Vales

### Lincoln Cliff

- 6 Lincoln Cliff

### Central Plateau

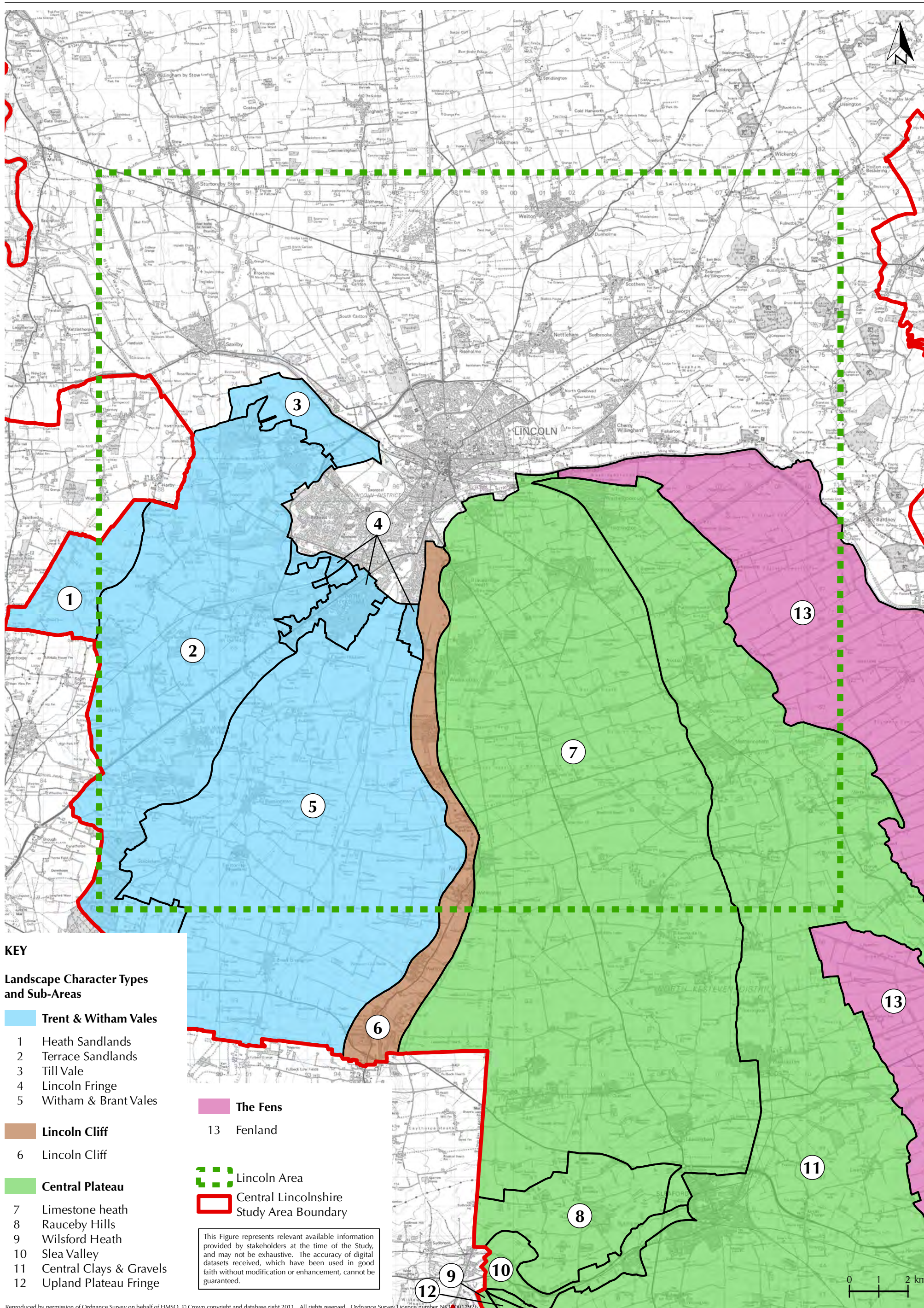
- 7 Limestone heath
- 8 Rauceby Hills
- 9 Wilsford Heath
- 10 Sleas Valley
- 11 Central Clays & Gravels
- 12 Upland Plateau Fringe

### The Fens

- 13 Fenland

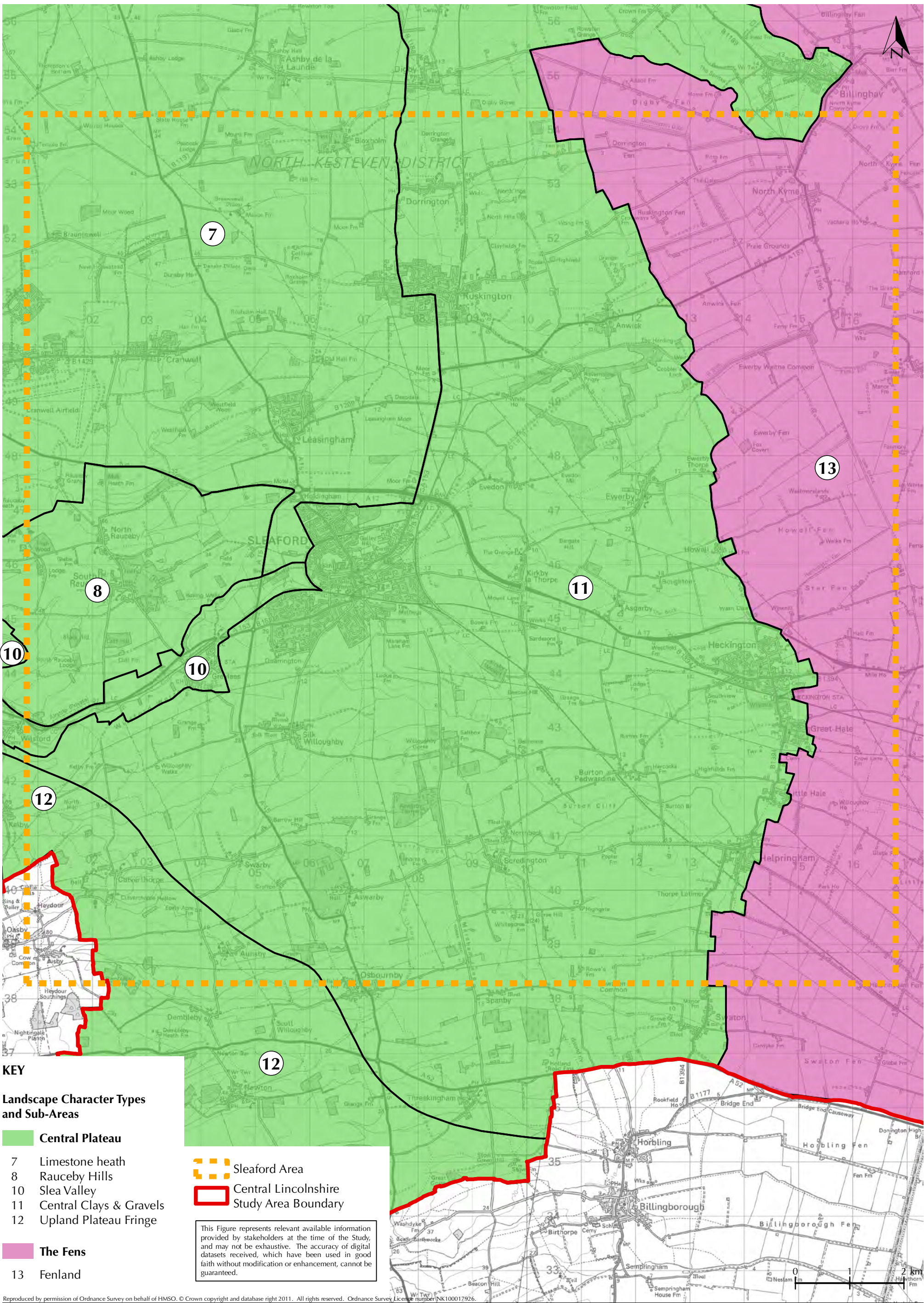
### Central Lincolnshire Study Area Boundary





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**Table 2.4c – North Kesteven Landscape Character Areas which Fall within the Study Area and Lincoln and Sleaford Areas**

East Midlands Regional Landscape Character Types	North Kesteven Landscape Character Areas	Central Lincolnshire	Lincoln Area	Sleaford Area
2b: Planned and Drained Fens and Carrlands	13: Fenland	✓	✓	
2c: Fen and Marsh Margin Farmlands	11: Central Clays and Gravels	✓	✓	✓
3a: Floodplain Valleys	13: Fenland	✓	✓	
4a: Unwooded Vales	1: Heath Sandlands	✓		
	2: Terrace Sandlands	✓	✓	
	3: Till Vale	✓	✓	
	4: Lincoln Fringe	✓	✓	
	5: Witham and Brant Vales	✓	✓	
	10: Slea Valley	✓		✓
4b: Wooded Vales	2: Terrace Sandlands	✓	✓	
6a: Limestone Scarps and Dipslopes	6: Lincoln Cliff	✓	✓	
	7: Limestone Heath	✓	✓	✓
	8: Rauceby Hills	✓		✓
	10: Slea Valley	✓		✓
10a: Forest Hills and Ridges	9: Wilsford Heath	✓		
	12: Upland Plateau Fringe	✓		

## Landscape Planning Designations

### *Area of Outstanding Natural Beauty*

- 2.4.21 The nationally significant landscape of the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) covers a relatively small proportion of the north-eastern corner of the Study Area within West Lindsey District, to the northeast of Market Rasen and east of Caistor (see **Figure 2.5a**). The main purpose of AONBs is the conservation and enhancement of the natural beauty of the area - the landscape, ecological and geographical interests, and heritage, including archaeology and settlement character. The conservation of the human influence on the areas, in terms of archaeological, architectural and vernacular feature is also important.

### *Areas of Great Landscape Value*

- 2.4.22 Areas of Great Landscape Value have been identified by West Lindsey District Council<sup>57</sup> as the most important and striking parts of the landscape. These areas are considered to be ‘*of distinctive value to the character of the District as a whole*’ and ‘*follow landscape features*

<sup>57</sup> West Lindsey Local Plan First Review Chapter 6: 6.60 (2006, West Lindsey District Council)



which run through towns and villages<sup>58</sup>. Areas of Great Landscape Value occur in the following six broad locations within the Study Area (see **Figure 2.5a**):

- Centred on Laughton Woods and Scotton Common in the northwest of the Study Area. This falls within the Gainsborough Area (see **Figure 2.5b**);
- To the northeast and east of Gainsborough, following parts of the Wooded Vales. This falls within the Gainsborough Area (see **Figure 2.5b**);
- Following the course of the Lincolnshire Cliff scarp slope, running north-south across the northern half of the Study Area. The southern part of this falls within the Lincoln Area (see **Figure 2.5c**);
- In the northeast of the Study Area, centred on Great Limber and the Chalk Wolds' Estates (abutting the northern edge of the Lincolnshire Wolds AONB);
- To the southwest of Caistor, centred on Nettleton Moor (abutting the western edge of the Lincolnshire Wolds AONB); and
- To the east of Market Rasen, centred on Willingham Forest and Woods (at the western edge of the Lincolnshire Wolds AONB).

### *Green Wedges*

2.4.23 North Kesteven District Council and the City of Lincoln have defined Green Wedges (see **Figure 2.5a**). Within North Kesteven, Green Wedges are defined as areas which are intended to *'bring continuous or closely linked open space into the heart of the City's built-up area<sup>59</sup>'*. They have been selected to *'either directly link with or to associate with the City's Green Wedges and hence to extend the established open space links within the City's built-up area further into the surrounding countryside<sup>60</sup>'*. The North Kesteven Local Plan describes green wedges as being valuable in different ways<sup>61</sup> and as having the following four broad roles:

#### *'Landscape*

- *They may be of intrinsic landscape value (natural beauty or visual significance).*
- *They may provide important views into or out of the City.*
- *They may play an important role in providing an attractive setting to the City.*

#### *Recreation*

- *They may provide recreational opportunities for the inhabitants of the City or any of the adjacent North Kesteven settlements, or visitors.*
- *They may provide opportunities for the existing footpath, bridleway or cycle route networks to be enhanced<sup>61</sup>.*

#### *Wildlife*

- *They may provide links of value to wildlife between the City and the countryside, between County Wildlife Sites and the countryside, or between different County Wildlife Sites.*

#### *Coalescence*

- *They may help to prevent the coalescence of settlements'*

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<sup>58</sup> West Lindsey Local Plan First Review (2006, West Lindsey District Council)

<sup>59</sup> North Kesteven Adopted Local Plan (2007, North Kesteven District Council) and City of Lincoln Local Plan (1998, City of Lincoln Council)

<sup>60</sup> North Kesteven Adopted Local Plan (2007, North Kesteven District Council)

<sup>61</sup> The character of the Green Wedges is described in Appendix 5 of the North Kesteven Adopted Local Plan (2007)



- 2.4.24 Within the North Kesteven part of the Study Area, Green Wedges are located along the southern and western edges of the City of Lincoln (within the Lincoln Area), linking, in several locations, with the Green Wedges defined by the City of Lincoln (see **Figure 2.5c**).
- 2.4.25 Within the City of Lincoln, Green Wedges are defined as ‘*an area (usually in a variety of uses) which brings continuous or closely linked open space into the heart of the City’s built up area*<sup>62</sup>’. These Green Wedges are located amongst the urban fabric and at the eastern and western edges of the city (within the Lincoln Growth area) (see **Figure 2.5c**).
- 2.4.26 Under Policy STRAT 13<sup>63</sup> of the West Lindsey District Local Plan, the following reference is made to green wedges:

*There are a number of settlements in West Lindsey which are very close neighbours. In view of pressures for development in the breaks between such neighbouring settlements, the Council is concerned that the individual and separate communities are not subject to coalescence which is harmful to the individuality of villages and their setting. Also some settlements close to the edge of the City of Lincoln need to be prevented from coalescing with the City.*

**Green Wedges** *have the specific purpose of protecting the historic setting of the City of Lincoln from inappropriate development on the urban fringes and to preserve links with the open countryside. Development, apart from in exceptional circumstances, will not be permitted on these areas of land as shown on the Proposals Map in line with the Lincolnshire Structure Plan Review 2004 and Local Plan First Review policies.’*

- 2.4.27 The Green Wedges referred to above form part of a set of identified Settlement Breaks (see below) within the District of West Lindsey and are situated at the northern edge of the City of Lincoln (see **Figure 2.5c**).

#### *Undeveloped Breaks between Settlements and Green Wedges*

- 2.4.28 West Lindsey District Council has defined Settlement Breaks/Green Wedges<sup>64</sup> as ‘*open areas between settlements*’ which are ‘*often especially important to the character of individual settlements and their setting, as they provide essential access to the countryside and nature for local people*’. Green Wedges are situated at the northern edge of the City of Lincoln. Settlement Breaks are located between Welton and Dunholme (within the Lincoln Area, see **Figure 2.5c**), and between Gainsborough and Lea and Upton and Kexby (within the Gainsborough Area, see **Figure 2.5b**). There is also a Settlement Break between Market Rasen and Middle Rasen in the northeast of the Study Area (see **Figure 2.5a**).

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<sup>62</sup> City of Lincoln Local Plan (Adopted August 1998, City of Lincoln Council)

<sup>63</sup> Policy STRAT 13 ‘Undeveloped Breaks between Settlements and Green Wedges around Lincoln District Council’

<sup>64</sup> West Lindsey Local Plan First Review (June 2006, West Lindsey District Council ) A101/A102



## Visual Amenity Areas

2.4.29 North Kesteven District Council defines Visual Amenity Areas on the basis of the following criteria:

- *'They should be open to public view; and*
- *They should play an important role in the character of the settlement, enhancing the locality or surrounding buildings, or framing or permitting views<sup>65</sup>.'*

2.4.30 Visual Amenity Areas are situated within the urban fabric and at the north-eastern and eastern edges of Sleaford Urban Area, in the Sleaford Growth Area (see **Figure 2.5d**).

## Lincoln Cliff Area of Distinctive Landscape Character

2.4.31 The North Kesteven Local Plan identifies the Lincoln Cliff as an area of distinctive landscape character *'in recognition of its particularly dramatic appearance and the vulnerability of its character to harm by insensitive development'*<sup>66</sup>. The Local Plan states that:

*'Within this area, greater attention will be paid to the landscape impact of development proposals, particularly in terms of impact upon views from, to and along the Cliff. In this respect, it is unlikely that planning permission will be granted for development that would be visually prominent, by virtue of its size or location (e.g. on the skyline) as this is highly likely to detract from the character of the area.'*

2.4.32 The Lincoln Cliff Area of Distinctive Landscape Character follows the course of the Lincolnshire Cliff scarp slope, running north-south across the southern half of the Study Area. The northern part of this falls within the Lincoln Area (see **Figure 2.5c**). Policy LW1 'Landscape Conservation' of the North Kesteven Local Plan<sup>67</sup> states that:

*'The Council will seek to protect the distinctive landscapes of the identified Landscape Character Areas and any special features which contribute to that character. Where development is acceptable, it will be required to contribute to the local distinctiveness of the area, be well integrated into the local landscape character, protect any features of importance to the local scene, and respect any important views.'*

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<sup>65</sup> North Kesteven Adopted Local Plan (2007, North Kesteven District Council)

<sup>66</sup> North Kesteven Adopted Local Plan (2007, North Kesteven District Council)

<sup>67</sup> North Kesteven Adopted Local Plan (2007, North Kesteven District Council)



## Townscape Character Assets

- 2.4.33 The Lincoln Townscape Assessment<sup>68</sup> (LTA) characterises the entire City of Lincoln into 108 distinctive Townscape Character Areas (see **Figure 2.8** and **Appendix A7**). These Townscape Character Areas record the historical development, urban form and use of different parts of the city and include perceptions and experiences of local character and sense of place. In overview, the heart of the city is centred on the Roman and medieval historic core which contains the Cathedral and Close, with adjacent late Victorian/Edwardian suburbs and at further distance from the historic core inter-war/post war and mixed age residential and industrial areas. Urban green spaces and open spaces at the setting of the city are included within the Townscape Character Areas, which may offer opportunities for GI improvements and linkages.
- 2.4.34 In light of planned growth around the City of Lincoln, a Growth Points Characterisation Project<sup>69</sup> has been carried out. It extends the existing LTA and, using the same methodology, *'characterises existing urban and rural areas that might be affected by proposed future development. Supported by policy within the joint LDF for Central Lincolnshire, the results of the project will help to inform how new development can maximise the potential of the inherited character of places in and around Lincoln'*<sup>70</sup>. The project has identified 30 Lincoln Growth Point Character Areas (GPCAs) around the outer edge of the administrative boundary of the City of Lincoln (see **Figure 2.8** and **Appendix A7**). Four GPCAs are natural extensions of existing character areas already defined in the LTA, within the Lincoln Authority area.
- 2.4.35 As described in the Lincoln Fringe Assessment<sup>71</sup>, the GPCAs *'can be broadly divided into two groups which relate to their current land use. Ten of the areas, mainly to the north and south of the city, are open and undeveloped in character and are mostly agricultural in use'* (under both arable and pastoral regimes). Traces of the past remain, *'in particular the large-scale enclosure of open fields, moor and heath lands undertaken from the Early Industrial Period. [...] Agricultural fields are defined by hedgerows and/or narrow wet open ditches and also by modern fencing and occasionally stone walling. [...] Woodland survives in varying degrees, for example around Riseholme and Canwick.'* Richmond Lakes and Whisby Character Area (to the south-west) survives as an example of large-scale gravel extraction now used for a number of recreational pursuits. *'Open areas are sparsely populated with a number of scattered isolated farmsteads and sporadic residential dwellings'. 'Substantial parts of the fringe area to the south and southwest of the city are agricultural in nature with wedges of rural land extending deep*

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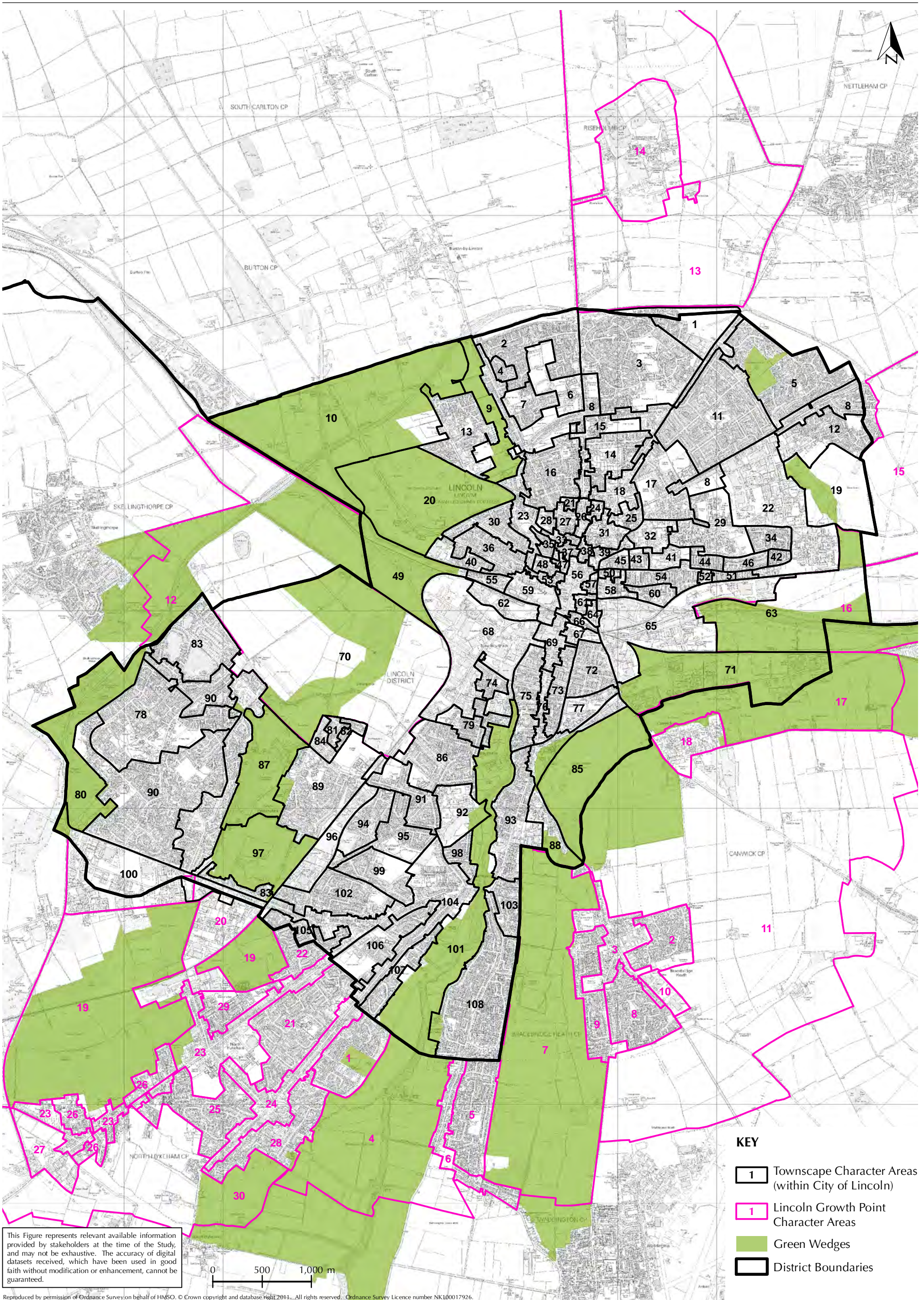
<sup>68</sup> The Lincoln Townscape Character Assessment (2005-2009) is available to download on the Lincoln City Council website: <http://www.heritageconnectlincoln.com/>

<sup>69</sup> Lincoln Fringe Assessment/Growth Points Characterisation Project: Overview Statement (August 2011, APS)

<sup>70</sup> Lincoln Fringe Assessment/Growth Points Characterisation Project: Overview Statement (August 2011, APS)

<sup>71</sup> Lincoln Fringe Assessment/Growth Points Characterisation Project: Overview Statement (August 2011, APS)







into the conurbation. Similar green wedges are located to the east and west of the city (in the Witham valley and Fossdyke corridor respectively).

- 2.4.36 *'The remaining 20 areas comprise both residential and industrial developments, the majority of which are located along the A46 and around the historic settlement of North Hykeham<sup>72</sup>. [...] There is considerable variation in the urban landscape of the Lincoln Fringe'. Residential areas include the historic village cores of North Hykeham and Canwick as well as linear ribbon development (focused along the Roman and Medieval road layout) and later residential estates. 'Much of the built townscape along major roads is strongly characteristic of the Late Victorian/Edwardian and Inter-war Periods. Land to the rear was developed with a series of housing estates from the Inter-war Period to the present day. There is an evolving change in the townscape character of these estates.'* Industrial areas are found in the Swanholme, South Hykeham, Bracebridge Heath areas.

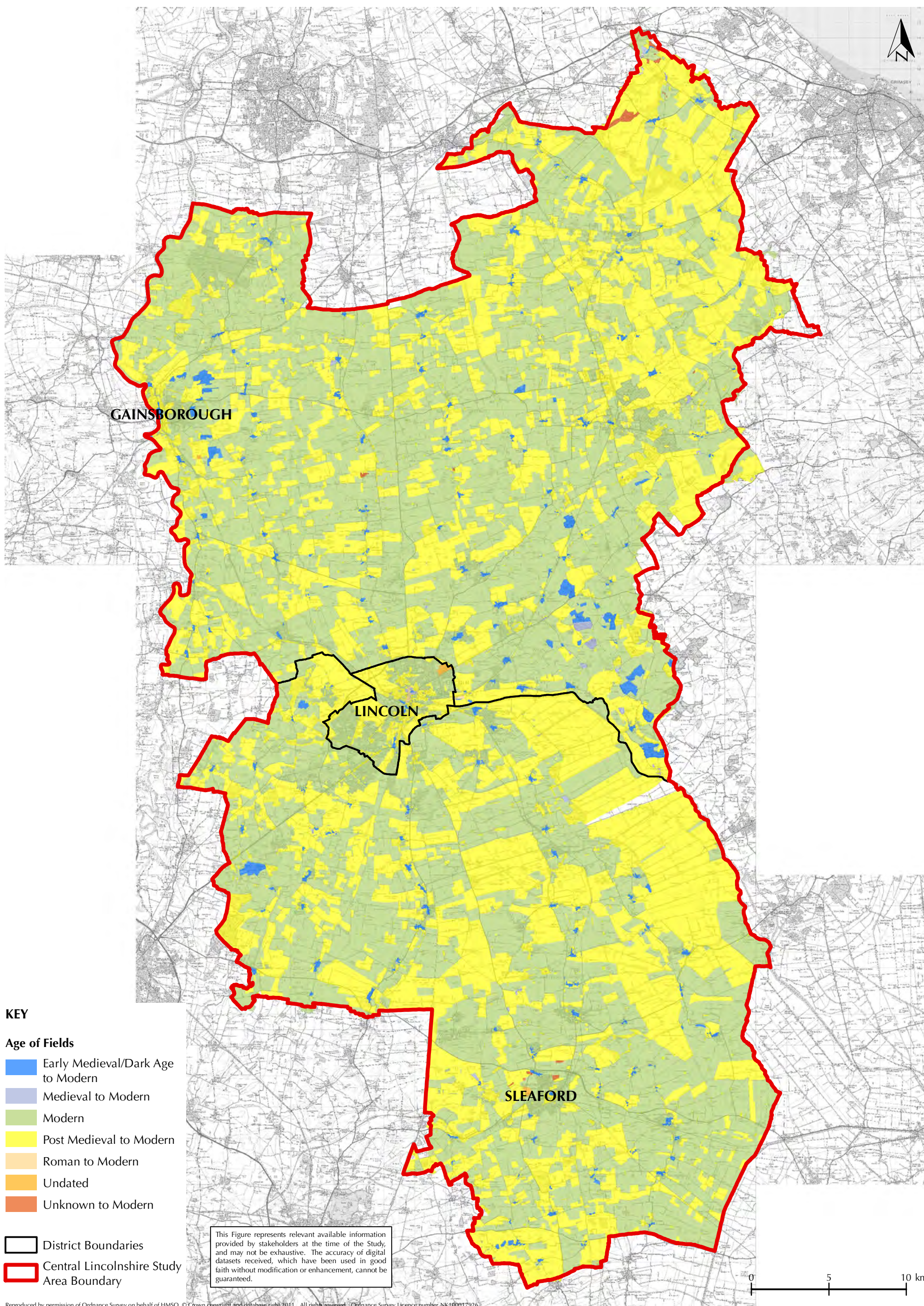
### **Historic Landscape Character**

- 2.4.37 Historic Landscape Character (HLC) analysis comprises a comprehensive consideration of the present day landscape identifying its historic origins and describing its character and distinctive elements. The latter, often perceived as 'natural' are nevertheless the product of centuries of human action – e.g. hedgerows, woodland, ponds and modified watercourses. They also take account of more intangible matters reflected in its physical structure: time-depth and patterns such as settlement, land use and the mixture of enclosed and non-enclosed land, arable and grazing, woodland and parkland. Historic Landscape Character analysis divides the landscape into a series of pre-defined categories of HLC types based on current and historic mapping. Examples include different types of woodland, fields, heathland, common and areas characterised by mineral extraction or industry.
- 2.4.38 The Lincolnshire Historic Landscape Characterisation Study has identified 85 HLC types and 11 broad HLC areas within Central Lincolnshire (see **Appendix A8**). For example, information on the different ages of fields within the Study Area, from Roman to Modern periods, is shown on **Figures 2.9a-d**). The majority of the Study Area is characterised by a patchwork of post medieval and modern fields, with pockets of small-scale early medieval fields at settlement edges and within the Wooded Vales to the east of Gainsborough and Lincoln. The location of many of the woodlands within the Study Area also originates from the early medieval period, whilst pockets of Roman enclosure are visible within the City of Lincoln (see **Figure 2.9c**).

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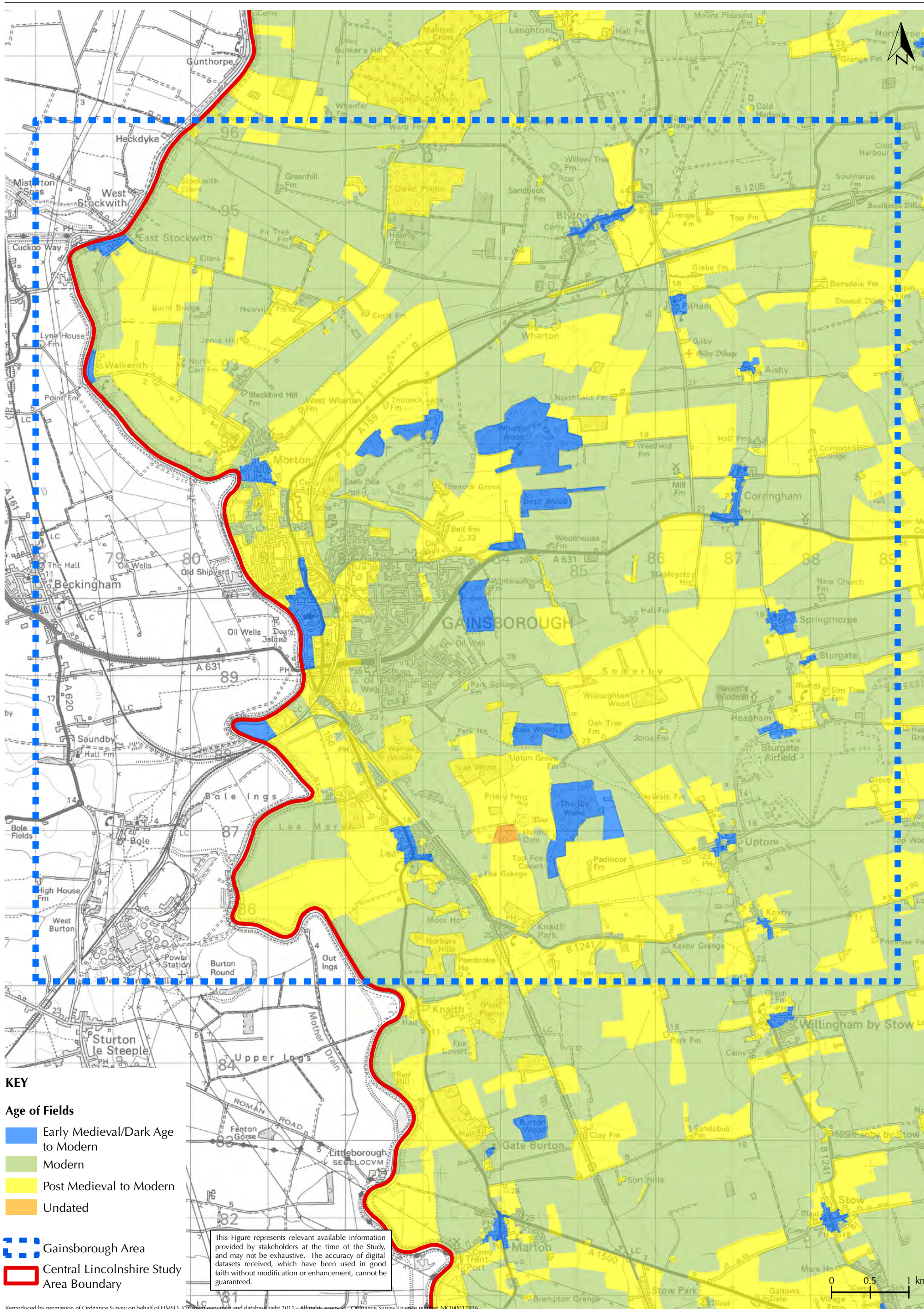
<sup>72</sup> Lincoln Fringe Assessment/Growth Points Characterisation Project: Overview Statement (August 2011, APS)



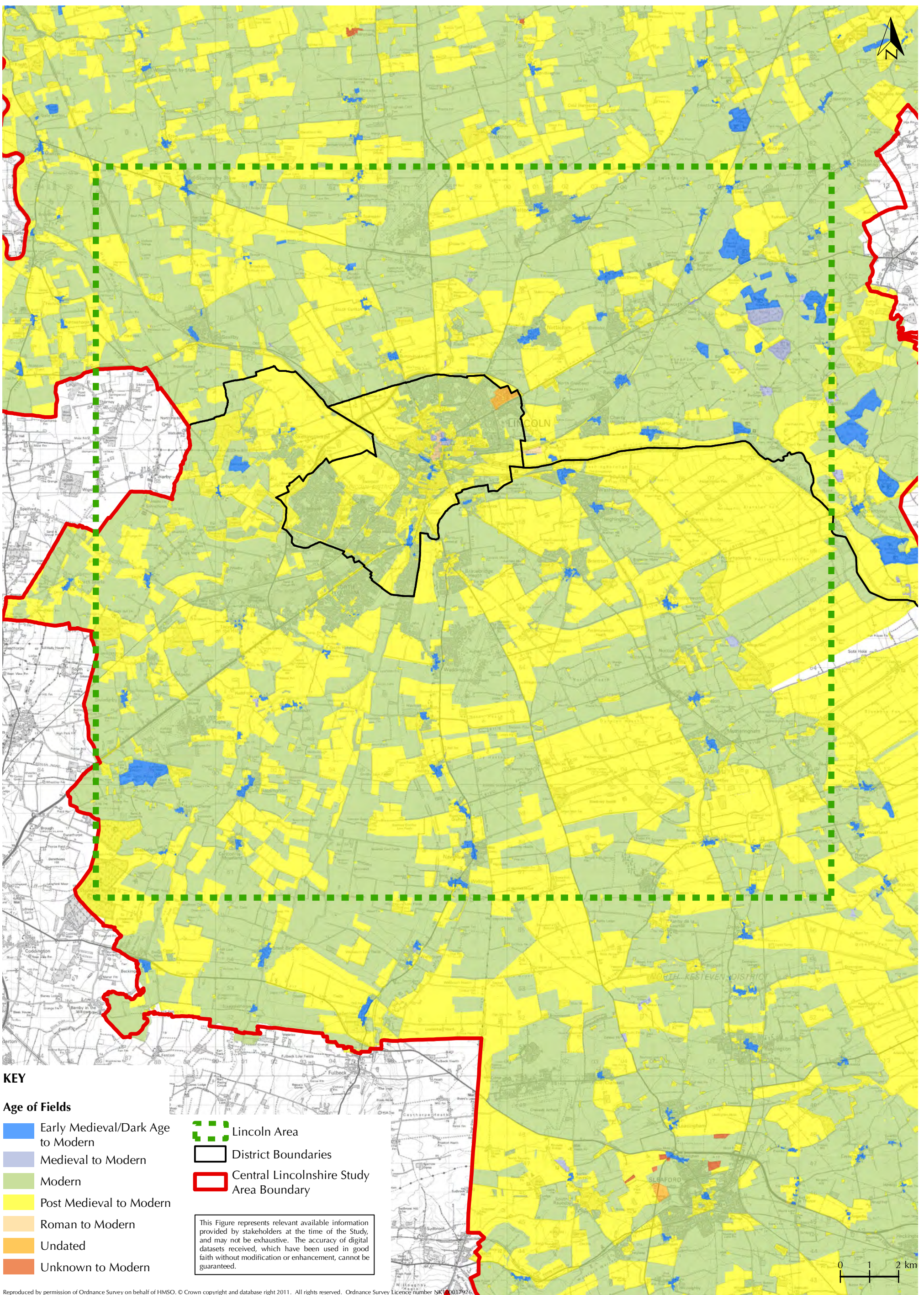


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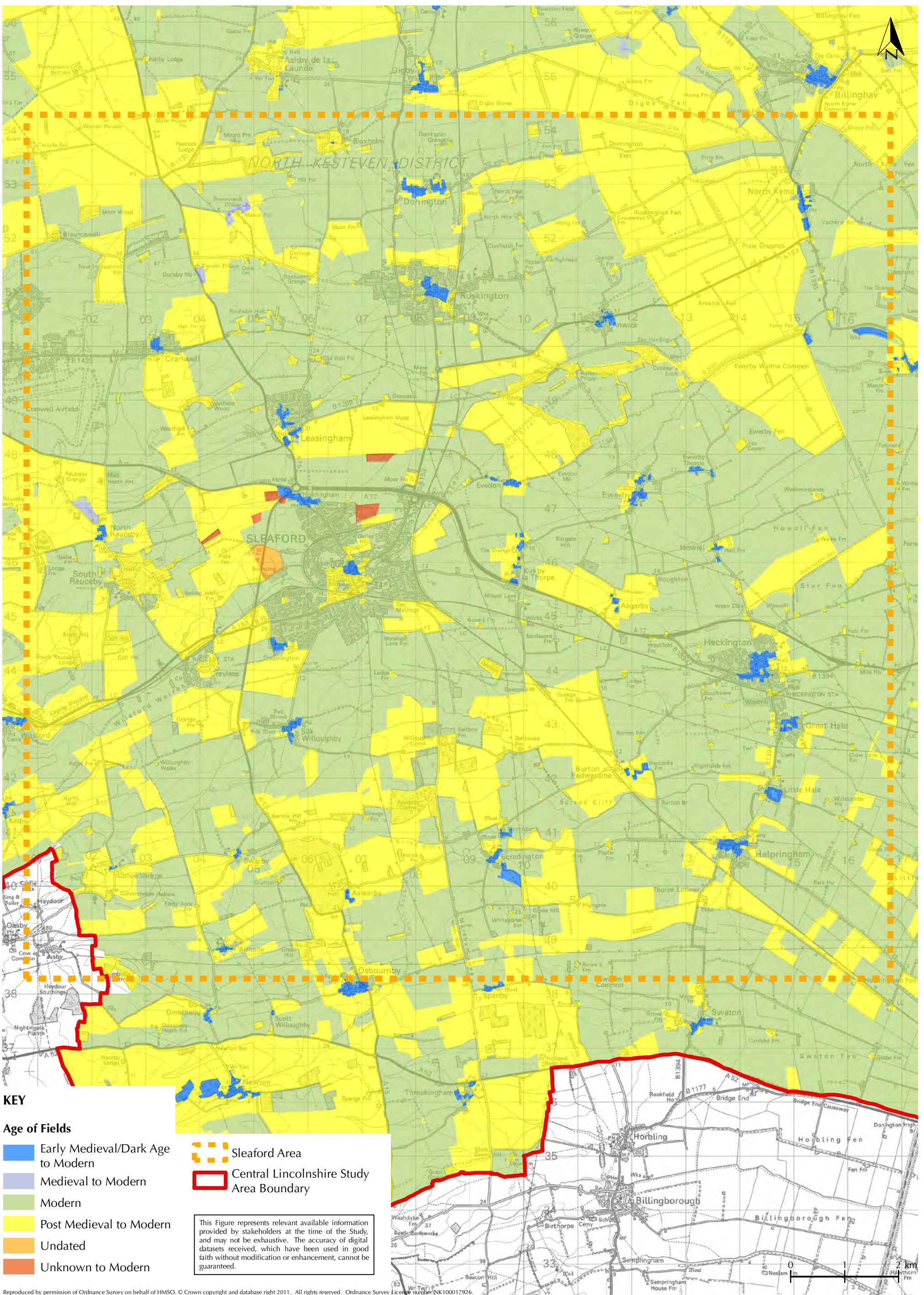






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