

APPENDIX A

Opportunity Mapping Methodology & Data Sources

1.0 APPENDIX A

1.1 Opportunity Mapping Methodology and Data Sources

Datasets

Baseline Habitat Data

- 1.1.1 The biodiversity opportunity mapping process began with the acquisition, testing and expression of existing spatial data for the extant habitat resource. Data relating to the distribution and abundance of semi-natural habitats were provided by the Greater Lincolnshire Nature Partnership (GLNP), Natural England (NE), Forestry Commission (FC) and Woodland Trust (WT). It was indicated from an early stage that some of the NE datasets, in particular heathland, were not very accurate and could not be relied upon to give a true impression of habitat coverage in Central Lincolnshire (C.Lincs). The GLNP datasets were reported to be accurate, but mapping has only been carried out across a very small area (approximately 2% of C.Lincs). In order to create the most comprehensive baseline habitat dataset, the datasets were combined in order to display maximum coverage of habitats across C.Lincs, but priority has been given to displaying the GLNP datasets as a 'top layer' over those provided by NE, FC and WT.
- 1.1.2 There are around 80 different habitat types that make up the baseline inventory of existing semi-natural habitats (see Table A1 below). In order to rationalise the approach to opportunity mapping, the individual datasets were aggregated into a series of broad habitat types, in line with the habitat priorities set out in the Lincolnshire Biodiversity action Plan (2nd edition, 2006). This is not intended to restrict the range of opportunities for specific habitat interventions (e.g. the restoration / creation of purple moor grassland and rush pasture habitat), but is intended to provide a broad view on the most appropriate areas where this type of intervention may be able to occur within the context of broad opportunity areas (e.g. heathland / acid grassland habitat opportunity areas).
- 1.1.3 In all, 6 categories of habitat type were identified:
- Woodland;
 - Wetland;
 - Neutral grassland;
 - Heathland;
 - Acid grassland; and,
 - Calcareous grassland

- 1.1.4 Due to the close relationship between certain habitat types, wetlands and neutral grasslands were expressed on a single plan. This is because the overwhelming majority of the neutral grassland resource in Central Lincolnshire is Floodplain Grazing Marsh, a habitat intimately linked with the water table. Similarly, heathland and acid grassland are expressed on a single map due to specific soil character requirements.
- 1.1.5 In addition to the aggregation of semi-natural habitat types, a layer was also created consisting of, in particular, allotments, brownfield sites, cemeteries, wood pasture and parkland and displayed at Lincoln Area scale. This is something of an anomaly in that the project does not necessarily seek to extend these types of sites, but it does recognise the important role that these sites play in the protection of existing semi-natural habitats of high ecological value, and in providing conduits for species dispersal within urban and suburban areas.
- 1.1.6 The woodland maps distinguish between coniferous plantation woodland and all other types of woodland, since coniferous woodland is considered to have limited biodiversity value and has the potential, for example, to be restored to broadleaved woodland or open heathland / acid grassland type habitats (as a consequence plantation woodland has been displayed on the heathland & acid grassland maps as potential opportunity areas.
- 1.1.7 The datasets and dataset subtypes which make up each of these habitat layers are set out in **Table A1** below:

Table A1: Datasets and Dataset Subtypes used in the Habitat Layers:

Habitat Layer	Dataset/Dataset Subtypes
Acid grassland	Acid grassland
	Dry heath/acid grassland mosaic
	Lowland dry acid grassland
	Purple moor grass and rush pastures
	Semi-improved acid grassland
	Unimproved acid grassland
Calcareous grassland	Calcareous grassland
	Lowland calcareous grassland
	Semi-improved calcareous grassland
	Unimproved calcareous grassland
Coniferous plantation woodland	Conifer
	Coniferous plantation woodland
	Coniferous semi-natural woodland
	Mixed – predominantly conifer
Greenspace	Allotments
	Amenity grassland
	Arable
	Bare ground
	Brownfield
	Cemeteries (active)

Habitat Layer	Dataset/Dataset Subtypes
	Cemeteries (disused)
	Dense/continuous scrub
	Ephemeral/short perennial
	Green wedge region
	Improved grassland
	Non-ruderal
	Open space green wedges
	Parks and gardens
	Quarry
	Scrub
	Tall ruderal
	Wood pasture and parkland
Heathland	Acid dry dwarf shrub heath
	Dry heath/acid grassland mosaic
	Lichen/bryophyte heath
	Lowland heathland
Neutral grassland	Grassland
	Lowland meadows
	Neutral and damp grassland
	Neutral grassland
	Poor semi-improved grassland
	Semi-improved grassland
	Semi-improved neutral grassland
	Undetermined grassland
	Unimproved grassland
	Unimproved neutral grassland
Wetlands	Acid/neutral flush
	Coastal and floodplain grazing marsh
	Eutrophic standing water
	Fens
	Inundation vegetation
	Lakes
	Lowland raised bog
	Marsh/marshy grassland
	Reedbeds
	Running water
	Standing water
	Swamp
	Wet woodland
Woodland	Ancient woodland (ASNW)
	Ancient woodland (PAWS)
	Assumed woodland
	Broadleaved
	Broadleaved plantation woodland
	Broadleaved semi-natural woodland
	Conifer
	Coniferous plantation woodland
	Coppice
	Deciduous woodland
	English Woodland Grant Scheme
	Felled
	Ground prepared for planting
	Low density

Habitat Layer	Dataset/Dataset Subtypes
	Lowland mixed deciduous woodland
	Mixed – predominantly broadleaved
	Mixed – predominantly conifer
	Mixed plantation woodland
	Mixed semi-natural woodland
	Non-native broadleaved woodland
	Plantation woodland
	Shrub land
	Traditional orchards
	Undetermined woodland
	Wet woodland
	Woodland
	Young trees
Woodland (other)	Ancient woodland (ASNW)
	Ancient woodland (PAWS)
	Assumed woodland
	Broadleaved
	Broadleaved plantation woodland
	Coppice
	Deciduous woodland
	English Woodland Grant Scheme
	Felled
	Ground prepared for planting
	Low density
	Lowland mixed deciduous woodland
	Mixed – predominantly broadleaved
	Mixed plantation woodland
	Non-native broadleaved woodland
	Plantation woodland
	Shrub land
	Traditional orchards
	Undetermined woodland
	Wet woodland
	Woodland
	Young trees

Supporting Datasets

- 1.1.8 The extant habitat datasets described above provide a record of the currently known spatial distribution of semi natural habitats within the Study Area. In order, however, to make predictions on where these habitat types could potentially be extended or created, a series of supporting datasets were also used in defining strategic and detailed opportunity areas at both the Central Lincolnshire and Lincoln Area scales.
- 1.1.9 The National Landscape Description Units provide a broad characterisation of land type within each character area. This provides a general characterisation of the types of semi natural habitats that would be expected to occur within each character area thereby providing a general commentary on the feasibility of habitat creation within a broad area.

- 1.1.10 Similarly Agricultural Land Classification is used as a means for identifying the relative quality of land and in particular, from an ecological perspective, where opportunities may occur for the creation of semi-natural habitats on nutrient poor soils.
- 1.1.11 The Environment Agency's Flood Zone maps provide an indication of the most appropriate areas where wetland creation may be targeted. Similarly, the Environment Agency's Water Framework Directive (WFD) Water Quality Classification data aids the identification of locations where biodiversity opportunities may be best targeted for the purposes of improving water quality, managing flood risk and increasing flow attenuation.
- 1.1.12 Superficial deposit data relating to sands and gravels were used to define the most appropriate location for targeting opportunities for heathland and acid grassland creation. Similarly, chalk and limestone bedrock data was used for targeting opportunities for calcareous grassland creation.
- 1.1.13 Strategic Housing Land Availability Assessment (SHLAA) data was also used to understand where protection of, and enhancements to, the existing network of semi natural habitats may be focused in relation to projected housing growth.

Data Accuracy

- 1.1.14 During the mapping process a number of inaccuracies in the datasets were noted by members of the Steering Group and Workshop participants. The main issue was reported to be an overestimation of habitat coverage, where large blocks of land were mapped as a specific habitat type e.g. heathland, when realistically only a very small amount (or none at all) of this habitat is actually present. The reason for these inaccuracies is not clear, but may result from a range of reasons, including: the age of the data; natural succession of habitats over time; mapping methodologies and lack of 'ground truthing'. The main inaccuracies in the habitat databases within C.Lincs are captured within the workshop notes in **Appendices B-E**.
- 1.1.15 In addition to inaccuracies in mapping, gaps in data coverage of the habitats were also identified. The most noticeable and important of these gaps appears to be the lack of calcareous grassland data. Much of this habitat resource exists as linear extents along roadside verges in C.Lincs, yet very few verges in this area are contained within NE's Lowland Calcareous Grassland dataset. The GLNP habitat dataset contains data from the 'Life on the

Verge Project' (LotV) which has surveyed 2918km of roadside verge to date¹ in the Lincolnshire and Rutland Limestone Natural Area, identifying important grassland verges and providing an evidence base to designate them as Local Wildlife Sites (LWSs) and Roadside Nature Reserves (RNRs). By using this dataset and the new LWS dataset² showing the most recently designated grassland verges identified through the LotV project, a greater extent of calcareous grassland has been displayed on the maps.

- 1.1.16 It was also indicated during the workshops that there are a number of calcareous grassland road verges (of unknown quality) within a corridor of limestone and chalk bedrock running north of Lincoln to Broughton. These are not displayed on the maps as they have not been surveyed and are not contained within any of the habitat or LWS datasets provided to date.
- 1.1.17 It is important to recognise that data accuracy or deficiency is an important first step in the Biodiversity Opportunity Mapping process; knowing the extent of each habitat resource is central to being able to accurately understand what requires protection and how best to defragment scatters of habitat through future management and habitat creation opportunities. Nevertheless, for the purposes of this project, opportunity mapping is based on the current, known, extent of each habitat type. Any revision to a particular dataset must be undertaken only on the master dataset by the organisation or individual responsible for its maintenance. Amendments to duplicate copies will result in the loss of the definitive dataset. The BOM methodology has been designed, however, to ensure that future updates of the data layers can be incorporated into the opportunity maps, which will enable the identification of opportunities to be refined as the data coverage becomes more comprehensive.

¹ Life on the Verge (2013) Available at <www.lifeontheverge.org.uk> Accessed 08/05/13

² Provided to CBA by the GLNP 19/04/13

Buffers

- 1.1.18 The combination of existing habitat and supporting datasets provides initial search areas for identifying broad opportunity areas. To further refine the opportunity areas and to start the process of prioritising locations where opportunities may be best targeted, buffers were applied to the existing habitat resource.
- 1.1.19 Buffers are a notional boundary indicating maximum dispersal distances of a selection of species associated with each habitat, based on variability in landscape permeability. Buffers have two principal functions:
- To identify areas around existing habitats to protect them from the influences of surrounding land use activities (e.g. agricultural production and/or urban growth) through habitat creation and/or restoration; and,
 - To identify areas where habitat restoration or creation could increase overall coverage by linking areas of existing, isolated, habitats (defragmentation), and to increase resilience to the influences of adjacent land use activity.
- 1.1.20 The buffer size for each habitat type was derived from a review of other BOM methodologies and a literature review and refined to reflect the context and habitat resource of Central Lincolnshire. The literature review was of maximum dispersal distances of species of nature conservation concern and 'generic focal species' (see Appendix 2 of the 6Cs Growth Point Biodiversity Opportunity Mapping Pilot Study for a list of academic papers reviewed on the maximal dispersal distances of species of nature conservation concern³). The 'generic focal species' is used by Watts et al⁴ to demonstrate the effective maximum dispersal distance of a conceptual woodland species through land with a varying degree of permeability – see Table A2.
- 1.1.21 In summary:
- 500m habitat buffers were applied to ancient woodlands; and,
 - 200m habitat buffers were applied to all wetland habitats, heathland, acid grassland and calcareous grassland habitats.

³ Chris Blandford Associates (2009) *Natural England and the Wildlife Trusts – 6Cs Growth Point Biodiversity Opportunity Mapping Pilot Study*

⁴ Watts et al (2010) *Targeting and evaluating biodiversity conservation action within fragmented landscapes: an approach based on generic focal species and least-cost networks*. *Landscape Ecol* 25:1305-1318

Table A2: From Watts et al (2010):

Table 1 Assessment of matrix permeability in the study landscape, in terms of perceived movement cost for woodland species, based on degree of ecological modification and extent of vertical structure within particular land cover types

	Matrix characteristics (modification/vertical structure)	Land cover types	Movement cost—low cost indicates high permeability—with effective maximum dispersal distance in parentheses based upon 1000 m dispersal distance for core GFS profile
High permeability	Secondary woodland and woodland-like habitats; relatively unmodified with strong vertical structure and known to readily accommodate woodland species	Planted/felled broad-leaved and mixed woodland, scrub, bracken	Cost = 1 (effective maximum dispersal distance for core profile = 1000 m)
Medium permeability	Unimproved semi-natural habitats; little modification with some vertical structure	Heathland, marshy grassland	Cost = 3 (effective distance = 333 m)
	Unimproved semi-natural habitats; little modification but with limited vertical structure	Unimproved grassland, mire	Cost = 5 (effective distance = 200 m)
	Semi-improved habitats; moderate modification and limited structure	Planted/felled coniferous woodland, semi-improved grassland, swamp	Cost = 10 (effective distance = 100 m)
Low permeability	Heavily modified habitats with very little structure	Improved and amenity grassland, arable, water	Cost = 20 (effective distance = 50 m)
	Artificial and hostile habitats	Roads, buildings	Cost = 50 (effective distance = 20 m)

Table A3: Review of other BOM methodologies:

Habitat	Buffer Size	Reason for Using Buffer	Source
Grassland (other than calcareous)	300m	<i>‘to help illustrate potential patterns within the landscape’</i>	Bedfordshire & Luton Biodiversity Partnership (2006) <i>Rebuilding Biodiversity in Bedfordshire & Luton</i>
Grassland (lowland meadow)	500m	<i>‘to identify key areas of connectivity for each habitat’</i>	Wildlife Trust BCN (2012) Nene Valley Habitat Opportunity Map
Wetland (fen, wet woodland and floodplain grazing marsh)	500m	<i>‘to identify key areas of connectivity for each habitat’</i>	Wildlife Trust BCN (2012) Nene Valley Habitat Opportunity Map
Wetland (main rivers and chalk rivers)	100m	(to identify) <i>‘strategic river corridors’</i>	Land Use Consultants & Terra Consult (2005) <i>East of England Biodiversity Mapping Project</i>
	100m	<i>‘to identify strategic river corridors’</i>	R.Land (2006) <i>Report of Ecological Network Mapping Project for Norfolk</i>
Woodland	300m	(to identify) <i>‘notional opportunity areas’</i>	Bedfordshire & Luton Biodiversity Partnership (2006) <i>Rebuilding Biodiversity in Bedfordshire & Luton</i>
Woodland (wet)	500m	<i>‘to identify key areas of connectivity for each habitat’</i>	Wildlife Trust BCN (2012) Nene Valley Habitat Opportunity Map

- 1.1.22 The use of buffers has been parsimonious. There are a range of constraints related to calculating buffer size, notably the accurate interpretation of species dispersal rates in relation to, for example, corresponding dispersal rates for host plant species. At its broadest level, therefore, buffers have been used to prioritise targeted interventions for the protection and/or extension of existing areas of semi-natural habitats.
- 1.1.23 With respect to the opportunity mapping for the Lincoln PUA/SUEs/WVCP, 500m buffers were applied to ancient woodlands, in order to identify opportunities for protecting and linking the most valuable woodland habitat. The establishment of new, or natural regeneration of, woodlands to create buffers can generally be achieved on any soil / geological conditions. The principal requirement, therefore, is to understand the most appropriate location for buffers and linkages.
- 1.1.24 By contrast, however, mapping opportunities for protecting and/or linking open habitats at this scale is more nuanced. A range of factors which influence the ability to create heathland / grassland habitats need to be taken into account, principally geological, overlying soil and hydrological conditions. The application of buffers in these circumstances is, therefore, limited as they do not discriminate between different land type and hydrological conditions. Moreover, at the Lincoln PUA/SUEs/WVCP scale it is possible to interrogate available data at the field scale and as a consequence, better judgements on the appropriate location of buffers can be made by an experienced eye.

Opportunity Areas

Woodland

- 1.1.25 The boundaries of the woodland biodiversity opportunity areas were drawn at the C.Lincs scale to include the main concentration of sites identified as having potential for woodland protection/enhancement/creation as described below, other sites identified during the stakeholder workshops and the largest extent of ancient semi-natural woodland. The boundary of the Lincolnshire Limewoods opportunity area was drawn largely in accordance with the boundary of the 'Woodland Zone' identified by Ecological Services Ltd (ESL) during the Lincolnshire Limewoods Project⁵ as high priority for woodland protection, enhancement and creation. Please see **Appendix G** for a map showing the 'Woodland Zone'.
- 1.1.26 Sites identified as having potential for woodland creation or restoration include ancient woodland buffer zones, permitted and submitted minerals and waste sites, hedgerows, greenspace and the proposed Lincoln Eastern Bypass. Where minerals and waste sites were identified as having already been fully restored to water, these were deleted from the woodland maps as opportunities for habitat creation.

Wetland

- 1.1.27 In the absence of a detailed soil dataset, the Landscape Description Unit (LDU) dataset was used as a surrogate for predicting where land most suitable for wetland creation lies. The boundaries of the wetland biodiversity opportunity areas were drawn at the C.Lincs scale largely in accordance with land described in the 'ground type' field of the LDU dataset as 'Bw', 'Cw', 'Wg' and 'Ws' – deepy loamy soils, claylands and wetlands with associated wet pasture/marsh, damp (neutral) pasture or swamp and fen habitats. The Environment Agency's Flood Zone 3 was also referred to when drawing the biodiversity opportunity area boundaries. See **Appendix F** for maps showing Flood Zone 3 and the Landscape Description Units.
- 1.1.28 The boundaries of the biodiversity opportunity areas were also drawn to include the main concentration of sites identified as having potential for wetland creation or restoration as described below, other sites identified during the stakeholder workshops, the largest extent of wetland habitats and WFD assessed rivers with a 'moderate', 'poor' or 'bad' ecological status.

⁵ ESL (Ecological Services) Ltd (2008) *Wildlife Corridors in the Lincolnshire Limewoods: Habitat Creation Opportunities and Constraints Map*.

- 1.1.29 Sites identified as having potential for creation or restoration include wetland buffer zones, permitted and submitted minerals and waste sites, greenspace, the Washlands and the proposed Lincoln Eastern Bypass.
- 1.1.30 The boundaries of the wetland biodiversity opportunity areas (drawn by Mark Tarttelin for the Lincolnshire Wildlife Trust Wetland Project) were drawn at the C.Lincs scale to include important peatlands, bird and plant areas.

Heathland & Acid Grassland

- 1.1.31 In the absence of a detailed soil dataset, the Landscape Description Unit (LDU) dataset and the DiGMapGB-50 – Superficial Deposits dataset were used as a surrogate for predicting where land most suitable for heathland and acid grassland creation lies. The boundaries of the heathland/acid grassland biodiversity opportunity areas were drawn at the C.Lincs scale largely in accordance with land described in the ‘ground type’ field of the LDU dataset as ‘Sd’ – other light land with associated heath/moor habitats. However, the LDU dataset did not illustrate the suitability of land south-west of Lincoln for heathland/acid grassland creation. For this purpose a decision was made to display the deposits in the ‘Rock Classification Scheme’ field of the DiGMapGB-50 – Superficial dataset described as ‘sand’ and ‘sand and gravel’ to indicate soil most likely suitable for heathland and acid grassland creation.
- 1.1.32 The boundaries of the biodiversity opportunity areas were drawn to include the extent of currently known heathland and acid grassland habitats, sites identified as having the greatest potential for heathland and acid grassland creation or restoration and any specific sites identified during the stakeholder workshops.
- 1.1.33 Sites identified as having potential for heathland and acid grassland creation or restoration include heathland and acid grassland buffer zones, coniferous (non-ancient) plantation woodland, permitted and submitted sand and gravel extraction sites and greenspace. All of these sites except the buffer zones were clipped to the superficial deposits of sand and gravel. In addition - where minerals and waste sites were identified as having already been fully restored to water, these were deleted from the maps as opportunities for habitat creation.

Calcareous Grassland

- 1.1.34 In a similar fashion to the method described above, the LDU dataset and the DiGMapGB-50 – Bedrock dataset were used as a surrogate for predicting where land most suitable for calcareous grassland creation lies. The boundaries of the calcareous grassland biodiversity

opportunity areas were drawn at the C.Lincs scale largely in accordance with land described in the 'ground type' field of the LDU dataset as 'Lr' or 'Cr' – chalk and limestone or claylands associated with dry (rough) pasture. To provide more refinement at the Lincoln Area scale, a decision was made to display the bedrock in the 'Rock Classification Scheme' field of the DiGMapGB-50 – Bedrock dataset described as 'chalk' and 'limestone' to indicate where the soil was most likely suitable for calcareous grassland creation.

- 1.1.35 The boundaries of the biodiversity opportunity areas were drawn to include the extent of currently known calcareous grassland habitats, sites identified as having the greatest potential for calcareous grassland creation or restoration and any specific sites identified during the stakeholder workshops.
- 1.1.36 Sites identified as having potential for calcareous grassland creation or restoration include calcareous grassland buffer zones, permitted and submitted chalk and limestone extraction sites, greenspace, and the proposed Lincoln Eastern Bypass. The greenspace was clipped to the chalk and limestone bedrock.

Habitat Mosaics

- 1.1.37 The mosaic biodiversity opportunity area drawn at the C.Lincs scale is a mixed priority area for woodland, wetland, heathland and acid grassland habitats. The boundaries were therefore drawn to include the relevant sites with potential for woodland, wetland, heathland or acid grassland creation or restoration, other sites identified during the stakeholder workshops and the largest extent of ancient woodland, wetland, heathland and acid grassland habitats. Ground suitable for wetland, heathland or acid grassland creation was also taken into consideration, and identified using the LDUs and superficial deposits of sand and gravel.

1.2 Records of Datasets Used

Key:

BGS = British Geological Survey
 CBA = Chris Blandford Associates
 CLC = City of Lincoln Council
 CLJPU = Central Lincolnshire Joint Planning Unit
 EA = Environment Agency
 FC = Forestry Commission
 GLNP = Greater Lincolnshire Nature Partnership
 LCC = Lincolnshire County Council
 LWT = Lincolnshire Wildlife Trust
 NE = Natural England
 OS = Ordnance Survey
 RSPB = Royal Society for the Protection of Birds
 WT = Woodland Trust

Dataset	Data Source/Supplier	Owner
Figure 1.1 – Central Lincolnshire Study Area		
Central Lincolnshire Boundary	CLJPU	CLJPU
1:250,000 Raster Map ⁵	OS Open Data	OS
Figure 1.2 – Witham Valley Country Park/Lincoln Principal Urban Area & Environs Study Area		
Witham Valley Country Park Boundary	CLJPU	CLJPU
Principal Urban Area Boundary	CLJPU	CLJPU
Sustainable Urban Extension Boundaries	CLJPU	CLJPU
1:50,000 Raster Map ⁵	CLJPU	OS
Figure 3.1 – Woodland Habitat Opportunity Mapping (Central Lincolnshire)		
Central Lincolnshire Boundary	CLJPU	CLJPU
Woodland Opportunity Area	CBA	CBA
Mosaic Opportunity Area	CBA	CBA
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
English Woodland Grant Scheme ⁶	FC	FC
National Forest Inventory 2011 ⁶	FC	FC
Ancient Woodland ¹	NE	NE
Deciduous Woodland ¹	NE	NE
Traditional Orchards ¹	NE	NE
Woodland Trust Sites	WT	WT
Lincoln Eastern Bypass Planning Boundary	LCC	CLJPU
Permitted Sand and Gravel Sites	LCC	LCC
Permitted Oil and Gas Sites	LCC	LCC
Permitted Limestone Sites	LCC	LCC
Permitted Chalk Quarry Sites	LCC	LCC
Dormant Sites	LCC	LCC
Closed Landfill Sites	LCC	LCC
Submitted Waste Sites	LCC	LCC
Submitted Minerals Sites	LCC	LCC
Ancient Woodland Buffer	CBA	CBA
1:250,000 Raster Map ⁵	OS Open Data	OS
Figure 3.2 – Wetland Habitat Opportunity Mapping (Central Lincolnshire)		
Central Lincolnshire Boundary	CLJPU	CLJPU
Wetland Opportunity Area	CBA	CBA
Wetland Opportunity Area (LWT)	LWT	LWT

Dataset	Data Source/Supplier	Owner
Mosaic Opportunity Area	CBA	CBA
Airfields	CBA	CBA
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Lakes	KL Water	KL Water
Fens ¹	NE	NE
Lowland Raised Bogs ¹	NE	NE
Reedbeds ¹	NE	NE
Coastal & Floodplain Grazing Marsh ¹	NE	NE
Lowland Meadows ¹	NE	NE
Undetermined Grassland ¹	NE	NE
Wetland Habitat Buffer	CBA	CBA
WFD Rivers	EA	EA
Lincoln Eastern Bypass Planning Boundary	LCC	CLJPU
Submitted Minerals Sites	LCC	LCC
Submitted Waste Sites	LCC	LCC
Dormant Sites	LCC	LCC
Closed Landfill Sites	LCC	LCC
Permitted Sand and Gravel Sites	LCC	LCC
Permitted Oil and Gas Sites	LCC	LCC
Permitted Limestone Sites	LCC	LCC
Permitted Chalk Quarry Sites	LCC	LCC
Washlands	EA	EA
Landscape Description Units (LDU) Level 1 ³	EA – Datashare	NE
1:250,000 Raster Map ⁵	OS Open Data	OS
Figure 3.3 – Heathland and Acid Grassland Habitat Opportunity Mapping (Central Lincolnshire)		
Central Lincolnshire Boundary	CLJPU	CLJPU
Heathland and Acid Grassland Opportunity Area	CBA	CBA
Mosaic Opportunity Area	CBA	CBA
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Lowland Heathland ¹	NE	NE
Lowland Dry Acid Grassland ¹	NE	NE
Purple Moor Grass Rush Pastures ¹	NE	NE
Heathland and Acid Grassland Buffer	CBA	CBA
National Forest Inventory 2011 ⁶	FC	FC
Permitted Sand and Gravel Sites	LCC	LCC
Submitted Minerals Sites	LCC	LCC
DiGMapGB-50 – Superficial ⁴	EA – Datashare	BGS
1:250,000 Raster Map ⁵	OS Open Data	OS
Figure 3.4 – Calcareous Grassland Habitat Opportunity Mapping (Central Lincolnshire)		
Central Lincolnshire Boundary	CLJPU	CLJPU
Calcareous Grassland Opportunity Area	CBA	CBA
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Local Wildlife Sites	GLNP	GLNP
Lowland Calcareous Grassland ¹	NE	NE
Lincoln Eastern Bypass Planning Boundary	LCC	LCC
Submitted Minerals Sites	LCC	LCC
Permitted Limestone Sites	LCC	LCC
Permitted Chalk Quarry Sites	LCC	LCC
Landscape Description Units (LDU) Level 1 ³	EA – Datashare	NE
1:250,000 Raster Map ⁵	OS Open Data	OS

Dataset	Data Source/Supplier	Owner
Figure 3.5 – Biodiversity Opportunity Areas (Central Lincolnshire)		
Central Lincolnshire Boundary	CLJPU	CLJPU
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Local Wildlife Sites	GLNP	GLNP
Lowland Calcareous Grassland ¹	NE	NE
Lowland Heathland ¹	NE	NE
Lowland Dry Acid Grassland ¹	NE	NE
Purple Moor Grass Rush Pastures ¹	NE	NE
Lakes	KL Water	KL Water
Fens ¹	NE	NE
Lowland Raised Bogs ¹	NE	NE
Reedbeds ¹	NE	NE
Coastal & Floodplain Grazing Marsh ¹	NE	NE
Lowland Meadows ¹	NE	NE
Undetermined Grassland ¹	NE	NE
English Woodland Grant Scheme ⁶	FC	FC
National Forest Inventory 2011 ⁶	FC	FC
Ancient Woodland ¹	NE	NE
Deciduous Woodland ¹	NE	NE
Traditional Orchards ¹	NE	NE
Woodland Trust Sites	WT	WT
WFD Rivers	EA	EA
Wetland Opportunity Area	CBA	CBA
Wetland Opportunity Area (LWT)	LWT	LWT
Mosaic Opportunity Area	CBA	CBA
Calcareous Grassland Opportunity Area	CBA	CBA
Heathland and Acid Grassland Opportunity Area	CBA	CBA
Woodland Opportunity Area	CBA	CBA
1:250,000 Raster Map ⁵	OS Open Data	OS
Figure 4.1 – Woodland Habitat Opportunity Mapping (Witham Valley Country Park/Lincoln Principal Urban Area & Environs)		
Witham Valley Country Park Boundary	CLJPU	CLJPU
Sustainable Urban Extension Boundaries	CLJPU	CLJPU
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
English Woodland Grant Scheme ⁶	FC	FC
National Forest Inventory 2011 ⁶	FC	FC
Ancient Woodland ¹	NE	NE
Deciduous Woodland ¹	NE	NE
Traditional Orchards ¹	NE	NE
Woodland Trust Sites	WT	WT
Lincoln Eastern Bypass Planning Boundary	LCC	CLJPU
Permitted Sand and Gravel Sites	LCC	LCC
Permitted Oil and Gas Sites	LCC	LCC
Permitted Limestone Sites	LCC	LCC
Permitted Chalk Quarry Sites	LCC	LCC
Dormant Sites	LCC	LCC
Closed Landfill Sites	LCC	LCC
Submitted Waste Sites	LCC	LCC
Submitted Minerals Sites	LCC	LCC
Parks and Gardens	CLC	CLJPU
Allotments	CLC	CLJPU

Dataset	Data Source/Supplier	Owner
Cemeteries (Active)	CLC	CLJPU
Cemeteries and Burial Grounds (Disused)	CLC	CLJPU
Green Wedge Regions	CLC	CLJPU
Open Space Green Wedges	CLC	CLJPU
Parks and Gardens	Merged Dataset Created by CBA	CBA
Wood Pasture & Parkland ¹	NE	NE
Ancient Woodland Buffer	CBA	CBA
1:50,000 Raster Map ⁵	CLJPU	OS
Figure 4.2 – Wetland Habitat Opportunity Mapping (Witham Valley Country Park/Lincoln Principal Urban Area & Environs)		
Witham Valley Country Park Boundary	CLJPU	CLJPU
Sustainable Urban Extension Boundaries	CLJPU	CLJPU
Airfields	CBA	CBA
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Lakes	KL Water	KL Water
Fens ¹	NE	NE
Lowland Raised Bogs ¹	NE	NE
Reedbeds ¹	NE	NE
Coastal & Floodplain Grazing Marsh ¹	NE	NE
Lowland Meadows ¹	NE	NE
Undetermined Grassland ¹	NE	NE
WFD Rivers	EA	EA
Lincoln Eastern Bypass Planning Boundary	LCC	CLJPU
Submitted Minerals Sites	LCC	LCC
Submitted Waste Sites	LCC	LCC
Dormant Sites	LCC	LCC
Closed Landfill Sites	LCC	LCC
Permitted Sand and Gravel Sites	LCC	LCC
Permitted Oil and Gas Sites	LCC	LCC
Permitted Limestone Sites	LCC	LCC
Permitted Chalk Quarry Sites	LCC	LCC
Wetland Opportunity Area	CBA	CBA
Wetland Opportunity Area (LWT)	LWT	LWT
Washlands	EA	EA
1:50,000 Raster Map ⁵	CLJPU	OS
Figure 4.3 – Heathland and Acid Grassland Habitat Opportunity Mapping (Witham Valley Country Park/Lincoln Principal Urban Area & Environs)		
Witham Valley Country Park Boundary	CLJPU	CLJPU
Sustainable Urban Extension Boundaries	CLJPU	CLJPU
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Lowland Heathland ¹	NE	NE
Lowland Dry Acid Grassland ¹	NE	NE
Purple Moor Grass Rush Pastures ¹	NE	NE
National Forest Inventory 2011 ⁶	FC	FC
Permitted Sand and Gravel Sites	LCC	LCC
Submitted Minerals Sites	LCC	LCC
DiGMapGB-50 – Superficial ⁴	EA – Datashare	BGS
Parks and Gardens	CLC	CLJPU
Allotments	CLC	CLJPU
Cemeteries (Active)	CLC	CLJPU

Dataset	Data Source/Supplier	Owner
Cemeteries and Burial Grounds (Disused)	CLC	CLJPU
Green Wedge Regions	CLC	CLJPU
Open Space Green Wedges	CLC	CLJPU
Parks and Gardens	Merged Dataset Created by CBA	CBA
Wood Pasture & Parkland ¹	NE	NE
1:50,000 Raster Map ⁵	CLJPU	OS
Figure 4.4 – Calcareous Grassland Habitat Opportunity Mapping (Witham Valley Country Park/Lincoln Principal Urban Area & Environs)		
Witham Valley Country Park Boundary	CLJPU	CLJPU
Sustainable Urban Extension Boundaries	CLJPU	CLJPU
BAP and Undetermined Habitats	GLNP	GLNP
Phase 1 Habitats	LWT	GLNP
Local Wildlife Sites	GLNP	GLNP
Lowland Calcareous Grassland ¹	NE	NE
Lincoln Eastern Bypass Planning Boundary	LCC	LCC
Submitted Minerals Sites	LCC	LCC
Permitted Limestone Sites	LCC	LCC
Parks and Gardens	CLC	CLJPU
Allotments	CLC	CLJPU
Cemeteries (Active)	CLC	CLJPU
Cemeteries and Burial Grounds (Disused)	CLC	CLJPU
Green Wedge Regions	CLC	CLJPU
Open Space Green Wedges	CLC	CLJPU
Parks and Gardens	Merged Dataset Created by CBA	CBA
Wood Pasture & Parkland ¹	NE	NE
DiGMapGB-50 – Bedrock ⁴	EA – Datashare	BGS
1:50,000 Raster Map ⁵	CLJPU	OS
Appendix F Figure – Agricultural Land Classification		
Central Lincolnshire Boundary	CLJPU	CLJPU
Agricultural Land Classification ¹	NE	NE
1:250,000 Raster Map ⁵	OS Open Data	OS
Appendix F Figure – DiGMapGB-50 – Bedrock		
Central Lincolnshire Boundary	CLJPU	CLJPU
DiGMapGB-50 – Bedrock ⁴	EA – Datashare	BGS
1:250,000 Raster Map ⁵	OS Open Data	OS
Appendix F Figure – DiGMapGB-50 – Superficial Deposits		
Central Lincolnshire Boundary	CLJPU	CLJPU
DiGMapGB-50 – Superficial ⁴	EA – Datashare	BGS
1:250,000 Raster Map ⁵	OS Open Data	OS
Appendix F Figure – Designated Sites		
Central Lincolnshire Boundary	CLJPU	CLJPU
Sites of Special Scientific Interest ¹	NE	NE
Sites of Nature Conservation Importance	GLNP	GLNP
RSPB Reserves England ²	CLJPU	RSPB
National Nature Reserves ¹	NE	NE
Lincolnshire Wildlife Trust Roadside Nature Reserves	GLNP	GLNP
Lincolnshire Wildlife Trust Reserves	GLNP	GLNP
Local Wildlife Sites	GLNP	GLNP
Local Nature Reserves ¹	NE	NE
1:250,000 Raster Map ⁵	OS Open Data	OS
Appendix F Figure – Flood Zone		

Dataset	Data Source/Supplier	Owner
Central Lincolnshire Boundary	CLJPU	CLJPU
Flood Zone 3	EA	EA
1:250,000 Raster Map ⁵	OS Open Data	OS
Appendix F Figure – Landscape Description Units		
Central Lincolnshire Boundary	CLJPU	CLJPU
Landscape Description Units (LDU) Level 1 ³	EA – Datashare	NE
1:250,000 Raster Map ⁵	OS Open Data	OS
Appendix F Figure – Strategic Housing Land Availability Assessment (SHLAA)		
Central Lincolnshire Boundary	CLJPU	CLJPU
SHLAA Dataset	CLC	CLJPU
1:250,000 Raster Map ⁵	OS Open Data	OS

Datasets are used under the following licences, conditions or copyrights:

1. Open Government Licence v1.0 - ©*Natural England copyright 2013*
2. Data reproduced with the permission of RSPB. © Crown Copyright. Ordnance Survey licence number 100021787
3. Land Description Units (LDU) (1:250,000 scale) developed for the Countryside Agency by Steven Warnock (in association with the Living Landscape Project). Copyright: Natural England, Living Landscapes Project and Cranfield University (soil component) 2001
4. Derived from 1:50,000 scale BGS Digital Data under Licence, DEFRA IPR/139-2DY British Geological Survey. ©NERC
5. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2012. All rights reserved. Ordnance Survey Licence number NK100017926
6. © Crown copyright and database rights (2013). All rights reserved. Ordnance Survey Licence Number 100021242

APPENDIX B
Biodiversity & Ecology
Stakeholder Workshop Note

Appendix B

Workshop 1 (Biodiversity & Ecology) Comments and Feedback Summary

Attendees for Workshop 1 are listed in **Table 1** below:

Table 1: List of Attendees to Workshop 1.

Name	Organisation
Jon Watson	
Gill Wilson	City of Lincoln Council
Allan Binding	County Wildlife Specialist
Andy Bailey	Environment Agency
Lesley Clarke	Environment Agency
Adrienne Bennett	Forestry Commission
David White	Forestry Commission
Fran Hitchinson	Greater Lincolnshire Nature Partnership
Claire Schofield	Greater Lincolnshire Nature Partnership
Liz Fleuty	Lincolnshire County Council
Matthew Harrison	Lincolnshire County Council
Nigel Sardeson	Lincolnshire County Council
Elizabeth Biott	Lincolnshire Wildlife Trust
Jeremy Fraser	Lincolnshire Wildlife Trust
Caroline Steel	Lincolnshire Wildlife Trust
Mark Schofield	Lincolnshire Wildlife Trust (Life on the Verge)
Steve Jack	Lincolnshire Wolds AONB
Paul Tame	National Farmers Union
Kate Fagan	Natural England
Ryan Hildred	Natural England
Chris Williams	Nettleham Woodland Trust
Marcus Craythorne	North Kesteven DC
Jenni Blakeman	Nottinghamshire Wildlife Trust
Jenny Wallace	RSPB

A total of 46 clarifications and items of information were recorded during the workshop. The clarifications and information have been absorbed into the report and have been provided to the project Steering Group to provide a basis for further work and incorporation into detailed feasibility studies that will need to be undertaken to develop specific projects further. **Table 2** provides a summary of the types of comments received.

Table 2: Summary of Clarifications and Points of Information

Information Type	Number of Comments
Data anomalies	11
Management priorities	10
Quality of habitats (existing)	10
Scales of intervention	3
IDB Management	3
Management issues	2
BOA validation	2

Information Type	Number of Comments
Species information	2
Data management	2
Unrecorded sites	1

A total of 68 opportunities were identified during the workshop. **Table 3** provides a summary of the opportunities identified and identifies where those opportunities have been incorporated into the BOM study.

Table 3: Summary of Opportunities identified

Habitat	Opportunity Type	Comment	Location / Map Ref.
Central Lincolnshire Scale			
Grassland and Heathland	Habitat Management	Very complex area. Local knowledge needed to target any work south of Caister.	BOA J
Grassland and Heathland	Habitat Assessment	Species priorities need referencing.	Outside the scope of the BOM at the current time.
Grassland and Heathland	Habitat Creation	Public Rights of Way network – links between villages south of Messingham.	BOA I
Grassland and Heathland	Habitat Creation	Possible opportunity through power line undergrounding in AONB around Market Rasen.	BOA J
Grassland and Heathland	Habitat Assessment	Wolds Phase 1 data (with LERC) for land around Caister.	Data incorporated into the BOM Study
Grassland and Heathland	Habitat Creation	Opportunity to link biodiversity with PROW network around Brigg.	BOA J
Grassland and Heathland	Habitat Restoration	Priority area for heathland restoration from forest east of East Ferry.	BOA I
Grassland and Heathland	Habitat Assessment	Information needs to be easily accessible and easy to use for organisations developing schemes e.g. EWGS and HLS	BOM application addressed in Section 6.0
Grassland and Heathland	Habitat Management	For neutral grassland – question appropriateness of target areas – so fragmented. Is protecting what we have and getting their management right better?	Addressed in Section 3.0
Grassland and Heathland	Habitat Creation	Diffuse calcareous grassland opportunity area south of Caister.	BOA M
Grassland and Heathland	Habitat Creation	Grassland on Lincolnshire edge/cliff – HLS or equivalent opportunity, south of Waddington	BOA M
Grassland and Heathland	Habitat Creation	Outside the project area – but good opportunity for heathland restoration in this area around Woodhall Spa.	Outside C Lincs but within BOA B
Grassland and Heathland	Habitat Creation	Whole plan area – grassland opportunities on (prematurely) closed waste sites (thin soil so less good for agric).	Waste sites included within BOA assessment
Grassland and Heathland	Habitat Creation	Potential for heathland creation in the Spalford, North Scarle, Besthorpe area towards Eagle/Whisby. Link with aggregates industry and future plans.	BOA K

Habitat	Opportunity Type	Comment	Location / Map Ref.
Grassland and Heathland	Habitat Creation	Grassland creation in connection with Lea Marsh SSSI – possible future sand/gravel extraction.	BOA D
Grassland and Heathland	Habitat Creation	Opportunities for calcareous grassland lies less on the steep slopes to the west as on agric land on the chalk plateau east of Caister.	BOA M
Grassland and Heathland	Habitat Creation	Link Laughton Forest habitats for woodlark, nightjar, adder etc. with locations around Scunthorpe (part of Scunthorpe link?).	Outside C Lincs but within BOA I
Grassland and Heathland	Habitat Assessment	Hedgerows and assess trees. Roadside verges outside 'Life on the Verge' north of Lincoln (on A15 axis).	Not currently defined by a BOA due to lack of current data
Wetland and Woodland	Habitat Creation	Riparian wet woodland south of Wragby and around Sleaford.	BOA B BOA H
Wetland and Woodland	Habitat Creation	Hedgerow links out from woodland/ woodland belts in woodlands to the west of Minting. Dormice.	BOA B
Wetland and Woodland	Habitat Creation	Ancholme Valley – floodplain ripe for wet grassland creation and reedbed and wet woodland.	BOA C
Wetland and Woodland	Habitat Restoration	Heathland restoration woods west of Market Rasen	BOA J
Wetland and Woodland	Habitat Creation	General opportunity area for mosaic of habitats south west of North Hykeham – more complex than just woodland. In terms of accessible greenspace this is ideal for a mosaic of habitats but perhaps not just woodland.	BOA K
Wetland and Woodland	Habitat Creation	Potential for washland/wet grazing meadows in the future? Around Tattershall	BOA H
Wetland and Woodland	Habitat Creation	Upper Witham – potential for woodland planting in upper reaches?	Outside C Lincs but included in BOA F
Wetland and Woodland	Habitat Creation	Burton Waters area- potential for wetland areas adjacent to residential site?	BOA E BOA K
Wetland and Woodland	Habitat Creation	Wet woodland opportunities for creation east of Collingham.	BOA K
Wetland and Woodland	Habitat Creation	Washland creation connected to flood alleviation – River Brant.	BOA F
Wetland and Woodland	Habitat Creation	Washland creation connected to flood alleviation – River Witham.	BOA G
Wetland and Woodland	Habitat Creation	Washland creation connected to flood alleviation – River Till.	BOA G
Wetland and Woodland	Habitat Creation	Wetland and woodland potential and pre-existing work at power stations along Trent – Cottam, West Burton – could link with other habitats.	BOA D
Wetland and Woodland	Habitat Creation	Larger wet grassland potential around Gainsborough area west of Trent – around RSPB at Beckingham Marshes.	BOA A BOA D
Wetland and Woodland	Habitat Creation	Why not Willingham Woods? Caistor – M.R.	Applying the sensitivity criteria (Section 3.3)

Habitat	Opportunity Type	Comment	Location / Map Ref.
Wetland and Woodland	Habitat Creation	Should not rule out wetland areas just because of RAF flight paths. An RAF officer has suggested they are open to discussion, e.g. depending on placement of wetland, this might attract birds AWAY from key RAF sites/flight paths.	Various locations shown on Fig. 3.2
Wetland and Woodland	Habitat Creation	Possibility of extending opportunity for wet grazing/wetland east of Lincoln. Possibility of high quality field drains here – money needed for project to survey.	BOA G
Wetland and Woodland	Habitat Creation	Wetland opportunities, mainly driven by aggregates industry – linking up with quarries/existing wetlands in Trent Valley/Notts. Some quarries in Notts at Langford, Besthorpe and Garton will expand, but there are also opportunities in the Eagle/ Swinderby/ N.Scarle area.	BOA D BOA K
Lincoln PUA/SUEs/WVCP Scale			
Grassland	Habitat Creation	Viking Way along cliff and through South Common and other grassland could act as a good corridor with access.	Fig 4.5 No 8
Grassland	Habitat Creation	Major scope for calcareous grassland creation in connection with link development including large buffer to Greetwell Hollow NR.	Fig 4.5 Nos 3, 4
Grassland	Habitat Creation	Calcareous grassland potential around Canwick.	Fig 4.5 Nos 4
Grassland	Habitat Management	Change management of allotment sites and cemeteries to better benefit wildlife.	Fig 4.5 No 1
Grassland	Habitat Creation	Lincoln Eastern Bypass – great opportunity for limestone grassland creation to link Bloxholme Lane LWS and Greetwell Quarry.	Fig 4.5 No 7
Grassland	Habitat Creation	Limestone grassland opportunities as part of SUE.	Fig 4.5 No 4
Grassland	Habitat Management	Opportunities to enhance the habitats in the greenspaces south of Lincoln e.g. better grassland management.	Fig 4.4
Grassland	Habitat Creation	Opportunities to extend grassland on banks of River Witham and scrapes.	Fig 4.5 No 21
Grassland	Habitat Creation	Bypass as a barrier to permeability – needs to mitigate through maximising opportunities along the line.	Fig 4.5 No 7
Grassland	Habitat Creation	Development masterplan to consider green wedges to create links to county site.	Fig 4.5 Nos 4, 5, 6, 7, 8
Grassland	Habitat Management	Local knowledge is needed to prioritise acid grassland around Canwick Hill / South Common. The large block shown here is fertile whereas the small block to the north-east is not fertile.	Fig 4.5 No. 8
Heathland	Habitat Creation	Most heathland and potential to expand.	Fig 4.3 No 18

Habitat	Opportunity Type	Comment	Location / Map Ref.
Heathland	Habitat Creation	Any space for more heathland? Questionable.	Fig 4.3 No 24
Heathland	Habitat Creation	Size of heathland – is there any point in pursuing small stepping stones?	Opportunity Areas identified. Recommend minimum size requirement for heathland creation = 30ha. Will require feasibility work
Heathland	Habitat Creation	Only consider contiguous areas or minimum size 30ha for new/standalone habitat.	Recommendation included in report
Heathland	Habitat Creation	Enhancement and management of existing heathland and woodland areas.	Fig 4.3 No 24
Wetland and Woodland	Habitat Creation	Possible wet woodland sites.	Fig 4.2 No 31
Wetland and Woodland	Habitat Creation	Scope for woodland clearance to favour remnant more open wetland habitat e.g. water violet and sphagnum.	Fig 4.2 No 24
Wetland and Woodland	Habitat Creation	Potential for SUDS scheme – going hand in hand with SUE.	Fig 4.2 No 10
Wetland and Woodland	Habitat Creation	Opportunity for tree planting within development (proposed arboretum around Baker memorial (?)), southern boundary of South Common.	Not included as grassland opportunities considered to be the priority in this area
Wetland and Woodland	Habitat Creation	Potential tree planting as part of bypass/landscaping development.	Fig 4.1 No 7
Wetland and Woodland	Habitat Creation	Some wet woodland to link Harbhome and Barthan Mere.	Fig. 4.2 No 9
Wetland and Woodland	Habitat Creation	Scope for major wetland creation, including along the drains.	Fig 4.2 No 9
Wetland and Woodland	Habitat Management	HLS current wetland site at Blackmoor Bridge – maintain/enhance/expand.	Fig 4.2 No 31
Wetland and Woodland	Habitat Management	Enhancement of existing wetlands on gravel pits.	Fig 4.2 No 24
Wetland and Woodland	Habitat Management	Management and enhancement of existing woodland.	Fig 4.2 No 14
Wetland and Woodland	Habitat Creation	Development to incorporate SUDS – combination of systems to provide wildlife links.	Fig 4.2 No 9
Wetland and Woodland	Habitat Creation	The urban woodland comprising street trees needs to be looked at as habitat creation as well as (primarily) amenity and also heat management in Lincoln.	Fig 4.5 No 1
Wetland and Woodland	Habitat Creation	Flood washland (wetland)	Fig 4.2 No 21
Wetland and Woodland	Habitat Creation	Development to incorporate SUDS – combination of systems to provide wildlife links.	Fig 4.2 No 4
Wetland and Woodland	Habitat Creation	Development to incorporate SUDS – combination of systems to provide wildlife links.	Fig 4.2 No 9

APPENDIX C
Land Use & Planning
Stakeholder Workshop Note

Appendix C

Workshop 2 (Land Use & Planning) Comments and Feedback Summary

Attendees for Workshop 2 are listed in **Table 1** below:

Table 1: List of Attendees to Workshop 2.

Name	Organisation
Sarah Rayney	Central Lincolnshire Joint Planning Unit
Brooke Smith	Central Lincolnshire Joint Planning Unit
Gill Wilson	City of Lincoln Council
Andy Bailey	Environment Agency
Liz Cairns	Environment Agency
Lesley Clarke	Environment Agency
Nicola Farr	Environment Agency
David Hutchinson	Environment Agency
Fran Hutchinson	Greater Lincolnshire Nature Partnership
Jenna Poole	Greater Lincolnshire Nature Partnership
Chris Williams	Nettleham Woodland Trust
Marcus Craythorne	North Kesteven District Council
Ken Bolland	Lincolnshire County Council
Liz Fleuty	Lincolnshire County Council
Brendan Gallagher	Lincolnshire County Council
Andrew Williams	Lincolnshire County Council
Adrian Winkley	Lincolnshire County Council
Chris Miller	Lincolnshire County Council (Countryside Access)
Elizabeth Biott	Lincolnshire Wildlife Trust
Caroline Steel	Lincolnshire Wildlife Trust
Roslyn Deeming	Natural England
Guy Bird	Upper Witham IDB

A total of 77 clarifications and items of information were recorded during the workshop. The clarifications and information have been absorbed into the report and have been provided to the project Steering Group to provide a basis for further work and incorporation into detailed feasibility studies that will need to be undertaken to develop specific projects further. Table 2 provides a summary of the types of comments received.

Table 2: Summary of Clarifications and Points of Information

Information Type	Number of Comments
Clarifications / data anomalies	28
Landuse	25
Habitat quality	17
Species information	4
Access	3

A total of 43 opportunities were identified during the workshop. Table 3 provides a summary of the opportunities identified and identifies where those opportunities have been incorporated into the BOM study.

Table 3: Summary of Opportunities identified

Habitat	Opportunity Type	Comment	Location / Map Ref.
Central Lincolnshire Scale			
Grassland and Heathland	Habitat Creation	Potential development for completed landfill sites.	BOA L
Grassland and Heathland	Habitat Creation	Appropriate management of road verges e.g. cut and bale, scrub removal to enhance verges and restore verges e.g. calcareous and neutral grassland. Or less cutting e.g. on edges of towns/ villages.	BOA L
Grassland and Heathland	Habitat Creation	Potential for green space – double as flood protection.	BOA B
Grassland and Heathland	Habitat Creation	Potential to develop wetland – in floodplain – part of flood risk mitigation.	BOA E BOA K
Grassland and Heathland	Habitat Creation	Floodplain/ grazing marsh/ neutral grassland good here by the Trent.	BOA D
Grassland and Heathland	Habitat Creation	Potential for limestone grassland north of Lincoln.	Report recommends surveys of limestone grasslands north of Lincoln to inform the development of the BOM
Grassland and Heathland	Habitat Creation	Calcareous grassland opportunity area.	BOA M
Grassland and Heathland	Habitat Creation	Hedgerow restoration – restoring farm boundaries along LEB. Opportunity to create calcareous grassland along verges of LEB and tie in with verges along Bracebridge Heath to Shipwick Road (Local Wildlife Site).	Fig. 3.5 BOA L Fig. 4.4 No. 7
Wetland and Woodland	Habitat Creation	Good quality woodland – potential for expansion (Nocton, Potterhanworth etc.)	BOA B BOA G
Wetland and Woodland	Habitat Creation	Sleaford northern extension – open space could have calcareous grassland developed – potential Local Nature Reserve.	BOA L

Habitat	Opportunity Type	Comment	Location / Map Ref.
Wetland and Woodland	Habitat Creation	<p>Woodland buffering and linkage opportunities which could come from developer contributions.</p> <p>Natural regeneration opportunities for extension to each woodland block – increase size of woodland = increased resilience to invested use.</p> <p>Opportunity (depending on land ownership) for open space – heathland creation through developer contributions + open space provision for increased housing.</p> <p>Use brownfield sites to link habitats and create routes into town – potentially better as open habitats than woodland.</p>	BOA A BOA I
Wetland and Woodland	Habitat Creation	River Brant – potential for improvements in water quality. Habitat restoration – bankside habitat.	BOA F
Wetland and Woodland	Habitat Creation	Potential use of SUDS to create nature sites – dual purpose – all new development.	Fig. 4.5 No. 1
Wetland and Woodland	Habitat Creation	Barlings Eau – potential for river restoration – in channel works – bents/ habitat etc.	BOA G
Wetland and Woodland	Habitat Creation	Hedgerow planting as connections between woodlands e.g. limewoods – green corridors e.g. to enable species such as dormice to move across the landscape.	BOA B
Wetland and Woodland	Habitat Creation	Restoration of plantations on ancient woodland sites to broadleaved woodlands.	BOA A BOA B
Wetland and Woodland	Suggestion	Prioritise unmappable agricultural landscape features (small fields, margins, hedgerows) within lower grade agricultural land.	To be undertaken as part of more detailed feasibility work
Wetland and Woodland	Suggestion	Good opportunities for restoration of heathland from woodland.	BOA J
Wetland and Woodland	Habitat Creation	Prioritise woodland within Gainsborough development not NG/ grazing marsh/ wetland.	Fig 3.5 BOA A
Wetland and Woodland	Habitat Management	Issue – large scale habitat management – resourcing.	To be considered through project development
Wetland and Woodland	Habitat Management	Opportunity to develop Trust's community management.	BOA E BOA K
Lincoln PUA/SUEs/WVCP Scale			
Grassland	Suggestion	Good opportunities for floodplain/ grazing marsh/ neutral targeting of agri-env schemes + other sites.	Fig 4.2 No 21

Habitat	Opportunity Type	Comment	Location / Map Ref.
Grassland	Suggestion	Encourage re-establishment of calcareous grassland?! Viking Way.	Fig 4.4 No 28
Grassland	Habitat Creation	Green roofs.	Fig 4.5 No 1 Fig 4.2 No 9
Grassland	Suggestion	Opportunities for species-rich grassland (acid or calcareous?) as part of SUE.	Fig 4.3, 4.4 No 8
Grassland	Habitat Creation	Opportunities for calcareous grassland restoration/ creation to mitigate loss through development of SUE.	Fig 4.4 No 4
Grassland	Habitat Creation	Opportunity for calcareous grassland as part of quarry restoration.	Fig 4.5 No 1
Grassland	Habitat Creation	Safeguard South Hykeham – keep area to East as open green space (around cemetery) – develop decent neutral grassland.	Fig 4.2 No 21
Grassland	Habitat Creation	General note – think acid grassland/ heathland opportunity zones/ areas need defining more specifically i.e. in line with superficial deposits rather than <u>broad</u> areas.	Fig 4.3
Grassland	Habitat Creation	Link Ash Lound to next woodland to the north – up to cycle path.	Fig 4.1 Nos 16, 17
Grassland	Habitat Creation	Heathy/ grassy/ open woodland open space – from developer contributions to some increasing population of Skellingthorpe.	Fig 4.1 No 15
Grassland	Habitat Creation	Potential expansion/ buffering of South Common (along Viking Way) and linked to other new green space (predominantly calcareous grassland) within developments.	Fig 4.4 Nos 23, 28
Grassland	Habitat Creation	Calcareous grassland verge to link bypass to Local Wildlife Site north-west of Branston.	Fig 4.4 No 23
Grassland	Habitat Creation	If Swanpool was developed – proper SUDS, reedbeds and habitat creation + proper flood risk attenuation. “Ecology village”/ flagship development within WVCP. Ecological housing e.g. green roofs/ permeable gardens/ surfacing etc.	Fig 4.2 No 9
Grassland	Habitat Creation	Greenspace buffers alongside LEB for proposed housing development around quarry.	Fig 4.5 No 7
Heathland	Habitat Creation	Potential green space development mosaic of heathland and wetland and acid grassland.	Figs 4.1 – 4.5 No 9
Heathland	Habitat Creation	Use fossdyke canal link (SGAL) to develop heathland/ acid grassland corridor.	Wetland opportunities prioritised in this area

Habitat	Opportunity Type	Comment	Location / Map Ref.
Wetland and Woodland	Habitat Management	Opportunity – drain management is an opportunity for considering shared objectives – water management.	To be worked up in detailed projects as they develop
Wetland and Woodland	Habitat Creation	Extend opportunity areas	Fig 4.2 Nos 9, 10, 11, 16, 14, 24
Wetland and Woodland	Habitat Management	Keep overlap of wetland and heathland as priorities at Whisby.	Fig 4.2 No 24 Fig 4.3 No 24
Wetland and Woodland	Habitat Creation	Woodland stepping stones within housing.	Fig 4.1 No 9
Wetland and Woodland	Habitat Creation	Link woodland? Opportunities for wetland/ wet grazing meadow etc. to provide FRM for Lincoln (+ to a lesser extent Boston) + FRM mitigation for new eastern bypass + provide green space for N + SE growth areas.	Fig 4.2 No 8

APPENDIX D
Water Environment
Stakeholder Workshop Note

Appendix D

Workshop 3 (Water Environment) Comments and Feedback Summary

Attendees for Workshop 3 are listed in **Table 1** below:

Table 1: List of Attendees to Workshop 3.

Name	Organisation
David Corbelli	Cascade Consulting
Gill Wilson	City of Lincoln Council
Toby Forbes Turner	CoLC
Andy Bailey	Environment Agency
Helen Barber	Environment Agency
Lesley Clarke	Environment Agency
Peter Haslock	Environment Agency
David Hutchinson	Environment Agency
Kamen Kalchev	Environment Agency
Richard Kisby	Environment Agency
Stephanie Pyburn	Environment Agency
Candy Reed	Environment Agency
Phil Smith	Environment Agency
Helen Woodall	Environment Agency
Katharine Samms	Environment Agency (Flood Risk)
Jez Brown	Environment Agency (Ops Delivery)
David Bole	Forestry Commission
Marcus Craythorne	North Kesteven District Council
Matthew Harrison	Lincolnshire County Council
Clare Sterling	Lincolnshire Wildlife Trust
Ruth Snelson	Lincolnshire Wolds Trust
Kristina Gould	Natural England
Neil Pike	Natural England
Chris Williams	Nettleham Woodland trust
John Badley	RSPB / Lincs Bird Club
Michael Copleston	RSPB
Ken Pratt	Upper Witham IDB
Mark Tarttelin	Wild Planet

A total of 71 clarifications and items of information were recorded during the workshop. The clarifications and information have been absorbed into the report and have been provided to the project Steering Group to provide a basis for further work and incorporation into detailed feasibility studies that will need to be undertaken to develop specific projects further. Table 2 provides a summary of the types of comments received.

Table 2: Summary of Clarifications and Points of Information

Information Type	Number of Comments
Species information	18
Engineering & management requirements	13
Strategies & other projects	9

Information Type	Number of Comments
River management & partnerships	9
Habitat management	5
Navigation	4
Data validation	4
Data anomalies	3
Data (information)	2
Water resources	1
Landscape issues	1
Survey work	1
Access	1

A total of 54 opportunities were identified during the workshop. Table 3 provides a summary of the opportunities identified and identifies where those opportunities have been incorporated into the BOM study.

Table 3: Summary of Opportunities identified

Habitat	Opportunity Type	Comment	Location / Map Ref.
Central Lincolnshire Scale			
Wetland	Habitat Creation	Existing woodlands – link with wet woodland? Key species – willow tit.	BOA K
Wetland	Habitat Creation	Gainsborough SUE's – link and buffer existing woodland blocks (not necessarily wetlands – grasslands, ponds, SUDS).	BOA A
Wetland	Habitat Creation	Widen floodplain wetland creation. Managing minor floodbanks to create wetlands.	BOA D
Wetland	Habitat Creation	Expansion of washland and associated wetland creation linked with flood alleviation.	BOA F
Wetland	Habitat Creation	Identify reedbed and wet grassland sites that work in tandem with existing sites e.g. Langford/Besthorpe.	BOA D
Wetland	Habitat Creation	20ha reedbed creation at Dunham lagoons through minor floodbank manipulation.	BOA D
Wetland	Habitat Creation	Mineral sites adjacent to Trent offer best reedbed opportunities for hydrology and restoration designs.	BOA D
Wetland	Habitat Creation	Expansion/creation of washland and/or reedbed linked with flood alleviation.	BOA G
Wetland	Habitat Creation	Creation of meandering water courses in Witham area.	BOA G
Wetland	Habitat Creation	Expansion of washland and associated habitat management/creation linked with flood alleviation.	BOA F
Wetland	Habitat Creation	Opportunity for work with contractors on bypass.	BOA G BOA L
Wetland	Habitat Creation	University masterplan opportunities?	Fig 4.5 No 1
Wetland	Habitat Creation	Opportunity through development of SUE's.	BOA G BOA L
Wetland	Habitat Creation	Opportunity to improve ecology of Sincil Dyke? Depending on flood risk?	BOA G

Habitat	Opportunity Type	Comment	Location / Map Ref.
Wetland	Habitat Creation	Sincil Dyke – future opportunity for decanalisation if land available? For ecology.	BOA G
Wetland	Habitat Creation	Prial drain issue? Opportunity to develop project as per Lincoln drainage group.	BOA G
Wetland	Habitat Creation	Limestone GP – protection of habitat.	BOA G BOA L
Wetland	Habitat Creation	Land use change in upper catchment – agriculture – woods = flood risk management. Silts reduced, phosphates reduced, economic benefits long term increase.	Whole area intervention
Wetland	Habitat Creation	Upper Langworth Beck. Floodplain restoration WFD – reedbed polishing?	BOA G
Wetland	Habitat Creation	Tree planting. Storage. Floodplain wood?	BOA H
Wetland	Habitat Creation	Maybe tree planting opportunities? (FC)	BOA F
Wetland	Habitat Creation	Upper Witham – Storage/attenuation etc. Marston, Long Bennington, Westboro, Claypole etc. (plant with woodland).	BOA F
Wetland	Habitat Creation	Opportunities to increase trees to offset Ag pollution and attenuate run-off (FC).	BOA E
Wetland	Habitat Creation	Buffer strips of vegetation needed alongside rivers to prevent sedimentation.	BOA E
Wetland	Habitat Creation	Trees absorb pollution. Buffer strips – use for shading along river. Wet woodland – floodplain woodland – alder carr (designated) 100ha on more sites increase – upper part of Barlings.	BOA G
Lincoln PUA/SUEs/WVCP Scale			
Wetland	Habitat Creation	Limestone grassland very important.	Fig 4.4 No 38
Wetland	Habitat Creation	Swanpool – Reedbeds. Access provision SUDS linked to development. Boutham Mere – wintering bitterns. Poss impacts or opportunities from adjacent development – breeding bitterns?	Fig 4.2 No 9
Wetland	Habitat Creation	Increased flood run-off from development. South Park road already flooded in events. Wetland areas?	Fig 4.2 No 8
Wetland	Habitat Creation	Could be wet grassland + reed + good for RSPB. Keep wet. If flood area allowed to get through bank will flow into here. Could also do in Bain valley + elsewhere due to topography.	Fig 4.2 Nos 10, 11
Wetland	Habitat Creation	SUE's – SUDS exemplar DEV.S. Highest standards of sustainable drainage should apply to SUE's (can be combined with GI etc.).	Fig 4.2 Nos 1, 4, 9
Wetland	Habitat Creation	Retrofitting of wetland SUDS to solve water surface problems.	Fig 4.2 No 1
Wetland	Habitat Creation	Peatlands and wetlands (existing) could be extended/ protected in Swanpool.	Fig 4.2 No 9
Wetland	Habitat Creation	Blue/green (turquoise) corridors along watercourses in Lincoln – as limited space for BO in urban centre.	Fig 4.2 No 1
Wetland	Habitat Creation	Hartsholme Lake – opportunity to store more water in woodland area rather than increase size of outfall from Hartsholme Lake.	Fig 4.2 No 14
Wetland	Habitat Creation	Witham green corridor – from South Hykeham to Boultham allotments.	Fig 4.2 Nos 13, 21

Habitat	Opportunity Type	Comment	Location / Map Ref.
Wetland	Habitat Creation	Minerals/gravels. Strategic restoration needed for eco services/cost benefits etc.	Fig 4.2 No 24
Wetland	Habitat Creation	Potential wetland habitats	Fig 4.2 Nos 13, 21
Wetland	Habitat Creation	Wet meadows	Fig 4.2 Nos 13, 21
Wetland	Habitat Creation	Wetland area creation for drainage reasons.	Fig 4.2 Nos 13, 21
Wetland	Habitat Creation	Canwick growth area could have public footpath and associated landscaping/ ecological swathe and WFD benefits to link up with Lower Witham public footpath and cycle.	Fig 4.2 No 8
Wetland	Habitat Creation	RSPB – wet grassland for breeding waders (but don't put in urban areas where lots of dog walking). Reedbed in urban area – much better for urban area and birds. + good recreation.	Fig 4.2 Nos 13, 21
Wetland	Habitat Creation	Mineral extraction areas could be good for new reedbeds.	Fig 4.2 Nos 29
Wetland	Habitat Creation	'Blue' corridor – water. Use open space and swales for biodiversity and WFD benefits. Ideal for flood risk emergency events.	Fig 4.2 No 9
Wetland	Habitat Creation	Habitat corridor = Till washlands – Swanpool reedbeds – wetlands around Whisby – woodland/wet woodland – heath/acid grassland. Habitat gradient.	Fig 4.2 Nos 9, 10, 14, 19, 24, 29, 30
Wetland	Habitat Creation	Extension of Skellingthorpe Old Wood – wet woodland – biodiversity habitat – silt reduction, flood risk management etc.	Fig 4.2 No 16
Wetland	Habitat Creation	Wet woodland creation – new government initiative to increase woodland cover. Biodiversity habitats, floodrisk, silt and pollutants.	Fig 4.2 No 31
Wetland	Habitat Creation	Brant washlands – peatlands? Value for ecosystem services. CO2 sinks etc. Needs mapping/ soils etc.	Fig 4.2 No 31
Wetland	Habitat Creation	Wetland habitat poss.	Fig 4.2 No 31
Wetland	Habitat Creation	Restoration – complimentary wetland sites (submitted minerals and waste sites) – dark blue.	Fig 4.2 Nos 29, 30
Wetland	Habitat Creation	Link up opportunity areas?	Fig 4.2 Nos 21, 31
Wetland	Habitat Creation	Catchment for flood/ surface run-off from development. And chemical/ silt stripping.	Fig 4.2 Nos 29, 30
Wetland	Habitat Creation	Lincolnshire Broads – interconnecting former gravel extraction pits, from Stapleford Woods to Western Growth corridor. Water resources benefit to AWS. Contributes to growth plan of LCC – more houses around lakes. Sailing opportunity. Connectivity of watercourses. Green infrastructure connectivity. Surface water problem solved. Wildlife habitat created. Tourist opportunity.	Fig 4.2 Nos 14, 19, 24, 29, 30

APPENDIX E
Witham Valley Country Park
Stakeholder Workshop Note

Appendix E

Workshop 4 (Witham Valley Country Park) Comments and Feedback Summary

Attendees for Workshop 4 are listed in **Table 1** below:

Table 1: List of Attendees to Workshop 4.

Name	Organisation
Andrew Hindmarsh	
Brooke Smith	Central Lincolnshire Joint Planning Unit
Ruth Simons	City of Lincoln Council
Gill Wilson	City of Lincoln Council
Andy Bailey	Environment Agency
Lesley Clarke	Environment Agency
Liz Fleuty	Lincolnshire County Council
Matthew Harrison	Lincolnshire County Council
Kate Percival	Lincolnshire County Council
Elizabeth Biott	Lincolnshire Wildlife Trust
Jeremy Fraser	Lincolnshire Wildlife Trust
Phil Porter	Lincolnshire Wildlife Trust
Caroline Steel	Lincolnshire Wildlife Trust
Allan Binding	Lincolnshire Wildlife Trust (Life on the Verge)
Elizabeth Barnicott	Natural England
Ryan Hildred	Natural England
Chris Williams	Nettleham Woodland Trust
Marcus Craythorne	North Kesteven District Council
Luisa McIntosh	North Kesteven District Council
Jenni Blakeman	Nottinghamshire Wildlife Trust
Alan Flintham	RSPB Lincoln Local Group

A total of 56 clarifications and items of information were recorded during the workshop. The clarifications and information have been absorbed into the report and have been provided to the project Steering Group to provide a basis for further work and incorporation into detailed feasibility studies that will need to be undertaken to develop specific projects further. Table 2 provides a summary of the types of comments received.

Table 2: Summary of Clarifications and Points of Information

Information Type	Number of Comments
Landuse and Management	14
Access / Recreation	12
Habitat Management	10
Habitat Type / Quality / Ownership	10
Data anomalies	6
Projects	3
Species information	1

A total of 30 opportunities were identified during the workshop. Table 3 provides a summary of the opportunities identified and identifies where those opportunities have been incorporated into the BOM study.

Table 3: Summary of Opportunities identified

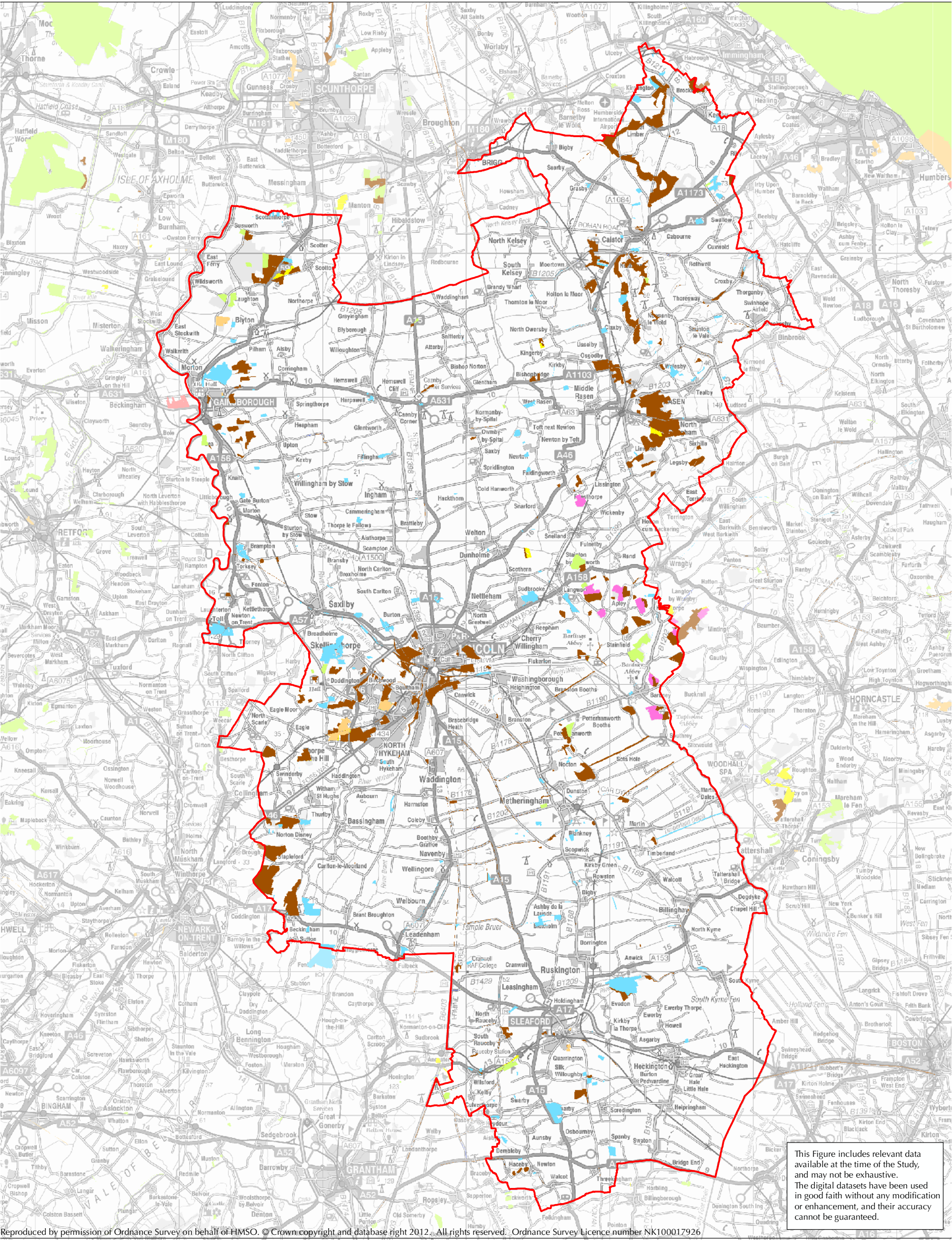
Habitat	Opportunity Type	Comment	Location / Map Ref.
Grassland	Habitat Management	Stapleford Woods – strategic removal of conifers to promote creation of acid grassland/heathland. Need to ensure ongoing management is appropriate. Already good areas of heathland/acid grassland here where conifers have been cleared.	Fig 4.3 No 35
Grassland	Habitat Restoration	Forestry Commission owned- big opportunity for heathland restoration.	Fig 4.3 Nos 35, 36
Grassland	Habitat Creation	Local community orchard under stewardship (olive green triangle middle left). Opportunity to extend orchards into new development. (Use locally occurring species?)	Fig 4.3 No 8
Grassland	Habitat Creation	Grassland. Wet grassland. Washlands.	Fig 4.1 No 21
Grassland	Habitat Creation	Green wedge overlay.	Fig 4.5 Nos 7, 8
Grassland	Habitat Creation	South E Q opportunity for calcareous grassland creation within masterplan.	Fig 4.4 Nos 8, 23
Grassland	Habitat Creation	Prial drain need to create wider margins along route.	Fig 4.2 No 19
Heathland	Habitat Restoration	Restoration plan for mineral site at Swinderby. Airfield includes pockets of acid grassland around water bodies (acid grassland was recorded on site as part of EIA).	Fig 4.3 Nos 29, 30
Heathland	Habitat Management	Change of land use management on parts of washland (Brant). Use of washland banks for habitat and access.	Fig 4.2 No 31
Heathland	Habitat Creation	Growth of Witham St Hughes/ Swinderby and need for GI provision – plan use of holes in advance.	Fig 4.3 Nos 29, 27, 24
Heathland	Habitat Restoration	Major potential for heathland restoration – but recreational pressure and future management implications. Hospital plantation/ both sites of bypass.	Fig 4.3 Nos 15, 18
Heathland	Habitat Creation	Stapleford Woods – further removal of conifers to create open habitat (heathland/ acid grassland). Need to make sure that future management retains these open habitats.	Fig 4.1 No 39
Heathland	Habitat Restoration	Coniferous woodland gives best opportunity for heathland/acid grassland creation/ restoration.	Fig 4.3 Nos 25, 30, 36

Habitat	Opportunity Type	Comment	Location / Map Ref.
Heathland	Habitat Creation	Opportunity for a heathland corridor – along railway (green line) up to and including university site.	Fig 4.3 Nos 29, 27, 24
Heathland	Habitat Creation	Opportunity for university masterplan and city centre masterplan to consider.	Fig 4.5 No 1
Wetland	Habitat Restoration	Existing wetlands in the Trent Valley and future expansion secured as part of aggregate industry expansion.	BOA D
Wetland	Habitat Management	Small bank canalised drain. Opportunity to consider biodiversity improvement through creation of more flood space/ washland on vacant site in city?	Fig 4.2 No 19
Wetland	Habitat Creation	Brant washland – Huge potential to create wetland/ wet grassland within the arable, which is currently arable.	Fig 4.2 No 31
Wetland	Habitat Creation	Important links west into Trent Vale.	BOA K BOA D
Wetland	Habitat Creation	Extend washland potential south (+ wider). Wetland opportunity area.	Fig 4.2 Nos 37, 40
Wetland	Habitat Creation	Connections with Trent Valley project area to the west. Housing growth in west Newark may also be relevant but if growth in east this would be closer.	BOA K BOA D
Wetland	Habitat Management	Beckingham Ranges – Opportunities here – MOD may be able to provide habitat enhancement over a large area.	Fig 4.2 No 40
Wetland	Habitat Management	Manage all river banks/ berms as wetland/ neutral grassland. Managed realignment within floodplains.	Area wide
Woodland	Habitat Creation	Joining up woodland areas between Skellingthorpe and Thorney. Existing areas of woodland in the two areas are already of high value.	Fig 4.1 Nos 15, 16, 17, 25
Woodland	Habitat Management	Hospital plantation woodland – city council ownership – good screen and noise attenuation between housing and bypass – woodland clear felling not an option, however possibly heathland mosaic opportunities through creating clearing, possibly to reflect historic airfield layout.	Fig 4.1 No 15 Fig 4.3 No 18
Woodland	Habitat Creation	Wet woodland expansion zone. Mosaic with significant reedbed + flood management.	Fig 4.1 Nos 9, 11 Fig 4.2 Nos 9, 10, 11
Woodland	Habitat Creation	Potential opportunity for coniferous woodland to heathland/ broadleaved woodland depending on previous land use.	Fig 4.1 No 25 Fig 4.3 No 25
Woodland	Habitat Creation	Stapleford Moor – opportunities for heathland creation. Forestry Commission managed.	Fig 4.3 No 36

Habitat	Opportunity Type	Comment	Location / Map Ref.
Woodland	Habitat Management	Top priority to appropriately manage woodlands especially ancient woodlands to restore to native broadleaves and extensions to buffer. Potential for heathland restoration in non-ancient woodland plantations.	Identified in the list of detailed projects. Tables 4.1 – 4.4
Woodland	Habitat Creation	Opportunities on prison land for woodland planting to link Tunman Wood.	Fig 4.1 No 30

APPENDIX F

Background Datasets used to inform the Biodiversity Opportunity Mapping



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2012. All rights reserved. Ordnance Survey Licence number NK100017926

KEY

Central Lincolnshire boundary

Local Nature Reserve

Lincolnshire Wildlife Trust Roadside Nature Reserve

Designated Sites

Local Wildlife Site

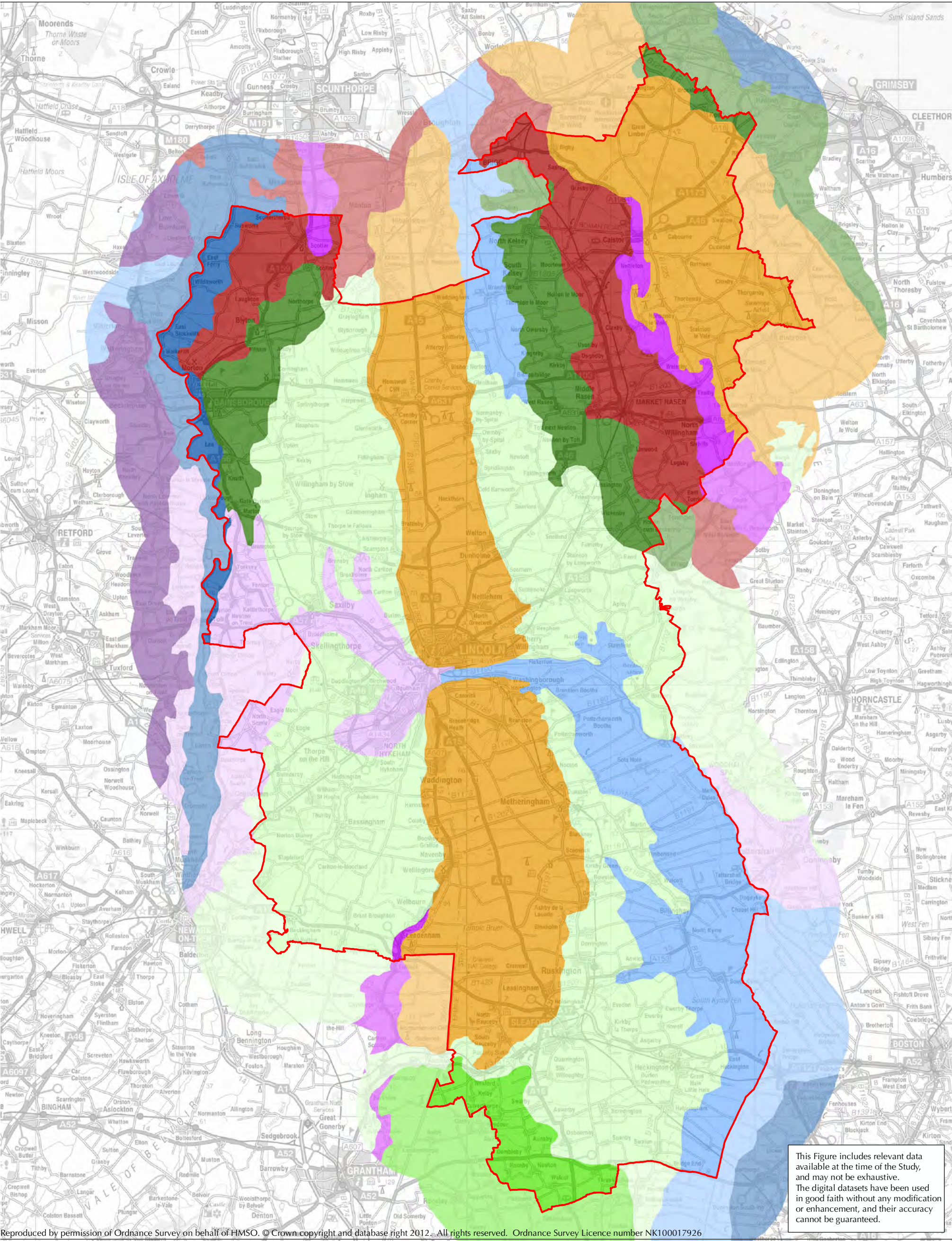
RSPB Reserve

National Nature Reserve

Site of Nature Conservation Importance

Site of Special Scientific Interest

Lincolnshire Wildlife Trust Reserve



KEY

Central Lincolnshire boundary

Ground Type and Associated Habitats

Wg: wetlands - damp (neutral) pasture

Ws: wetlands - swamp and fen

Bg: deep loamy soils - damp (neutral) pasture

Br: deep loamy soils - dry (rough) pasture

Bw: deep loamy soils - wet pasture/marsh

Lr: chalk and limestone - dry (rough) pasture

Cg: claylands - damp (neutral) pasture

Cr: claylands - dry (rough) pasture

Cw: claylands - wet pasture/marsh

Sd: other light land - heath/moor

0 5 10 km

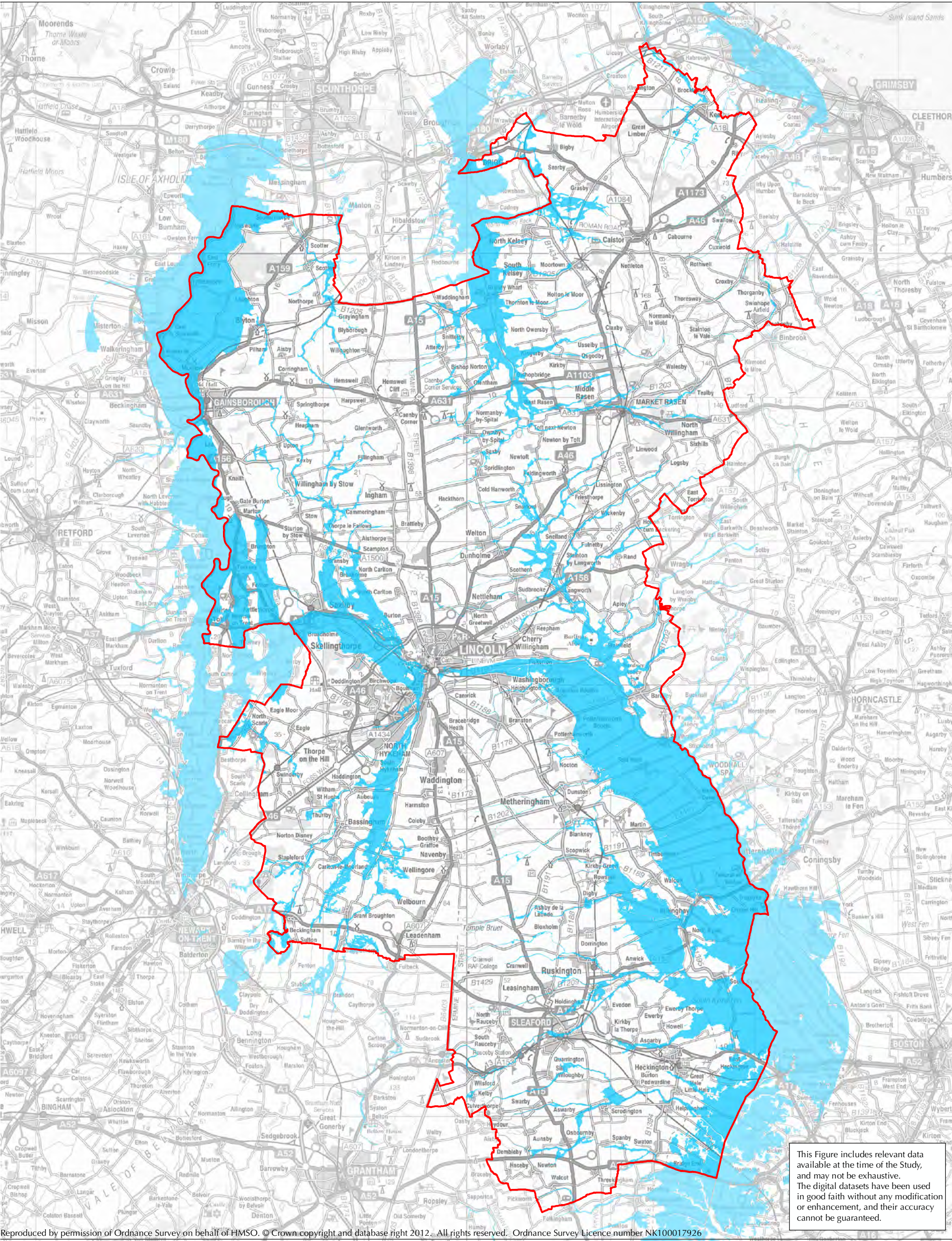
CHRIS BLANDFORD ASSOCIATES
landscape | environment | heritage

**BIODIVERSITY OPPORTUNITY MAPPING STUDY
FOR CENTRAL LINCOLNSHIRE**



Landscape Description Units (LDU)
Level 1: Ground Type and
Associated Habitats

MAY 2013

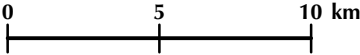


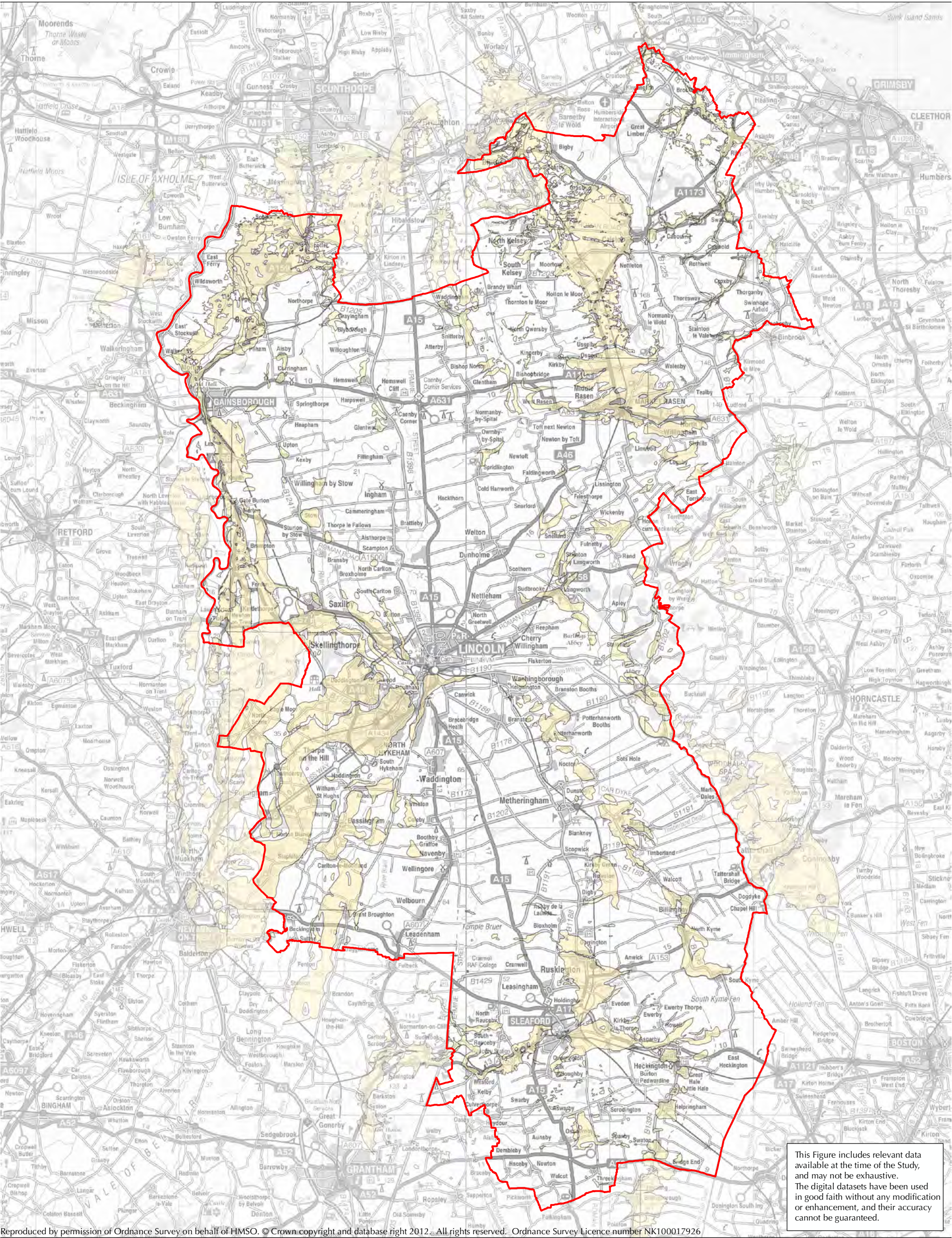
Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2012. All rights reserved. Ordnance Survey Licence number NK100017926

KEY

Central Lincolnshire boundary

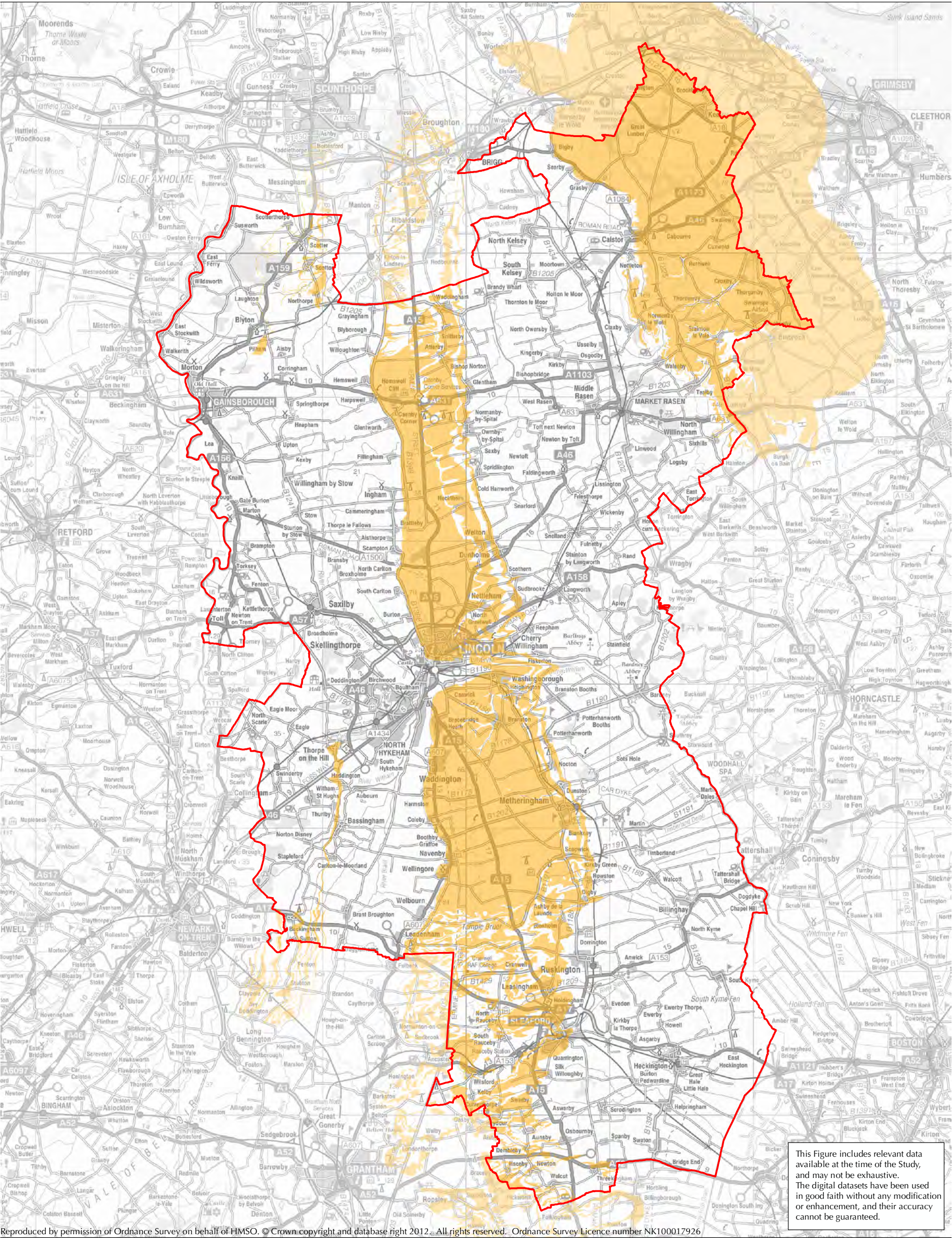
Flood Zone 3 - land with a high probability of flooding
(1 in 100 or greater annual probability of river flooding,
or a 1 in 200 or greater annual probability of flooding from the sea)





Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2012. All rights reserved. Ordnance Survey Licence number NK100017926

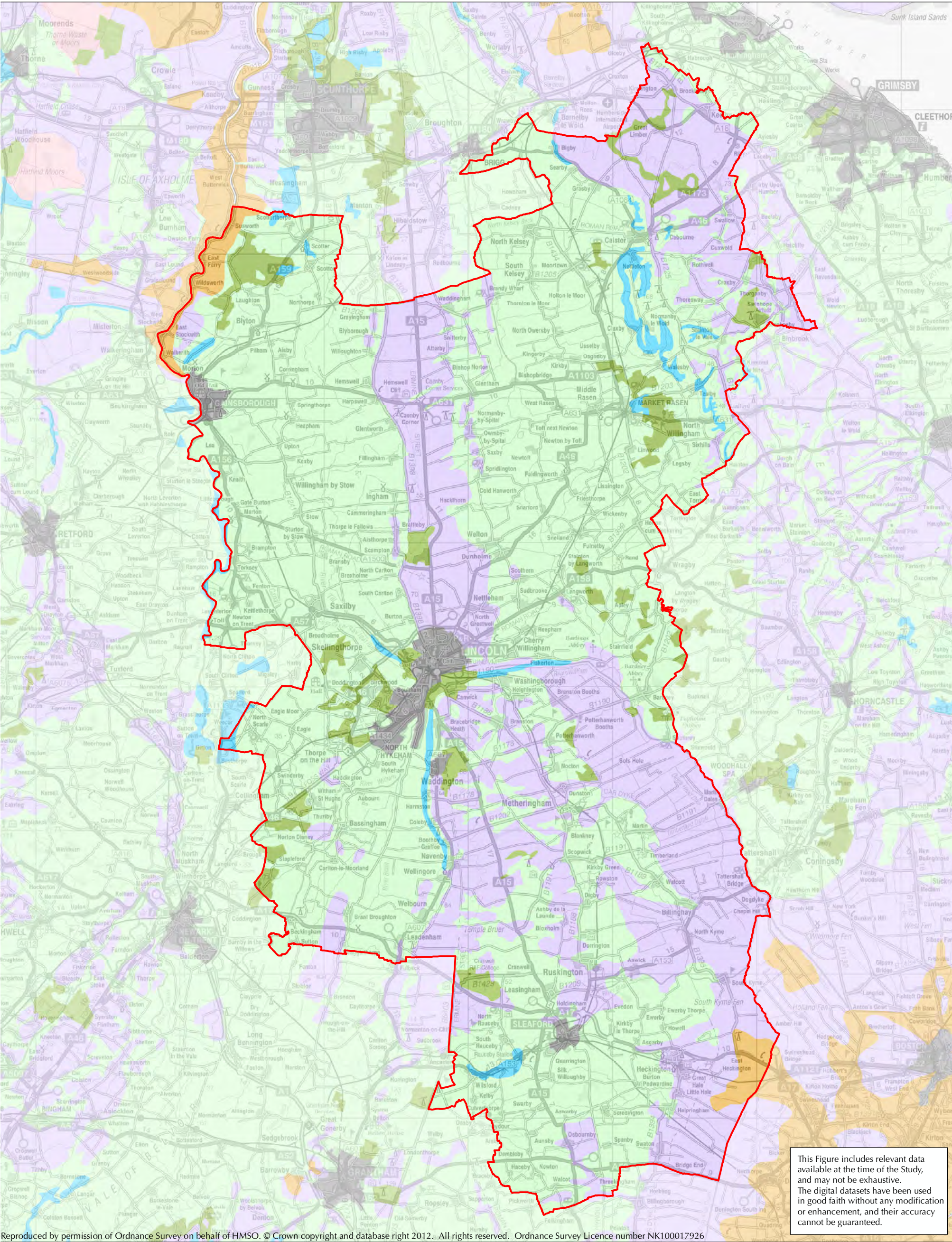
- KEY**
- Central Lincolnshire boundary
 - Superficial deposits of 'sand' and 'sand and gravel'



KEY

Central Lincolnshire boundary

'Chalk' and 'Limestone' Bedrock



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2012. All rights reserved. Ordnance Survey Licence number NK100017926

KEY

Central Lincolnshire boundary

Grade 1
(best quality agricultural land)

Grade 2

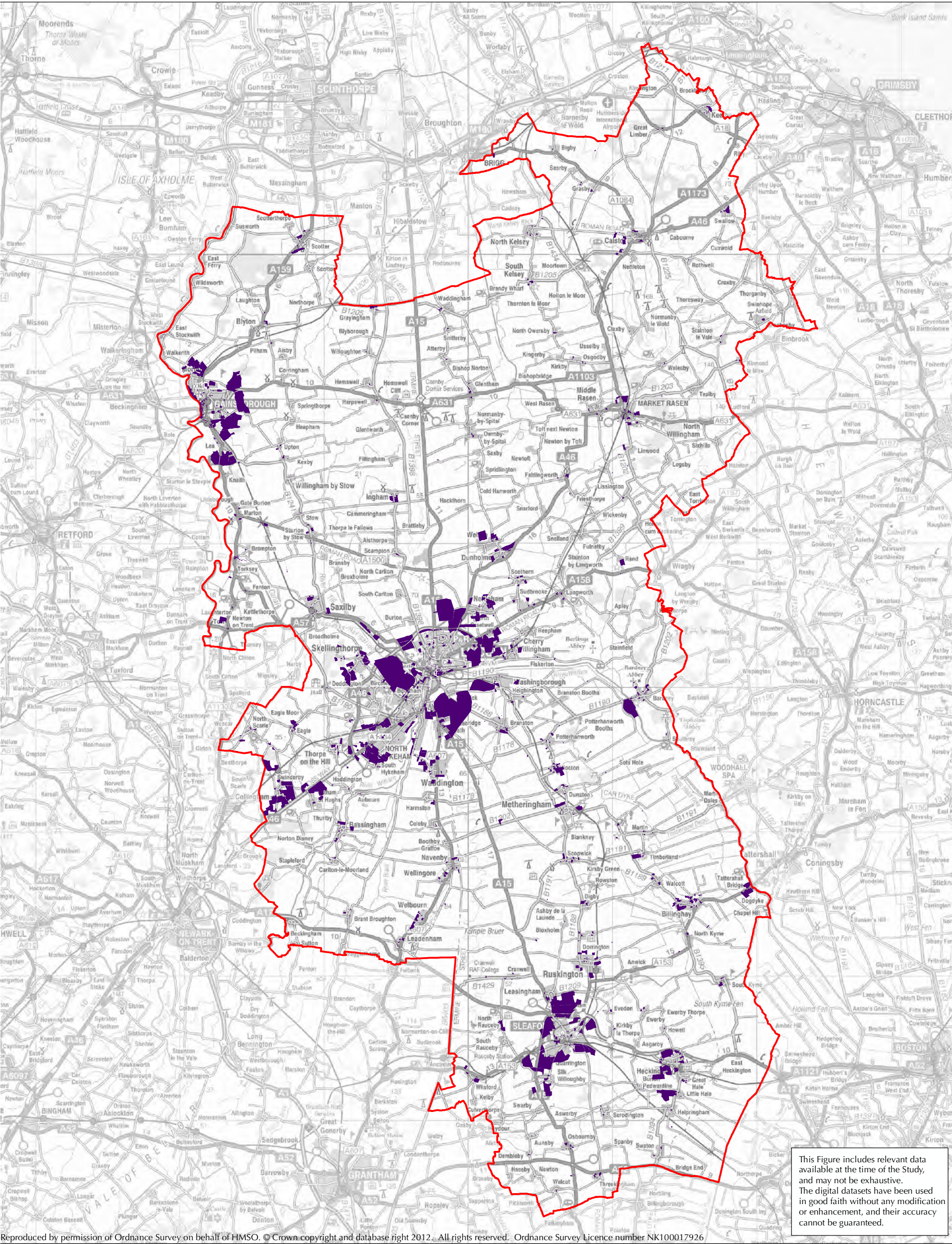
Grade 3

Grade 4

Grade 5
(poorest quality agricultural land)

Non-agricultural

Urban

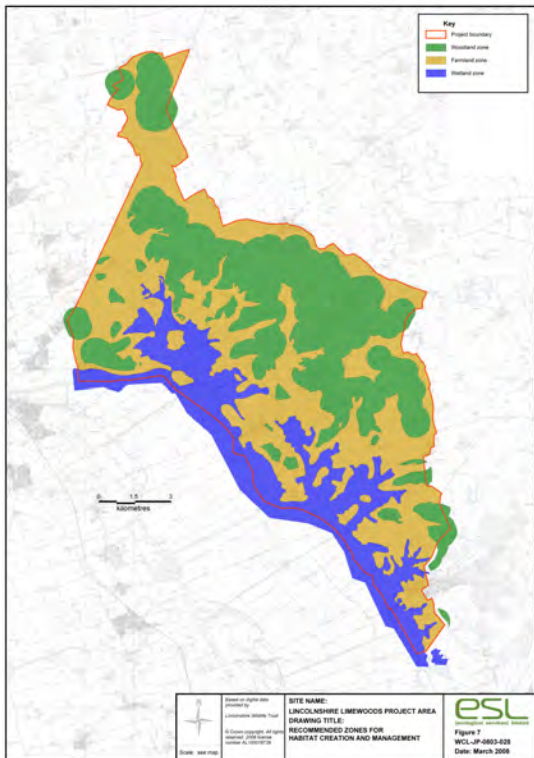


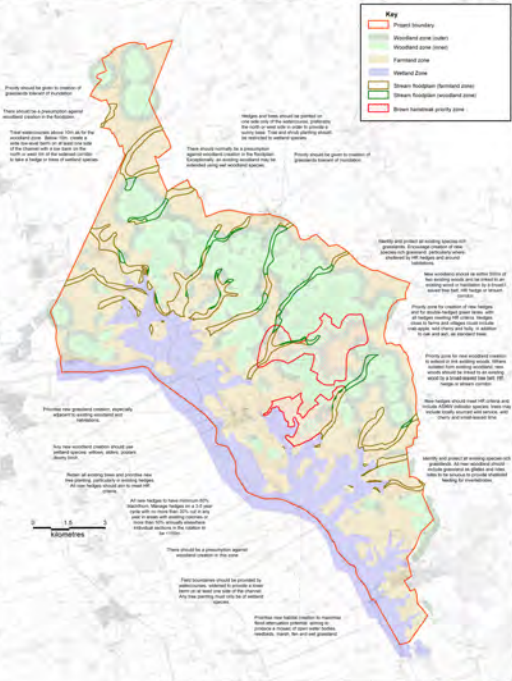
Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2012. All rights reserved. Ordnance Survey Licence number NK100017926

KEY

- Central Lincolnshire boundary
- Sites with potential for residential development

APPENDIX G
Lincolnshire Limewoods
Biodiversity Opportunity Mapping





There should be a presumption against modified custody in the first instance.

Three watercourses above 10th St. for the second storm. Below this, create a wide flow road (width of at least one mile of the Channel) with a low bank on the north or east side of the watercourse to take a bridge or cross of southern access.

There should normally be a presumption against scheduled recreation in the Backstop. Exceptionally, an existing woodland may be scheduled using well wooded areas.

Finally, should we grant to members of assemblies treated as minorities?

Hedges and trees should be planted on one side only of the watercourse, preferably the north or west side in order to provide a sunny bank. Tree and shrub planting should be restricted to native species.

Key

-  Project boundary
-  Woodland zone (outer)
-  Woodland zone (inner)
-  Farmland zone
-  Wetland Zone
-  Stream floodplain (farmland zone)
-  Stream floodplain (woodland zone)
-  Brown harewood priority zone

- Project boundary
Woodland zone (outer)
Woodland zone (inner)
Farmland zone
Wetland Zone
Stream floodplain (farmland zone)
Stream floodplain (woodland zone)
Brown hares/must priority zone

- Woodland zone (outer)
- Woodland zone (inner)

- Worked and some more

- 100

- Westland Zone

- © 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 103–110

- ...the ...

Heavily and profitably seed-eating species of granivores. Encourage creation of new forests rich in granivore, particularly where sheltered by tall hedgerows and around buildings.

These words have been placed in either British or American spelling, and are not intended to be an exacting word or translation by a (non-) native speaker. All words are in British or American spelling.

only serve the creation of new bridges for double-budget grant areas with bridges meeting HIF criteria. Bridges in far-flung and villages could include apple, wild cherry and holly, in addition to oak and ash, as permanent trees.

Shrubs grow for most woodland creation to without or low planting costs. Others tolerate full sunlight, woodland, new woods should be mixed to an existing wood by a broad-based tree belt. 197.

These budgets should meet off-budget and include A&EY indicator species, even the include locally sourced wild services, and they are essential to the

Identify and protect all existing species of grasslands. All new woodland should include grassland in, along and near, water to be suitable to provide enhanced feeding for waterbirds.

Providing new graduate content, especially relevant to quality assessment and solutions.

Any new scientific method should use standard species, culture, ethics, protocol, data, tools.

Remove all existing lines and provide new line spacing, particularly in writing headings. All new headings should start on a new line.

All new hedges to have minimum 20% maximum. Mortgage hedges on a 3.0 year cycle with no more than 20% net in any year in arrears with existing contracts or more than 10% annually elsewhere. Individual members in the position to

There should be a presumption against
warranted creation in the zone

First insurance should be provided by participants, intended to provide a time limit at all least one side of the channel. Any time passing must only be of sufficient

Practical case studies illustrate the importance of sound attenuation patterns, giving us a glimpse of a future of open water bodies, landfills, roads, and other natural resources.



SITE NAME:
LINCOLNSHIRE LIMETWOODS PROJECT AREA
DRAWING TITLE:
WILDLIFE CORRIDORS IN THE
LINCOLNSHIRE LIMETWOODS
HABITAT CREATION OPPORTUNITIES
AND CONSTRAINTS MAP

DRAWING TITLE:
WILDLIFE CORRIDORS IN THE
LINCOLNSHIRE LIMETWOODS
HABITAT CREATION OPPORTUNITIES
AND CONSTRAINTS MAP



WCL-JP-003-034
Date: April 2008

Date: April 2008



South East Studio The Old Crown High Street Blackboys Uckfield East Sussex TN22 5JR T 01825 891071 F 01825 891075 E mail@cbastudios.com W www.cbastudios.com

London Studio Woolyard 52 Bermondsey Street London SE1 3UD T 020 7089 6480

Directors C J Blandford BA DipLD MLA FLI • M E Antonia BSc EnvSci RSA DipPA • D Watkins BSc MSc AMIEnvSci

Chris Blandford Associates is the trading name of Chris Blandford Associates Ltd Registered in England No 3741865. Registered Office: The Old Crown High Street Blackboys East Sussex TN22 5JR