# Norfolk's Aggregate Landscape: An Archaeological Assessment

Aggregates Levy Sustainability Fund

English Heritage Project No: 5241MAIN

Sophie Tremlett

February 2009

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A report for English Heritage
by Sophie Tremlett

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## Abbreviations

| | |
|---|---|
| ADS | Archaeology Data Service |
| ALSF | Aggregates Levy Sustainability Fund |
| BGS | British Geological Survey |
| BP | before present |
| CUCAP | Cambridge University Collection of Air Photographs |
| DMV | Deserted medieval village |
| EERA | East of England Regional Assembly |
| EH | English Heritage |
| GIS | Geographical Information System |
| HECA | Historic Environment Countryside Adviser |
| HLC | Historic Landscape Characterisation |
| MLP | Minerals Local Plan |
| MPA | Mineral Planning Authority |
| MPP | Monuments Protection Programme |
| MWDF | Minerals and Waste Development Framework |
| mya | million years ago |
| NAPL | Norfolk Air Photo Library |
| NCC | Norfolk County Council |
| NHER | Norfolk Historic Environment Record, formerly Sites and Monuments Record (SMR) |
| NLA | Norfolk Landscape Archaeology |
| NM&AS | Norfolk Museums and Archaeology Service |
| NMP | National Mapping Programme |
| NMR | National Monuments Record |
| OS | Ordnance Survey |
| PAS | Portable Antiquities Scheme |
| SCC | Suffolk County Council |
| SM | Scheduled Monument |

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| ST | Sophie Tremlett (Senior Air Photo Interpretation Officer, NMP Team) |

# Key to Figures

**Archaeological sites in Sub-Units** (outlined in blue)

*Significance*

| | International | National | Regional | Local | Negligible | Ungraded |
|---|---|---|---|---|---|---|
| Find Spot | ● | ● | ● | ● | ● | ● |
| Monument | ■ | ■ | ■ | ■ | ■ | ■ |
| Building/Listed Building | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ |

*Survival*

| | |
|---|---|
| ★ | Cropmark |
| ▲ | Historic Landscape |
| ▲ | Major Earthwork |
| ▲ | Minor Earthwork |

*Extraction*

| | |
|---|---|
| □ | Active Quarry |
| □ | Proposed Quarry |

**Archaeological Sites in Study Areas** (outlined in green)

*Designated Sites*

| | |
|---|---|
| ★ | Scheduled Monument |
| ▲ | Grade I or II* Listed Building |
| ⚑ | Grade II Listed Building |

*Survival*

| | |
|---|---|
| ★ | Cropmark |
| ▼ | Earthwork |

*Extraction*

| | |
|---|---|
| □ | Active Quarry |
| □ | Proposed Quarry |
| • | Archaeological Site |

## Acknowledgements

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The authors would also like to acknowledge the interest and input provided by the various members of the project's Steering and Liaison Group.

# Summary

This report describes the results of an investigation, synthesis and assessment project concerning the archaeological resource of sample areas of the aggregate-bearing landscapes of Norfolk.

The project began in May 2007, and was undertaken by Norfolk Landscape Archaeology (NLA), part of Norfolk County Council's Museums and Archaeology Service (NMAS). The project was funded by English Heritage under the Aggregates Levy Sustainability Fund (ALSF).

The assessment consists of a consideration of the archaeology within the aggregate producing areas of the county, through analysis of data held within the Norfolk Historic Environment Record (NHER). Four Study Areas based on aggregate type were selected for broad assessment. Within each of these a smaller sample area or 'Sub-Unit' was subject to detailed investigation, record enhancement and assessment. This included a systematic air photo interpretation survey undertaken as part of English Heritage's National Mapping Programme (NMP), and the scoring of archaeological sites within each area for archaeological Significance and other values.

This report draws together the results of the assessment phase of the project, identifying patterns and trends of potential significance within each area. It includes a characterisation of the historic environment of Norfolk's aggregate-bearing geologies, in terms of the date, significance and survival of archaeological sites on each deposit, and the character of their historic landscape. **It is intended that the resulting information will inform and facilitate future planning and management decisions regarding aggregate extraction and the historic environment**.

Further details of the archaeological records created and enhanced by the project can be accessed via the NHER database, and via its online counterpart 'Norfolk Heritage Explorer' < http://www.heritage.norfolk.gov.uk/>.

# 1. Introduction

(SH/ST)

The Norfolk Aggregates Assessment Project (EH Project No. 5241MAIN) is an archaeological investigation, synthesis and assessment project, funded by the Aggregates Levy Sustainability Fund. The project, which began in May 2007, has been undertaken by Norfolk Landscape Archaeology (NLA), part of Norfolk County Council's Museums and Archaeology Service (NMAS).

The project has investigated and assessed the archaeological potential of the mineral reserves of Norfolk, with a view to informing and facilitating future planning and management decisions regarding aggregate extraction, including mitigation (Massey 2007). This is achieved by providing baseline data and archaeological synthesis and assessment for sample areas of Norfolk's aggregate-bearing geologies, in particular those areas defined as being under threat from future extraction. (The assessment consists of a consideration of the historic environment of these sample areas through analysis of data held in the Norfolk Historic Environment Record, the results of which are brought together in this report.) Through outreach and dissemination the project has informed a wider audience about the historic environment within extraction areas, including the general public, local interest groups, the academic community and the minerals industry. The aims of the project meet four of the key priorities identified under Objective 2 of the Aggregates Levy Sustainability Fund (ALSF) (see Section 1.1 below).

The strategic decision by Norfolk County Council (NCC), the Mineral Planning Authority, to reduce and limit extraction within environmentally sensitive areas, such as river valleys, has and will continue to result in the increased extraction of other mineral reserves, such as the higher-level and plateau gravels. This change in approach has provided an impetus to the project, which aims to provide a framework within which future decisions about the historic environment of aggregate-bearing areas can be made.

The project methodology was based on that employed in other regions, including Gloucestershire (EH Project No. 3346; Mullin 2005), Hampshire (EH Project No. 4766; Young *et al*. 2007) and the neighbouring county of Suffolk (EH Project No. 3987; SCC Archaeological Service 2007). It has created and employed a Minerals Resource GIS to correlate the available information concerning geology, past, current and future extraction, and the historic environment of Norfolk. This information was used to identify four sample areas, each based on an aggregate/geological type, for which detailed investigation and assessment would be undertaken, including the mapping of archaeological sites from aerial

photographs to English Heritage's National Mapping Programme (NMP) standards (see Albone *et al*. 2008, appendix 1). The results of the assessment are described in this report, which also includes a discussion of the wider implications for the county as a whole, a consideration of the effectiveness of the methodology employed and details of areas where further work should be targeted. The results of the NMP phase of the project are described in a separate report (Albone *et al*. 2008).

## 1.1. Aims and Objectives

As outlined in the Project Design (Massey 2007), the main aims of the project were:

- To facilitate and inform decisions with regards to strategic planning, management and mitigation for extraction within the aggregate areas.
- To feed into the Norfolk Minerals and Waste Development Framework (MWDF), which will cover all minerals and waste development in Norfolk up to April 2021.
- To assess whether further aerial photograph and historic environment assessment and characterisation is required over a larger part of Norfolk's aggregate landscapes.
- To analyse the relative gain of aerial photographic analysis when compared with pre-NMP historic environment data held in the Norfolk Historic Environment Record (NHER).
- To aid the dissemination and presentation of information about the historic environment within aggregate areas and to increase awareness of this archaeology amongst the extraction industry and the general public.

The project's main objectives were:

- To create a Norfolk Minerals Resource GIS containing all available geological and mineral information in a spatial environment. This is an evolving dataset that can be added to when new geological and archaeological information and resources become available.
- To provide baseline archaeological data for NCC minerals-related planning decisions.
- To enhance NHER records within the study areas through the incorporation of existing data and the production of new information derived from aerial photographs.
- To produce an assessment report and GIS layer that provides summary archaeological information on each study area for use by Norfolk Landscape Archaeology's Planning Team and the NCC Minerals and Waste Planning Team.
- To assess the archaeological potential of the different geological deposits of Norfolk and to produce a management framework for these areas.

- To undertake analysis of the information gained through the NMP process and to ascertain the extent to which planning decisions should only be made after systematic consultation of aerial photographs.
- To publicise and disseminate the results of the project through a variety of means, including leaflets, the English Heritage and Norfolk Museums and Archaeology Service (NM&AS) websites and talks to local societies.
- To make this new data publicly accessible through the NHER online database (Norfolk Heritage Explorer), the National Monuments Record (NMR) and the Archaeology Data Service (ADS) ALSF Online digital archive.

The project meets the following ALSF Objective 2 priorities:

- Threat definition: strategic research on the character, scale and geographical distribution of the potential impacts of aggregate extraction.
- Research to enhance the understanding of the scale and character of the historic environment in current and future likely aggregate producing areas in order to provide baseline information for effective future management.
- Providing support for the development of management strategies for the historic environment in current and future likely aggregate producing areas.
- To undertake local education, interpretation and outreach activities that communicate the knowledge of the historic environment within areas of extraction and the knowledge gained through the extraction process.

## 1.2. Background and Impetus

One of the main impetuses for the project was the proposed alteration of patterns of future extraction within Norfolk in the next 15 years. River valleys, the traditional source of sand and gravel in Norfolk, have been afforded special protection by both the Norfolk Minerals Local Plan (MLP), adopted in 2004, and by its replacement, the MWDF, which is currently at consultation stage (NCC 2008a). Consequently there was a need to assess the archaeological impact of this changed approach on non-riverine aggregate resources.

Norfolk is also expected to experience a phase of extensive and rapid development over the next 15 to 20 years. The urban centres of Norwich and Thetford have recently been awarded New Growth Point status by the Department for Communities and Local Government and are set to become two of the fastest growing parts of the East of England. More than 72,000 new houses are planned for the county in the period to 2021, the majority in Breckland and Broadland districts but with over 10,000 planned for Norwich (EERA 2004, 125). In the Norwich Urban Area housing growth is expected to be in the region of 1325 per annum (Hewdon Consulting 2006, 7), while Thetford is expected to

grow in size by 66%. Other large-scale developments planned for the county include the Rural Enterprise Valley (REV) scheme, which seeks to expand and support the region's motorsport and advanced engineering businesses. This urban expansion will have a significant effect on the county's aggregate requirements in the next 20 years, with increased need for construction materials for housing and roads.

The Norfolk MLP and new draft MWDF contain general development control policies relating to archaeological investigation and constraint. All planning applications for mineral extraction are subject to consultation with Norfolk Landscape Archaeology's Planning Team. At present, these consultations and decisions are made on a site-by-site basis and within a timetable which allows for only a limited assessment of each site's significance. Decisions are made using information contained in the NHER database, together with the archaeological planning officers' combined knowledge and experience. The NHER provides no synthesis or framework within which to assess these sites, whether in a local or national context. In addition, there is much archaeological information held within the local and national aerial photographic collections, and in the unpublished archaeological literature, that may be essential to establishing the existence, character and significance of sites within proposed areas of mineral extraction. The project reported on here was devised to maximise the baseline archaeological data available for four sample areas, in order to inform planning decisions and facilitate future mitigation with regards to aggregate extraction. In addition, the wider 'aggregate landscapes', within which each of these sample areas lay, have also been subject to broad-based assessment.

Prior to the project starting, a number of planning permissions within Norfolk stipulated that some aerial photograph mapping be undertaken prior to extraction taking place. Much of this was done as part of a post-determination planning condition and not as a pre-determination archaeological assessment. The provision of NMP-standard data at an early stage in the planning process helps to ensure that both the archaeological planning officer and the minerals operator have a realistic understanding of the work required, therefore allowing informed decisions about preservation and mitigation strategies to be made. The aerial photographic mapping that had previously been done was of a variable standard, and utilised several different methodologies, in particular regarding the sources consulted. It was also only undertaken within the immediate confines of the proposed extraction area and was therefore often interpreted in isolation from its archaeological and landscape context. The results of the assessment project described here are intended to provide a framework through which future aerial photographic work at aggregate sites could be properly considered within the planning process. It will also serve to demonstrate the advantages of a standardised approach to aerial photographic sources, mapping and recording.

The use of an NMP methodology as the primary means to investigate four sample blocks of aggregate landscape also contributes to English Heritage's aim of mapping all archaeological sites visible on aerial photographs to a consistent standard across the entire country, as stated in programme 1.6 of the *Implementation Plan for Exploring Our Past 1998* (English Heritage 2003). Prior to the project starting, approximately 25% of the county had been mapped as part of the original Norfolk NMP project (EH Project No. 2913). This work, and its continuation as part of the Norfolk Aggregates Assessment Project, also contributes to English Heritage's Research Theme A — 'discovering, studying and defining historic assets and their significance' (English Heritage 2005).

The archaeological assessment stage of the project has involved the creation of a scheme for ranking archaeological monuments and findspots by their significance within a local and national framework. The criteria used to 'score' the assessed sites were broadly based on the Scheduling guidance. This system acts as the basis for a county standard for assessing archaeological sites, and will feed into many other local, regional and national agendas and schemes. This is particularly pertinent for archaeological sites also at risk from threats other than aggregate extraction, such as intensive agriculture and coastal erosion. For example, the scheme is compatible with that used in the provision of information and advice for agri-environment programmes, including DEFRA's Environmental Stewardship schemes.

The Regional Archaeological Research Agenda and Strategy for the Eastern Counties (Brown & Glazebrook 1997), expressed a need for chronological and thematic synthesis of the known archaeological resource. The synthesis and archaeological assessment phases of the project contribute towards meeting these aims and will ultimately feed back into ongoing reviews of the agenda and framework. Aerial survey was also identified as the only long-term initiative then current that was producing 'valuable new data about the archaeological resource on a regional basis' (Wade & Brown 2000, 54). It was anticipated that the NMP phase of the project would identify numerous new archaeological sites through the systematic analysis of existing archives of aerial photographic data; this has proved to be the case, with nearly 400 new records added to the NHER during this project, and amendments made to more than 150 existing records.

The outreach and dissemination phase of the project has aimed to encourage public involvement in and understanding of the historic environment. This contributes towards the local and national aims of encouraging social inclusion and community involvement in heritage, as set out in English Heritage's *Research Agenda* (2005). The project has increased access to Norfolk's archaeology through the inclusion of its results on the online version of the NHER, the Norfolk Heritage Explorer, and by adding material to the NMAS

and English Heritage websites. In addition, talks and presentations have been given to a variety of audiences, both within Norfolk and elsewhere.

# 2. Methodology

## 2.1. Introduction

The methodology of the project was broadly based upon that developed for an assessment of the aggregate landscape of Gloucestershire (EH Project No. 3346; Mullin 2005). This methodology had been implemented successfully in other Mineral Planning Authorities (MPAs), including Hampshire (EH Project No. 4766; Young *et al*. 2007) and Norfolk's neighbouring county of Suffolk (EH Project No. 3987; SCC Archaeological Service 2007). The methodology was amended to meet Norfolk's current mineral planning concerns, *i.e*. encouraging extraction of non-riverine aggregates, whilst still providing a long-term management tool for future minerals planning.

The project has encompassed several stages of data collection and enhancement, assessment and synthesis, employing information derived from a range of different sources. Although it is the assessment of the archaeological resource of Norfolk's aggregate-bearing landscapes that forms the focus of this report, it also draws upon earlier phases of work within the project, namely the enhancement and synthesis of existing NHER data, new and existing sites identified, mapped and interpreted as part of the NMP, and an analysis of Norfolk's Historic Landscape Characterisation (HLC) data. To reflect this, the methodology for all stages of the project is outlined below, using the Stages, Phases and Tasks itemised in the Project Design (Massey 2007). More detailed methodologies are given in the relevant archive reports or, for the assessment itself, in later sections of this report.

The Project Design identified four main Stages to the project, each comprising one or more Phases, broken down into several individual Tasks.

## 2.2. Stage One, Phase 1: Creation of Norfolk Minerals Resource GIS

The first Phase of the project involved collating and mapping all available information concerning the minerals resource of Norfolk into a MapInfo GIS format. British Geological Survey (BGS) map layers of Norfolk's Bedrock and Superficial geologies were imported into the GIS environment. No attempt was made to mitigate the clear variability in the detail of the BGS mapping and of the classifications used across different map sheets. Such variations, evident as abrupt changes from one deposit to another at the junctions of survey sheets, were worst in Sub-Unit A, where mainly the Superficial deposits along its southern and eastern edges are affected (Fig. 3.2). In contrast, the mapping in Sub-Unit D

appears to be almost entirely consistent across the three survey sheets that fall within it. (More detail on the areas affected by this issue is given, where relevant, in Chapters 5–8 below.)

A new dataset of active and dormant quarries was created, combining information from the BGS Mines and Quarries database with polygons mapped from the paper archive held by NCC's Minerals and Waste Planning Team (this was subsequently supplemented by a digital dataset defining active quarry sites provided by NCC). Following the Gloucestershire methodology (EH Project No. 3346; Mullin 2005, 110), no attempt was made at this stage to compile information regarding quarries pre-dating the 1948 Town and Country Planning Act, as it is only after this date that all documentation for extraction has been held by local planners. However, evidence of former extraction pits, with a dimension greater than 50m and where the extracted product was not known to be marl, clay or a similar non-aggregate mineral deposit, were transcribed by the NMP where visible on aerial photographs or historic maps. The resulting polygons and attribute information have also been imported into the Norfolk Minerals Resource GIS. Additional information added to the Minerals Resource GIS at an early stage in the project included borehole information (from NCC) and, more significantly, polygons defining NCC's then preferred areas of extraction ('Areas of Investigation'). (The latter too have been superseded by more up-to-date polygons defining the minerals allocations included in the MWDF.) Data derived from the NHER could then be viewed — and queried — against these other variables.

The resulting GIS environment allows data relating to geology, past, current and future extraction, and the historic environment to be analysed together, both spatially and in terms of associated database fields. The resource will continue to be managed by NLA and, as far as possible, will be updated when new geological or archaeological resources become available. **There is huge potential for additional layers of information to be added, concerning, for example, palaeoenvironmental data or records relating to current ecology.** Data derived from it will also be made available to NCC's Minerals and Waste Planning Team, who can in turn feed in updated planning information. Already they have provided new datasets defining the extent of active quarries within the county and the updated 'Proposed Minerals Site Allocations' put forward in the MWDF.

## 2.3. Stage One, Phase 2: Defining the Project Area

Analysis of the information held in the Norfolk Minerals Resource GIS was undertaken to define four broad Study Areas, within which the project would investigate, enhance and analyse archaeological information. The number and scale of the Study Areas had to be restricted, as the geology of the county varies considerably (see Chapter 3), while the time and resources available to the project were limited. Three of the Study Areas were selected

on the basis of aggregate type, and through liaison with NCC's Minerals and Waste Planning Team as to which deposits were likely to see the biggest impact from future extraction. In addition, a river valley Study Area was also included, in order to assess the impact of past extraction, and because, while extraction in these areas is now discouraged, it might resume in the future. In line with the provisional suggestions made in the Project Design (Massey 2007, 14, 20), the areas selected were: the Crag deposits to the northeast of Norwich (Study Area A), the Plateau Gravels of central Norfolk (Study Area B), River Gravels (Study Area C), and the 'Lower Greensand' and Fen-Edge Gravels of west Norfolk (Study Area D) (Fig. 2.1). These Study Areas, and the method used to define them, are described in more detail in Chapter 3.

Within the four broad Study Areas, Sub-Units were selected for more detailed investigation and assessment, namely: NMP survey and synthesis; enhancement and synthesis of existing NHER data; analysis of HLC data; assessment of archaeological character and significance (Fig. 2.1). This further sampling of the county's aggregate geologies was again necessitated by the project's resources and timetable, and was in line with the methodologies employed in Hampshire (EH Project No. 4766; Young *et al*. 2007) and Suffolk (EH Project No. 3987; SCC Archaeological Service 2007). Interrogation of the Norfolk Minerals Resource GIS allowed four blocks of land, each of 45 sq km, to be identified which a) had been affected by and/or were at threat from large-scale extraction, b) were representative of the broad Study Area of which they form part, and c) avoided conurbations, which present no opportunities for extraction. In Study Areas B and C it was possible to select contiguous blocks, forming an area of 90 sq km.

As well as being the subject of detailed investigation, the Sub-Units also form the basis for the assessment, and it is from these blocks of land that a characterisation of the broader Study Areas has been extrapolated. They are described in more detail in Chapter 3.

## 2.4. Stage Two, Phase 3: NMP

Archaeological sites visible on aerial photographs were identified, mapped and recorded to NMP standards across as much of the four Sub-Units as was possible in the time available (Fig. 2.2). In addition to the normal scope of interest for NMP projects, former extraction pits or sites with a dimension of greater than 50m were also transcribed, whether visible on aerial photographs or on available digital copies of historic maps. While the project was timetabled to allow the NMP survey to be completed for all four Sub-Units, *i.e*. 180 sq km, the density of sites encountered, particularly in Sub-Unit A, meant that only a proportion of this total area (77%) could be covered. A formal Variation covering this issue, and requesting that the remaining 23% be removed from the NMP phase of the project, was submitted by NLA in February 2008 and approved by English Heritage in March.

The methodology for NMP is detailed in the Project Design (Massey 2007) and in a separate report on this element of the project (Albone *et al*. 2008). In summary, all available aerial photographs held by the Norfolk Air Photo Library (NAPL), NCC's Planning and Transportation Department, Cambridge University Collection of Air Photographs (CUCAP, part of the Unit for Landscape Modelling), and the National Monuments Record (NMR) were consulted. All visible archaeological sites, dating from the Neolithic to 1945, were recorded. Sites were transcribed in AutoCAD, from scanned photographic images rectified in AERIAL. Records were added directly to the NHER database and subsequently linked to an export of the mapping in MapInfo.

The NMP phase of the project created 382 new records in the NHER, 84% of which were new discoveries. It also amended and enhanced the records for a further 162 sites. The results of the NMP are discussed in more detail in the NMP report (Albone *et al*. 2008), which includes a detailed summary of the results for each period. A short synthesis will also be published in the journal *Norfolk Archaeology*.

## 2.5. Stage Three, Phase 4: NHER Enhancement and Synthesis

Prior to the assessment phase of the project, it was necessary to enhance the NHER data for each Sub-Unit. In particular, for many sites where extraction had already taken place, there was information held as hard copy in Secondary Files, or within the 'grey literature' produced by contractors and consultants, which needed to be added to the database records. The extent to which this had been done in the past varied, and prior to the project starting there was a backlog of data that had not been added to the NHER. This provided the opportunity to update, enhance and standardise the digital record for each site, and to ensure that they contained the maximum possible level of detail. The enhancement principally involved updating the summary and description fields, and the adding all relevant monument types, finds and periods to the searchable index for each site.

During the enhancement, a gazetteer was maintained, listing each site within the Sub-Unit. These were then used to produce a thematic, period-based synthesis of the information held for each area, characterising the archaeology and identifying any patterns within the record, particularly in relation to the aggregate landscape. These syntheses have been used to inform the period-based assessments for each Sub-Unit (Chapters 5–8), and updated gazetteers, including the provisional Significance scoring, are appended (Appendix A1). The original gazetteers and period-based text form part of the project archive.

## 2.6. Stage Three, Phase 4: HLC Assessment

Historic Landscape Characterisation (HLC) data was available for each of the four Sub-Units. This was analysed and interrogated to produce a short statement characterising the landscape history of each area. Norfolk's HLC project, which was completed recently, is part of English Heritage's regional project for the East of England (comprising Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk). The methodology for the East of England HLC was developed from a classification of landscape types originally used in Suffolk. Like all HLC projects, it is a GIS-based approach to presenting information on landscape change over a range of periods, information on current and former landscape types being derived from historic maps. The East of England HLC is unique in England, in that each county follows the same methodology so that the region's HLC maps present a seamless picture of the landscape. The methodology employed by the project overall is detailed elsewhere (Dyson-Bruce & Thorogood, forthcoming).

The HLC data for each Sub-Unit, both mapping and associated records, was selected, interrogated and assessed. A report summarising the HLC types present in each area, and outlining any changes to the relative dominance of these types over the last 200 years (the effective timescale for the Norfolk HLC), was then produced. In a concluding statement, the most significant features and changes within each Sub-Unit were outlined, and any particularly rare or vulnerable landscape types identified. A shortened version of each report is included in the assessment of each Sub-Unit (see Chapters 5–8).

## 2.7. Stage Four, Phase 5: Archaeological Assessment and Report

In order to assess the archaeology of the four aggregate Sub-Units, it was first necessary to assign scores or 'statements of significance' to each site (a 'site' equating to a record in the NHER database). To this end, a scoring system was developed, encompassing Significance, Survival, Certainty and Evidence. Of these categories Significance and Survival were the most extensively used in the assessment. These two scores were judged individually in order to avoid too great a bias towards well-preserved sites, when compared to finds scatters or cropmarks, for example. Interrogation of the resulting data allows the relative archaeological 'value' of given areas of aggregate-bearing deposits to be identified, whether in terms of particularly significant sites, or good preservation, or both. The scoring system, the use of which is intended to continue beyond the end of the project, was developed in consultation with both internal NLA staff and external consultees at English Heritage and Suffolk County Council (where a similar scoring system has been used). A discussion document outlining the development of the scoring system forms part of the project archive.

Broadly, archaeological Significance was judged against the more 'academic' criteria used for Scheduling (rarity, diversity/representivity, period, group value, potential). Reference was also made to the scoring system and Monument Class Descriptions (MCDs) developed for English Heritage's Monuments Protection Programme (MPP), the existing version and draft revision of the research framework for the Eastern Region (Glazebrook 1997; Brown & Glazebrook 2000; Medlycott in prep.), and to informal scoring systems already used within the county. The scores were also intended to reflect existing designations, such as Scheduled Monuments and Listed Buildings. Each score was designed to relate to the site as a piece of land, rather than reflecting the significance of individual (portable) finds, for example. The Significance score is also independent of the site's survival, so a Bronze Age barrow cemetery destroyed by aggregate extraction would be of National significance, regardless of its destruction, thus allowing adjacent areas of land to still be judged in the context of the significance of the destroyed site. Most importantly, **all of the scores are provisional, and may be subject to revision as and when new information about a site becomes available.** The initial scores for each Sub-Unit were checked by NLA staff, including the County Archaeologist, members of the Planning Team, including the Historic Environment Countryside Adviser (HECA), and members of the Finds Identification and Recording Service.

The Survival score reflected the current condition of the site, *i.e.* the form in which it survives today (or on most recent evidence). It comprised a word list ('historic landscape', 'ruined structure', 'destroyed', *etc.*), with which each site was indexed with all relevant terms. Scores for Certainty and Evidence were also added for use as qualifiers. Further details of the scoring system and its development are given in Section 4.1.1. and in the project archive.

The resulting scores were then applied to each site falling within or intersecting with each Sub-Unit: **a total of 1783 sites or records**. New fields for each score were created in the 'Scores' tab of Norfolk's HBSMR database, with the potential scores available as a drop-down list. Each time a score was made, it was linked to an appropriate Event record and dated, making the process auditable and accountable. In practice, many of the scores had already been completed as part of earlier phases of the project, namely the NMP survey and the NHER enhancement. Scores for Significance, however, were only assigned at this assessment stage, when an overview could be gained of the entire archaeological record held for that area, providing the necessary context for each score. This also ensured a greater degree of consistency, with only 1 staff member being responsible for assigning scores for Significance.

Once the scores had been assigned and validated, the NHER was queried to produce 'final' datasets for each Sub-Unit and its broader Study Area, and these were then subject

to further interrogation, analysis and evaluation, the results of which are detailed in Chapters 5 to 8. In addition, an export query was designed to migrate NHER data together with its Significance score to MapInfo, where it can be thematically mapped to show areas of higher and lower archaeological Significance. Accompanying gazetteers for each Sub-Unit were also created.

A more detailed overview of the methodology employed in the assessment is given separately in Chapter 4.

## 2.8. Stage Four, Phase 6: Dissemination

The primary means of disseminating the project's results, and in particular those relating to the data gathering and enhancement phases of the project (Phases 3 and 4), has been via the NHER, and its online version the Norfolk Heritage Explorer. Ultimately it is expected that the records and maps produced by the project will also be accessible via the NMR. A digital export of the Minerals Resource GIS, thematically mapped to show the significance of the archaeological sites within each Sub-Unit, is available for the use of both archaeological curators and NCC's Minerals and Waste Planning Team. The production and circulation of both an NMP Report (Albone *et al*. 2008) and this Assessment Report, together with the publication of a synthesis of the NMP results in *Norfolk Archaeology*, will bring the project's results to a wider audience.

In addition to the digital data and reports created by the project, a number of other means of dissemination and outreach were utilised. A major element was the setting up of a project Steering & Liaison Group, consisting of representatives from the heritage, minerals and planning sectors, as well as local researchers and other potential stakeholders. Two meetings of this group were held during the lifetime of the project: a more formal meeting in September 2007, at which the aims, objectives and methodology of the project were outlined, together with early results, and a more informal meeting in April 2008, at which the results of the project and their potential implications were discussed. A series of talks and presentations were also given at a variety of events, including Lincolnshire Archaeology Day, the NMP Annual Meeting, and a meeting of the Norfolk Archaeological and Historical Research Group.

A leaflet was produced, aimed at the aggregates industry and for use by NCC's Minerals and Waste Planning Team. The leaflet outlined the issues surrounding archaeology and extraction in Norfolk, and highlighted the work of the ALSF and the results of the Norfolk Aggregates Assessment Project. New pages outlining the project and in particular the results of its NMP phase were added to the English Heritage and NM&AS websites.

## 2.9. Stage Four, Phase 7: Archive

The archiving of the project is currently ongoing. An End-of-Project Management Report is in progress; this will provide an assessment of the methodology and management of the project in order to aid future project planning. The digital maps created in AutoCAD by the NMP have been archived, and copies submitted to English Heritage. Exports of the mapping and its associated data now form part of the NHER GIS environment. The site records created and enhanced by the NMP and the NHER enhancement are held within the NHER database; ultimately, it is expected that the NMP data, both maps and accompanying database records, will be submitted to the NMR. The main project archive, including all written records, mapped data and reports will be stored at NLA. Copies of this data will be sent to the ADS for inclusion in the ALSF Online project archives.

# 3. Project Area and the Aggregate Resource

## 3.1. The Geology of Norfolk (JA)

The solid geology or bedrock of Norfolk comprises a series of sedimentary rocks that date from the Upper Jurassic to the Early Pleistocene (154–0.78 mya). In general, they dip gently towards the east and outcrop as a series of north-to-south bands, with the oldest rocks in the west and the youngest in the east. This bedrock is overlain by a highly variable sequence of superficial or drift deposits, many of which are glacial in origin. The glacial history of East Anglia is very complex, more so than any other part of the country (Engineering Geology Ltd 1979, 9), with successive phases of deposition and erosion affecting different parts of the county to a varying extent.

### 3.1.1. Bedrock Geology

In common with much of Eastern England, the bedrock of Norfolk has a regular pattern, with bands of different rock types forming a north-to-south aligned grain. As has already been described, these strata dip gently towards the east, so that the oldest rocks lie in the west of the county with younger deposits to the east. In the west, below the Fenland basin and King's Lynn, are the Upper Jurassic Kimmeridge Clay deposits. To the east, these are overlain by the Lower Cretaceous Greensands, loosely termed the 'Lower Greensand', which include uncemented deposits like the Sandringham Sands and other strata bonded by iron oxides to form the distinctive brown sandstone known as Carstone. (Of these, only the Carstone is equivalent to the Lower Greensand of the south of England, Engineering Geology Ltd 1979, 4.) The Lower and Middle Chalk form a roughly north-to-south aligned escarpment through west Norfolk, which is followed by the course of the Peddars Way Roman road. These rocks, including the Red Chalk, outcrop in the northwest corner of the county, forming the cliffs at Hunstanton. Much of the central part of the county is underlain by the Upper Chalk. The solid geology of the eastern part of the county comprises soft marine sands and gravels of the Norwich Crag Formation (also termed 'Crag' or 'Wroxham Crag' by the BGS). These were deposited in a precursor of the modern North Sea during the Pliocene and early Pleistocene periods, between 3.5 and 1.6 million years ago (Chatwin 1961, 41; Williamson 2006, 12).

### 3.1.2. Superficial Geology

The drift deposits that overlie the solid geology dictate the character and topography of the county, and influence its soils in particular. The bulk were deposited by successive glacial events, with continental ice sheets advancing and retreating during the Quaternary period. The earliest glaciations did not extend as far south as East Anglia, but in the interglacials that followed sands and gravels were deposited by meltwater channels across parts of the county. During the Cromerian interglacial in particular (*c.* 750,000–480,000 BP), the sands, gravels and laminated clays of the Cromer Forest Beds were deposited under deltaic freshwater and estuarine conditions by a 'proto-Thames' river that flowed northwards across the east of the county. These outcrop intermittently along the coast between Weybourne in north Norfolk and Pakefield in Suffolk (Chatwin 1961, 57; Funnell 2005, 4–5). The Anglian Glaciation (*c.* 480,000–430,000 BP) resulted in significant drift deposits being laid down across much of the county. The dark grey, clayey Cromer Till was deposited along the north coast, along with sandy Norwich Brickearth across parts of northeast Norfolk. A second glacier brought in material derived from central England and deposited a boulder clay, known as the Lowestoft Till, across the central part of the county. The meeting of these two glacial lobes resulted in massive disruption of the superficial geology and the underlying bedrock, creating the high ground of the Cromer Ridge. The Blakeney esker, a 3.5km gravel ridge, was deposited as the ice retreated, marking the position of a sub-glacial stream (Williamson 2006, 14). The final glaciation, the Devensian, resulted in the deposition of the Hunstanton Till along the north coast, with fans of outwash gravels occurring further inland on Salthouse and Kelling Heaths (Funnell 2005, 5). Significant post-glacial deposits, primarily associated with river valleys, are found throughout the county.

## 3.2. The Aggregate Resource of Norfolk (SH)

Aggregates are usually defined as being 'hard, granular, materials which are suitable for use either on their own or with the addition of cement, lime or a bituminous binder in construction' (BGS 2007, 1). For the purposes of the Aggregates Levy, this term applies to sand, gravel and crushed rock subjected to commercial extraction in the UK, including aggregate dredged from the seabed (BGS 2007, 27). In effect, this relates to Primary Aggregates, *i.e.* those 'produced from naturally occurring mineral deposits, extracted specifically for use as aggregate and used for the first time' (*ibid*, 1), as opposed to Secondary, manufactured or recycled aggregate.

The most important sources of Primary Aggregates are crushed rock and sand and gravel (BGS 2007, 6). In Great Britain, while some of the sand and gravel is derived from marine

sources, most is still supplied by land-won deposits (*ibid*, table 2). **In 2005, the East of England was the biggest supplier of land-won sand and gravel** (*ibid*, table 3).

A BGS study undertaken in 2006 indicated that the national permitted aggregate landbank is declining as extraction exceeds new planning consents. In the East of England this shortfall was 5% for sand and gravel and 99% for crushed rock (BGS 2007). In Norfolk, at the start of 2000, there was a landbank of 9.8 years for sand and gravel and 31.7 years for Carstone (the county's only source of crushed rock). At the time it was felt that there was no overriding need to permit new workings (NCC 2004, 23), as no new workings are allowed when the landbank exceeds 7 years for sand and gravel and 10 years for crushed rock. More pressing was the need to investigate new areas of a less sensitive nature to ensure a steady and secure long-term future supply. The figures for the start of 2007 indicate that the landbank of sand and gravel has reduced to 5.71 years and 16.86 years for Carstone (John Brigham, NCC, pers. comm.). This indicates that in keeping with regional and national trends, Norfolk has a shortfall of required aggregate sites, in particular those relating to the extraction of crushed rock. It also indicates that although the sand and gravel extraction is not being outpaced by demand, new sand and gravel workings are required. **Further details of Norfolk's minerals reserves and the issues surrounding the maintenance of its landbank are given in the draft Minerals and Waste Development Framework (NCC 2008a).**

The main sources of land-won aggregate within Norfolk are its glacially derived sands and gravels, although a number of pre-glacial deposits also exist. The most significant of these in terms of the aggregate resource are the Upper Tertiary deposits, consisting mainly of shelly sands, pebbly gravels and sands, collectively called the Crag. These extend over much of eastern Norfolk. Glacially derived deposits constitute the greater part of the aggregate resource, the main sources of coarse aggregate being the glacial sands and gravels, which are widespread across the county. (The potential high sand content within these deposits, however, means that their workability is variable.) Post-glacial sources of aggregate include the marine gravels of Hunstanton, the high-level 'teale' gravels on the chalk, the valley and fen gravels and the coastal blown sand and shingle (Engineering Geology Ltd 1979, 12). The river valley gravels represent one of the most important minerals deposits, particularly as these tend to be cleaner than the glacial deposits and therefore have increased potential profit if used for extraction. **It is on these river valley gravels that, across much of the county, extraction has focused in the past. With increased concern for the environmental vulnerability of such areas, however, it is now NCC policy to discourage further extraction within river valleys.**

In addition to the superficial deposits just described, Norfolk's bedrock geology also contains significant aggregate resources. Specificially, the 'Lower Greensand' deposits —

Carstone, Snettisham Clay and Sandringham Sands — which form an almost continuous north-south outcrop across west Norfolk, comprise several deposits which can be exploited for minerals. The Carstone division includes brown and yellow sands and ferruginous sandstone, the latter often used for building stone (Engineering Geology Ltd 1979, 5). Also, as has already been described, it is the only source of crushed rock within the county. The amount of crushed rock extracted in the East of England is quite small when compared with national figures, but it is still a significant amount given the scarcity of hard rock suitable for crushed rock aggregate in the region, when combined with high demand (*ibid.*). Norfolk now imports increasingly large quantities of crushed rock for use in the construction industry (NCC 2004, 9).

The Sandringham Sands are estuarine, current-bedded, light-coloured, sharp silvery sands, often stained and cemented into a flaggy brown stone (Engineering Geology Ltd 1979, 5). These deposits are a major source of silica sand, a relatively scarce material used for glass making, foundry moulding, ceramics and other specialised uses (NCC 2004, 13). Norfolk has considerable deposits of silica sand of Lower Cretaceous age within the Leziate Beds which run along its western edge. The quarry at Leziate is one of the largest industrial silica sand operations in the country (NCC 2004, 13), and is a particularly important source of raw material for the manufacture of colourless glass containers and flat glass, and for foundry sand (BGS 2006). At present the Leziate Beds are one of the few silica sand deposits where no associated production of construction sand takes place (*ibid.*), and therefore none of the extraction of this deposit is strictly subject to the Aggregates Levy. However, with the decline in the British foundry industry and the increase in glass manufacture from recycled materials, it is feasible that in the long term the Leziate Beds will be extracted for construction sand and other materials that are subject to the Levy.

## 3.3. Project Study Areas (AC/ST)

While the project has aimed to inform our understanding of the historic environment of the mineral resource throughout the whole of the county, the complexity of Norfolk's geology, together with the limited resources and timescale available to the project, meant that only selected areas could be made the subject of detailed study. As has already been described in Chapter 2 (Section 2.3), four broad study areas were identified, based on aggregate type. Each Study Area represents a schematised approximation of the distribution of an aggregate-bearing geology or group of geological deposits. The BGS ROCK type classifications for each deposit were used as the primary means of distinguishing different aggregate types; the LEX type was used as a secondary indicator (and was used more widely in the assessment itself, Section 4.1.2).

The Study Areas were defined using the Norfolk Minerals Resource GIS (Section 2.2), which combines geological data supplied by the BGS, including Minerals Resource Mapping, with other sources of information, such as data supplied by NCC's Minerals and Waste Planning Team. Polygons defining the extent of each selected aggregate type were digitised using a 1km grid.

### 3.3.1. Study Area A: Norwich Crag (596 sq km)

This Study Area includes all 1km squares to the northeast of Norwich where at least 50% of the bedrock is sand and gravel (BGS ROCK type B_SAND_AND_GRAVEL), but excludes those squares where the bedrock is overlain by BGS ROCK type S_DIAMICTON (Lowestoft Formation, Corton Formation, Devensian Till, Hanworth Till and other, similar, deep glacial deposits) (Figs 3.1 & 3.2). The more dispersed Crag deposits in the east of the county were excluded, as in relative terms they do not form a coherent aggregate landscape.

### 3.3.2. Study Area B: Plateau Gravels (327 sq km)

Study Area B includes all 1km squares where the bedrock is Chalk (BGS ROCK type B_CHALK) and where over 50% of the square contains superficial deposits containing sand and/or gravel, predominantly glacial (Lowestoft Formation, Corton Formation and Briton's Lane Member) and glaciofluvial deposits (BGS ROCK type S_SAND_AND_GRAVEL) (Figs 3.3 & 3.4).

### 3.3.3. Study Area C: River Gravels (966 sq km)

Study Area C comprises all 1km squares that include a substantial proportion of river terrace deposits (BGS ROCK type S_SAND_AND_GRAVEL, distinguished by various 'River Terrace' LEX types) and/or alluvium (BGS ROCK type S_CLAY_SILT_SAND_AND_GRAVEL, LEX type 'Alluvium') (Figs 3.5 & 3.6). Alluvial deposits along the north Norfolk coast were excluded.

### 3.3.4. Study Area D: 'Lower Greensand' and Fen-Edge Gravels (270 sq km)

This area includes all 1km squares where at least 50% of the bedrock is part of the Sandringham Sand Formation (BGS ROCK type B_SAND, including Mintlyn Sand, Leziate Sand, and Roxham and Runcton Sand Members), Sandstone (B_SANDSTONE, predominantly LEX type Carstone) or BGS ROCK type

B_SANDSTONE_AND_MUDSTONE, or where at least 50% of the square contains superficial deposits of Fen-Edge Gravels (S_GRAVEL, primarily the Tottenhill Gravels) (Figs 3.7 & 3.8).

Further details of each of the Study Areas is given in their respective sections of the Assessment (Chapters 5–8).

## 3.4. Project Sub-Units (JA/ST)

As has already been described (Section 2.3), within each Study Area a Sub-Unit of 45 1km squares was identified. Two of the Sub-Units — B and C — were selected as contiguous areas, forming a single block of 90 sq km (because of the overlap between the 2 Study Areas this encompassed 45 sq km of Plateau Gravels and 64 sq km of River Gravels). These were then made the subject of detailed archaeological investigation and assessment.

### 3.4.1. Sub-Unit A: Norwich Crag (45 sq km)

Situated on the southern edge of Study Area A, Sub-Unit A provides an 8% sample of this broader area (Fig. 2.1). The area selected for the Sub-Unit lies to the north of Norwich, a major area of demand, with good transport links ensuring that it is a definite area of growth in terms of aggregate extraction. It encompasses several areas proposed for future extraction in the draft MWDF (NCC 2008a; Fig. 5.15), and also a number of existing quarries, although these are relatively limited in extent and some appear to now be inactive (Fig. 5.14).

The area covers a gently undulating plateau, lying for the most part at around 20m OD, but rising to just over 30m OD at its southern edge, near Norwich International Airport. The River Bure passes through the northern corner of the Sub-Unit at Little and Great Hautbois, and then skirts its northeastern side just beyond the Sub-Unit boundary. Despite the presence of this river, the drainage pattern is not a major feature of the Sub-Unit. The most important minor watercourse, known as Stone Beck beyond the western limit of the Sub-Unit, is a tributary of the Bure, and divides the Sub-Unit from west to east. It is joined from the south by Dobb's Beck, the only other significant watercourse in the Sub-Unit.

As might be expected, the bedrock in Sub-Unit A is dominated by Crag deposits (BGS ROCK type B_SAND_AND_GRAVEL), with river valleys cutting through these to reveal small areas of the underlying Chalk (B_CHALK) (Fig. 3.1). The Crag is classified by the BGS as LEX type 'Wroxham Crag' across much of the area, with undifferentiated Crag to

the east and south, although the abrupt boundary between these deposits, as mapped by the BGS, highlights the imprecision of such differentiations (see Section 2.2).

In many places within Sub-Unit A, particularly on the plateaux between the valleys, the Crag is masked by superficial deposits of Middle Pleistocene date (Fig. 3.9). The most extensive of these is the Norwich Brickearth (BGS ROCK type S_CLAY_SILT_AND_SAND), a decalcified sandy clay with silt and sand layers and scattered pebbles. It is equivalent to the till deposits of the North Sea Drift and was deposited during the Anglian Glaciation (460,000–420,000 BP; (Chatwin 1961, 65; Engineering Geology Ltd 1979, 10). In the southeast part of the Sub-Unit, the Crag and Brickearth are overlain by diamicton (S_DIAMICTON) and sand and gravel deposits of the Happisburgh Glacigenic Formation (S_SAND_AND_GRAVEL, LEX type 'Corton Formation' [a classification which is now obsolete]), which are also Anglian in date (BGS 2008).

On the plateaux in the northwest of the Sub-Unit are Middle Pleistocene glaciofluvial gravels (BGS ROCK type S_SAND_AND_GRAVEL) which can be equated with deposits in Sub-Units B and C. These sands and gravels were deposited as outwash gravels from the Anglian ice sheets. In addition to the Crag and glaciofluvial gravels, small areas of further post-glacial alluvial and river terrace sand and gravel deposits are present overlying the Chalk bedrock along the river valleys.

The majority of the eastern part of Sub-Unit A is dominated by rich loam soils formed over the Crag deposits. In the west, and extending along a narrow valley that bisects the Sub-Unit, are the well-drained sands, gleys and gley podzols of the Wensum Sands (Corbett & Dent 1994, 18). Small areas of alluvium-derived soils are present in the east of the Sub-Unit further along this valley (Williamson 2005, 8)

### 3.4.2. Sub-Unit B: Plateau Gravels (45 sq km)

Sub-Unit B is situated in the centre of the county, just to the north of the growing market town of East Dereham (Fig. 2.1). It is made up of multiple detached bocks of land, reflecting the dispersed distribution of the Plateau Gravels. Covering 45 sq km, the Sub-Unit provides a 14% sample of its broader Study Area. Two significant clusters of NCC 'Areas of Investigation' fell within the Sub-Unit, located around East Dereham in the west — an area of high demand with good transport links — and at Weston Longville in the east, where the Till underlying the Plateau Gravels meets the Crag. (Most of the latter areas were dropped from the draft MWDF, NCC 2008a.) Existing quarries in the area are relatively extensive compared to Sub-Unit A (Fig. 6.14), but large areas of potential mineral resources still remain uninvestigated. A preference for the choice of this area for detailed

study, rather than a second cluster of 'Areas of Investigation' to the west of Fakenham, was expressed during preliminary meetings with NCC's Minerals and Waste Planning Team.

The topography of the Sub-Unit is that of the dissected claylands occupying much of central Norfolk (Williamson 2005). Here, the relatively elevated clays (covered in many areas by superficial deposits of sand and gravel), are divided into a series of plateaux by the River Wensum and its tributaries. The river follows a winding course through Sub-Units B and C, from Guist in the north to Ringland in the east. For the most part it is only its margins that fall within the Sub-Unit, which is focused on the plateaux overlooking the river. In the eastern part of the Sub-Unit the areas of Plateau Gravels are relatively small and dispersed, but to the west the landscape is dominated by the plateaux, bisected here by the Black Water and its tributaries. These plateaux in the west represent the highest part of the Sub-Unit, reaching over 70m OD at Stanfield and 69m on the northern edge of East Dereham. Further to the east at Lyng and Bylaugh, the edges of the plateaux overlooking the Wensum are generally lower in height, falling within the 40–45m OD range. However, Telegraph Hill at Honingham in the far east of the Sub-Unit reaches a height of 63m.

In common with much of central Norfolk, the solid geology of Sub-Unit B is almost entirely formed by Chalk of Late Cretaceous date (93.5–71.3 mya) (BGS ROCK type B_CHALK). The Pleistocene Crag deposits (B_SAND_AND_GRAVEL), which dominate in Sub-Unit A, overlie the chalk at the eastern end of the area and are present in limited exposures around Weston Longville (Fig. 3.3).

It is, however, the superficial geology of Sub-Unit B that is of greatest significance as an aggregate resource (Fig. 3.10). The earliest of the superficial deposits is the Brickearth, which is present in a series of sinuous exposures along the sides of the Wensum Valley, between Bintree and Ringland. A considerable proportion of the Sub-Unit (29%) is covered by diamicton, primarily classified as LEX type 'Lowestoft Formation'. This takes the form of a chalky till and covers the chalk bedrock of central Norfolk in a broad north-to-south band. The most extensive superficial deposits within Sub-Unit B are classified as BGS ROCK type S_SAND_AND_GRAVEL; the bulk of these are made up of glacial (Lowestoft and Corton Formation) and glaciofluvial deposits, but a small proportion (8%) represent post-glacial river terrace deposits. The sand and gravel deposits of the Lowestoft Formation and other glacial deposits are present on the plateaux between the river valleys, forming the Plateau Gravels by which the Sub-Unit is defined. In the west of the area these form large exposures, particularly around Longham and Beetley, which have been extensively worked for aggregate.

The soils of Sub-Unit B comprise mainly poorly-draining stagnogleys derived from the diamicton (chalky till) on the plateaux, with loamier and sandier soils present over the gravel deposits in the valleys (Williamson 2005, 8).

### 3.4.3. Sub-Unit C: River Gravels (64 sq km)

Despite covering a larger area than any of the other Sub-Units, Sub-Unit C represents only a 7% sample of its very extensive Study Area, the lowest of any of the aggregate types covered by the assessment. Forming a contiguous block of 90 sq km with Sub-Unit B, the Sub-Unit is again located in the centre of the county, covering a stretch of approximately 20 km at the upper end of a mid-section of the Wensum Valley, together with its tributaries and immediate environs (Fig. 2.1). The River Gravels represent one of Norfolk's most important mineral deposits; they are, for example, cleaner — and therefore more profitable — than glacial deposits, and they have been subject to substantial levels of extraction in the past. This is clearly demonstrated by the number of existing quarries recorded along this stretch of valley (Fig. 7.14). Although surviving areas of archaeology should be at no immediate threat, thanks to the protection afforded by their environmental sensitivity, there remains potential for further extraction in the long term (see also Section 9.1.6). The likely scale of any future exploitation is indicated by the extensive extraction that has taken place here in the past, and the area's proximity to Norwich and to the region's transport network would place it under particular pressure should current environmental constraints be lifted.

In broad terms, as for Sub-Unit B, the landscape of the Sub-Unit is that of the dissected claylands of central Norfolk. Its dominant topographic feature, the River Wensum, flows south and then east through the Sub-Unit for a distance of approximately 29km. Over this distance the height of the valley floor drops from 25m OD where it enters the Sub-Unit to approximately 9m OD where it exits in the east. The Wensum is fed by several tributaries within the Sub-Unit, including the Black Water flowing from East Bilney and the Scarning River which joins it at Worthing, the Penny Spot Beck at Swanton Morley and a further watercourse — also called the Blackwater — at Lenwade.

As for Sub-Unit B, it is the Sub-Unit's superficial geologies that have the greatest significance in terms of the aggregate resource. The area's bedrock is again overwhelmingly dominated by the Chalk (BGS ROCK type B_CHALK), with only limited occurrences of Crag (B_SAND_AND_GRAVEL) at its eastern end (Fig. 3.5). Amongst the superficial geologies present (Fig. 3.11), the most significant in terms of the character of the Sub-Unit are the extensive deposits of post-glacial sands and gravels. These comprise the river terrace (BGS ROCK type S_SAND_AND_GRAVEL, LEX type 'River Terrace Deposits (Undifferentiated)') and alluvial sands and gravels (S_CLAY_SILT_SAND_AND_GRAVEL) present along the River Wensum and its

tributaries. It is these deposits that have been widely extracted for aggregate in the past; within the Sub-Unit, this is particularly evident between Elsing and Morton on the Hill. The other superficial deposits within Sub-Unit C comprise Brickearth, diamicton, and Lowestoft Formation and glaciofluvial sands and gravels, all of which are also present in Sub-Unit B and have been described above.

As for Sub-Unit B, relatively loamy and sandy soils are present over the gravel deposits of the valleys, with poorly-draining stagnogleys derived from the diamicton on the plateaux above (Williamson 2005, 8).

### 3.4.4 Sub-Unit D: 'Lower Greensand' & Fen-Edge Gravels (45 sq km)

Situated more or less along the western side of what is approximately the centre of its corresponding Study Area (Fig. 2.1), Sub-Unit D provides a 17% sample of the 'Lower Greensand' and Fen Edge Gravels. 56% of the area of the Sub-Unit is made up of the Sandringham Sands; these include deposits of silica sand, the exploitation of which is not strictly subject to the Levy as they are not, at present, extracted for use as aggregate. As has already been discussed (Section 3.2), however, they may be exploited for construction sand in the future; furthermore, their exclusion from this assessment would mean the Study Area no longer forming the coherent geographical entity required for broad-based archaeological assessment to take place at a scale comparable with areas already described. A single kilometre square within the southern part of the Sub-Unit has been excluded, as it largely comprises Kimmeridge Clay. The area selected for the Sub-Unit is biased towards the Fen-Edge (Tottenhill) Gravels, which were the focus of several NCC 'Areas of Investigation'.

Sub-Unit D has a varied topography resulting from its complex underlying geology (see below). It can be divided into separate northern and southern landscape areas, split by the Nar Valley, which itself forms a third area. The southwest part of the Sub-Unit forms the edge of the Fenland basin and lies at below 5m OD. Here, a few kilometres to the north of Downham Market, the landscape is dominated by the River Great Ouse and Relief Channel, which follow parallel south-to-north courses. In the southern part of the Sub-Unit a line of settlement extends along the 5m contour line north from Stowbridge to Watlington, marking the edge of the fen. To the east a terrace rises up gently to around 20m OD and is cut by a series of small valleys marking the line of watercourses flowing westwards into the Great Ouse.

The valley of the River Nar forms a distinct landscape area in the centre of the Sub-Unit. It is broad and low-lying, measuring up to 3km across within the Sub-Unit and with parts lying at only 2m OD. To the south of the river an elongated island, occupied by the village of

Wormegay, rises out of the valley floor to a height of 10m. Within the Sub-Unit, the Nar Valley with its alluvial and peat deposits has more in common with the areas of Fenland to its west than the adjacent upland areas.

The northern part of Sub-Unit D rises steeply out of the Nar Valley at Blackborough End, onto the southern edge of a large, roughly triangular plateau that extends to the east of Middleton. This corresponds to an outcrop of Carstone and rises up to 42m OD. The north side of the plateau is defined by a valley containing Middleton Stop Drain. To its north is an upland area of irregular hills covered by former heath and warren land that extends from Bawsey to Ashwicken. It is cut by a small valley running north-south at Leziate but generally has a rolling topography lying between 10m and 35m OD. This landscape has been extensively altered by the extraction of silica sand from the Leziate Beds.

The Sub-Unit is highly variable in terms of its geology. Its solid geology includes the oldest strata exposed within the county. These consist of mudstones belonging to the Kimmeridge Clay Formation of the Late Jurassic period (154–145 mya; BGS ROCK type B_MUDSTONE, LEX type Kimmeridge Clay Formation). They are mainly present along the western edge of the southern part of Sub-Unit D (Fig. 3.7), where they are mostly overlain by later deposits, and they also extend westwards beneath the Fenland basin. Overlying the Kimmeridge Clay is a sequence of Late Jurassic and Early Cretaceous deposits (145–99 mya) that are loosely termed the 'Lower Greensand', although they are not directly comparable to strata of the same name found in southeast England (Chatwin 1961, 18–20; Engineering Geology Ltd 1979, 4–5). The earliest of these is the Sandringham Sand Formation (B_SAND), which is divided into the Roxham and Runcton Sand, the Mintlyn Sand and the Leziate Sand. These are light-coloured, sharp, silvery estuarine sands, which are often stained and are sometimes cemented into flaggy brown sandstone. The Sandringham Sand Formation forms the solid geology for the majority of the northern part of Sub-Unit D, but is frequently masked by later drift deposits (see below).

Stratigraphically overlying the Sandringham Sands is the Snettisham Clay (B_MUDSTONE, LEX type Snettisham Clay Member), an Early Cretaceous mudstone that has been extracted in the Heacham area for brick manufacture (Chatwin 1961, 20). This deposit only outcrops as a few narrow bands in the northern part of Sub-Unit D. The uppermost of the 'Lower Greensand' strata in Norfolk is the Carstone (B_SANDSTONE), which comprises a series of yellow and brown sands and ferruginous sandstones. Although it mainly outcrops as a ridge lying to the east of Sub-Unit D, two significant outliers of Carstone are present within the area, at Middleton and Leziate. The Carstone is overlain by mudstone of the Early Cretaceous Gault Clay Formation ((B_MUDSTONE, LEX type Gault Formation). This deposit has only limited exposures within Sub-Unit D and mainly outcrops further to the east.

The superficial geology of Sub-Unit D includes a mixture of glacial and post-glacial deposits, some of which are an important source of aggregate (Fig. 3.12). Deposits of both diamicton (S_DIAMICTON) and sand and gravel of the Lowestoft Formation (S_SAND_AND_GRAVEL), laid down during the Anglian Glaciation (460,000–420,000 BP), are present within the Sub-Unit. The diamicton is widespread and masks the 'Lower Greensand' at various locations throughout the area. It is particularly extensive in the southern part of the Sub-Unit at Wallington, and also to the southeast of Tottenhill. The sand and gravel deposits of the Lowestoft Formation were deposited as outwash beds beyond the edge of the ice sheets. These are present in two main areas within the Sub-Unit, lying on either side of the River Nar to the west of Wormegay and Blackborough End.

The Tottenhill Gravels (S_GRAVEL) are a sequence of outwash sands and gravels with a high flint content dating from the Wolstonian Stage of the Middle Pleistocene. The sequence is divided into upper and lower parts with coarser material present towards the base and finer, better-sorted gravel present at the top. The gravels are widespread in the southern part of Sub-Unit D, where they mainly overlie the Kimmeridge Clay. They form an irregular band along the Fen Edge, from Tottenhill in the north through to Wimbotsham in the south. They have been, and continue to be, extensively extracted for aggregate.

Some later deposits of Flandrian date (10,000 BP onwards) are also present within Sub-Unit D. These include alluvial clay and silt along the Fen Edge, and a broad band of fen peat along the Nar Valley. The peat deposits in the Nar Valley mask the aggregate-bearing Sandringham Sands in that area.

The soils of Sub-Unit D vary between the north and south of the area. In the north, overlying the sand and gravel deposits, the soils are poor and acidic. In the southern part of the Sub-Unit, stagnogley soils are more dominant (Williamson 2005, 8).

# 4. Assessment Methodology and Overview

## 4.1. Assessment Methodology

In practice, the assessment phase of the project was undertaken in two distinct phases: first, site scoring (Stage Four, Phase 5.1, Tasks 9.3–9.4 in the Project Design, Massey 2007); secondly, the written assessment and characterisation of each Sub-Unit and corresponding Study Area (principally Stage 4, Phase 5.1, Task 9.2). An overview of the methodology employed in the assessment — and in particular the site scoring — has been given in Section 2.7. A more detailed description of the methodology is given here, as an overview and introduction to the data provided in the following chapters.

### 4.1.1. Site Scoring

An overview of the scoring methodology and the development of criteria for scoring Significance has been given in Section 2.7. Four score fields were completed for each site: Certainty, Evidence, Significance and Survival; it is the latter two that have been used most extensively in the assessment. It is important to note that **it was intended at all the scores should be provisional, subject to revision as and when new information about a site becomes available.**

***Certainty***

This score was introduced as a qualifier, to allow sites where there was a significant degree of uncertainty as to their archaeological nature (*i.e.* a sufficiently ancient and/or anthropogenic origin for finds or features), rather than their survival or significance. The value 'Uncertain' could also be applied to sites where there is considerable uncertainty as to location, including 'lost' settlements and churches. The field to some extent compensates for the inability to query the 'Confidence' field of HBSMR's Monument Form. The score is hierarchical, with only one value being current at any time.

| | ***Potential Scores*** | |
|---|---|---|
| **Certainty** | **-** | null value |
| | **Uncertain** | uncertain site |

***Evidence***

This score too was developed for use as a qualifier, to discriminate between sites with divergent forms of evidence. The score was applied to the evidence for the site overall. While it to some extent replicated information in the NHER monument index for each site, the inclusion of an overall score for evidence allows different forms of site to be more

readily — albeit broadly — distinguished. As for Certainty, the score is hierarchical, with only one value current at any time.

| | ***Potential Scores*** | |
|---|---|---|
| **Evidence** | **Physical** | recorded evidence of the physical remains of the site, including cropmarks visible on photographs, geophysics and finds scatters, as well as excavated features. |
| | **Documentary** | the site is documented, *e.g.* by maps or records, but no physical evidence has been recorded. |
| | **Conjectural** | the existence or location of the site is uncertain or conjectured. |

***Significance***

This was an overall score for archaeological significance, incorporating a judgement of rarity, group value, potential for preservation of archaeological finds and features, and diversity/complexity, as per the Scheduling criteria and those used in the Monuments Protection Programme (MPP). Existing designations — Scheduled Monuments and Listed Buildings — were used as a marker for the Significance of those sites they covered. As for Certainty and Survival, the potential scores were again hierarchical.

| | ***Potential Scores*** | |
|---|---|---|
| **Significance** | **International** | World Heritage Sites and other archaeological sites, historic buildings, *etc.* of equivalent significance |
| | **National** | Scheduled Monuments, Grade I and II* Listed Buildings and other archaeological sites, historic buildings, *etc.* of equivalent significance |
| | **Regional/County** (Termed 'Regional' throughout this report) | Grade II Listed Buildings and other archaeological sites, historic buildings, *etc.* of equivalent significance |
| | **Local** | undesignated archaeological sites, historic buildings, *etc.* of sub-regional significance |
| | **Negligible** | archaeological sites of minimal signficance or where evidence is uncertain |
| | **Ungraded** | non-antiquities and other records of minimal relevance |

***Survival***

The Survival score is a reflection of the form in which the site survives today (or on most recent evidence). The score is non-hierarchical, with all relevant terms being added for each site.

| | *Potential Scores* | |
|---|---|---|
| **Survival** | **Historic Landscape** | used for coherent landscape features with 'group value', such as surviving parks, airfields, groups of ceremonial/funerary monuments, *etc*. Used for the landscape feature itself, not its component elements. |
| | **Surviving Structure** | surviving buildings, *etc*. |
| | **Ruined Structure** | ruined buildings, *etc*. |
| | **Major Earthwork** | earthwork features that are well defined and/or survive to a height greater than 1m above ground-level.* |
| | **Minor Earthwork** | earthwork features that are poorly defined and/or survive to a height of no more than 1m above ground-level.* |
| | **Buried Site** | levelled site where buried features are known, evidenced by remote sensing, or strongly suspected. |
| | **Finds Scatter** | levelled site only evidence by artefacts or other material, and where original or surviving physical character is uncertain. |
| | **Destroyed** | indexed with other relevant Survival types for partially destroyed sites. |
| | **Unknown** | too little known about current condition of site to judge survival. |

* The division between 'minor' and 'major' earthwork sites was intended to be subjective, with the height treated only as a rough guide and greater weight given to feature definition; some well-preserved earthworks might never have measured more than 1m in height.

### 4.1.2. Assessment and Characterisation of Study Areas

***Overview***

In Chapters 5–8 the results of the archaeological assessment are discussed separately for each Sub-Unit and Study Area, broken down by geology, period, significance score, *etc*. Using this method, the historic environment of each area can be characterised and assessed. Throughout this report, the term 'site' is used to denote individual records held in the Norfolk Historic Environment Record (NHER). A 'site' or record might comprise a findspot of a single sherd of pottery, or an extensive, multi-period landscape (a 'Monument') extending over several hectares. **This division of the archaeological record into individual units is obviously an artificial construct, which reflects as much the ways in which archaeological remains are discovered and recorded, as it does what they actually represent**. An archaeological 'site' (or, in reality, a 'record') is only a reflection of where past human activity is known to have happened, and where some archaeological 'event' has taken place (documents, maps or aerial photographs created **and used**, field walking or metal detecting undertaken **and recorded**, *etc*.) providing a record or indicator of this activity, which has then been included in the NHER. Just because there is **no record of activity having taken place in a particular area does not indicate that there are no archaeological remains**, only that as yet no clear indication of their existence has been recorded. The creation of the archaeological record is, in effect, a multi-stage process: past activity must take place, this activity must leave some physical trace in the archaeological record, and any such traces must be 'discovered', recognised and recorded in the NHER. Despite this caveat, however, **the numbers of sites recorded**

**in each area or on each geological deposit can be used as a crude tool to assess archaeological character and potential**.

Above all, it should be borne in mind that the NHER is the end product of decades of work by numerous individuals from a variety of organisations and backgrounds. It has been curated and accessed via several different mechanisms, from cardboard index cards to an integrated GIS. Its scope, in terms of what has been recorded, and the method of defining sites and assigning records, has altered considerably over time. Consequently, the information it contains (currently some 57,000 recorded sites, although only 49,000 with specific geographical locations falling within the county [see below]) is not entirely consistent, with Findspot records, for example, sometimes relating to the location of a single object, or in other cases to one or more fields from which multiple objects of different periods have been recovered. While the NHER enhancement carried out as part of this project (Section 2.5) has gone a considerable way to rectifying such inconsistencies within the project's Sub-Units, others still remain, not least because the data is not tailored to fit the needs of a particular end-user or product, but rather to provide the raw material for a variety of uses. Therefore, **the results of the assessment,** discussed in Chapters 5–8, **must be treated as a broad-based snapshot of the information held by the NHER at a particular point in time, not a finely-tuned, detailed quantification of a highly consistent and validated dataset**.

***Geographical Queries***

The vast majority of sites recorded by the NHER are linked to a geographical object (point, line or polygon), which can be viewed in the mapping platform of a suitable GIS, such as MapInfo. Prior to starting the assessment of each area, a subset of the NHER was created by querying for every site whose geographic object **intersected** with the boundary of the relevant Sub-Unit or Study Area. This means that all records lacking a geographical object, *i.e.* records with an uncertain or non-specific location, were excluded from the assessment. Also, very extensive sites, such as railway lines, may be included in the assessment of more than one area. Following basic validation of the data (checking for missing Significance scores, *etc.*), the resulting dataset — whether as a database file, the original mapping, or converted to point data — was the basis for any further analysis.

Subsequent geographical queries, for example to find all sites falling within minerals allocations proposed in the MWDF, or all sites within Sub-Unit A that overlay Chalk bedrock, were also constructed using an 'intersect' operator (rather than 'contains', 'within', *etc.*), unless otherwise specified. It was felt that the results of such queries would provide the best representation of the archaeological record in a given area. All queries on archaeological sites were executed using the original polygons, lines and points copied from the NHER mapping; for clarity, the resulting datasets have been converted to point

data for the distribution maps accompanying the four main chapters (see below). Other geographical datasets, such as BGS geology mapping or the MWDF minerals allocations, were cropped as necessary to ensure that only those sites falling both within the boundaries of a particular deposit or allocation, and the relevant Sub-Unit or Study Area, were selected. Queries to find the number of sites falling within minerals allocations proposed in the MWDF were conducted using the dataset provided by NCC Minerals and Waste Planning Team, which is largely that reproduced in the Development Framework. Where these proposals are subsequently known to have been withdrawn (see NCC 2008b), this is mentioned in the text but no attempt has been made to re-interrogate the digital data. The distribution maps also make use of the dataset originally provided.

***Database Queries***

Within the NHER, records are classified as being of a particular type. The main types, relevant for the data discussed here, are (in order of relevance):

- **Monument**: archaeological features or structures known through survey, excavation, cropmarks or earthworks, or through documentary or secondary sources, placenames, verbal communications, *etc.*. At least one monument type (excluding 'FINDSPOT') must be listed in the monument index (see below).
- **Find Spot**: individual find or scatter of artefacts, with no known associated archaeological features or deposits.
- **Building**: extant historic building still substantially intact or in use. This includes buildings converted to alternate uses (*e.g.* a church now used as a house) but does not include ruined buildings.
- **Listed Building**: as for building, but covered by an active Listed Building designation.

The datasets created for each Study Area and Sub-Unit using the geographical queries described above were re-imported into the NHER database as .dbf files. They could then be queried using the Monument Index form of HBSMR. This allows for records to be queried in relation to a variety of different criteria, including date, monument type, and scores.

The numbers of sites recorded for each period were derived using this method. It is important to note that **the dating of many sites is uncertain, or only accurate to a period or range of periods**. For example, it is often difficult to distinguish the cropmarks of Iron Age settlements and field systems from those of Roman date (Albone *et al.* 2007a, 81, for example). In addition, sites are generally indexed in order to maximise their return in any query, so an enclosure of probable Iron Age but possible medieval date, would be indexed as both Iron Age and medieval, and also, in all likelihood, as of unknown date.

Many of the assessment sites, therefore, will be included under several different period sections in the reports below. For this reason, the number of sites given in the assessment should be regarded as relative, **not** absolute. As the queries have been formulated in the same way for each given area and for each period, the figures still provide a valid comparative tool; they cannot, however be totalled up to provide an absolute number of sites for each area. This contrasts with the methodology employed in Hampshire (Young *et al*. 2007, *e.g*. table 3) and Suffolk (SCC 2007, *e.g*. 3), for example.

The queries for each period were executed using those already set up within HBSMR. In two cases it was necessary to adjust the date ranges used, where chronological overlaps had been built into date range for the period. Specifically, there is an overlap between the dates given for the Bronze Age and Iron Age periods, with the former ending in 701 BC but the latter beginning in 800 BC. While this provides a true reflection of the lack of distinction in the archaeological record, it means that as the vast majority of sites are indexed by period, or occasionally sub-period (Early, Middle or Late, for example), a query on the Bronze Age period will also return sites of Early or non-specific Iron Age date. By querying using date-specific chronological blocks, based on the existing periods but removing any overlap, irrelevant returns of this type were minimised. The chronological periods used were as follows, with adjustments for the assessment highlighted in bold:

| ***Chronological periods used in the assessment*** | | | | |
|---|---|---|---|---|
| **HBSMR Period** | **HBSMR** | | **Assessment Query** | |
| | ***Start date*** | ***End date*** | ***Start date*** | ***End date*** |
| Palaeolithic | 500,000 BC | 10,001 BC | 500,000 BC | 10,001 BC |
| Mesolithic | 10,000 BC | 4001 BC | 10,000 BC | 4001 BC |
| Neolithic | 4000 BC | 2351 BC | 4000 BC | 2351 BC |
| Bronze Age | 2350 BC | 701 BC | 2350 BC | **801 BC** |
| Iron Age | 800 BC | AD 42 | **700 BC** | AD 42 |
| Roman | AD 43 | AD 409 | AD 43 | AD 409 |
| Saxon | AD 410 | AD 1065 | AD 410 | AD 1065 |
| Medieval | AD 1066 | AD 1539 | AD 1066 | AD 1539 |
| Post Medieval | AD 1540 | AD 1900 | AD 1540 | AD 1900 |
| Modern | AD 1901 | AD 2050 | AD 1901 | AD 2050 |

The period queries were conducted in the 'monument type and date' field of the index form. This meant that a query on the period 'Neolithic' would return all sites indexed with a monument type with a date range falling in the period 4000 BC–2351 BC. The return would include all Find Spot sites that had been indexed with the monument type 'FINDSPOT (Neolithic)'.

The queries executed for each period were conducted using an 'inclusive' search, *i.e*. one that returns all sites for which that date is possible. In order to provide some indication as to the number of sites specifically dated to that period, figures are also given, where relevant, for the results of an 'exclusive' or 'wholly within range' search using the same

criteria. (Such searches return only those sites for which a date exclusively within that period has been recorded.) For example, an 'inclusive' search for Neolithic sites in Sub-Unit D returns 85 records, while an 'exclusive' query brings back only 33. While many of the non-exclusive records relate to sites of non-specific prehistoric date, which do not accurately reflect the known extent of Neolithic activity in the area, such sites are still of interest for the period as there is often potential for a Neolithic date, and their exclusion would lead to a falsely sparse view of the site density for the period. The only exceptions, for which exclusive searches were used, were the Palaeolithic and Mesolithic periods. For these periods sites of non-specific prehistoric date are of minimal relevance. In these cases, the returns from each query in the monument index were checked against and correlated with those for equivalent queries in the finds index. (It should be noted that the inclusive/exclusive searches operate using any individual entry on a site's monument index; a record where 'ENCLOSURE (Roman)' and 'ENCLOSURE (medieval)' have both been indexed would still be returned by an exclusive search on either period.)

The results returned by each query were briefly assessed, and any obviously 'rogue' sites excluded. The dataset was then exported, both as a map export, which could be subjected to further interrogation and analysis in MapInfo, and as a .csv file from which point data could be derived for use in distribution maps.

***Distribution Maps***

Distribution maps accompany each relevant section of the text assessing the historic environment character of each Sub-Unit and Study Area. Unless otherwise specified, they illustrate the results of 'inclusive' queries, with, for the period-based maps at least, each Monument, Findspot and Building (including Listed Buildings) coloured to show its Significance score. In these cases only sites of Local or higher significance are shown.

For the most part, these points used to create the distribution maps have been derived from the centre point of each site. These have been adjusted by hand where necessary, for example for the railway lines, where the centre point would be at the centre of an arc described by the railway, rather than on the line itself. This is why certain sites appear from the distribution maps to lie outside a particular Sub-Unit or Study Area, when in fact their recorded extent does overlap with the relevant polygon. In the period-based maps, linear sites of considerable length have had their original line, as mapped in the NHER, substituted for a point, in order to provide a more representative view of their distribution; shorter examples have been left as points.

## 4.2. Countywide Overview

Using the spatial data in the Norfolk Minerals Resource GIS, it has been possible to undertake a preliminary archaeological assessment of the aggregate (and non-aggregate) landscape of the entire county (Table 4.1 below). This provides very basic statistical data with regard to the number of archaeological sites recorded in the NHER on each geological deposit (classified by BGS ROCK type and, where appropriate, BGS LEX type). The methodology employed replicates that described above for the more detailed assessment undertaken on each of the project's four Study Areas, and therefore any sites without a map object are excluded. Sites falling entirely outside the county boundary were also removed from the dataset.

A figure for the number of Scheduled sites on each geology is also given, providing a broad indication of the significance and survival of sites on each geology. Here, and throughout the assessment, 'Scheduled sites' are those sites recorded in the NHER which are associated with a Scheduled Monument. They are not exactly analogous with Scheduled Monuments, as a Scheduled Monument may encompass more than 1 NHER site and vice versa, and in most cases their boundaries are discrepant.

***Table 4.1. Density of archaeological sites in county relative to geology***
Emboldened ROCK types are aggregate-bearing geologies where extraction has been and/or will be targeted (information principally derived from NCC Minerals and Waste Planning Team 'Areas of Investigation' and MWDF minerals allocations). Deposits in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within county (sq km)** | **No. of sites** (as of 11.11.08) | **per sq km** | **Sche-duled sites** | **per sq km** |
|---|---|---|---|---|---|---|
| ***Overall*** | | ***5497.99*** | ***49,290*** | ***9.0*** | ***535*** | ***0.1*** |
| | | | | | | |
| B_CHALK | various | 3121.40 | 28,270 | 9.1 | 403 | 0.1 |
| B_CLAY_AND_SILT | Snettisham Clay Member | 1.73 | 70 | 40.5 | 0 | 0.0 |
| B_CLAY_SILT_AND_ SAND | London Clay Formation | 4.18 | 19 | 4.5 | 0 | 0.0 |
| B_MUDSTONE | various | 641.82 | 3826 | 6.0 | 33 | 0.1 |
| B_MUDSTONE_AND_ LIMESTONE_ INTERBEDDED | Roach Formation | 1.04 | 13 | 12.5 | 0 | 0.0 |
| B_SAND [Crag] | Crag | 173.49 | 1581 | 9.1 | 4 | <0.1 |
| **B_SAND [Sandringham Sand Formation]** | **various (Roxham, Mintlyn, Leziate, *etc.*)** | **166.07** | **1361** | **8.2** | **29** | **0.2** |
| **B_SAND_AND_ GRAVEL** | **Crag** | **1317.59** | **14,480** | **11.0** | **85** | **0.1** |
| **B_SANDSTONE** | **97% Carstone** | **52.35** | **623** | **11.9** | **19** | **0.4** |
| B_SANDSTONE_AND_ MUDSTONE | Dersingham Formation | 13.16 | 138 | 10.5 | 2 | 0.2 |
| | | | | | | |
| S_CLAY_AND_SILT | various | 598.38 | 4090 | 6.8 | 26 | <0.1 |
| S_CLAY_SILT_AND_ SAND | Brickearth | 130.78 | 1401 | 10.7 | 8 | 0.1 |
| **S_CLAY_SILT_SAND_ AND_GRAVEL [alluvial]** | **Alluvium** | **196.89** | **4167** | **21.2** | **84** | **0.4** |

| BGS ROCK type | BGS LEX type (where relevant) | Area within county (sq km) | No. of sites (as of 11.11.08) | per sq km | Sche-duled sites | per sq km |
|---|---|---|---|---|---|---|
| S_CLAY_SILT_SAND_ AND_GRAVEL [other] | Beeston Regis Formation & Head | 87.23 | 2353 | 27.0 | 23 | 0.3 |
| S_DIAMICTON | various | 2182.84 | 17,380 | 8.0 | 145 | 0.1 |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | **11.36** | **155** | **13.6** | **0** | **0.0** |
| S_GRAVEL [other] | various, including **Storm Beach deposits*** | 4.75 | 153 | 32.2 | 1 | 0.2 |
| S_GRAVEL_SAND_ AND_SILT | Storm Beach deposits | 1.32 | 38 | 28.8 | 0 | 0.0 |
| S_GRAVEL_SAND_ SILT _AND_CLAY | Tidal Flat & Head deposits | 15.29 | 264 | 17.3 | 1 | 0.1 |
| S_PEAT | Peat & Breydon Formation | 270.73 | 1773 | 6.5 | 12 | <0.1 |
| **S_SAND [glacial]** | **Corton Formation** | **86.50** | **1895** | **21.9** | **9** | **0.1** |
| S_SAND [other] | Blown Sand, Bank deposits & Breydon Formation | 19.13 | 564 | 29.5 | 2 | 0.1 |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **various** | **778.46** | **10,319** | **13.3** | **165** | **0.2** |
| **S_SAND_AND_ GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | **105.40** | **2946** | **30.0** | **76** | **0.7** |
| S_SAND_AND_ GRAVEL [other] | various | 33.44 | 1120 | 15.9 | 9 | 0.3 |
| S_SAND_AND_SILT | Storm Beach deposits | 0.95 | 30 | 31.6 | 0 | 0.0 |
| S_SAND_SILT_AND_ CLAY | Marine and Tidal deposits | 56.48 | 12 | 0.2 | 0 | 0.0 |
| S_SAND_WITH_CLAY _AND_GRAVEL | Head | 0.29 | 25 | 86.2 | 1 | 3.4 |
| S_SEDIMENT_SHELL | Shell bank | 0.30 | 1 | 3.3 | 0 | 0.0 |
| S_SHELLY_ MUDSTONE | Shell Marl | 0.97 | 9 | 9.3 | 0 | 0.0 |

* The Storm Beach deposits at Snettisham have been subject to extraction in the past, but are too limited in extent to warrant any more detailed treatment in this assessment.

**This very basic analysis provides only baseline figures for the county, and should be seen as supplementary to, and providing a broader context for, the more detailed assessment outlined in subsequent chapters (Chapters 5–8).** The significance of the figures given above, and in the following chapters, are discussed in more detail in Chapter 9.

# 5. Sub-Unit A Assessment Results

Sub-Unit A contains all or part of 441 sites, incorporating all those recorded in the NHER up to 29 February 2008.

## 5.1. Geology

As has been described in Chapter 3, the solid geology of Sub-Unit A is dominated by Crag deposits (BGS ROCK type B_SAND_AND_GRAVEL), with narrow exposures of Chalk along its river valleys. Of these, it is the Crag deposits which will be the principal target for aggregate extraction in future years, although the high-purity chalk of the valleys is, unlike the Crag, included on the BGS Minerals Resource Map.

Of the two bedrock deposits, the Chalk, which covers only 10% of the Sub-Unit, appears to have a slightly higher density of archaeological sites (13.7 per sq km; see Table 5.1 below), but it is likely that this is a product of the querying method used — employing an 'intersect' operator, combined with an extensive perimeter (due to its elongated, meandering shape), hence allowing more opportunities for intersections — rather than a significant pattern. The density of 10.3 sites per sq km on the Crag deposits is slightly higher than for the Sub-Unit overall (which is 9.8 per sq km), but the difference is too small to be of great significance. The Crag is present across some 90% of the Sub-Unit.

The superficial geology of the Sub-Unit is dominated by Brickearth (BGS ROCK type S_CLAY_SILT_AND_SAND), which particularly occurs in its northern portion, and sand and gravel (S_SAND_AND_GRAVEL). Each covers approximately 23% of the Sub-Unit area. The latter is principally made up of glaciofluvial deposits, although small bands of river terrace deposits are also present in the valleys. The BGS Minerals Resource Map, together with the 'Areas of Investigation' defined by NCC's Minerals and Waste Planning Team, suggest that both the Brickearth and the glaciofluvial sand and gravel are targets for extraction, although in the former case it is likely to be the underlying Crag deposits that would be exploited.

**There appears to be an above-average density of archaeological sites on the Brickearth (12.4 sites per sq km) and, in particular, on the superficial sands and gravels (16.3 sites per sq km)**, when compared with the Sub-Unit average of 9.8 per sq km, although the size of the areas in question means that there is scope for these figures to have been distorted (see also Section 5.16.1 below). Such distortion is almost certainly the major factor that has led to very high site densities being recorded on the more

restricted superficial deposits occurring in the river valleys (Peat, Head Gravel) and on the Corton Formation diamicton deposits (now reclassified as part of the Happisburgh Formation) that occur on the southern edge of the Sub-Unit. Here, high site densities are almost certainly the product of long meandering perimeters (leading to more intersections with site boundaries) and the areas involved being too small for statistical analysis to be valid. Variations in the amount and type of archaeological work undertaken across the Sub-Unit, including NMP coverage, may be a secondary factor.

***Table 5.1. Density of archaeological sites in Sub-Unit A relative to geology***
Emboldened ROCK types are those where aggregate extraction will be targeted (information derived from NCC Minerals and Waste Planning Team 'Areas of Investigation'). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Sub-Unit (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***45.00*** | ***441*** | ***9.8*** |
| | | | | |
| B_CHALK | | 4.51 | 62 | 13.7 |
| **B_SAND_AND_GRAVEL** | **Crag** | **40.49** | **418** | **10.3** |
| | | | | |
| S_CLAY_SILT_AND_SAND | Brickearth | 10.49 | 130 | 12.4 |
| S_CLAY_SILT_SAND_AND_GRAVEL | Alluvium | 1.79 | 23 | 12.8 |
| S_DIAMICTON | Corton Formation | 2.09 | 50 | 23.9 |
| S_GRAVEL | Head | 0.10 | 5 | 50.0 |
| S_PEAT | | 0.17 | 4 | 23.5 |
| **S_SAND_AND_GRAVEL** | **various (predominantly glacial & glaciofluvial)** | **10.28** | **168** | **16.3** |

In the assessment, and in the period-based discussion below, attention has focussed on those geologies identified as being targets for extraction, and/or extensive enough within the Sub-Unit to make a valid analysis, *i.e.* BGS ROCK types B_SAND_AND_GRAVEL [Crag], S_CLAY_SILT_AND_SAND [Brickearth] and S_SAND_AND_GRAVEL [various types, principally glaciofluvial]. As has been discussed in Section 2.2, the figures given for each geological deposit will be skewed by variations in the level of detail in the BGS mapping and the classification of deposits across different survey sheets. Such inconsistencies are most apparent in Sub-Unit A, with the superficial deposits of the southern and eastern edges of the Sub-Unit being worst affected. However, by using a combination of both database queries and visual examination of site distributions, any significant trends were still apparent, and were distinguishable from those of lesser archaeological significance.

## 5.2. Archaeological Significance

The breakdown of Sub-Unit A sites by the provisional score assigned to them for 'Archaeological Significance' is shown in Table 5.2.

| *Table 5.2. No. archaeological sites in Sub-Unit A by significance score* | | |
|---|---|---|
| **Archaeological Significance score** | **No. of sites** | **Sites per sq km** |
| ***Overall*** | ***441*** | ***9.8*** |
| | | |
| International | 0 | 0.0 |
| National | 13 | 0.3 |
| Regional | 90 | 2.0 |
| Local | 300 | 6.7 |
| Negligible | 31 | 0.7 |
| Ungraded | 7 | 0.2 |

403 sites in Sub-Unit A have a provisional significance score of Local or higher. These are discussed in more detail in the period discussions below (Sections 5.3–5.12), and their distribution as a group is illustrated in Figure A1.1.

### 5.2.1. International

There are no sites of known International significance within the Sub-Unit. Such sites are in any case rare within the county, which contains no archaeological World Heritage Sites (a designation that would automatically lead to such a score; see Section 4.1.1). Only two sites of International significance are recorded within the ALSF Sub-Units as a whole, both of which are part of a Middle Saxon 'productive' site in Sub-Unit D (Chapter 8).

### 5.2.2. National

There is a clear distribution pattern amongst sites of National significance within the Sub-Unit, in that those recorded as Monuments (*i.e.* where archaeological remains or monument types are recorded) are found exclusively in or on the edge of the river valleys. Those few sites found on the higher ground are exclusively Listed buildings. With only 13 sites, all of different date and form (excavated features, cropmarks, standing buildings, *etc.*), the factors leading to this apparent pattern are difficult to define, and are likely to reflect a variety of different circumstances and conditions, including topography, soils and geology.

### 5.2.3. Regional

Sites of Regional (or County) significance are more widely spread across the Sub-Unit than those with a National score, but there is a notable concentration to the south of the watercourse (named Stone Beck beyond the western limit of the Sub-Unit) that crosses west-to-east across the Sub-Unit's southern portion. These sites relate to the World War Two airfield at Rackheath, and to a dense profusion of multi-period cropmarks evident on

the exposed Crag and the edges of the overlying Corton Formation sands and gravels. This apparent concentration may in part reflect the extent of the NMP mapping within the Sub-Unit (and being the subject of a detailed survey might lead to site's significance being more apparent), but there is no intrinsic reason why the NMP should lead to greater numbers of sites with this particular Significance score being recorded, and it is notable that the profusion of such sites does not continue into those areas to the north of the watercourse for which NMP was also completed. By comparison, there is a clear discrepancy, in terms of site extent as much as site numbers, between the eastern and western halves of the Sub-Unit. This almost certainly relates directly to the completion of NMP mapping for only the eastern portion: the mapping and phasing of larger areas of cropmarks and earthworks tends to result in higher numbers of complex, overlapping site polygons, some extending for several hectares.

#### 5.2.4. Local

Sites of Local significance are also widely spread across the Sub-Unit, with several dense clusters and apparent *lacunae* evident. These distribution patterns are, for the most part, more likely to represent areas of high or low levels of archaeological fieldwork, such as the intensive fieldwalking undertaken in Beeston St Andrew by the late Alan Davison (Davison with Rogerson 2007), or the area for which NMP was completed, rather than a genuine or straightforward pattern of past activity.

#### 5.2.5. Ungraded and Negligible

7 sites within the Sub-Unit have a score of Ungraded for significance. 2 relate to records of cropmarks that are now regarded as part of larger sites, and consequently their original records are irrelevant for the purposes of this assessment. The remaining 5 relate to recent archaeological investigations, the results of which have not yet been reported to the NHER.

31 sites have been given a significance score of Negligible. These comprise a range of different sites of very low archaeological significance, most of medieval or later date.

Sites scored as Ungraded and Negligible are included in the overall figures given below, but are not shown on the distribution maps accompanying each section. Figure 5.1 illustrates their distribution as a group. There is no obvious pattern to their distribution: a group of Find Spots to the east of Horsham St Faith reflects the generally high density of such sites in this area; a cluster of post medieval field boundaries at Horstead derives from the high incidence of cropmarks in this area, particularly where the Wroxham Crag bedrock is overlain by Brickearth deposits.

## 5.3. Palaeolithic (500,000 BC – 10,001 BC)

Although 39 sites of possible Palaeolithic date have been recorded within the Sub-Unit, the vast majority are of non-specific prehistoric date and therefore are largely irrelevant for a discussion of this period. Only 2 sites incorporate evidence of known Palaeolithic date, both Find Spots of flint handaxes; these alone are tabulated below (Table 5.3) and illustrated in the relevant distribution map (Fig. 5.2). For comparison, within the county as a whole, 402 Palaeolithic sites are recorded with a specific geographic location within (or partially within) the county. This equates to 0.1 sites per sq km, suggesting that Sub-Unit A has a marginally below-average site density for this period. There are two possible causes that this can be attributed to: Palaeolithic finds are often recovered in river valleys, and the Sub-Unit contains few of these; aggregate extraction often leads to recovery of Palaeolithic artefacts but has been relatively limited in this area. This pattern accords with the relatively low incidence of handaxe finds recorded in northeast Norfolk (Wymer 2005, 14).

Both the Palaeolithic sites lie in the western half of Sub-Unit A, but occupy slightly different geological and topographical positions. NHER 24415, a Palaeolithic handaxe from a multi-period Find Spot, overlies Crag bedrock, and is located in close proximity (within 200m) to an existing watercourse. NHER 18828, another handaxe, was recovered from a site on the edge of the Brickearth and the exposed Crag; contour lines suggest it lies on the edge of a palaeochannel. Both sites have been scored as being of only Local significance, as at neither is there any evidence of associated deposits preserved *in situ*, or of more substantial assemblages of Palaeolithic material. (The issues surrounding the visibility, recording and curation of sites of this date are given more consideration in Section 9.2.8.)

***Table 5.3. Palaeolithic sites in Sub-Unit A***

| Total no. Palaeolithic sites (exclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **2** | <0.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | <0.1 |

## 5.4. Mesolithic (10,000 BC – 4001 BC)

49 sites of potential Mesolithic date have been recorded within the Sub-Unit, but as for the Palaeolithic period (see above), most have a non-specific prehistoric date and do not incorporate any evidence dated specifically to the Mesolithic. 14 sites incorporate material of exclusively Mesolithic date, and only these are illustrated on the distribution map (Fig. 5.3) and quantified below (Table 5.4). For comparison, within the county as a whole, 727 such sites are recorded, equating to just above 0.1 per sq km. This suggests that Sub-Unit A, with 0.3 sites per sq km, has a slightly above-average site density for this period. This may be a product of the high level of fieldwalking that has taken place in the southern part

of the Sub-Unit (see below), but also reflects the relatively high number of finds known from this part of the county (Wymer 2005, 16). It is not, however, borne out by the figures for the broader Study Area, across which only an average number of Mesolithic sites is recorded (see Table 5.20 below).

As little is known of the Mesolithic in Norfolk, any large flint scatters, or sites where there is strong evidence of buried deposits or features, or of occupation, deserve a significance score of Regional or higher. The 4 Mesolithic sites within the Sub-Unit with a Regional significance score include a possible flint-working site at Rackheath (NHER 12630), where a dense scatter of Mesolithic flints has been recorded, together with material dating to later periods. Unsurprisingly given the small number of sites recorded, no clear preference for a particular geology is apparent. Overall, there is a notable concentration of sites in the southern part of the Sub-Unit, but this may simply reflect a greater amount of fieldwalking having taken place here. In common with other Mesolithic sites in the county as a whole (Wymer 2005, 16), there is an apparent preference for valley or valley-edge sites.

***Table 5.4. Mesolithic sites in Sub-Unit A***

| **Total no. Mesolithic sites (exclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| **14** | 0.3 | 0 | 0.0 | 0 | 0.0 | 4 | 0.1 | 10 | 0.2 |

## 5.5. Neolithic (4000 BC – 2351 BC)

83 sites of possible, probable or known Neolithic date have been recorded within the Sub-Unit (Table 5.5 and Fig. 5.4). This equates to a site density of 1.8 per sq km, considerably higher than the average of 1.2 Neolithic (or possibly Neolithic) sites recorded across the county as a whole. This above-average density is also evident from the NMP data for the Sub-Unit (Albone *et al.* 2008), although this may reflect the NMP's more detailed recording of the sites it covers, and contrasts with that recorded across the broader Study Area (Table 5.20 below), which is closer to the average for the county. 33 (40%) of the Sub-Unit A sites incorporate finds or features dated exclusively to the Neolithic (rather than having a general prehistoric date), but the difficulty of breaking down such a large and diverse dataset within the NHER means that the results of inclusive (rather than exclusive) searches are used for this and later periods (see Section 4.1.2).

1 site within Sub-Unit A, NHER 39833 at Buxton with Lammas, has been assigned a National significance score, but this is due to the later Middle Saxon activity at the site, rather than the Neolithic to Bronze Age flint working also identified there; the latter is arguably of only Regional significance. There is a notable concentration of Monument sites of Regional significance in the southeastern portion of the Sub-Unit. These include several

possible funerary sites (oval barrows or mortuary enclosures) mapped in this area by the NMP (Albone *et al*. 2008). While this distribution may in part reflect the NMP being completed for only the eastern half of the Sub-Unit, the fact that this concentration of sites does not extend throughout the area covered by NMP, but rather is confined to a particular part of it, suggests that other, more significant factors may be at work. Other potential funerary and/or ceremonial monuments previously identified in the Sub-Unit are too uncertain to warrant anything higher than a Local score.

As with the sites dating to earlier periods, there is no clear correlation between site distribution and geology. A relationship is apparent, however, between site location and topography, with sites clustered around both existing watercourses and dry valleys. This pattern is one that has been noted for the period in the county as a whole (Ashwin 2005a). It is apparent amongst both the Monument and Find Spot sites, with a particular concentration of the latter in the southwestern part of the Sub-Unit, where there have been high levels of metal-detecting and fieldwalking.

***Table 5.5. Neolithic sites in Sub-Unit A***

| Total no. Neolithic sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **83** | 1.8 | 0 | 0.0 | 1 | <0.1 | 14 | 0.3 | 67 | 1.5 |

## 5.6. Bronze Age (2350 BC – 701 BC)

87 sites of potential or known Bronze Age date have been recorded in the Sub-Unit. (See Section 4.1.2 for details of adjustments made to the period dates used when querying for Bronze Age and Iron Age sites.) This equates to an average site density of 1.9 per sq km (see Table 5.6 below), notably higher than the 1.4 Bronze Age (or potentially Bronze Age) sites recorded across the county as a whole. This accords with the apparently higher density of Neolithic and Bronze Age sites in northeast Norfolk (Albone *et al*. 2008), but is not borne out by the figures for the broader Study Area, across which only an average number of Bronze Age sites is recorded (see Table 5.20 below).

The sites are distributed quite widely across the Sub-Unit (Fig. 5.5). As for the Neolithic period, there is a notable dominance of valley and valley-edge locations, a pattern that was evident from the NMP evidence alone (Albone *et al*. 2008). Those sites positioned furthest from existing watercourses tend to be of uncertain Bronze Age date: NHER 16547 at Frettenham is a Find Spot of a flint blade and flake of non-specific prehistoric date; NHER 50712 at Wroxham is a ring ditch of uncertain archaeological origin; and NHER 50718, a cropmark at Salhouse, is more likely to mark the site of a medieval or post medieval post mill than a prehistoric monument, although the latter interpretation cannot be ruled out.

Of the 2 sites identified as being of National significance, one (NHER 39833 at Buxton with Lammas) owes its significance to later activity at the site (see Section 5.9 below). The other, NHER 50775, a ring ditch at Horstead with Stanninghall, lies in close proximity to a Scheduled Roman camp (NHER 4379, SM 352; see Section 5.8 below), as well as an enclosure, and trackways and boundaries of varying dates. Consequently, while in isolation the ring ditch might be of only Local significance, the potential at this multi-period site for investigating the relationships between archaeological features of different types and dates, together with the National significance of the camp itself, means that ring ditch shares in this heightened significance (the 'group value' criterion included in the scoring methodology; see too Section 2.7).

As for the Neolithic period (Section 5.5), there is a concentration of Monument sites of Regional significance in the southeastern portion of the Sub-Unit, clustered around Dobbs' Beck, a tributary of the Bure. Many of these sites were mapped by the NMP, and form part of a dense landscape of multi-period cropmarks, where there is again good potential for investigating the relationship between different site types and periods. They include a probable linear barrow cemetery (NHER 50816) on the Salhouse/Wroxham parish boundary, and two circular enclosures (NHER 29561 & 50758) which possibly relate to settlement. Given the scarcity of domestic sites of this period known from the county (Ashwin 1996, 53; 2005c, 21) the Regional — and arguably National — significance of the latter two sites is clear. While this apparent cluster of Regionally significant Bronze Age sites may in part reflect the fact that NMP mapping was completed for only the eastern half of the Sub-Unit, the fact that this concentration of sites does not extend throughout the area covered by NMP, but rather is confined to a particular part of it, suggests that other, more significant factors may be at work. This is not to say that similar clusters of significant sites are not recorded, or do not remain to be discovered, across the remainder of the Sub-Unit. For example, a second barrow cemetery (NHER 7990) is recorded at Frettenham, further to the northwest, but this has been largely (or even wholly) destroyed by gravel extraction, and unlike the example from Salhouse/Wroxham, each barrow that made up the cemetery has not been recorded individually (and thus the site is not evident as a cluster on Figure 5.5).

Overlaying the distribution map on the BGS geological mapping, there appears to be a relatively low incidence of Bronze Age sites on the superficial sands and gravels (S_SAND_AND_GRAVEL), but the sample area is too small to tell whether this is a genuine pattern. Those sites that are located on this BGS ROCK type have scores of only Local significance.

| *Table 5.6. Bronze Age sites in Sub-Unit A* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total no. Bronze Age sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
| **87** | 1.9 | 0 | 0.0 | 2 | <0.1 | 25 | 0.6 | 59 | 1.3 |

## 5.7. Iron Age (800 BC – AD 42)

76 sites of possible Iron Age date have been recorded within the Sub-Unit. (See Section 4.1.2 for details of adjustments made to the period dates used in queries for the Bronze Age and Iron Age.) This equates to a site density of 1.7 per sq km (see Table 5.7 below), significantly higher than the 1.1 such sites recorded within the county as a whole. This is not borne out, however, by the figures for the broader Study Area, across which only an average density of sites is recorded for the Iron Age period (see Table 5.20 below). In terms of site distribution, overall there is still some correlation between the location of the Sub-Unit A Iron Age sites and watercourses (Fig. 5.6). This period, however, appears to see a slight increase of activity on the higher ground, a trend which is evident elsewhere in the county, and indeed the Eastern Region as a whole.

Sites provisionally scored as being of National significance comprise a cluster at Horstead, in proximity to the Roman camp (NHER 4379, SM 352; Section 5.8 below), and the multi-period site (NHER 39833) at Buxton with Lammas, where the main interest lies in the Middle Saxon period (Section 5.9). To the southeast, on either side of Dobbs' Beck, extensive multi-period cropmarks include enclosures, trackways and field systems of probable Iron Age to Roman date. Their Regional significance derives not only from their character, extent and apparent coherence: their proximity suggests that they may represent a western continuation of a pattern of coaxial fields identified from aerial photographs across much of the Broads landscape, with which they share some characteristics (Albone *et al*. 2007b, 36–44; Albone *et al*. 2008), although they are too fragmentary to be certain of their character and they also share affinities with rectilinear field systems mapped across Norfolk's coastal hinterland (Albone *et al*. 2007a, 96-100). Because the NMP was not completed for the western portion of the Sub-Unit, it is difficult to say whether these types of site continue further to the west; certainly, the coaxial fields are not clearly identifiable west of Dobbs' Beck, and no directly comparable sites were identified by the NMP in Sub-Units B and C.

Iron Age sites are relatively evenly distributed across the principal geological deposits, although there appears to be a slightly higher number of sites on the superficial Brickearth and glaciofluvial deposits, relative to the exposed Crag, than is seen in earlier periods. In the case of the superficial glacial and glaciofluvial deposits (BGS ROCK type S_SAND_AND_GRAVEL), a band of Monument sites of Regional significance on the

Corton Formation sands and gravels in the southeast of the Sub-Unit relates to parts of a linear settlement visible as cropmarks on aerial photographs at Rackheath. While an Iron Age to Roman date cannot be ruled out for this settlement, it is more likely to date to the late medieval or early post medieval period (Albone *et al*. 2008). This may mask a relative scarcity of sites of this period on this particular deposit.

To the northwest, the intermittent and conjectured line of a possible Roman road (NHER 7598) crosses the glaciofluvial sands and gravels between Hainford and Horstead, following (or, rather, followed by) the roughly north-south alignment of a modern road; this line is picked up again further to the south in Beeston Park. A pre-Roman origin has been suggested for elements at least of several of Norfolk's Roman roads (the Fen Causeway, for example); the example described here, although conjectural, might also have pre-Roman origins, and it is interesting to note that most finds of Iron Age horse furniture (harness fittings, a terret, a bridle bit, *etc*.) recovered from the Sub-Unit have been located within 1km of it. An alternative interpretation of this pattern, however, is that it simply reflects the tendency of metal-detectorists to target Roman roads, or even the continuing production of such items in the early Roman period and their subsequent loss 'in transit' (Hutcheson 2005, 27).

***Table 5.7. Iron Age sites in Sub-Unit A***

| Total no. Iron Age sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **76** | 1.7 | 0 | 0.0 | 4 | 0.1 | 23 | 0.5 | 48 | 1.1 |

## 5.8. Roman (AD 43 – AD 409)

105 sites of known or potential Roman date have been recorded in Sub-Unit A, or 2.3 per sq km (Table 5.8). This compares to a site density of 1.7 per sq km across the broader Study Area and 1.5 across the county as whole (Table 5.20), indicating the relative abundance of evidence for this period within the Sub-Unit. As NMP has been carried out for 41% of the Study Area but only 28% of the county, compared to 49% of the Sub-Unit, this indicates that the apparent 'busyness' of the latter is a product of more than just this single factor. It also suggests that the Study Area may therefore be relatively 'quiet' in terms of sites of this period.

In terms of distribution, the overall pattern in Sub-Unit A looks quite similar to that of the Iron Age sites, reflecting the difficulty of distinguishing between the two periods on the basis of only aerial photographic evidence (one of the principal sources for the region) (Fig. 5.7). The greater number of Find Spot records, and in particular a greater number in the northern half of the Sub-Unit, is perhaps significant, not only in reflecting the greater

quantity and visibility of such material in the archaeological record, but in demonstrating the increased (or increasingly visible) exploitation of the higher interfluves. The use of 'exclusive' (rather than 'inclusive') searches in the NHER synthesis phase of the project identified a possible concentration of finds of this date along the postulated line of a Roman road running northnorthwest-southsoutheast from Brampton to Thorpe St Andrew (NHER 7598). This may, however, merely reflect the tendency of metal detectorists to target Roman roads.

As for the Iron Age period, sites of National significance include the Scheduled Roman camp and nearby cropmarks at Horstead (NHER 4379 & 50775–8, SM 352). The only other site of National significance within the Sub-Unit — a field system at Mayton Wood, Buxton with Lammas (NHER 39833), which was excavated in advance of gravel extraction — primarily owes its high significance score to Middle Saxon activity at the site (see Section 5.9 below). A record of Roman building material incorporated into the fabric of St Margaret's Church, Stratton Strawless (NHER 7665), has been excluded from the period assessment.

Sites of Regional significance include a probable settlement at Hainford (NHER 16738), on the line of the possible Roman road, indicated by finds of metalwork, pottery and building material. To the northwest, on the very edge of the Sub-Unit, a Roman kiln (NHER 31783), probably used for pottery production, has been excavated. This might have been an outlier to the extensive Roman kiln site at Brampton (NHER 1006), which lies some 2km to the north. Both sites are located on Brickearth deposits, which were presumably being exploited as a mineral resource. Other sites of Regional significance, in the southern portion of the Sub-Unit, are of possible or probable Iron Age to Roman date and have already been described in Section 5.7.

Querying site distribution against the BGS geological mapping suggests that there is a notably high incidence of sites on the Brickearth deposits: 3.6 sites per sq km, compared to 2.3 for the Sub-Unit overall. While small, this may be enough to represent a genuine archaeological pattern, or at least one that warrants further investigation. The density of sites on the glaciofluvial sands and gravels is also slightly above average (3 per sq km), but this is skewed by the undated settlement at Rackheath, described above, for which a medieval or post medieval date is most likely.

***Table 5.8. Roman sites in Sub-Unit A***

| **Total no. Roman sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| **105** | 2.3 | 0 | 0.0 | 6 | 0.1 | 24 | 0.5 | 75 | 1.7 |

## 5.9. Saxon (AD 410 – AD 1065)

47 sites of Saxon date have been recorded within the Sub-Unit, equating to a site density of 1 site per sq km, an average that is matched by that recorded across the broader Study Area (Section 5.16.3 below). Across the county as a whole, a density of 1.1 Saxon sites per sq km has been recorded, indicating a marginally below-average density of sites within this part of the county. The extent to which this is a reflection of past activity, or merely a product of the ways in which such sites are recognised and recorded (Saxon sites are difficult to identify from aerial photographs, for example, Albone *et al*. 2007a, 113-4), or simply an artefact of the data deriving from the small size of the sample, is not clear.

Of the Monument sites recorded in Sub-Unit A, only 1 incorporates actual features of Saxon date. This is the multi-period site at Buxton with Lammas (NHER 39833), excavated in advance of mineral extraction, where a considerable number of charcoal-burning pits have been revealed; these have been radiocarbon-dated to the Middle Saxon period. The general paucity of sites of this period in the archaeological record, and the great importance of the period to the history of both Norfolk and the surrounding region, means that any Middle Saxon site where sub-surface deposits and features are likely to be preserved should be regarded as being of Regional, and in some cases (including this example) National or even International significance.

A possible iron-working site at Stanninghall Wood (NHER 8041) is undated, but similar sites on the Norfolk coast have been interpreted as being Late Saxon and/or medieval in date. The Stanninghall site has consequently been given a Regional significance score. Most other Monument sites recorded in the Sub-Unit for this period are sites of earlier or later date from which some Saxon material has been recovered. Amongst the Find Spot sites, most of which have been scored as being of only Local significance, there is a notable scarcity of Early Saxon finds, particularly given that such material is usually recovered near rivers and on well-drained gravelly soils (Penn 2005, 30).

In common with earlier periods, there are a greater number of Find Spot sites in the southwestern portion of the Sub-Unit, probably reflecting the greater amount of fieldwalking and metal-detecting carried out here (Fig. 5.8).

***Table 5.9. Saxon sites in Sub-Unit A***

| Total no. Saxon sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **47** | 1 | 0 | 0.0 | 1 | <0.1 | 11 | 0.2 | 35 | 0.8 |

## 5.10. Medieval (AD 1066 – AD 1539)

185 sites of known, probable or possible medieval date have been recorded within the Sub-Unit, substantially more than for any preceding period. It equates to a site density of 4.1 medieval (or possibly medieval) sites per sq km, notably higher than the average of 3.2 per sq km recorded for this period across the county as a whole. This apparently high density within the Sub-Unit contrasts even more with the broader Study Area, across which a site density of only 2.9 sites per sq km is recorded (see Table 5.20 below). The possible reasons for these discrepancies are discussed in more detail in Section 5.16 below.

In Sub-Unit A, there is no obvious correlation between site distribution and the underlying geology. The most striking feature of the distribution map is the dense cluster of medieval sites, mainly Find Spots but including some Monument records, in the southwestern corner of the Sub-Unit (Fig. 5.9). These lie to the east of the medieval and post medieval fairstead at Horsham St Faith (NHER 8126), itself a Monument of Regional significance located on the westernmost edge of the Sub-Unit. While the presence of the fair — for which a charter was granted in 1100, and which continued to be held annually until the mid-19th century — goes some way towards explaining the dense distribution of finds in the area, it does not explain why this density should continue so far eastwards. Whether this merely reflects a greater amount of metal-detecting and fieldwalking in this area, or a pattern of greater archaeological significance, is a question that warrants further investigation. That 19 of the 21 findspots of medieval harness pendants come from this corner of the Sub-Unit is also of interest. By comparison, a second market and fairstead documented at Horstead with Stanninghall (NHER 51130) has no such spread of associated material.

Sites scored as being of National significance are exclusively medieval churches designated as Grade I Listed Buildings, and ditches and pits excavated at Mayton Wood quarry (NHER 39833), where the high significance score is mainly derived from the Middle Saxon phase of activity (Section 5.9). Many of the sites of Regional significance relate to deserted, shrunken or migrated medieval settlements (Great Rackheath, NHER 12638 & 50825; Little Rackheath, NHER 50727, 50729 & 50730; Stanninghall, NHER 8059 & 39859) or to 'lost' or ruined churches (All Saints, Hainford, NHER 8019; St Andrew's, Beeston St Andrew, NHER 8142 & 18125; Little Rackheath, NHER 12639; St Peter's. Stanninghall, NHER 44213). This pattern of shifting or contracting settlement is not untypical for the county. Unfortunately, unlike the other Sub-Units investigated by the project, little of these sites now survives above ground, although good to exceptional cropmarks relating to settlement have been recorded by the NMP at Rackheath (in two different locations, perhaps corresponding to the 'Great' and 'Little' elements) and Beeston St Andrew. One of these is the linear settlement visible as cropmarks on the Rackheath/Salhouse parish boundary (NHER 50727 and related records), for which an Iron Age and/or Roman date has not been ruled out entirely (see Sections 5.7–5.8 above). The

interpretation of this site as a late medieval to early post medieval 'heath-edge' settlement, sited alongside Mousehold Heath, currently seems more likely, however, and a possible association with the former settlement of Little Rackheath (NHER 12639) can also be postulated.

Another medieval site of Regional significance recorded on the southeastern edge of the Sub-Unit is a peat cutting at Wroxham known as Norton's Broad (NHER 13520). This highlights the liminal nature of this part of the county, where the upper reaches of the Broads landscape merge with the eastern fringes of the central Norfolk uplands.

***Table 5.10. Medieval sites in Sub-Unit A***

| Total no. Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **185** | 4.1 | 0 | 0.0 | 6 | 0.1 | 34 | 0.8 | 133 | 3.0 |

## 5.11. Post Medieval (AD 1540 – AD 1900)

219 sites of known or possible post medieval date have been recorded within the Sub-Unit. This equates to a site density of 4.9 per sq km (Table 5.11), which is markedly high when compared to that of the broader Study Area (4.5 per sq km) and the county as a whole (4.3 per sq km). A notable number (39) of the Sub-Unit A sites are buildings, both Listed and undesignated. 8 are sites of medieval churches that have continued in use, most up to the present day. There is greater evidence in this period for the exploitation of the area's mineral resources, with lime kilns recorded at Horstead with Stanninghall (NHER 15932) and Rackheath (NHER 15933), a brick kiln at Horstead with Stanninghall (NHER 8063), and a brickworks at Wroxham (NHER 15934). All these industrial sites have been scored as being of Local significance.

The overall distribution of post medieval sites follows that seen in earlier periods, in that there is a dense cluster recorded in the southwestern portion of the Sub-Unit (Fig. 5.10). Again, this appears to reflect a greater amount of fieldwalking and metal-detecting having taken place here. There is a notable scarcity of Find Spot sites in the southeastern corner, on the glaciofluvial sands and gravels (BGS ROCK type S_SAND_AND_GRAVEL), and those sites that have been recorded are almost entirely Monument sites relating to cropmarks. These include a probable late medieval to early post medieval settlement at Rackheath (Albone *et al.* 2008), for which a Roman date is also plausible (see Section 5.8 above).

8 sites have been scored as being of National significance; 7 are buildings or structures with Grade I or II* Listings, including the site of Mayton Bridge (NHER 7685) at Horstead,

which is also Scheduled (SM 207). The eighth site is Mayton Wood quarry (NHER 39833), already described for earlier periods, where a small amount of relatively insignificant post medieval archaeology has been recorded. The 49 sites scored as being of Regional significance include 27 Listed buildings, 2 railway lines, the Bure Navigation canal and the park at Beeston St Andrew (NHER 30495). Sites assigned a Local significance score mainly comprise unlisted buildings and small, relatively common structures such as icehouses and hydraulic rams, cropmarks of post medieval field boundaries, and findspots of post medieval metalwork and other material.

***Table 5.11. Post Medieval sites in Sub-Unit A***

| Total no. Post Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **219** | 4.9 | 0 | 0.0 | 8 | 0.2 | 49 | 1.1 | 148 | 3.3 |

## 5.12. Modern (AD 1901 – AD 2050)

71 sites dating to the 20th–21st centuries are recorded within Sub-Unit A. This relatively low number in comparison with sites of post medieval date reflects the understandably selective recording of modern sites, and the complete absence of any records of modern findspots. It is also, however, notably lower than for the county as a whole and the broader Study Area, where a density of 1.8 sites per sq km is recorded across both areas (Table 5.20; compared to 1.6 sites per sq km within the Sub-Unit, Table 5.12).

Several records, including all those accorded a National significance score, relate to the continued use of earlier buildings or structures such as churches. Many of the records (*c.* 30%) relate to 20th-century military activity; the presence of two World War Two airfields (at Horsham St Faith, NHER 8137, and Rackheath, NHER 8170) accounts for the relatively high site density in the southern portion of the Sub-Unit (Fig. 5.11). 3 military aircraft crash sites, all dating from World War Two, are recorded within the Sub-Unit.

***Table 5.12. Modern sites in Sub-Unit A***

| Total no. Modern sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **71** | 1.6 | 0 | 0.0 | 4 | 0.1 | 30 | 0.7 | 33 | 0.7 |

## 5.13. Survival and Visibility

Sites recorded as surviving or historic landscapes and major or minor earthworks are illustrated in Figure 5.12 and tabulated below, cross-referenced with aggregate type (Table

5.13). The distribution map shows a landscape populated only sparsely by well-preserved sites (excluding surviving buildings and structures, recorded at 56 sites in the Sub-Unit), with those that do survive generally being found on the Crag deposits and in the river valleys. Of these, 11 have been scored as being of Local significance and 10 of Regional; no sites were considered to be of National significance.

***Table 5.13. Survival and visibility of sites in Sub-Unit A relative to geology***

| | Area (sq km) | Historic Land-scapes | per sq km | Major Earth-works | per sq km | Minor Earth-works | per sq km | Crop-marks | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| ***Sub-Unit A*** | ***45.00*** | ***6*** | ***0.1*** | ***7*** | ***0.2*** | ***14*** | ***0.3*** | ***104*** | ***2.3*** |
| | | | | | | | | | |
| **B_SAND_AND_ GRAVEL [Crag]** | **40.49** | **5** | **0.1** | **7** | **0.2** | **11** | **0.3** | **101** | **2.5** |
| | | | | | | | | | |
| S_CLAY_SILT_AND_ SAND [Brickearth] | 10.49 | 2 | 0.2 | 2 | 0.2 | 3 | 0.3 | 29 | 2.8 |
| **S_SAND_AND_ GRAVEL [glaciofluvial]** | **10.28** | **3** | **0.3** | **3** | **0.3** | **3** | **0.3** | **37** | **3.6** |

By plotting sites visible as cropmarks (also shown on Fig. 5.12), it is possible to see the huge discrepancy between the eastern portion of the Sub-Unit, for which NMP was completed, and the western portion. The figures for each portion are broken down by geological type in the tables below (Tables 5.14–5). Those for the eastern portion, for which NMP has been completed, appear to show a slightly higher incidence of cropmark sites on principal superficial geologies (Brickearth and glacial/glaciofluvial sands and gravels) when compared to the Crag, but further investigation would be required to establish the archaeological relevance of this trend: it might instead be a coincidence relating to the relative complexity of the archaeology encountered in these specific areas (which in turn produces more site records). Further investigation might also establish whether there are any patterns in the date and character of the archaeology recorded on each geology, but this lies beyond the scope of the current project.

***Table 5.14. Survival and visibility in Sub-Unit A relative to geology: eastern portion of Sub-Unit for which NMP was completed***

| | Area (sq km) | Historic Land-scapes | per sq km | Major Earth-works | per sq km | Minor Earth-works | per sq km | Crop-marks | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| ***Sub-Unit A*** | ***22.00*** | ***3*** | ***0.1*** | ***5*** | ***0.2*** | ***10*** | ***0.5*** | ***92*** | ***4.2*** |
| | | | | | | | | | |
| **B_SAND_AND_ GRAVEL [Crag]** | **19.43** | **2** | **0.1** | **4** | **0.2** | **8** | **0.4** | **89** | **4.6** |
| | | | | | | | | | |
| S_CLAY_SILT_ AND_SAND [Brickearth] | 2.93 | 1 | 0.3 | 1 | 0.3 | 1 | 0.3 | 21 | 7.2 |
| **S_SAND_AND_ GRAVEL [glaciofluvial]** | **5.61** | **2** | **0.4** | **2** | **0.4** | **2** | **0.4** | **35** | **6.2** |

| *Table 5.15. Survival and visibility in Sub-Unit A relative to geology: western portion of Sub-Unit for which there is no NMP data* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Area (sq km)** | **Historic Land-scapes** | **per sq km** | **Major Earth-works** | **per sq km** | **Minor Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
| ***Sub-Unit A*** | ***23.00*** | ***3*** | ***0.1*** | ***2*** | ***0.1*** | ***4*** | ***0.2*** | ***15*** | ***0.7*** |
| | | | | | | | | | |
| **B_SAND_AND_GRAVEL [Crag]** | **21.05** | **2** | **0.1** | **2** | **0.1** | **3** | **0.1** | **15** | **0.7** |
| | | | | | | | | | |
| S_CLAY_SILT_AND_SAND [Brickearth] | 7.56 | 1 | 0.1 | 1 | 0.1 | 1 | 0.1 | 11 | 1.5 |
| **S_SAND_AND_GRAVEL [glaciofluvial]** | **4.67** | **1** | **0.2** | **1** | **0.2** | **0** | **0.0** | **2** | **0.4** |

## 5.14. Historic Landscape Character (PT)

The topography of the Sub-Unit is gently undulating, declining towards the Bure Valley to its northeast. It exhibits the dispersed settlement pattern typical of much of central Norfolk and is a landscape that has remained relatively unchanged from the production of the parish tithe maps in the 19th century up to the 2004 Ordnance Survey Mastermap. The greatest degree of change evident on the 1959 Ordnance Survey map is the construction of Horsham St Faith and Rackheath airfields in the south of the Sub-Unit. Before the tithe maps, we might presume that the historic landscape was one of small sinuous enclosures, a more finely divided version of what existed throughout the 19th century. This would have supported a number of small landowners engaged in a mixed, but mainly arable, farming economy. The pattern of deserted, shrunken and migrated settlement evident from the archaeological record (see Section 5.10 above) is not apparent from the HLC mapping, as most of these changes took place before the production of the earliest consulted maps.

Small areas of common, along with meadow and marsh, would have provided valuable grazing land for livestock. The parish boundaries for 6 of the 12 parishes within the Sub-Unit follow the line of a small valley of meadow that runs west-to-east through its centre, along a tributary of the River Bure (known for part of its length as Stone Beck). It may be the case that each settlement sought a share of this grazing land when the parish boundaries were established. It could also be that the stream and valley provided a convenient landscape feature along which to draw the parish boundaries, but in the north of the Sub-Unit the Tithe Map shows that part of Frettenham was once detached, forming a separate area adjacent to the River Bure, presumably again to take advantage of the grazing land there. The significance of these observations is that **the Sub-Unit, and large areas of the broader Study Area, appear to have been a predominantly arable region since the parish boundaries were established over a millennium ago**. Lacking any

large areas of woodland and pasture, there was a consequent need to maintain access to those areas of grazing and meadow that did exist.

Exceptions to this impression of the Sub-Unit as a fertile arable landscape are found in its northwest and southeast corners, where Parliamentary enclosure of heathland has occurred. The distribution of 'Heath' as a Previous HLC type shows some correlation with that of the superficial sand, gravel and Brickearth deposits that overlie the Crag. **The resulting combination of arable land and large tracts of less fertile, sandy acid soil is representative of the broader Study Area as a whole**, this mixture of parkland, arable, meadow, marsh and heath continuing northwards as far as the coast. In the early modern period, along with the cultivation of cereals, such a landscape could support large numbers of cattle, kept for either beef or dairying, and flocks of sheep grazed on the heaths (Wade Martins & Williamson 1999, 13–16). The areas of infertile sandy soil offered an opportunity for the expansion of arable in the early 19th century through Parliamentary enclosure of the heaths, but were also utilised for woodland plantations. Many of these areas are still managed as forestry plantations, as at Horsford on the northwestern edge of the Sub-Unit.

The HLC mapping suggests that mineral extraction has yet to make a large-scale impact on the Sub-Unit. **Those areas of Historic Landscape Character within the broader Study Area as a whole that can perhaps be considered as having the greatest 'value', in terms of their rarity, representivity and vulnerability, are those which contain survivals of piecemeal enclosure and meadow, which have been a feature of this landscape for many centuries**. The surviving areas of enclosed meadow, as might be expected, are almost exclusively confined to the Chalk and alluvial deposits of the river valley bottoms. Areas of piecemeal enclosure by agreement are found more widely spread across the Sub-Unit, but survive most cohesively on the Brickearth at Frettenham.and Horstead.

## 5.15. The Impact of Extraction

Past extraction has been quite widely distributed across the Sub-Unit. Several of the larger quarries, for example at Mayton Wood, Frettenham, Hainford and Spixworth, are sited on or close to the Bure or its tributaries, perhaps to exploit river terrace deposits, although no such deposits are mapped at these locations by the BGS (high-purity chalk could instead be a target). A greater number of smaller extraction sites are recorded in the east of the Sub-Unit; this is a direct result of the NMP having mapped evidence of past extraction from aerial photographs and historic maps. Data from NCC and the BGS show little quarrying in this area, and in the southeast corner none at all. Like the larger areas of extraction, these smaller quarries tend to be clustered along the Bure and its side valleys. Overall, the general impression is that the area has been only lightly quarried, with most sites located

on exposed Crag, but with some encroachment on the valley and superficial deposits, in particularly the Chalk and Brickearth.

In all, 55 archaeological sites within Sub-Unit A have some form of mineral extraction recorded as taking place within them (Table 5.16, Fig. 5.14). The impact may vary from total destruction of the site — which in some cases may only be known about because of the quarrying, and attendant archaeological investigations, taking place — to a small gravel or sand pit located within the archaeological site but not impinging on any known archaeological features. For two sites (NHER 7990 & 12786) information about extraction taking place there has been derived solely from the 'Landuse' field of the NHER, as no quarrying has been mapped at these locations, whether by NCC, the BGS or the NMP. In these cases, the information has been taken from the descriptive field of the archaeological record: a probable barrow cemetery on Frettenham Common (NHER 7990) is recorded as having been destroyed by gravel extraction before 1970, although some traces may still survive; at Buxton with Lammas (NHER 12786) the cropmarks of five ring ditches includes the cropmark of a former quarry pit.

Of the 55 sites affected, 3 are recorded as being of National significance. 2 sites at Horstead (NHER 4379 & 50778) relate to the Scheduled Roman camp (SM 352) and other cropmarks in its vicinity. Here, the only apparent impact from extraction is a small sand pit depicted on the Ordnance Survey 1st edition 6 inch map. This would presumably have removed part of the northern circuit ditch of the camp, although, inexplicably, a ditch on the appropriate line is visible here as a vegetation mark on aerial photographs. The third site is the multi-period site at Mayton Wood quarry (NHER 39833), which was excavated in advance of aggregate extraction. This site had not been recorded prior to the investigations necessitated by the quarrying, reflecting one of the benefits of extraction taking place. Other sites affected by mineral extraction comprise 9 of Regional significance, and 40 of Local significance. For the former, most of the extraction sites with which they are co-located are relatively small in scale; those affected by larger quarries have generally been the subject of, and have often been discovered by, attendant archaeological investigations, as was the case for the possible medieval settlement and fields at Stanninghall (NHER 39859). The exception is the medieval and post medieval market and fairground at Mayton (NHER 51130), which is only known from documentary evidence. Overall, there is no obvious trend as to the date or type of site affected, nor is there any striking pattern to their distribution.

***Table 5.16. Sites in Sub-Unit A co-located with past and active extraction sites***
*(as of 29.2.08)*

| Total no. sites | International | National | Regional | Local |
|---|---|---|---|---|
| **55** | 0 | 3 | 9 | 38 |

There are 4 active quarry sites within the Sub-Unit, some made up of several blocks of land and covering 1.23 sq km in total (Fig. 5.14). These are located at Buxton with Lammas (Mayton Wood; NCC Site No. 51), Horstead with Stanninghall (where there are 2: NCC Site No. 398 & 410), and Spixworth (NCC Site No. 279). These are all located within the northern and western portions of the Sub-Unit. **25 archaeological sites intersect with these quarries, 1 of National significance, 1 of Regional significance and 20 of Local significance.** The sites of National and Regional significance — respectively the multi-period site at Mayton Wood, Buxton (NHER 39833) and the possible medieval settlement and fields at Stanninghall (NHER 39859) — have both been the subject of intensive archaeological investigation as part of the planning process, prior to which their existence had not been recorded. Those of Local significance are for the most part Find Spots; those that are recorded as Monuments have generally been the subject of archaeological investigation prior to extraction taking place, the only exception being a probable World War Two military site at Horstead (NHER 50773) which had not been recorded prior to the NMP mapping undertaken as part of this project.

In terms of future extraction within the Sub-Unit, the Core Strategy for the draft Minerals and Waste Development Framework suggests that future extraction should be prioritised in the vicinity of the county's larger urban centres (also termed Key Centres for Development and Change), as these are likely to see the greatest amount of development, and therefore will have the highest demand for aggregate resources. This includes Norwich and, as a consequence, the aggregate resources surrounding it. Within the Sub-Unit, four proposed minerals allocation sites have been included in the draft MWDF, all within the northwest of the Sub-Unit and all lying adjacent to active quarry sites (Fig. 5.15; Appendix 2). Totalling 1.68 sq km, **should all the proposed sites go ahead this would more than double the existing active areas of extraction**, although this represents only 3.7% of the total area of the Sub-Unit or 6.5% when taken together with the currently active sites.

26 archaeological sites intersect with one or more of the proposed mineral allocations (Table 5.17, Fig. 5.15). However, it should be noted that 2 of the proposed allocations are located in the western half of the Sub-Unit, where NMP has not yet taken place, and there is therefore high potential for further sites to remain undiscovered. The 2 known sites of National and Regional significance are both located on active quarry sites and have been subject to intensive archaeological investigation under PPG16 (NHER 39833, the multi-period site at Mayton Wood, and NHER 39859, the possible medieval settlement and fields at Stanninghall). The 22 sites of Local significance again mainly comprise Find Spots, but include several of the Monument sites that have already been impacted upon by active quarries (see above). Perhaps most significant amongst the Monument sites is the cropmark of a ring ditch (NHER 50756), probably the site of a Bronze Age round barrow, within the proposed southeastern extension of the Grange Farm pit at Horstead (MWDF

site ref. MIN 64). This site was a new identification by the NMP. Two possible hengiform monuments were also recorded from cropmarks (NHER 24977 & 50782), both of which fall within the proposed extension to the quarry at Stanninghall (MWDF site ref. MIN 65), but these are of doubtful archaeological origin.

***Table 5.17. Sites in Sub-Unit A co-located with proposed minerals allocation sites*** *(as of 29.2.08)*

| Total No. Sites | International | National | Regional | Local |
|---|---|---|---|---|
| **26** | 0 | 1 | 1 | 22 |

## 5.16. The Broader Study Area

Study Area A has been described briefly in Section 3.3.1. 5514 archaeological sites have been recorded within, or partially within, this area (as of 31 March 2008). 1150 of these lie within Study Area C as well, due to the overlap between the River Gravels and the other three Study Areas.

### 5.16.1. Geology

The density of archaeological sites within the Study Area, broken down by BGS ROCK type, is shown in Table 5.18 below. Comparison with Table 5.1 above suggests that the overall site density is not that different from the Sub-Unit (9.3 sites per sq km rather than 9.8). Any bias that might have been caused by the NMP being completed for part of the Sub-Unit has presumably been largely negated by the fact that the northern and eastern edges of the Study Area have also been the subject of an NMP survey, as part of the Coastal and Broads Zone mapping (EH Project No. 2913). As a consequence, the NMP coverage of the Study Area (41%) is only slightly lower than that of the Sub-Unit (49%). The higher density of sites within the latter, however, is borne out in the period breakdown outlined below (Section 5.16.2), and the Sub-Unit does therefore appear to represent a portion of the Study Area that is 'busier' than average, while not being overtly different in character.

It is striking that the Crag itself (BGS ROCK type B_SAND_AND_GRAVEL) and the Brickearth (S_CLAY_SILT_AND_SAND) average exactly the same site density as for the Study Area as a whole. For the former this is understandable, as it occurs across some 95% of the Study Area. The seemingly lower incidence of sites on the Brickearth within the Study Area than in the Sub-Unit (9.3 per sq km rather than 12.4) may reflect the fact that while this geology is productive of NMP sites, only a small proportion of it has been covered by the survey, as it does not extend into the Coastal or Broads Zones. This in turn suggests that **NMP would be particularly beneficial on the Brickearth**. An above-

average number of sites recorded on S_SAND_AND_GRAVEL may relate, at least in part, to a preference for such sites in the past, but other factors, such as a high potential for cropmark formation, are also likely to have contributed towards this.

The very high density of sites apparent on BGS ROCK type S_CLAY_SILT_SAND_AND_GRAVEL (alluvium, head and Beeston Regis Formation deposits) is almost certainly in part a product of the geographical occurrence of these deposits, with numerous long and narrow areas of mapped geology creating greater numbers of intersections with site boundaries (as was noted earlier for the Sub-Unit). Conversely, the relatively low site density on S_DIAMICTON (16.3 sites per sq km rather than 23.9 within the Sub-Unit) is probably a more realistic figure for this deposit, although, as it occurs only sporadically within the Study Area, this too is unlikely to be truly representative (compare Table 4.1). By contrast, a site density of 10.8 per sq km for S_SAND_AND_GRAVEL is a better illustration of the archaeological record for this geological type, as such deposits occur widely across the Study Area. The areas of S_CLAY_AND_SILT, S_GRAVEL, S_GRAVEL_SAND_SILT_AND_CLAY and S_PEAT are too small and too irregular to make a valid statistical analysis, and hence the site density figures diverge widely from those given for the Sub-Unit (only S_GRAVEL and S_PEAT occur within the latter). A slightly higher incidence of sites on Chalk bedrock (17 per sq km as opposed to 13.7) may be of note, but is unexplained.

***Table 5.18. Density of archaeological sites in Study Area A relative to geology***
Emboldened ROCK types are those where aggregate extraction will be targeted (information derived from NCC Minerals and Waste Planning Team 'Areas of Investigation'). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Study Area (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***596.00*** | ***5514*** | ***9.3*** |
| | | | | |
| B_CHALK | | 21.56 | 366 | 17.0 |
| **B_SAND_AND_GRAVEL** | **Crag** | **569.12** | **5272** | **9.3** |
| | | | | |
| S_CLAY_AND_SILT | Breydon Formation | 2.06 | 36 | 17.5 |
| S_CLAY_SILT_AND_ SAND | Brickearth | 115.44 | 1077 | 9.3 |
| S_CLAY_SILT_SAND_ AND_GRAVEL | Alluvium, Head & Beeston Regis Formation | 41.07 | 887 | 21.6 |
| S_DIAMICTON | various | 35.79 | 582 | 16.3 |
| S_GRAVEL | Head | 1.25 | 34 | 27.2 |
| S_GRAVEL_SAND_SILT _AND_CLAY | Tidal Flat & Head Deposits | 2.17 | 112 | 51.6 |
| S_PEAT | | 25.42 | 163 | 6.4 |
| **S_SAND_AND_GRAVEL** | **various (predominantly glacial & glaciofluvial)** | **287.48** | **3113** | **10.8** |

### 5.16.2. Archaeological Significance

As only sites within the Sub-Unit have been scored for 'Archaeological Significance', it is not possible to assess the Study Area as a whole using these criteria. The number, type and distribution of designated sites, however, can provide some indication as to the incidence of sites of high significance. In Table 5.19 below, figures are given for designated sites within both the Study Area and the Sub-Unit; their distribution is illustrated by Figure 5.16. The numbers involved, which are relatively small, make statistical analysis difficult, and overall no clear pattern is discernible. Scheduled sites (*i.e.* those which are wholly or partially designated Scheduled Monuments) and Grade I and II* Listed buildings, which automatically qualify for a National or higher significance score, appear to be relatively evenly spread across the Study Area. There is, however, a notable scarcity of Grade II Listed Buildings (scored as being of Regional significance), within the Sub-Unit, in comparison to the Study Area as a whole. This can be accounted for by the lack of historic urban centres in the Sub-Unit.

Scheduled sites are arguably of most relevance in an assessment of archaeological significance. In concordance with the distribution of bedrock deposits within the Study Area, 2 of the Scheduled sites (5.5%) lie on Chalk Bedrock, which occurs across *c.* 3.6% of the Study Area. The remainder are found on the Crag. In terms of Superficial geology, 8 Scheduled sites (22%) are found on the Brickearth which covers 19% of the Study Area, and 21 (58%) lie on S_SAND_AND_GRAVEL which covers 48% of the Study Area. This would suggest that such sites are fairly evenly distributed across the principal geologies, but with a possible preference for the superficial sands and gravels.

| ***Table 5.19. Designated archaeological sites in Study Area A*** | | | ***in Sub-Unit A*** | |
|---|---|---|---|---|
| **Designation** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***5514*** | ***9.3*** | ***441*** | ***9.8*** |
| | | | | |
| Scheduled sites | 36 | <0.1 | 5 | 0.1 |
| Grade I & II* Listed Building | 143 | 0.2 | 7 | 0.2 |
| Grade II Listed Building | 860 | 1.4 | 28 | 0.6 |

### 5.16.3. Archaeological Period

A breakdown and comparison of the Study Area and Sub-Unit A sites by period (Table 5.20) demonstrates that for almost all periods there is a slightly higher density of archaeological sites within the Sub-Unit than for the Study Area as a whole. Only for the Palaeolithic and Saxon periods are the site density figures for each area the same, and for the former any pattern may be masked by the very low number of sites recorded. It is possible that some of the discrepancy may reflect the fact that NMP has been completed

for 49% of the Sub-Unit, compared to only 41% of the Study Area. However, if this was the major factor influencing the figures, and as NMP has been completed for only 28% of the county, a greater divergence between the figures for the Study Area and those for Norfolk as a whole might be anticipated, but this is not the case. Furthermore, for the Modern period a slightly lower density of sites has been recorded within the Sub-Unit, despite this being one of the areas where the NMP often has a significant impact; this may reflect a bias towards the coastal portion of the Study Area, where numerous 20th century military defences have been recorded, not least by earlier NMP projects (EH Project No. 2913; Albone *et al*. 2007a). Analysis of the varying percentages of NMP sites for each period within the Sub-Unit confirms the complex nature of the processes that lead to the formation of the archaeological record. Further analysis of the multiplicity of factors affecting the site densities recorded in different areas would certainly be worthwhile, but sadly lies beyond the scope of the current project.

The higher site densities recorded within the Sub-Unit all appear to be fairly uniform, *i.e.* they are all slightly higher in a range proportional to the numbers of sites recorded, rather than diverging widely across different periods. **The greatest difference — equivalent to an additional 1.2 sites per sq km — is for the medieval period; the factors leading to this are worthy of further investigation**. This discrepancy may again reflect the extent of NMP within the Study Area, and in particular the significant medieval settlement sites mapped within the eastern portion of the Sub-Unit. NMP sites, however, make up only 14% of the medieval records for the Sub-Unit, compared, for example, to 35% of Iron Age sites, 25% of modern and 13% of Neolithic. This suggests that the impact of the NMP may be relatively insignificant in these terms, and that other factors such as the distribution of fieldwalking and metal detecting, and in particular the presence of highly productive sites such as Horsham St Faith fairstead (NHER 8126, Section 5.10), may have had a greater effect. Nevertheless, overall the figures appear to indicate that the character of the historic environment recorded within the Sub-Unit reflects that of the Study Area as a whole, even if the former represents a relatively busy part of the latter, in particular for sites of medieval date.

Comparison of the figures for Study Area A and for the county as a whole (Table 5.20) indicates that for the most part the densities of sites recorded within the Study Area are close to or the same as those for Norfolk overall. Given that NMP has been completed for 41% of the Study Area but only 28% of the county, this would suggest that the Crag Study Area is relatively 'quiet' in terms of numbers of sites recorded for most periods, although this is not the case within the Sub-Unit. The Sub-Unit was in fact particularly busy in terms of NMP sites, as were other parts of the Study Area, in particular the northernmost portion, which was completed as part of the NMP's Coastal Zone (Albone *et al*. 2007a). The contrast between these areas and those which were relatively 'quiet' in terms of NMP sites,

for example, much of the eastern side of the Study Area which was completed as part of the Broads mapping (Albone *et al*. 2007b), may in part account for the relatively low number of sites within the Study Area as a whole (but note the high number of cropmark sites recorded, see Section 5.16.4 below). However, given the relatively small proportion (22%) of the total number of sites within the Study Area that the NMP represents, it is likely that other variables are also at work. The greatest difference between the Study Area and the county, equivalent to 0.3 fewer sites per sq km, is for the medieval period, which qualifies to an extent the discrepancy between the Study Area and Sub-Unit figures for this period (see above). A higher density of sites is recorded within the Study Area for both the post medieval and modern periods. The latter interestingly goes against the figures for the Sub-Unit, which are lower than for the county as a whole; the fact that a greater proportion of the Study Area than the county is formed by the coast — with its dense network of World War One and World War Two defences — is probably a significant factor.

A comparison of the Sub-Unit figures with those for the county has generally been given in the relevant period sections above (Sections 5.3–5.12). The fact that the NMP survey has been completed for 49% of the Sub-Unit but for only 28% of the county is probably a factor in the generally higher density of sites recorded within the former, but it is certainly not the only one, or even the most significant. The complexity of the situation is reflected by divergent figures for the Mesolithic, for which a higher site density is recorded within the Sub-Unit despite the NMP having recorded no sites of this date, and for the modern period, for which a lower site density is apparent despite this generally being a productive period for NMP. The need for further, more fine-grained analysis of such patterns has already been stated above.

***Table 5.20. Archaeological sites in Study Area A by period***

| | ***Sub-Unit A*** | | ***Study Area A*** | | ***in county*** *(as of 11.11.08)* | |
|---|---|---|---|---|---|---|
| | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***441*** | ***9.8*** | ***5514*** | ***9.3*** | ***49,290*** | ***9.0*** |
| | | | | | | |
| Palaeolithic (exclusive) | 2 | <0.1 | 11 | <0.1 | 402 | 0.1 |
| Mesolithic (exclusive) | 14 | 0.3 | 33 | 0.1 | 727 | 0.1 |
| Neolithic (inclusive) | 83 | 1.8 | 758 | 1.3 | 6768 | 1.2 |
| Bronze Age (inclusive) | 87 | 1.9 | 843 | 1.4 | 7722 | 1.4 |
| Iron Age (inclusive) | 76 | 1.7 | 653 | 1.1 | 6161 | 1.1 |
| Roman (inclusive) | 105 | 2.3 | 1021 | 1.7 | 8478 | 1.5 |
| Saxon (inclusive) | 47 | 1.0 | 607 | 1.0 | 6227 | 1.1 |
| Medieval (inclusive) | 185 | 4.1 | 1718 | 2.9 | 17,463 | 3.2 |
| Post Medieval (inclusive) | 219 | 4.9 | 2706 | 4.5 | 23,624 | 4.3 |
| Modern (inclusive) | 71 | 1.6 | 1163 | 2.0 | 10,039 | 1.8 |

### 5.16.4. Survival and Visibility

It is not possible to derive numbers of surviving earthwork or 'historic landscape' sites from the NHER, as such information is not always recorded, and when it is, it is often recorded within the descriptive text, rather than in a specific field that can be queried. (Such information was recorded for the Sub-Unit as an additional, 'ALSF Survival' score.) The figures given in Table 5.21 and illustrated by Figure 5.17, however, which include all sites that have been recorded as containing earthwork elements, surviving or not, can provide a rough characterisation of the form and survival of the archaeology of this area. Overall the Sub-Unit contains a below-average density of recorded earthwork sites, when compared to the Study Area as a whole, and an above-average density of recorded cropmark sites. This pattern appears to be borne out by the distribution of such sites on specific geological types, although the difficulty of interpreting these figures (long boundaries giving rise to greater number of intersections, *etc.*) has already been discussed.

The high number of earthworks recorded on BGS ROCK type S_SAND_AND_GRAVEL includes large numbers on the 'Briton's Lane Sand and Gravel Member', along the northern edge of the Cromer ridge, and also a substantial spread of sites on the Corton Formation deposits of the Broads landscape of east Norfolk. These are both liminal areas in topographic terms and, more significantly, these areas have already been covered by the NMP. The glaciofluvial sands and gravels, which make up the northwestern occurrence of this ROCK type within the Sub-Unit, appear to be more sparsely populated with earthwork sites than other areas with the same ROCK type, as is the Sub-Unit as a whole. This indicates that the likely survival of earthwork sites cannot be reliably predicted on the basis of BGS ROCK type, but that BGS LEX type may be a better indicator, at least in terms of this particular geology.

The distribution of recorded cropmark sites on S_SAND_AND_GRAVEL shows a strong bias towards the Corton Formation deposits of the east of the Study Area and the 'Briton's Lane member' deposits to the north. It is unlikely to be a coincidence that these are also areas for which NMP has been completed. The sparser distribution of cropmarks recorded on the glaciofluvial sands and gravels is difficult to interpret, as so little of this geology has been covered by the NMP. Comparison with the portions of the Corton Formation and Briton's Lane LEX types not covered by the NMP suggests that the potential for the NMP to record a similar density here cannot be ruled out. In contrast to the Sub-Unit, there is no apparent preference for the superficial Brickearth, but again this may reflect the relatively small area (less than 3% within the Study Area) for which NMP has been completed.

Comparison of the Sub-Unit and Study Area figures with those for the county as a whole indicates that the Study Area contains an average density of earthwork sites. In contrast, the density of recorded cropmark sites is almost double the average for Norfolk, no doubt

in part a reflection of the NMP having been completed for 41% of the Study Area but only 28% of the county.

***Table 5.21. Survival and visibility in Study Area A relative to geology***

| | ***Sub-Unit A*** | | | | | ***Study Area A*** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
| ***Overall*** | ***45.00*** | ***26*** | ***0.6*** | ***104*** | ***2.3*** | ***596.00*** | ***496*** | ***0.8*** | ***1127*** | ***1.9*** |
| | | | | | | | | | | |
| **B_SAND_AND_GRAVEL [Crag]** | **40.49** | **22** | **0.5** | **101** | **2.5** | **569.12** | **483** | **0.8** | **1116** | **2.0** |
| | | | | | | | | | | |
| S_CLAY_SILT_AND_SAND [Brickearth] | 10.49 | 3 | 0.3 | 29 | 2.8 | 115.44 | 37 | 0.3 | 149 | 1.3 |
| **S_SAND_AND_GRAVEL [various]** | **10.28** | **9** | **0.9** | **37** | **3.6** | **287.48** | **325** | **1.1** | **844** | **2.9** |

***in county*** *(as of 11.11.08)*

| **Area (sq km)** | **Earthworks** | **per sq km** | **Cropmarks** | **per sq km** |
|---|---|---|---|---|
| **5497.99** | **4434** | **0.8** | **5510** | **1.0** |

### 5.16.5. The Impact of Extraction

Former and active quarry sites are found widely across the Study Area, but there is a notable concentration within the Sub-Unit and those few sq km that lie to its south (this is a direct product of the criteria used to select the Sub-Units, see Section 2.3) (Fig. 5.18). The vast majority are found on the Crag bedrock which characterises the Study Area, and a significant proportion also overlie the superficial sand and gravel deposits. The reasons for the clustering of extraction sites in the southern part of the Study Area are not known, although their proximity to Norwich is likely to have been a significant factor. Former or active extraction sites recorded by NCC and the BGS encompass or intersect with 62 archaeological sites recorded in the NHER (Table 5.22). As additional extraction sites visible on aerial photographs or depicted on historic maps were only mapped by the NMP within the Sub-Unit, this means that the total number of sites within the Study Area to have been affected by past extraction is almost certainly higher than this. The archaeological significance of those 62 sites known to have been affected has not been assessed (unless they fall within the Sub-Unit, see Section 5.15); none is or has been a Scheduled Monument.

7 active quarries, covering 1.62 sq km, are recorded within the Study Area, with a clear concentration within the Sub-Unit. 33 archaeological sites are recorded as being co-located with an active extraction site. The vast majority of these sites are again located within the Sub-Unit, which contains 4 of the active sites. Of the 3 other active extraction areas, that at

Attlebridge (NCC Site No. 12), which may now be dormant, has no archaeological sites recorded within it, while that at Trimingham (NCC Site No. 10), possibly also now inactive, intersects with 3 sites but only skirts their edges; the sites in question range in date from the Iron Age to World War Two. The third active quarry site at Beeston Regis (NCC Site No. 11) is co-located with at least 5 known archaeological sites, 2 of which represent iron working pits of probable late Saxon or medieval date (NHER 6351 & 6392). None of the 33 sites is Scheduled.

In terms of future extraction within the Study Area, 8 minerals allocation sites are proposed in the draft Minerals and Waste Development Framework. Although they are more evenly distributed than the active quarry sites, in terms of area more than half (of a 2.69 sq km total) are located within the Sub-Unit. As within the Sub-Unit (see Section 5.15 above), the proposed sites are all located adjacent or in close proximity to an existing extraction site. 32 archaeological sites are recorded as falling entirely or partially within the proposed allocations. Of these, 13 are already co-located with an active quarry site. Of the remainder, the most significant are the ring ditch (NHER 50756) recorded at Horstead within Sub-Unit A (see above), and the earthworks of a round barrow (NHER 7762) and possible long barrow (NHER 7763) at Felthorpe; the round barrow is a Scheduled Monument (SM 256).

***Table 5.22. Sites in Study Area A co-located with past, active and proposed extraction sites*** *(as of 31.3.08)*

| | **Total no. sites** | **Scheduled sites** |
|---|---|---|
| ***Overall*** | ***5514*** | ***36*** |
| | | |
| Past & active quarries (excluding NMP quarries mapping) | 62 | 0 |
| Active quarries | 33 | 0 |
| Proposed minerals allocations | 32 | 1 |

# 6. Sub-Unit B Assessment Results

Sub-Units B and C were selected as a contiguous 90 sq km block in order to maximise the potential of the data, in particular the NMP results. The discussion below refers to that part of this larger block — 45 sq km — which coincides with Study Area B (Plateau Gravels). This area (Sub-Unit B) contains all or part of 435 archaeological sites, incorporating all those recorded in the HER up to 6 March 2008.

## 6.1. Geology

As has been described in Chapter 3, the solid geology of Sub-Unit B is predominantly made up of Chalk, with a limited occurrence of Wroxham Crag (BGS ROCK type B_SAND_AND_GRAVEL) at its eastern end (around Morton on the Hill and Weston Longville). In contrast to Sub-Unit A, only a very small proportion of either bedrock is exposed, as nearly the entire Sub-Unit (more than 44 sq km) is covered by a variety of superficial deposits (see below). Neither the Chalk, which covers 95% of the Sub-Unit, nor the Crag appears to be a direct target for future extraction. Of the two, the Wroxham Crag appears to have a slightly higher density of archaeological sites (13 per sq km compared to 9.8 on the Chalk; see Table 6.1 below), but this is almost certainly a product of the querying method used and the relatively small area across which the deposit occurs; for comparison, the site density across the Crag Study Area as a whole (Study Area A) is only 9.3 per sq km (see Section 5.16), although it is 11.0 across the whole county (Table 4.1).

The superficial geology of Sub-Unit B is dominated by BGS ROCK type S_SAND_AND_GRAVEL. Three specific lithologies or LEX types are recorded by the BGS: Lowestoft Formation, occurring mainly in the west of the Sub-Unit; undifferentiated glaciofluvial (Middle Pleistocene) deposits, occurring in the centre and east of the Sub-Unit; and post-glacial river terrace deposits, found along many of the area's river valleys. In addition, a small area of Lowestoft and Corton (the latter is now classified as Happisburgh) Formation deposits occurs around Ringland at the extreme southeastern limit of the Sub-Unit. Of the three main lithologies mapped by the BGS, it is the Lowestoft Formation and glaciofluvial deposits which, together with the Lowestoft/Corton Formation, form the Plateau Gravels by which the Sub-Unit is defined; together they cover 56% of the area. The river terrace deposits are much more limited in extent, being present across only 5% of the Sub-Unit, and they occupy a distinct topographic position. For this reason they have been separated out from the glacial sand and gravel in Table 6.1 below, and in the discussion that follows. (They are assessed in more detail in Chapter 7, which deals with

the River Valley Gravels — Study Area C — of which they should more properly be considered a part.)

The Lowestoft/Corton Formation and glaciofluvial sands and gravels are a target for future extraction. The river terrace deposits have been heavily exploited in the past, but it is now NCC policy to avoid extraction in the Environmentally Sensitive Areas in which they generally occur. This past extraction has also taken place on the superficial alluvium (BGS ROCK type S_CLAY_SILT_SAND_AND_GRAVEL), below which sub-alluvial aggregate deposits occur. This too will be avoided by future extraction; any impact on the Sub-Unit's other Superficial geologies, *i.e.* Brickearth and diamicton, is presumably incidental, although not necessarily insignificant in terms of its impact on the archaeological resource.

Of the Sub-Unit's superficial geologies, only the glacial sands and gravels and the tills of BGS ROCK type S_DIAMICTON are extensive enough to support meaningful statistical analysis. As for the Crag bedrock, the small size of the other superficial deposits (Brickearth, alluvium and river terrace), together with their long perimeters, accounts for much or all of the apparently high site density recorded on these deposits (between 24.8 and 29.9 sites per sq km, compared to 9.7 across the Sub-Unit as a whole). This is also likely to account for the site density recorded on the diamicton, which at 13.8 sites per sq km is also slightly higher than the average across the Sub-Unit as a whole.

***Table 6.1. Density of archaeological sites in Sub-Unit B relative to geology***
Emboldened ROCK types are those where aggregate extraction will be targeted (information derived from NCC Minerals and Waste Planning Team 'Areas of Investigation'). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Sub-Unit (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***45.00*** | ***435*** | ***9.7*** |
| | | | | |
| B_CHALK | various formations | 42.93 | 419 | 9.8 |
| **B_SAND_AND_GRAVEL** | **Wroxham Crag** | **2.07** | **27** | **13.0** |
| | | | | |
| S_CLAY_SILT_AND_ SAND | Brickearth | 1.54 | 46 | 29.9 |
| S_CLAY_SILT_SAND_ AND_GRAVEL | Alluvium | 2.23 | 64 | 28.7 |
| S_DIAMICTON | various tills | 13.07 | 181 | 13.8 |
| **S_SAND_AND_GRAVEL [glacial & glaciofluvial]** | **Lowestoft & Corton Formations, & glaciofluvial** | **25.16** | **260** | **10.3** |
| **S_SAND_AND_GRAVEL [post-glacial]** | **River terrace deposits** | **2.22** | **55** | **24.8** |

As has been discussed in the methodology (Section 2.2), the figures given for each geological deposit will be skewed by variations in the detail of the BGS mapping and the classification of deposits across different survey sheets. In Sub-Unit B, amongst the superficial deposits, this is most apparent towards the western end of the Sub-Unit, where

deposits classified as Lowestoft Formation sands and gravels give way abruptly to a mixture of glaciofluvial sands and gravels and Brickearth. By considering the superficial glacial sands and gravels together, the effect of this inconsistency should be largely negated, while the area of Brickearth falling within the Sub-Unit is in any case too small to make a valid statistical analysis.

## 6.2. Archaeological Significance

The breakdown of Sub-Unit B sites by the score assigned to them for 'Archaeological Significance' is shown in Table 6.2. 396 sites in Sub-Unit B have a provisional significance score of Local or higher. These are discussed in more detail in the period discussions below (Sections 6.3–6.12).

***Table 6.2. No. archaeological sites in Sub-Unit B by significance score***

| Archaeological Significance score | No. of sites | Sites per sq km |
|---|---|---|
| ***Overall*** | ***435*** | ***9.7*** |
| | | |
| International | 0 | 0.0 |
| National | 33 | 0.7 |
| Regional | 101 | 2.2 |
| Local | 260 | 5.8 |
| Negligible | 38 | 0.8 |
| Ungraded | 3 | 0.1 |

### 6.2.1. International

There are no sites of known International significance within the Sub-Unit. Such sites are in any case rare within the county, which contains no archaeological World Heritage Sites (a designation that would automatically lead to this score; see Section 4.1.1). Only 2 sites of International significance are recorded within the ALSF Sub-Units as a whole, both part of a Middle Saxon 'productive' site in Sub-Unit D (Chapter 8).

### 6.2.2. National

33 sites are recorded as being of National significance. As for Sub-Unit C, **the resulting site density for sites with this significance score of 0.7 per sq km seems very high** (compare Sub-Unit A, for example, with only 0.3 per sq km). With no comparable figures available for the county, however, while the significance of this figure seems clear, the magnitude of this significance is uncertain. At the same time, **the density of sites relating to Scheduled Monuments is slightly above the average for the county** (0.2 per sq km

rather than 0.1), **reinforcing the impression of the area's high significance** (see Section 9.1.3 for further discussion).

There is no clear pattern to the distribution of the sites. It is notable that the majority of sites lie adjacent to or overlook a watercourse, but within the Sub-Unit areas of land at any distance from a river or stream are in fact relatively limited. There are two obvious exceptions to this apparent trend, however: one is a World War Two Allan Williams turret sited on a hilltop to the north of East Dereham (NHER 32429); the other is the line of a Roman road (NHER 2796). The latter is known as the 'Fen Causeway' because it continues the line of what can more properly be called by that name (*i.e.* the Roman road crossing the Fens) from Denver in the west to the town of Brampton (and beyond) in the east (Gurney 2005, 29). Within Sub-Unit B, the road traverses the plateaux on a roughly east-west line, negotiating a major confluence of the River Wensum between Billingford and Worthing (in Sub-Unit C; see Chapter 7).

#### 6.2.3. Regional

The 101 sites recorded as being of Regional significance again show a tendency to cluster along the river valleys, with relatively few found on the higher ground of the plateaux. A number of very extensive sites representing 20th-century military remains, such as Attlebridge airfield, and several post medieval parks are a feature of this group of sites.

#### 6.2.4. Local

260 sites within Sub-Unit B have been assessed as being of Local significance. These are quite widely spread throughout the Sub-Unit, when compared to those with a National or Regional score, although there are still some areas, notably between Broom Green and North Elmham in the northernmost part of the Sub-Unit, where there is an apparent preference for a valley or valley-side location. Also, when the form of the sites is looked at, there appears to be a predominance of Find Spot records in the southwest of the Sub-Unit. This may well reflect a greater amount of fieldwalking and metal detecting having taken place here, rather than a genuine pattern of past activity.

#### 6.2.5. Ungraded and Negligible

3 sites within the Sub-Unit have a score of Ungraded for significance. 2 relate to recent archaeological investigations, the results of which have not yet been reported to the NHER

and another relates to a plot of land at Billingford where a watching brief was carried out but no archaeological finds or features were identified.

38 sites have been given a significance score of Negligible. The majority (23) are Find Spot records, all isolated finds of known or probable medieval or post medieval date. (1 site, NHER 9869, encompasses a pot sherd of Roman or medieval date.) The Monument records relate to isolated boundary and drainage ditches or pits of relatively recent (usually post medieval or later) date, and to sites, often cropmarks, the location or origin of which is uncertain.

Sites scored as Ungraded and Negligible are included in the overall figures given below, but are not shown on the distribution maps accompanying each section. Figure 6.1 illustrates their distribution as a group. There appears to be no overall pattern to their distribution.

## 6.3. Palaeolithic (500,000 BC – 10,001 BC)

Although approximately 40 sites of possible Palaeolithic date have been recorded within the Sub-Unit, the vast majority are of non-specific prehistoric date and therefore are largely irrelevant for a discussion of this period. Only 2 sites incorporate features or material dated specifically to the Palaeolithic period, equating to a density of less than 0.1 site per sq km (Table 6.3 and Fig. 6.2). For comparison, within the county as a whole 402 such sites are recorded, equating to 0.1 per sq km. This suggests that Sub-Unit B has a slightly below-average site density for this period, perhaps due to the relatively limited areas of river valley within it, which are usually productive of Palaeolithic finds (compare Sub-Unit C, Section 7.3).

The Sub-Unit B sites both lie in its southwestern corner, surrounded by the headwaters of the Black Water tributary of the River Wensum. One site (NHER 13025) comprises an Upper Palaeolithic blade and flake recovered during excavations in advance of aggregate extraction at Salter's Lane, Longham. This site has been scored as being of Regional significance, but this is due to the later activity evident there. The second site is the Find Spot of a handaxe, recovered from the surface of a field at Beetley (NHER 2780). At neither site is there any evidence of *in situ* remains or more substantial assemblages of finds, and consequently in their own right neither can be considered as being of any more than Local significance. (See Section 9.2.8 for further discussion of the issues surrounding the recovery and recording of sites of this period.) The geological context of the two sites varies slightly, in that the Find Spot at Beetley lies on Lowestoft Formation sand and gravel, while the Salter's Lane site straddles the boundary between the latter and the Lowestoft Formation diamicton; both overlie Chalk bedrock.

| *Table 6.3. Palaeolithic sites in Sub-Unit B* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total no. Palaeolithic sites (exclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
| **2** | <0.1 | 0 | 0.0 | 0 | 0.0 | 1 | <0.1 | 1 | <0.1 |

## 6.4. Mesolithic (10,000 BC – 4001 BC)

44 sites of potential Mesolithic date have been recorded within the Sub-Unit, but as for the Palaeolithic period (see above), most have a generic prehistoric date and do not incorporate any evidence specifically dating to the Mesolithic. 9 sites incorporate material of exclusively Mesolithic date, and only these are illustrated on the distribution map (Fig. 6.3) and quantified below (Table 6.4). These equate to a nominal site density of 0.2 sites per sq km, marginally above that of 0.1 sites per sq km recorded across the county as a whole. Such blunt figures, however, which have been generated from a very small sample, may hide significant differences, for example in terms of date, character and distribution, and they should be treated with a degree of circumspection.

5 of the Sub-Unit B sites have been scored as being of Regional significance, but only 2 warrant this relatively high score in their own right; the remainder owe much of their significance to later activity at these sites. At Lyng (NHER 3036), a layer of more than 250 flints and a hearth, probably representing a flintworking site preserved *in situ*, was observed in the side of a disused pit in 1911. The preservation of Mesolithic remains *in situ* is unusual within the county. A second flintworking site (NHER 16351) was identified at Beetley from fieldwalking evidence, where a range of Mesolithic and probable Neolithic tools and debitage was recovered. The 4 sites of Local significance represent isolated or stray finds of Mesolithic material, and material of uncertain origin.

The Mesolithic sites are widely distributed across the Sub-Unit, but there is a slight concentration on the superficial glacial sands and gravels, in particular those classified as Lowestoft Formation, and in the southern half of the Sub-Unit (there are no recorded sites north of Stanfield). There is a clear preference for valley and valley-side locations; the site located furthest (0.6 km) from a watercourse, NHER 39703, is the Find Spot of a flint blade at Beetley. This trend is one that is apparent across the county as a whole (Wymer 2005, 16), but may reflect the processes leading to the survival and discovery of such sites as much as it does the true extent of Mesolithic activity.

| *Table 6.4. Mesolithic sites in Sub-Unit B* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total no. Mesolithic sites (exclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
| **9** | 0.2 | 0 | 0.0 | 0 | 0.0 | 5 | 0.1 | 4 | 0.1 |

## 6.5. Neolithic (4000 BC – 2351 BC)

73 sites of possible, probable or known Neolithic date have been recorded within the Sub-Unit. A substantial proportion of these are dated only generally to the prehistoric period, but they are included in Table 6.5, Figure 6.4 and the discussion below as, unlike for the Palaeolithic and Mesolithic periods, there is a strong possibility that at least some are of Neolithic date (see too Section 4.1.2). This figure equates to a site density of 1.6 sites per sq km, notably greater than the average of 1.2 such sites per sq km recorded across the county as a whole. However, given the dislocated nature of the Sub-Unit — made up as it is of multiple detached blocks, thus creating more opportunities for intersections with site boundaries — this apparently higher density is probably negligible.

4 Neolithic sites within the Sub-Unit have been scored as being of National significance, but in 3 cases this significance derives from later activity evident at the site. At Weston Longville, towards the eastern end of the Sub-Unit, however, the earthwork remains of a possible oval barrow have been identified by the NMP, below the Scheduled earthwork of a Bronze Age round barrow (NHER 7718, SM 129; Albone *et al*. 2008). Although the site has yet to be confirmed on the ground, it is extremely significant in Norfolk, and in a regional context, as the survival of Neolithic earthworks is very rare. The placement of a Bronze Age barrow on top of an earlier oval barrow is a pattern that is recorded elsewhere in Norfolk, for example at the site of Howe's Hill, Sheringham (NHER 6292, SM 115).

15 Neolithic sites are recorded as being of Regional significance. The majority are multi-period sites, where the relatively high significance score reflects the potential to investigate landscapes that have developed over a considerable period of time, or later activity which overshadows that of Neolithic date. These sites are spread fairly evenly across the Sub-Unit, with a small cluster at its western end, surrounding the multi-period sites at Longham, which have been excavated in advance of aggregate extraction. Here, a natural hillock became the focus for Late Neolithic and Bronze Age funerary/ceremonial activity (NHER 15275; Ashwin 1996, 50-1). A number of significant areas of Neolithic and later activity, including Neolithic to Bronze Age pits and a possible Iron Age barrow and four-post structure, co-located with the probable site of a medieval moot and gibbet (NHER 13025), are also recorded in the vicinity, several of which incorporate elements of known or possible Neolithic date.

Sites of Local significance are also spread widely across the Sub-Unit. The higher number of Monument sites recorded towards its western end is perhaps notable, and is only partially explained by the greater amount of fieldwork that has taken place here in advance of aggregate extraction. The fact that the most extensive Neolithic sites are also concentrated in this part of the Sub-Unit is almost entirely a product of the latter. More significant, perhaps, is the dense cluster of Find Spot sites evident at its eastern end, to the

north of Ringland. The Monument site of Regional significance on the eastern edge of this cluster, NHER 11711, is a probable Roman villa or farmstead, from which Neolithic material has been recovered. The remaining sites are Find Spots of surface material, the majority of which include finds dated specifically to the Neolithic period. The significance of this cluster has yet to be explained, but it highlights the fact that while some sites may be of only Local significance in isolation, their Significance may be greater when considered as a group.

There is no clear preference for a particular geology amongst the Neolithic sites. The average number of sites on the glacial sands and gravels is slightly higher than for the Sub-Unit overall (1.8 per sq km rather than 1.6), but this is not enough to be statistically significant. If anything, the site distribution would suggest a preference for the edges of these deposits, and therefore perhaps favouring or marking those areas where a variety of resources were available for exploitation. A preference for sites close to watercourses is also evident, particular in the eastern part of the Sub-Unit, although as for the Mesolithic (see above) this may reflect the circumstances leading to the discovery of the site, as much as it does past activity.

***Table 6.5. Neolithic sites in Sub-Unit B***

| **Total no. Neolithic sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| **73** | 1.6 | 0 | 0.0 | 4 | 0.1 | 15 | 0.3 | 54 | 1.2 |

## 6.6. Bronze Age (2350 BC – 701 BC)

92 sites of potential or known Bronze Age date have been recorded in the Sub-Unit, equating to a site density of 2.0 sites per sq km (Table 6.6 below). Across the county as a whole, an average density of 1.4 Bronze Age (or possibly Bronze Age) sites per sq km has been recorded, suggesting that Sub-Unit B contains an above-average number of sites for the period. As for the Neolithic (Section 6.5 above), the dislocated nature of the Sub-Unit — made up, as it is, of multiple detached blocks, thus creating more opportunities for intersections with site boundaries — may render this apparently high site density negligible. The fact that Sub-Unit B, however, is contiguous with Sub-Unit C, which is notable for its extensive complexes of prehistoric funerary and/or ceremonial monuments, predominantly of Bronze Age date, may also be a significant factor.

Bronze Age sites are distributed quite widely across the Sub-Unit, although a larger number of the more extensive sites are found in its northern and western portions (Fig. 6.5). This pattern is only partially explained by the greater proportion of excavation and other large-scale fieldwork that has taken place here, as the form of the sites, and the

nature of their discovery, varies considerably. As for the Neolithic period, there is an apparent preference for valley and valley-edge locations, but this is not as dominant a pattern as that seen in earlier periods or in other areas (*e.g.* Sub-Unit A, Section 5.6). In terms of geology, the sites again mirror the Neolithic, in that there is a notable preference for the glacial sands and gravels, and particularly the edges of these deposits where they meet other superficial geologies, such as the diamicton. This may reflect a need or desire amongst Bronze Age populations for access to a variety of resources or, more prosaically, a preference (whether in terms of past activity or present site visibility) for the valley-side locations where such exposures most frequently occur. There is also a notable density of sites on the post-glacial river terrace deposits: 14 sites in total or 6.3 per sq km, compared to 2.0 sites per sq km across the Sub-Unit as a whole. While this is in part a product of the relatively long perimeter (and hence greater number of site intersections) of the river terrace deposits, a visual assessment of the site distribution can identify significant clusters on these deposits which are more pronounced than in the Neolithic for example, suggesting a genuine pattern.

7 Bronze Age sites within the Sub-Unit are classified as being of National significance. 4 are part of larger, multi-period sites, where the main significance lies in other periods. 5 of the Nationally significant sites overlie river terrace deposits, with a notable cluster between Morton and Great Witchingham, at the eastern end of the Sub-Unit. 3 of these sites represent part of several extensive complexes of prehistoric funerary and/or ceremonial monuments in the Wensum Valley, and are discussed in more detail in the assessment of Sub-Unit C (Chapter 7), of which they more properly form part. Several Monument records of Regional significance located here also form part of this sepulchro-ritual landscape.

Funerary sites are a particular characteristic of the records for this period in Sub-Unit B (and also within the contiguous Sub-Unit C, see Section 7.6). This is in part because ring ditches and round barrows are the most distinctive site-type for the Bronze Age in a county where aerial photography has played such a significant part, although their distribution across the county is not uniform (see Ashwin 2005b, 20). 34 (37%) of the Bronze Age sites recorded in the Sub-Unit have been indexed with a barrow type, most often 'ROUND BARROW'. Amongst the sites of Regional significance, a large proportion represent ring ditches and probable barrow cemeteries. A cluster of Monument sites at Sparham, for example, forms part of a Bronze Age round barrow cemetery (NHER 50639), the greater part of which falls within Sub-Unit C (Chapter 7). Others are multi-period sites, including those clustered around Longham at the western end of the Sub-Unit (NHER 13025, 7239 & 15275), where excavations in advance of aggregate extraction have taken place (see Section 6.5 above).

Sites of Local significance, in particular Monument sites, are heavily biased towards the north and west of the Sub-Unit. As for the Neolithic period, the factors leading to this distribution are unclear, but it in part reflects the greater amount of commercial fieldwork that has taken place here, in advance of aggregate extraction and other development.

***Table 6.6. Bronze Age sites in Sub-Unit B***

| Total no. Bronze Age sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **92** | 2.0 | 0 | 0.0 | 7 | 0.2 | 26 | 0.6 | 57 | 1.3 |

## 6.7. Iron Age (800 BC – AD 42)

67 sites of possible Iron Age date have been recorded within the Sub-Unit, equating to a site density of 1.5 sites per sq km (Table 6.7 below). This is higher than the average for the county (1.1 Iron Age or possibly Iron Age sites per sq km), but the extent to which this is a genuine pattern, or is instead a product of the dislocated nature of the Sub-Unit (multiple blocks of land creating a long perimeter, leading to a greater number of site intersections) is not clear. In terms of site distribution, there is still a tendency for sites to be located along or above watercourses, but there are some slight indications of increased activity on the higher ground (Fig. 6.6). In particular, there are two groups of possible Iron Age to Roman enclosures on an interfluve at Weston Longville (NHER 50610 & 50615), mapped from cropmarks by the NMP. This pattern of increased activity on the higher, often heavier land, correlates with that seen in Sub-Unit A (Section 5.7), and is one that is evident elsewhere in the county and in the Eastern Region as a whole.

5 Iron Age sites have been provisionally scored as being of National significance, but in every case the site's greatest significance lies in a later period (or periods). The most significant in terms of the character of the area is the Roman road known as the 'Fen Causeway' (NHER 2796), the known or projected line of which runs in a roughly east-west direction across the Sub-Unit. A pre-Roman origin for parts of this road has been suggested.

The 20 Iron Age sites of Regional significance recorded within the Sub-Unit comprise a variety of Monument and Find Spot sites. Monument sites include the multi-period site excavated in advance of aggregate extraction at Salter's Lane, Longham, in the west of the Sub-Unit (NHER 13025; described above, Section 6.5). Here, part of the site comprises an extensive, apparently unenclosed Iron Age settlement, but also a four-post structure and a small square enclosure that may represent an Iron Age funerary enclosure or square barrow. This site, and the others which surround it, lie in close proximity to the Launditch (NHER 7235, SM 215), a linear earthwork of either Iron Age or Saxon date, which lies just

beyond the western limit of the Sub-Unit. The 7 Regionally significant Find Spot sites all comprise multiple objects dating to more than one period; some are quite large in terms of the quantity of material recovered, thus warranting a Regional score in their own right, while others lie in close proximity to more substantial and/or more significant sites.

The 42 sites of Local significance occur widely across the Sub-Unit. Many of the Monument sites recorded in the east, whether of Local significance or higher, are a product of the NMP having been carried out. The NHER synthesis for Sub-Units B and C, which was undertaken prior to the NMP survey, identified a concentration of such sites, and particularly Iron Age occupation sites, in the western half of this area. Here the NMP was relatively unproductive, with several extensive sites known from previous excavation showing poorly or not at all on the consulted aerial photographs (see Section 6.13 below). By contrast, the relatively light valley soils of the eastern part of the Sub-Unit produced a better cropmark response, and a concurrent increase in the number of sites recorded (Albone *et al*. 2008). The NMP sites comprise, for the most part, undated field boundaries and enclosures, where an Iron Age date can be postulated on the basis of comparison with sites mapped elsewhere in the county. A cluster of Find Spot sites to the west of a Regionally significant Monument site at Ringland, in the east of the Sub-Unit, is related to that described for the Neolithic period (Section 6.5 above); as only one find (a hammerstone from NHER 11711) can be suggested as being specifically Iron Age in date, the cluster may have no significance for this particular period.

As for earlier periods, and for the Sub-Unit overall, the raw figures for the distribution of sites on different geologies are distorted by the irregular, elongated perimeters, and the small area, of many deposits. It is significant, however, that the superficial glacial sands and gravels which characterise the Sub-Unit support 1.9 records of Iron Age sites per sq km, compared to only 1.5 for the Sub-Unit overall. This apparent preference for the glacial sands and gravels is one that is seen in earlier periods and is also borne out by a visual assessment of the distribution. Sites are again concentrated on or towards the edges of these plateau gravels, however, rather than central areas of the higher plateaux. Exceptions to this are found at Longham and Stanfield in the west of the Sub-Unit, where the extent of the underlying Lowestoft Formation is in any case relatively limited.

***Table 6.7. Iron Age sites in Sub-Unit B***

| Total no. Iron Age sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **67** | 1.5 | 0 | 0.0 | 5 | 0.1 | 20 | 0.4 | 42 | 0.9 |

## 6.8. Roman (AD 43 – AD 409)

87 sites of known or potential Roman date have been recorded in Sub-Unit B. This equates to a site density of 1.9 sites per sq km (Table 6.8), higher — but not substantially so — than for the county as a whole (1.5 sites per sq km). The distribution pattern is not radically different to that seen in the Iron Age, but there again appears to be a slight increase of activity on the higher ground, away from the main watercourses (Fig. 6.7). This is particularly evident in the southwest of the Sub-Unit, north of East Dereham, where several Find Spot sites are recorded.

6 Roman sites within the Sub-Unit have been scored as being of National significance, but in all but one case this significance is primarily derived from later activity at the same site. The exception is the 'Fen Causeway' Roman road (NHER 2796), which traverses the Sub-Unit on a roughly east-west orientation, negotiating a major confluence of the River Wensum to the west of the Roman small town at Billingford (both within Sub-Unit C, Chapter 7). The NHER synthesis, which looked at Sub-Units B and C as a contiguous block, noted a tendency for Roman period sites to be clustered along its route.

The 25 sites given a Regional significance score include two further possible lengths of Roman road, lying to the north and south of the 'Fen Causeway' (NHER 7276 & 14228 respectively). There are two distinct clusters of sites with this score, around Longham in the west of the Sub-Unit, where there have been extensive excavations in advance of aggregate extraction, and at Billingford in the centre of the Sub-Unit, to the east of the Roman small town. While all the major Roman settlement sites in the area (Billingford, NHER 7206 & 50976; Spong Hill, NHER 1012; Stanfield/Beetley, NHER 30600) occupy comparatively low-lying positions and fall within Sub-Unit C, several of the Regionally significant sites recorded in the east of the Sub-Unit relate to possible settlements. For the most part, the date and/or character of these sites, which are often located on the higher ground of the interfluves, tends to be less certain; for example, NHER 50610 at Weston Longville, where a possible farmstead of Iron Age and/or Roman date has been tentatively identified from fragmentary cropmarks visible on aerial photographs.

The 54 sites of Local significance show the greatest amount of intrusion onto the higher plateaux. A slight majority (52%) are Find Spot records; many of the Monument records relate to cropmark sites, for the most part recorded by the NMP. As for sites of Regional significance, there are notable clusters around Bylaugh and Elsing in the centre of the Sub-Unit, and around Weston Longville in the east, all areas where considerable numbers of NMP sites were recorded.

As for earlier periods, there appears to be a higher density of Roman sites on the superficial glacial sands and gravels — 2.3 sites per sq km — when compared to the Sub-

Unit overall (1.9 sites per sq km). The tendency for sites to be found towards the edges of these deposits, rather than being more centrally located on the plateaux, is also again apparent. **The NHER synthesis noted that excavations had demonstrated the existence of Roman finds and features in the plateau gravel areas, indicating the potential for further archaeological sites of this period to be found here.**

***Table 6.8. Roman sites in Sub-Unit B***

| Total no. Roman sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **87** | 1.9 | 0 | 0.0 | 6 | 0.1 | 25 | 0.6 | 54 | 1.2 |

## 6.9. Saxon (AD 410 – AD 1065)

47 sites of Saxon date have been recorded in the Sub-Unit. This compares to the 6227 that have been recorded in the county as a whole, equating to 1.1 Saxon sites per sq km. It suggests that the density within the Sub-Unit (1.0 per sq km) is marginally below average. The sites are distributed quite widely across the area, but with a notable scarcity in the east, and a concentration in the west where the greatest amount of fieldwork (in particular excavation) has taken place (Fig. 6.8). In terms of topography, there is again little change from the distribution seen in earlier periods, with the majority of sites being located along both the main river valleys and their tributaries. There is a notable cluster of sites around the junction of Foxley, Bawdeswell, Bylaugh and Billingford parishes, in the centre of the Sub-Unit. For the most part, these comprise Find Spot sites of Saxon and other material, but they also include 2 groups of multi-period cropmarks, elements of which may be Saxon in date. A second cluster is evident at Elsing, comprising the parish church and finds of Saxon date made to its south.

Of the 9 sites assessed as being of National significance, 5 are extant churches, Listed as Grade I or II*. St Andrew's, Hoe (NHER 2833), St Mary's, Bylaugh (NHER 3011) and St Margaret's, Stanfield (NHER 7184) are thought to be Late Saxon or early Norman in origin, and/or to incorporate elements dating to this period. St Mary's, Elsing (NHER 3062), is of medieval date, but a pre-church Saxon hearth was revealed during excavations there. St Andrew's, Longham (NHER 7277), is also medieval, but a sherd of possible Middle Saxon pottery has been recovered from the churchyard. The remaining sites comprise 3 Early Saxon cemeteries, and a Middle Saxon to medieval settlement. Only 1 of these 4 sites, the Early Saxon cemetery and settlement at Beetley (Roosting Hills) Quarry (NHER 37159), has seen any excavation; the remainder are known from surface and metal-detected finds.

Saxon sites of Regional significance mainly comprise Monument sites. These range from a possible iron-working or procurement site at Lyng which is visible as earthworks on aerial

photographs (NHER 50766) to Saxon features, including a possible grübenhaus, excavated in advance of aggregate extraction at East Bilney (NHER 39348). A single building is included in this group of sites: a moated hall at Brisley, where Late Saxon pottery has been recovered. The 2 Find Spot sites are both multi-period scatters which include some Saxon artefacts. The 26 Saxon sites of Local significance are overwhelmingly made up of Find Spots, with some cropmarks and excavated features recorded in the west and centre of the Sub-Unit. More unusual are 2 Monument sites at Bawdeswell and Sparham (NHER 3000 & 3001) which relate to a single account from 1743 of finding several human skeletons; the precise location and nature of the discovery is uncertain.

In terms of geology, a visual assessment of site distribution suggests that the pattern follows that seen in earlier periods, although the apparent preference for the superficial glacial sands and gravels seems less marked. Rather, sites are clustered on the edges of the Lowestoft Formation (both S_SAND_AND_GRAVEL and S_DIAMICTON) deposits at the western end of the Sub-Unit, in part reflecting the greater amount of fieldwork that has taken place here. There is also some indication that a greater proportion of sites overlie the diamicton till.

***Table 6.9. Saxon sites in Sub-Unit B***

| Total no. Saxon sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **47** | 1.0 | 0 | 0.0 | 9 | 0.2 | 11 | 0.2 | 26 | 0.6 |

## 6.10. Medieval (AD 1066 – AD 1539)

161 sites of known, probable or possible medieval date have been recorded within the Sub-Unit, substantially more than for any preceding periods. In the county as a whole a site density of 3.2 per sq km has been recorded, and Sub-Unit B's site density of 3.6 per sq km appears — once again — to be above average (but compare Sub-Unit A, Section 5.10). The sites are spread widely across the Sub-Unit, with notable clusters in the central and western areas and, conversely, a relative scarcity at its eastern and northern limits (Fig. 6.9). The clusters do not appear to be related directly to a greater amount of fieldwork in the area, although this may be the case for those sites recorded at the western end of the Sub-Unit. They might instead relate to the larger areas of glacial sands and gravels in these parts of the Sub-Unit, although one might expect similar numbers of sites to also be recorded on these deposits at its eastern end. In terms of topography, while there is still an apparent preference for valley and valley-side locations, a greater number of sites are recorded on the higher ground than in preceding periods.

15 medieval sites within the Sub-Unit have been scored as being of National significance. It is notable that this is a much higher proportion than for Sub-Unit A, despite a lower number of medieval sites being recorded overall (see Section 5.10). Of these, 9 sites are Grade I or II* Listed Buildings, all surviving churches dating to the Late Saxon and/or medieval period. 2 sites — Hoe shrunken village (NHER 2810) and Little Bittering DMV (NHER 7266) — represent important medieval settlement remains, their significance deriving not least from their survival as earthworks. The remaining 2 sites derive their principal significance from evidence for Saxon activity, although that at Longham (NHER 7269), which is known only from fieldwalking, may also be the site of a medieval settlement.

Of the 32 sites given a Regional significance score, only 3 are recorded as buildings; all are Listed and all are secular in nature, comprising a late medieval barn (NHER 14248), the site of a possible hall house (NHER 17415), and a 17th-century house incorporating reused medieval stonework (NHER 20986). Of the 24 Monument sites with this significance score, 7 possess a moated element, while at least 6 sites relate to other forms of settlement, including the sites of Dunham and (possibly) Bylaugh deserted settlements (NHER 14364 & 11524). Two religious sites are recorded; the approximate site of St Nicholas' Chapel, Great Bittering (NHER 2816) and the site of a hospital and chapel at Beck Hall, Billingford (NHER 51208). A single road, which may have originated in the Roman period, is recorded along the Bylaugh parish boundary (NHER 14228). A deer park is recorded at Gressenhall (NHER 50576). Several extraction, industrial and, in particular, water management sites also fall within the Sub-Unit. Only 5 Find Spot sites, all of which are multi-period, have been given a Regional significance score. 93 sites have been scored as being of Local significance, approximately half of which are Find Spot sites.

With reference to the underlying geology, a visual assessment of the distribution pattern of medieval sites suggests that it is not radically different from that seen in earlier periods. A preference for those locations where a range of geologies is present, and which are close to a watercourse, is again apparent, and is to a certain extent borne out by the modern settlement pattern. The statistics, however, are notable in that this is the first time that the density of sites recorded on the superficial glacial sands and gravels is lower than across the Sub-Unit overall (3.4 sites per sq km rather than 3.6). Conversely, a much higher number of sites is recorded on the diamicton till: 6.9 sites per sq km, compared to only 2.3 for the Saxon period and 4.1 for the Roman. This clearly demonstrates the increased exploitation of the higher ground and the heavier soils during the medieval period, but it is not clear how far it reflects a genuine pattern of past activity, rather than the processes that lead to the survival and discovery of archaeological finds and features.

| *Table 6.10. Medieval sites in Sub-Unit B* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total no. Medieval sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
| **161** | 3.6 | 0 | 0.0 | 15 | 0.3 | 32 | 0.7 | 93 | 2.1 |

## 6.11. Post Medieval (AD 1540 – AD 1900)

197 sites of known or possible post medieval date have been recorded within the Sub-Unit. This equates to a site density of 4.4 per sq km (Table 6.11), which is only slightly more than the average for the county as a whole (4.3 sites per sq km). The sites are distributed relatively widely and evenly across the Sub-Unit, following much the same distribution pattern as that seen in the medieval period, although the apparent scarcity of sites towards the east is less pronounced (Fig. 6.10). The most obvious difference is the occurrence of several very extensive sites, mainly parks. This is most noticeable in the centre and east, where three parks (Honingham, NHER 30437; Weston, NHER 33733; and Bylaugh, NHER 30496) lie largely within the bounds of the Sub-Unit; further to the north, only the edges of Sennowe Park (NHER 30487) and Elmham Park (NHER 30437) fall within it. The extensive site of Swanton Morley airfield (NHER 2830) is also noticeable in the central area; it dates from World War Two but its record incorporates the site of a post medieval building or structure.

Amongst the 17 post medieval sites recorded as being of National significance, 11 are Listed buildings. Most of these are churches of medieval date that remain in use, but secular sites are also represented: Bylaugh Hall (NHER 3006), a model farm (Park Farm, NHER 29982), and a 19th-century animal pound at North Elmham, which is also Scheduled (NHER 14125, SM 35076). The 6 Monument sites all derive their high significance score from remains of earlier or (in the case of Swanton Morley airfield, NHER 2830) later date.

58 sites have been scored as being of Regional significance, substantially higher than for any of the preceding periods. The most obvious feature of this group is the three railway lines that pass through the Sub-Unit, to its east (the Midland and Great Northern Joint Railway, NHER 13584), its north (the East Norfolk Railway, NHER 13587) and through its centre (the Wymondham to Wells Railway, NHER 13588). Other notable Monument sites include the parks (see above) two of which — Sennowe (NHER 30487) and Elmham (NHER 30437) — are included on English Heritage's Register of Parks and Gardens, while others appear on local lists (NCC n.d.). Most of the sites, however, derive their significance principally from earlier activity. The group also includes 20 Listed Buildings, which range from cottages to park lodges to the former Mitford and Launditch Incorporation House of Industry (now Gressenhall Farm and Workhouse Museum, NHER 2819). Sites of Local

significance include a number of industrial and water management sites, including a hydraulic ram at Gressenhall (NHER 12468), possible water meadows at Elsing (NHER 50731), brick kilns and brickworks at Lyng (NHER 12943), East Dereham (NHER 13442), Hoe (NHER 14159) and Bylaugh (NHER 28636), and a possible lime kiln at Ringland (NHER 16692). The latter sites testify to the exploitation of the area's mineral resources.

In terms of geology, the site distribution is again similar to that seen in earlier periods. With 4.6 sites per sq km (compared to 4.4 for the Sub-Unit as a whole), there is no apparent preference for the superficial glacial sands and gravels. A slightly lower density of sites is recorded on S_DIAMICTON than in the medieval period (6.8 sites per sq km rather than 6.9); while the difference is small, the fact that this is despite a greater number of sites being recorded for this period overall means that it may be significant.

***Table 6.11. Post Medieval sites in Sub-Unit B***

| Total no. Post Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **197** | 4.4 | 0 | 0.0 | 17 | 0.4 | 58 | 1.3 | 104 | 2.3 |

## 6.12. Modern (AD 1901 – AD 2050)

102 sites dating to the 20th–21st centuries are recorded within Sub-Unit B. This relatively low number in comparison with sites of post medieval date reflects the understandably selective recording of modern sites, and the complete absence of any modern Find Spot sites. The resulting site density of 2.3 per sq km, however, is substantially higher than for the county as a whole, where 1.8 modern sites per sq km is the average. It provides a significant contrast to Sub-Unit A where only 1.6 sites per sq km are recorded for this period (Section 5.12). Approximately 50% of the modern sites in both Sub-Units are buildings, both Listed and undesignated (Fig. 6.11).

Nearly 40% of the modern sites in Sub-Unit B relate to 20th-century military activity. These are predominantly of World War Two date, although some possible World War One sites and a Cold War Royal Observer Corps site (NHER 19367) have also been recorded. They include two World War Two airfields — Attlebridge (NHER 3063) and Swanton Morley (NHER 2830); the latter is of National significance and incorporates three Scheduled Pickett-Hamilton forts (NHER 51063–5, SM 30607). The World War Two RAF headquarters at Bylaugh Hall (NHER 44346), substantial portions of which may still survive, is also of National significance. In fact **the number of modern sites of National significance is notably high** when compared to Sub-Unit A. It reflects the relatively large number of sites relating to Grade I and II* Listed buildings and Scheduled Monuments of this date within the Sub-Unit (13 compared to 4 in Sub-Unit A), and also the multiple

records relating to Swanton Morley airfield and its constituent elements. 3 aircraft crash sites are recorded within the Sub-Unit, 2 of which are known to be of World War Two date.

***Table 6.12. Modern sites in Sub-Unit B***

| Total no. Modern sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **102** | 2.3 | 0 | 0.0 | 20 | 0.4 | 37 | 0.8 | 44 | 1.0 |

## 6.13. Survival and Visibility

Sites recorded as surviving as historic landscapes and major or minor earthworks are illustrated in Figure 6.12 and tabulated below, cross-referenced with aggregate type where significant (Table 6.13). The distribution map shows a landscape relatively densely populated by well-preserved sites, particularly across its central portions, even without the inclusion of surviving buildings and structures (recorded at 69 sites within the Sub-Unit). The number of surviving earthworks and 'historic landscapes' is significantly higher than in Sub-Unit A, for example. There is no obvious pattern to the distribution of such sites, although there appears to be a concentration in the central portion of the Sub-Unit, and a relative scarcity, at least of more substantial sites, towards the west. The statistics given below suggest slightly better survival on S_DIAMICTON when compared to both the superficial glacial sands and gravels and the Sub-Unit overall, as might be expected given the heavy soils, but the variations in the figures are too small to be certain of their validity. 5 of the sites are scored as being of National significance (4 are wholly or partially Scheduled), 24 have been judged to be Regionally significant, while 23 are of Local significance.

Cropmark sites are also recorded across much of the Sub-Unit. Such sites are relatively scarce in its northwest corner, for which the NMP survey was only partially completed, but there are also apparent gaps in areas where the NMP was undertaken — for example, to the north of East Dereham, at Beetley and across Swanton Morley airfield — and it is difficult to assess what the impact of the NMP might have been in areas which were not surveyed. The average density of 2.4 cropmark sites per sq km is marginally higher than in Sub-Unit A, where only 2.3 sites were recorded per sq km. However, since the NMP was only completed for 22 sq km of Sub-Unit A, compared to 41 sq km of Sub-Unit B, the difference is actually much greater. In fact, in those areas for which NMP was completed, the 2.6 cropmark sites per sq km recorded in Sub-Unit B is significantly lower than the average of 4.2 sites recorded across the eastern portion of Sub-Unit A (Table 5.14). This, it can be presumed, is substantially a reflection of the heavier soils and geology in Sub-Unit B, both in terms of cropmark formation and past human activity, but may also reflect variations in photographic coverage.

Breaking the results down by individual geology (Table 6.13) there appears to be a slightly higher density of cropmarks on S_DIAMICTON than on the superficial glacial sands and gravels. This is contrary to what was expected, as the heavier soils of the diamicton (essentially the Boulder Clay) should be less productive of cropmarks that the more free-draining sands and gravels. More detailed interrogation of the figures, however, suggests that the apparently high numbers on the diamicton may reflect the considerable number of sites that overlap its margins, being sited on both S_DIAMICTON and S_SAND_AND_GRAVEL, for example. When the site distribution is queried using a 'within' or 'entirely within' operator, *i.e.* searching for sites with a centre point on or falling wholly within S_DIAMICTON, the results are lower than for the superficial glacial sands and gravels. They are still relatively high though, and whether these densities are representative of the diamicton as a whole, or just of its edges where it meets with more free-draining geologies, is a matter for further investigation.

**It is worth noting the discrepancy between the site distribution recorded by the NMP and that of sites known from excavation or other methods in Sub-Unit B. This was most apparent for the Iron Age period** and is discussed in detail in the NMP report (Albone *et al.* 2008), as well as in Section 6.7 above. The NHER synthesis had identified a concentration of sites of this period, and settlement in particular, in the west of the Sub-Unit. By contrast, the NMP recorded all of its sites of this period, including enclosures and other signs of settlement, in the east and central portions; nothing of this date was recorded in the west, where (presumably) the heavier soils led to poor or non-existent cropmark formation.

***Table 6.13. Survival and visibility of sites in Sub-Unit B relative to geology***

| | **Area (sq km)** | **Historic Land-scapes** | **per sq km** | **Major Earth-works** | **per sq km** | **Minor Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| ***Sub-Unit B*** | ***45.00*** | ***11*** | ***0.2*** | ***11*** | ***0.2*** | ***37*** | ***0.8*** | ***110*** | ***2.4*** |
| | | | | | | | | | |
| S_DIAMICTON | 13.07 | 7 | 0.5 | 3 | 0.2 | 14 | 1.1 | 46 | 3.5 |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **25.16** | 8 | 0.3 | 5 | 0.2 | 20 | 0.8 | 77 | 3.1 |

## 6.14. Historic Landscape Character (PT)

In common with much of Sub-Unit C, with which it is contiguous, the historic landscape of Sub-Unit B is largely characterised by a mixture of piecemeal enclosure and 20th-century alteration. Although some piecemeal Parliamentary enclosure is evident, on the whole it retains much of the irregular character of early piecemeal enclosure, which is even more apparent on the 1959 Ordnance Survey map. In Billingford and Bintree, relatively large fields, enclosed by regular boundaries, appear to represent Parliamentary enclosure of

former ‘common field’ that had survived unenclosed long enough to be depicted on Faden’s 1797 *Map of Norfolk*. Such late survival of common fields is unusual in clayland areas; the reason they persisted in these parishes is unclear, but poor soil quality may have been a factor.

Many parishes, such as Swanton Morley, Brisley and Gressenhall, still exhibit a degree of irregularity in their field boundaries that distinguishes the dissected clayland plateau of which they form part from the clayland areas to the south and east. It may be the case that, in addition to early enclosure of irregular open fields, some of these irregular field boundaries are a result of the enclosure of woodland. It was on this plateau, the central watershed of Norfolk, that the greatest concentration of woodland in Norfolk at the time of Domesday (1086) was located. Much of this woodland has subsequently been enclosed, as demand for land increased along with population density (Williamson 1993, 114-115).

Sub-Unit B is notable for its areas of former heathland, distinguishing it from Sub-Unit C, which is characterised by its parkland and enclosed meadow. However, few areas of heathland survive today. The larger heaths and commons, such as Bylaugh and Billingford, were the subject of Parliamentary enclosure and today are the site of woodland plantations. The enclosure of the commons and heaths in Norfolk as a whole was not purely restricted to the Parliamentary enclosures of the early 19th century, but had been taking place for some centuries with piecemeal alterations to their shape and extent (Williamson 2006, 168).

The majority of extraction of the plateau gravels has taken place since 1959, but that at Creefer’s Hill, Beetley, has been ongoing since 1884. Earlier exploitation of the plateau gravels is suggested by the 1842 Tithe Map for Morton on the Hill, on which a wood called ‘Gravelpit Plantation’ is depicted. This extraction has seen some exploitation of the commons and heaths that escaped Parliamentary enclosure and woodland plantation, but it has also occurred on arable land at Stanfield and Beetley. **In order to preserve the landscape character of the area, some care should be given in the selection of sites for mineral extraction to respect those fields that, rarely for Norfolk, have survived intact from the 19th century and earlier.**

Although Sub-Unit B is representative of those areas of plateau gravels that immediately surround it, it is not necessarily representative of the broader Study Area as a whole, as this extends across a large area of the county, from Breckland in the southwest to the north Norfolk coast. The variation in soil types is such that there are significant differences in the landscape of the different areas, for example between those parts of the Study Area that fall within the ‘Good Sands’ region of northwest Norfolk, and those on the light soils of Breckland to the south. Study Area C (Valley Gravels) exhibits similar variations in

landscape type. Both Sub-Unit B and Sub-Unit C are most indicative of those parts of their respective Study Areas that correspond with the dissected claylands of central Norfolk.

## 6.15. The Impact of Extraction

Past extraction has been quite widely distributed across the Sub-Unit, but with a clear concentration, particularly of the larger quarries, in the west and along the River Wensum as it skirts west to east past the central portion of the Sub-Unit. The western extraction sites were sited to exploit the superficial glacial and glaciofluvial sands and gravels, being found mainly on the Lowestoft Formation deposits, but also on the undifferentiated Middle Pleistocene glaciofluvial deposits. The central quarry sites along the River Wensum were sited to exploit its river terrace and sub-alluvial aggregate deposits; for the most part, these extraction sites only encroach slightly into Sub-Unit B, and they are treated in more detail in the discussion of extraction with Sub-Unit C (Section 7.15), of which they more properly form part. Smaller extraction sites, predominantly mapped by the NMP from aerial photographs and historic maps, also occur widely, but principally in the southern and western portions of the Sub-Unit. They occur on most deposits, and some may have been excavated for marl, chalk or clay, rather than aggregate.

In all, 46 archaeological sites within Sub-Unit B have some form of mineral extraction recorded as taking place within them (Table 6.14, Fig. 6.14). The impact may vary from total destruction of the archaeological remains — which in some cases may only be known about because of the quarrying, and attendant archaeological investigations, taking place — to a small gravel or sand pit located within the archaeological site but not impinging on any known archaeological features. For one site (NHER 50764) information about extraction taking place there has been derived solely from the 'Landuse' field of the NHER, as no quarrying has been mapped at this location, whether by NCC, the BGS or the NMP.

Of the 46 sites affected by extraction, 4 are recorded as being of National significance, one of which is the 'Fen Causeway' Roman road (NHER 2796). Within the Sub-Unit the line of this road (now followed by Salter's Lane and Stony Lane) is lined by almost continuous extraction on both sides where it passes through the parish of Longham. The area has seen a considerable amount of archaeological investigation, including excavation, although the road itself is not recorded as having been disturbed. Nearby is the site of the deserted medieval village of Little Bittering (NHER 7266). Extraction has encroached upon its southern fringes, where the NMP recorded a number of possible field boundaries associated with the settlement. The church and surviving earthworks, which are Scheduled (SM 386), remain undisturbed. A second deserted or shrunken medieval settlement site at Hoe (NHER 2810) has seen only a small amount of historic extraction at its eastern edge. The fourth site is the World War Two airfield at Swanton Morley (NHER 2830). This is

significant in being the largest grass airfield in Europe, the site from which the first joint British-American bombing raid was launched, and also the site at which the de Havilland Mosquito first entered service in an RAF squadron. Although its preservation is mediocre, it still possesses 3 Pickett Hamilton forts, rare survivals which have been Scheduled (SM 30607).

Other sites affected by mineral extraction comprise 15 of Regional significance, and 22 of Local. For the former, most are co-located with quarries that are relatively small in scale, or, in the case of the larger extraction sites in the west of the Sub-Unit, have been subject to, and sometimes discovered by, intensive archaeological investigations attendant on the planning permissions relating to the extraction. This was the case with the several archaeological sites of Regional (and other) significance at Longham. The site of a prehistoric barrow cemetery at Weston Longville and Morton on the Hill (NHER 50646) has been significantly impacted upon by post-War aggregate extraction in the Wensum Valley; this issue is discussed further in the section on Sub-Unit C (see Chapter 7), the River Gravels, of which it more properly forms part.

***Table 6.14. Sites in Sub-Unit B co-located with former and existing extraction sites*** *(as of 6.3.08)*

| Total no. sites | International | National | Regional | Local |
|---|---|---|---|---|
| **46** | 0 | 4 | 15 | 22 |

There are 4 existing quarry sites within the Sub-Unit (some made up of more than 1 block of land), covering 1.06 sq km in total. These are located at Stanfield (NCC Site No. 193), Beetley (East Bilney, NCC Site No. 275), Beeston with Bittering and Longham (NCC Site No. 32), and Swanton Morley/Billingford (NCC Site No. 29). These are predominantly located at the western end of the Sub-Unit; only the small portion (<0.05 sq km) of Swanton Morley/Billingford quarry that falls within the Sub-Unit avoids this trend, being located more centrally. This distribution goes some way towards explaining the apparent concentration of sites in this area noted by the NHER synthesis, which was written prior to the NMP survey (which showed a bias towards the lighter soils of the east) being completed. Within the limits of the Sub-Unit, 17 archaeological sites intersect with these quarries. 2 are of National significance: the 'Fen Causeway' Roman road (NHER 2796), and Little Bittering DMV (NHER 7266), both of which are discussed above. 5 are of Regional significance; for the most part these sites have been the subject of intensive archaeological investigation prior to extraction taking place, and in some cases they are only known about because this happened. Only 1 site appears not to have received any archaeological attention prior to its destruction, but this site — the cropmarks of part of the 'Fen Causeway' Roman road (NHER 50601) — was recorded only recently by the NMP, and so was not known about until after the extraction had taken place. 9 of the affected sites are of Local significance;

these include 4 NMP sites, including 2 ring ditches (NHER 49699), which may have been destroyed without any other record being made of their existence.

In terms of future extraction, all of the sites in Sub-Unit B proposed in the draft MWDF are sited on higher ground in the west of the Sub-Unit, away from the river valleys that have historically seen the greatest amount of exploitation (Fig. 6.15). There are a number of different areas of proposed allocations, some of which are made up of multiple individual blocks. Only 2 lie adjacent to active quarry sites, although in the past there has been quarrying in the vicinity of most of the proposed sites, the only exception being the block at Bintree and Billingford, where no previous extraction is recorded as having taken place. Totalling 4.08 sq km, **should all the proposed sites go ahead this would result in a near 400% increase to the areas of active extraction** (Appendix 2). Furthermore, this represents over 9% of the total area of the Sub-Unit, or 11.5% when taken together with the currently active sites.

Within the Sub-Unit, 30 archaeological sites are recorded as intersecting with one or more of the proposed mineral allocations (Table 6.15, Fig. 6.15). The 2 sites recorded as being of National significance are Swanton Morley airfield (NHER 2830), which has already seen some extraction at its southwest corner, adjacent to the proposed site (MWDF site ref. MIN 22), and a multi-period site known from surface finds at Longham, where a Middle Saxon settlement is recorded (NHER 7269). While the bulk of this site lies outside of the proposed minerals allocation (MWDF site ref. MIN 66), its eastern edge extends into it. No sites of Regional significance are recorded within the proposed extraction sites, but 24 of Local significance are. These include 12 cropmark sites, including several ring ditches of possible prehistoric funerary origin. These all require careful consideration of how they should be treated before planning permission is granted. Since the Assessment was undertaken, MWDF site ref. MIN 22 has been withdrawn, as planning permission has already been granted for this site (NCC 2008b).

***Table 6.15. Sites in Sub-Unit B co-located with proposed minerals allocation sites*** *(as of 6.3.08)*

| Total No. Sites | International | National | Regional | Local |
|---|---|---|---|---|
| **30** | 0 | 2 | 0 | 24 |

## 6.16. The Broader Study Area

Study Area B, the broader area of aggregate type of which Sub-Unit B forms part, is described briefly in Section 3.3.2. 2749 archaeological sites have been recorded within, or partially within, this area (as of 28 May 2008). 543 of these sites also lie within Study Area C (River Gravels), due to the overlap between the latter and the other three Study Areas.

### 6.16.1. Geology

The density of archaeological sites within the Study Area, broken down by BGS ROCK type, is shown in Table 6.16 below. Comparison with Table 6.1 above suggests that the overall site density is somewhat lower than for the Sub-Unit (8.4 sites per sq km rather than 9.7). It is likely that this reflects, at least in part, the area of the Sub-Unit for which NMP has been completed (91%) and that portion of the Study Area for which NMP data exists (24%, including those areas mapped as part of the Coastal Zone). The effect of this difference, however, might be expected to be more pronounced, given the tendency for the NMP to increase the archaeological record of the areas it covers by at least 30%. This suggests that the overall site density within the Sub-Unit may in fact be relatively low compared to the Study Area as a whole, if it is assumed that the NMP will be similarly successful when it covers the remainder of the Study Area. On individual geologies, however, the figures vary widely, with higher site densities being recorded within the Study Area on some deposits, and lower site densities on others.

Unsurprisingly, and as for the Sub-Unit, the average site density on the Chalk, which forms the bedrock for 99% of the Study Area, is the same as that for the Study Area as a whole. The figure of 8.4 sites per sq km is thus again slightly lower than for Sub-Unit B, and is also lower than that of 9.1 recorded on the Chalk across the county as a whole (Table 4.1). A slightly higher density of sites is recorded on the Crag deposits within the Study Area than in the Sub-Unit, but the extremely small areas of this bedrock encountered within either means that the figures derived for it are unsuitable for statistical analysis.

For the superficial deposits, the statistics recorded for S_CLAY_AND_SILT, S_CLAY_SILT_AND_SAND (Brickearth), S_GRAVEL and S_GRAVEL_SAND_AND_SILT (tidal flat deposits) are similarly unrepresentative, the high site densities recorded being largely the product of the numerous small occurrences of such geologies and/or their long, irregular boundaries resulting in a greater number of intersections with the boundaries of archaeological sites. In the same way, the long perimeters mapped around alluvial and river terrace deposits (S_GRAVEL_SILT_SAND_AND_GRAVEL and the post-glacial river terrace S_SAND_AND_GRAVEL) also intersect with large numbers of archaeological sites; as for the Sub-Unit, the latter have been separated out from the glacial/glaciofluvial S_SAND_AND_GRAVEL deposits, which can more properly be considered the Plateau Gravels. These latter deposits, which are currently a target for aggregate extraction, form the dominant superficial geology within the Study Area, being found across 57% of its area. A site density of 10.0 sites per sq km is recorded on these deposits, only very slightly lower than on this geology within the Sub-Unit (Table 6.1) but substantially lower than the 13.3 sites per sq km recorded on these deposits across the county as a whole (Table 4.1). Within the Sub-Units, the limited and variable occurrence of cropmarks across the these deposits, and in particular the Lowestoft Formation sand and gravel, makes it difficult to

assess the potential for further NMP work to increase this density across the Study Area as a whole. A figure of 9.4 sites per sq km on the S_DIAMICTON tills (which equate broadly to Norfolk's 'Boulder Clay Plateau') is far more representative than the average of 13.8 sites per sq km recorded within the Sub-Unit, but is still notably higher than the average of 8.0 sites recorded on diamicton across the county as a whole (Table 4.1).

Overall this brief analysis would suggest that **in terms of numbers of archaeological sites, the Sub-Unit is broadly representative of its wider Study Area**, with no widely divergent site densities recorded across any of the geological deposits present across significant areas. **This is contrary to the impression gained from the analysis of the HLC data for the Sub-Unit** (Section 6.14 above), suggesting that despite this apparent similarity, the relatively recent landscape history of different parts of the Study Area has varied considerably. Whether further NMP work across a greater proportion of the Study Area would highlight any differences between its different geological components remains to be seen.

***Table 6.16. Density of archaeological sites in Study Area B relative to geology***
Emboldened ROCK types are those where aggregate extraction will be targeted (information derived from NCC Minerals and Waste Planning Team 'Areas of Investigation'). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Study Area (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***327.00*** | ***2749*** | ***8.4*** |
| | | | | |
| B_CHALK | various formations | 322.22 | 2706 | 8.4 |
| **B_SAND_AND_GRAVEL** | **Wroxham Crag** | **4.78** | **76** | **15.9** |
| | | | | |
| S_CLAY_AND_SILT | Corton & Lowestoft Formations, & Banham member | 4.40 | 65 | 14.8 |
| S_CLAY_SILT_AND_SAND | Brickearth | 4.16 | 58 | 13.9 |
| S_CLAY_SILT_SAND_AND_GRAVEL | Alluvium and Head | 10.21 | 316 | 31.0 |
| S_DIAMICTON | various tills | 90.48 | 849 | 9.4 |
| S_GRAVEL | Ringstead sand & gravel member | 0.02 | 2 | 100.0 |
| S_GRAVEL_SAND_SILT_AND_CLAY | Tidal flat deposits | 0.01 | 2 | 200.0 |
| S_PEAT | | 0.96 | 30 | 31.3 |
| **S_SAND_AND_GRAVEL [glacial & glaciofluvial]** | **Lowestoft & Corton Formations, Briton's Lane member & glaciofluvial** | **188** | **1879** | **10.0** |
| S_SAND_AND_GRAVEL [post-glacial river terrace] | River terrace deposits | 4.78 | 138 | 28.9 |

### 6.16.2. Archaeological Significance

As only sites within the Sub-Unit have been scored for 'Archaeological Significance', it is not possible to assess the Study Area as a whole using these criteria. The number, type

and distribution of designated sites, however, can provide some indication as to the incidence of sites of high significance. In Table 6.17 below, figures are given for designated sites within both the Study Area and the Sub-Unit. The numbers involved, which are relatively small, make statistical analysis difficult. The dislocated nature of the Study Area, made up as it is of multiple irregularly shaped blocks of land, makes it difficult to discern any overall patterns in the data. Scheduled sites and those consisting of or incorporating Grade I and II* Listed buildings, which qualify virtually automatically for a National or higher significance score, appear to be relatively evenly spread across the Study Area (Fig. 6.16). There are notable clusters of Scheduled sites, relating to Bronze Age barrows, in the north and west of the Study Area, for example on Salthouse Heath, at Bircham and Harpley, and at Weasenham. There is a relative paucity of Grade I and II* Listed buildings in the Study Area's southern portion. Grade II Listed buildings are more widely spread, although are again scarce in the southwest. There are notable clusters of such sites at historic towns and villages, predominantly in the central northern part of the Study Area; these include Blakeney, Holt and Hindolveston. There are notably fewer Grade II Listed sites within the Sub-Unit when compared to the Study Area; this was also the case in Sub-Unit A and is a reflection of the avoidance of built-up areas when the Sub-Units were selected.

It is the Scheduled sites that are arguably of most relevance in an assessment of archaeological significance. Analysis of their distribution in relation to the geology of the Study Area reveals some interesting trends. **72 of the sites relating to a Scheduled Monument are found on the superficial glacial/glaciofluvial sand and gravel deposits; this equates to 92% of the sites, despite these deposits being found across only 57% of the Sub-Unit**. Conversely, only 9 (12%) of the Scheduled sites are found on S_DIAMICTON, although this covers 28% of the Study Area. This apparent bias towards the superficial sands and gravels is worthy of further investigation.

| ***Table 6.17. Designated archaeological sites in Study Area B*** | | | ***in Sub-Unit B*** | |
|---|---|---|---|---|
| **Designation** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***2749*** | ***8.4*** | ***435*** | ***9.7*** |
| | | | | |
| Scheduled sites | 78 | 0.2 | 8 | 0.2 |
| Grade I & II* Listed Building | 66 | 0.2 | 11 | 0.2 |
| Grade II Listed Building | 416 | 1.3 | 28 | 0.6 |

### 6.16.3. Archaeological Period

A breakdown of the Study Area and Sub-Unit B sites by period, and a comparison with the figures for the whole of Norfolk, is given in Table 6.18 below. Several interesting areas of divergence and concordance between the figures are apparent. For the most part, the site density figures for each period in the Study Area are not notably different from those for the

Sub-Unit, suggesting that, in these terms at least, the Sub-Unit is broadly representative of the Study Area as a whole. In terms of the overall number of sites, it is clear that the site density in Study Area B is below the average for the county, in effect almost 0.6 sites per sq km fewer being recorded on the Plateau Gravels. **The substantially higher density of 9.7 sites per sq km in the Sub-Unit is likely to relate to the NMP survey having been carried out across 91% of the Sub-Unit but only 24% of the Study Area** (and 28% of the county).

Looking at the figures for each period chronologically, for the Palaeolithic and Mesolithic periods, there is no strong divergence (if any), although the small numbers of sites involved may mask broader patterns. For the Bronze Age, and to a lesser extent the Neolithic, the higher density of sites recorded in both the Sub-Unit and the Study Area, when compared to the average for the county, is striking. The reasons for this apparent concentration of sites on the Plateau Gravels, and in particular the form (cropmarks, findspots, *etc.*) and the character (funerary/domestic) of the sites involved, warrant further investigation. It is also noteworthy that despite the Bronze Age being a productive period in terms of NMP sites, the fact that the NMP survey has been completed for 91% of the Sub-Unit but only 24% of the Study Area is not apparent from the figures. That NMP mapping has been completed for 28% of the county as a whole, *i.e.* a higher proportion than for the Study Area, indicates that the NMP is not a major factor in the higher density of Bronze Age sites recorded on the Plateau Gravels; rather it suggests the opposite.

The site density figures for the Iron Age and Roman periods are difficult to interpret, as the variance between the different sample areas is small, in the order of 0.5 sites per sq km or less (*i.e.* too small to be certain of statistical validity). Higher site densities are recorded within the Sub-Unit for both periods; this is probably a reflection of the presence or proximity of Roman sites such as the 'Fen Causeway' (NHER 2796), the small town at Billingford (NHER 7206) and Swanton Morley fort (NHER 17486), and also the large-scale excavations that have taken place, mainly on extraction sites. For the Saxon period the figures appear to be entirely average; there is a slightly lower incidence of sites within the Sub-Unit, but again the numbers involved are small and their significance is difficult to assess.

For the medieval and post medieval period the number of sites recorded within the Study Area is markedly lower than for both the Sub-Unit and the county. In terms of settlement at least, these figures may reflect a preference for valley locations, rather than the higher ground of the plateaux. Certainly, this pattern is apparent for the medieval period within the Sub-Unit (see Section 6.10 above). It would also appear to be the case for the modern pattern of settlement; northwest Norfolk in particular, where a considerable proportion of the Plateau Gravels are found, is relatively empty of settlement today. The number of

modern sites recorded within the Study Area is in line with the average for the county. It is unclear why a high density of sites of this period is recorded within the Sub-Unit; the number of new sites of this date recorded by the NMP is too small to account for it entirely.

***Table 6.18. Archaeological sites in Study Area B by period***

| | ***Sub-Unit B*** | | ***Study Area B*** | | ***in county*** *(as of 11.11.08)* | |
|---|---|---|---|---|---|---|
| | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***435*** | ***9.7*** | ***2749*** | ***8.4*** | ***49,290*** | ***9.0*** |
| | | | | | | |
| Palaeolithic (exclusive) | 2 | <0.1 | 47 | 0.1 | 402 | 0.1 |
| Mesolithic (exclusive) | 9 | 0.2 | 46 | 0.1 | 727 | 0.1 |
| Neolithic (inclusive) | 73 | 1.6 | 503 | 1.5 | 6768 | 1.2 |
| Bronze Age (inclusive) | 92 | 2.0 | 672 | 2.1 | 7722 | 1.4 |
| Iron Age (inclusive) | 67 | 1.5 | 411 | 1.3 | 6161 | 1.1 |
| Roman (inclusive) | 87 | 1.9 | 466 | 1.4 | 8478 | 1.5 |
| Saxon (inclusive) | 47 | 1.0 | 381 | 1.2 | 6227 | 1.1 |
| Medieval (inclusive) | 161 | 3.6 | 782 | 2.4 | 17,463 | 3.2 |
| Post Medieval (inclusive) | 197 | 4.4 | 1197 | 3.7 | 23,624 | 4.3 |
| Modern (inclusive) | 102 | 2.3 | 629 | 1.9 | 10,039 | 1.8 |

### 6.16.4. Survival and Visibility

It is not possible to derive numbers of surviving earthwork or 'historic landscape' sites from the NHER, as such information is not always recorded, and when it is, it is often recorded within the descriptive text, rather than in a specific field that can be queried. (Such information was recorded for the Sub-Unit as an additional, 'ALSF Survival' score.) The figures given in Table 6.19 below, however, which include all sites that have been recorded as containing earthwork elements, surviving or not, can provide a rough characterisation of the form and survival of the archaeology of this area.

Overall it can be seen that the Study Area contains a higher number of earthwork sites than the average for the county (1.1 per sq km as opposed to 0.8), and a very slightly lower number of cropmark sites (0.9 per sq km rather than 1.0). In terms of earthwork sites, this is also borne out within the Sub-Unit, where a site density of 1.3 per sq km is recorded. In contrast, a very high number of cropmark sites is recorded in Sub-Unit B: 2.4 per sq km compared to 1 per sq km in the county as a whole. This is a reflection of the NMP survey having been completed for 91% of the Sub-Unit but only 24% of the Study Area; it is borne out by the site distribution, which shows strong concentrations in those parts of the Study Area for which NMP has been completed (*i.e.* the Coastal Zone and the Sub-Unit) (Fig. 6.17). Very few cropmark sites are recorded in Breckland, in the southwest of the Study Area.

Of the geological deposits occurring within the Study Area, only S_DIAMICTON and the superficial glacial/glaciofluvial sands and gravels warrant detailed analysis. (The Chalk is too widespread and the other deposits too limited in extent to produce any valid or meaningful statistics.) Surprisingly, there is no clear preference amongst the Study Area's cropmark sites for either of these two superficial geologies. A greater number on the lighter soils of the sands and gravels, as opposed to the heavier tills of the diamicton, might have been expected. As has been discussed above, however, the irregular, dislocated occurrences of both deposits, where opportunities for intersections with site boundaries are greatly increased by multiple long perimeters, may mask any pattern in the data. It is also likely that cropmark formation is variable across the different LEX types that make up the glacial sands and gravels (Lowestoft Formation, Corton Formation, undifferentiated glaciofluvial, Briton's Lane sand and gravel member, *etc.*), and this too may hide significant patterns. A more in-depth analysis of this question, however, is beyond the scope of the current project.

The distribution of earthwork sites within the Study Area also shows some correlation with those areas covered by the NMP, both for this project and in previous NMP projects, but this is not as pronounced as for the cropmark sites. There is also a comparatively high density of sites within Breckland, where a cluster of earthwork sites relates to the MOD's Stanford Training Area (STANTA), a landuse that has favoured their preservation. The significance of the 0.3 sites per sq km difference between the number of such sites recorded in the Study Area compared to Norfolk as a whole is difficult to gauge; the relatively heavy soils of the Boulder Clay Plateau, together with consequent variations in landscape history, are likely to have been a factor, although it might be expected to have left a clearer signal than this. A better impression is perhaps gained through comparison of the figures for Study Area A, where the density of earthwork sites was comparatively low (0.8 per sq km). The two respective Sub-Units provide a particular contrast: only 0.6 earthwork sites per sq km being recorded in Sub-Unit A, compared to 1.3 per sq km in Sub-Unit B.

When the figures for the Study Area are broken down by geology, rather surprisingly there appears to be a higher density of earthwork sites on the superficial glacial/glaciofluvial sands and gravels, rather than on the tills of S_DIAMICTON. This, together with the (lack of) cropmark evidence (see above), appears to indicate that the soils of the glacial sands and gravels are relatively heavy, thus favouring earthwork survival. The matter warrants further investigation, however, and as with the cropmark data, more detailed analysis of the variation in site survival across different LEX types (and in relation to other factors) would almost certainly be productive. The difficulty of interpreting such figures is highlighted by the site densities recorded in Sub-Unit B, where a higher number of earthwork sites is recorded on S_DIAMICTON than on the glacial sands and gravels.

| *Table 6.19. Survival and visibility in Study Area B relative to geology* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***Sub-Unit B*** | | | | | ***Study Area B*** | | | | |
| | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
| ***Overall*** | ***45.00*** | ***60*** | ***1.3*** | ***110*** | ***2.4*** | ***327.00*** | ***371*** | ***1.1*** | ***298*** | ***0.9*** |
| | | | | | | | | | | |
| S_DIAMICTON [tills] | 13.07 | 25 | 1.9 | 46 | 3.5 | 90.48 | 90 | 1.0 | 117 | 1.3 |
| **S_SAND_AND_ GRAVEL [glacial]** | **25.16** | **29** | **1.2** | **77** | **3.1** | **188** | **292** | **1.6** | **225** | **1.2** |

| ***in county*** *(as of 11.11.08)* | | | | |
|---|---|---|---|---|
| **Area (sq km)** | **Earthworks** | **per sq km** | **Cropmarks** | **per sq km** |
| **5497.99** | **4434** | **0.8** | **5510** | **1.0** |

### 6.16.5. The Impact of Extraction

Former and active quarries are spread quite widely across the Study Area (Fig. 6.18). (These include only those sites recorded by NCC and the BGS, quarries visible on aerial photographs or depicted on historic maps having only been mapped by the NMP within the 4 Sub-Units.) There is a notable band of quarries running approximately westnorthwest–eastsoutheast across the centre of the Study Area (taking in the Sub-Unit), with a cluster on the Briton's Lane sand and gravel member to the northeast (around Letheringsett with Glandford, Holt and Blakeney), and a more dispersed cluster on the Corton/Lowestoft Formation sands and gravels to the southwest (around Snetterton and Quidenham). The use of quarries data in the selection of the Sub-Unit, in order to investigate those areas most at threat, is apparent in the clustering of many of the active extraction sites at its western end. The vast majority of the quarries are located on the superficial glacial/glaciofluvial sands and gravels which characterise the Study Area; a few are instead sited on adjacent areas of river valley deposits. 63 archaeological sites within the Study Area are recorded as being co-located with 1 or more of these former and active quarry sites. 2 are Scheduled (either wholly or partially): Swanton Morley airfield (NHER 2830), which encompasses 3 Scheduled World War Two Pickett-Hamilton forts (SM 30607), and Little Bittering DMV (NHER 7266, SM 386). In neither case are the Scheduled areas affected directly by the extraction, but at Little Bittering the boundary of the quarry extends right up to and partially surrounds the Scheduled Monument.

11 active quarries, covering 2.68 sq km, are recorded within Study Area B; some are made up of multiple blocks of land. There are no particularly clear concentrations, although the general groupings already described for both past and active sites are still apparent. 31 archaeological sites are recorded as being co-located with 1 or more of these active extraction sites. The majority are located within the Sub-Unit, and particularly at its western end where several large-scale excavations have taken place prior to extraction. There is a

notable absence of any recorded sites within the 2 active quarries in the northeast of the Study Area (Letheringsett/Glandford, NCC Site No. 27; Holt, NCC Site No. 26). Only 1 site is associated with a Scheduled Monument: Little Bittering DMV (NHER 7266, SM 386). As has already been described, the extraction does not extend into the Scheduled portions of this site.

Within the Study Area, 32 allocations for future minerals extraction are put forward in the draft MWDF; some form clusters of multiple blocks of land (Fig. 6.18). Their distribution also follows that described for the past and active sites, again with a concentration within the Sub-Unit. There is less of a correlation between the proposed allocations and areas of past or current extraction than was seen in Study Area A, with several apparently 'new' areas having been selected. 53 archaeological sites within the Study Area are co-located with one or more of the proposed minerals allocations. Only 2 are already co-located with an active quarry, a very small proportion (4%) when compared with Study Area A (Section 5.16.5). This suggests that **the impact of these mineral allocations, should they go ahead, will be considerable in terms of their effect on sites that have previously remained relatively undisturbed**. 3 of the sites are wholly or partially Scheduled. Swanton Morley airfield (NHER 2830, incorporating SM 30607) falls partly within the proposed site at Hoe (MWDF site ref. MIN 22, although none of the Scheduled elements are directly affected (planning permission for this site has now been granted, NCC 2008b). An Early Bronze Age saucer barrow (NHER 11280, SM 368), which in 1992 was thought to be one of the best preserved barrows in the county, falls within the proposed site at Coxford Abbey Quarry, Syderstone (MWDF site ref. MIN 45). Devil's Ditch (NHER 6115, SM 79), an Iron Age and/or Saxon linear boundary, is clipped by the proposed site at West Harling Woods (MWDF site ref. MIN 99). (The latter allocation, MIN 99, which would also impact upon other Scheduled Monuments and archaeological sites outside the Study Area, has since been withdrawn from the MWDF proposals, NCC 2008b.) It is probable that a substantial number of non-Scheduled sites, which are nevertheless of considerable significance, also number amongst those which will potentially be affected.

***Table 6.20. Sites in Study Area B co-located with past, active and proposed extraction sites*** *(as of 28.5.08)*

| | **Total no. sites** | **Scheduled sites** |
|---|---|---|
| ***Overall*** | ***2749*** | ***78*** |
| | | |
| Past & active quarries (excluding NMP quarries mapping) | 63 | 2 |
| Active quarries | 31 | 1 |
| Proposed minerals allocations | 53 | 3 |

# 7. Sub-Unit C Assessment Results

Sub-Units C and B were selected as a contiguous 90 sq km block in order to maximise the potential of the data, in particular with regards the NMP results. The discussion below refers to that part of this larger block — 64 sq km — which coincides with Study Area C (River Gravels). This area (Sub-Unit C) contains all or part of 708 archaeological sites, incorporating all those with map objects intersecting with this area on the NHER MapInfo 'Mon' layer, up to 6 March 2008.

## 7.1. Geology

As has been described in Chapter 3, the solid geology of Sub-Unit C is almost entirely formed by Chalk. The Wroxham Crag deposits (which are dominant in Sub-Unit A), overlie the Chalk at the eastern end of the Sub-Unit, the edges of more extensive exposures intruding into the Sub-Unit around Attlebridge and Morton on the Hill. As in Sub-Unit B, and in contrast to Sub-Unit A, only a very small proportion of either bedrock is exposed, as nearly the entire Sub-Unit (more than 60 sq km) is covered by a variety of superficial deposits (see below). Neither the Chalk, which covers 98% of the Sub-Unit, nor the Crag appears to be a direct target for future extraction (at least within the Sub-Unit), although any that takes place will obviously impact upon the archaeological resource they share with the overlying superficial geology. Of the two bedrock deposits, the Wroxham Crag appears to have a higher density of archaeological sites (18.7 per sq km compared to 11.1 on the Chalk; see Table 7.1 below), but this is almost entirely a product of the querying method used and the relatively small area across which the deposit occurs; for comparison, the site density across the Crag Study Area as a whole (Study Area A) is only 9.3 per sq km (see Section 5.16). Neither deposit is suitable for generating valid or meaningful statistics: the Chalk is so extensive that there is no discernible difference from the figures for the Sub-Unit as a whole; as has already been described, the Crag occurs across too limited an area to calculate meaningful site densities.

The superficial geology of Sub-Unit C is dominated by BGS ROCK type S_SAND_AND_GRAVEL. Three specific lithologies or LEX types are recorded by the BGS: Lowestoft Formation, occurring in the west of the Sub-Unit; undifferentiated glaciofluvial (Middle Pleistocene) deposits, occurring in the centre and east of the Sub-Unit; and post-glacial river terrace deposits, found along many of the area's river valleys. The first two of these geologies, which are glacial/glaciofluvial in origin, are distinctly different from the post-glacial river terrace deposits. Consequently, in the discussion below, the Lowestoft Formation and glaciofluvial sands and gravels which form the Plateau Gravels of

Sub-Unit B are treated separately from the river terrace deposits. The latter, together with the alluvial deposits of the river valleys (S_CLAY_SILT_SAND_AND_GRAVEL), below which sub-alluvial aggregate deposits occur, form the River Gravels by which Sub-Unit C is defined. Except where specified these are treated as a single deposit ('River Valley deposits combined'), as the larger sample size thus created enhances the validity of the statistics for numbers of sites, *etc*. Together they account for 34% of the surface area of the Sub-Unit.

Of the superficial deposits within the Sub-Unit, the combined River Valley deposits, the glacial sand and gravel deposits and, to a lesser extent, the diamicton are extensive enough to support meaningful statistical analysis. The site density figures are all fairly high, however, when compared with Sub-Units A and B, and while this in part reflects the higher density of archaeological sites in the Sub-Unit overall, the likelihood that it is also a product of the lengthy, irregular perimeters of most of the deposits needs to be borne in mind (see too Section 6.1, for example). Any figures for the Brickearth should be discounted, due to the narrow, dispersed occurrences of this geology, which exaggerate incidences of intersections with site boundaries, as they should be for the Crag bedrock, and for the river terrace sands and gravels when not combined with the alluvial deposits. Given this, a slight preference for the combined River Valley deposits is perhaps reflected by the site density over this geological group (15.5 sites per sq km compared to 11.1 for the Sub-Unit overall); while this is too small when compared to the other main geologies to be certain of its significance, it appears to be borne out by the figures for the broader Study Area (Section 7.16.1 below), and for the county as a whole (Table 4.1).

Future extraction within the Sub-Unit will be targeted on the superficial glacial sands and gravels — the Plateau Gravels — in the west and north of the Sub-Unit (information extrapolated from NCC Minerals and Waste Planning Team 'Minerals Allocations' data). The River Gravels will be avoided, as it is now NCC policy to avoid extraction in the Environmentally Sensitive Areas where they generally occur. They are included in this assessment, however, because they have been heavily exploited in the past, and in the long term may see some extraction again in the future. Consequently, it is these deposits which are the focus of this Chapter; the archaeology of the Plateau Gravels, and the impact of any extraction, has already been discussed in Chapter 6. The impact of future extraction on the Sub-Unit's other superficial geologies, *i.e.* Brickearth and diamicton, as for its bedrock, is presumably incidental, although not necessarily insignificant in terms of its effect on the archaeological resource.

***Table 7.1. Density of archaeological sites in Sub-Unit C relative to geology***
Emboldened ROCK types are those that have been most heavily exploited in the past (information derived from Norfolk Minerals Resource GIS and NCC Minerals and Waste Planning Team quarries data). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Sub-Unit (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***64.00*** | ***708*** | ***11.1*** |
| | | | | |
| B_CHALK | various formations | 62.66 | 693 | 11.1 |
| B_SAND_AND_GRAVEL | Wroxham Crag | 1.34 | 25 | 18.7 |
| | | | | |
| S_CLAY_SILT_AND_SAND | Brickearth | 4.82 | 106 | 22.0 |
| **S_CLAY_SILT_SAND_AND_GRAVEL** | **Alluvium** | **14.05** | **205** | **14.6** |
| S_DIAMICTON | various tills | 12.44 | 182 | 14.6 |
| S_SAND_AND_GRAVEL [glacial & glaciofluvial] | Lowestoft Formation & glaciofluvial | 21.77 | 319 | 14.7 |
| **S_SAND_AND_GRAVEL [post-glacial river terrace]** | **River terrace deposits** | **7.55** | **187** | **24.8** |
| | | | | |
| **River Valley deposits combined** | **Alluvium & River terrace sands and gravels** | **21.60** | **334** | **15.5** |

As described in Section 2.2, the figures given for each geological deposit will be skewed by variations in the detail of the BGS mapping and the classification of deposits across different survey sheets. In Sub-Unit C (as for Sub-Unit B), this has the greatest impact towards the western end of the Sub-Unit, where deposits classified as Lowestoft Formation sands and gravels give way abruptly to a mixture of glaciofluvial sands and gravels and Brickearth. By considering the superficial glacial sands and gravels together, the effect of this inconsistency should be largely negated, whilst the area of Brickearth falling within the Sub-Unit is in any case too small for valid statistical analysis.

## 7.2. Archaeological Significance

The breakdown of Sub-Unit C sites by the provisional score assigned to them for 'Archaeological Significance' is shown in Table 7.2. 648 sites in Sub-Unit C have a provisional significance score of Local or higher. These are discussed in more detail in the period discussions below (Sections 7.3–7.12).

***Table 7.2. No. archaeological sites in Sub-Unit C by significance score***

| **Archaeological Significance score** | **No. of sites** | **Sites per sq km** |
|---|---|---|
| ***Overall*** | ***708*** | ***11.1*** |
| | | |
| International | 0 | 0 |
| National | 56 | 0.9 |
| Regional | 181 | 2.8 |
| Local | 411 | 6.4 |
| Negligible | 55 | 0.9 |
| Ungraded | 5 | <0.1 |

### 7.2.1. International

There are no sites of known International significance within the Sub-Unit. Such sites are in any case rare within the county, which contains no archaeological World Heritage Sites (a designation that would automatically lead to this score; see Section 4.1.1). Only 2 sites of International significance are recorded within the ALSF Sub-Units as a whole, both part of a Middle Saxon 'productive' site in Sub-Unit D (Chapter 8).

### 7.2.2. National

56 sites are recorded as being of National significance, several of which are wholly or partially Scheduled. As for Sub-Unit B, **the resulting site density for sites with this significance score of 0.9 per sq km seems very high** (compare Sub-Unit A, for example, with only 0.3 per sq km). With no comparable figures available for the county, however, while the significance of this figure seems clear, the magnitude of this significance is not (see Section 9.1.3 for further discussion).

There is a clear concentration of such sites in the centre of the Sub-Unit, in the parishes of Hoe, Swanton Morley and Billingford. These predominantly relate to several large sites, namely Swanton Morley Roman fort (NHER 17486), Billingford Roman small town (NHER 7206), and Swanton Morley airfield (NHER 2830), each of which encompasses multiple individual records. A secondary cluster at North Elmham, to the northwest, relate to Saxon and later sites within the village, including the ruins of a 12th-century episcopal chapel, later incorporated into a fortified manor, that stand on the site of a Late Saxon cathedral (NHER 1014, SM 96). Most of the sites occupy locations close to watercourses, but overlooking the valleys rather than on the valley bottom (and thus on the Valley Gravels). Exceptions to this pattern include the moated site of Beetley Manor (NHER 2785, SM 35063), two very rare surviving examples of World War Two spigot mortar emplacements within their weapons pits (NHER 32448 & 32441), St Mary's Church, Bylaugh (NHER 3011), St Andrew's Church, Attlebridge (NHER 7748), several prehistoric barrow sites (*e.g.* NHER 7718, SM 129), and an Early Saxon cemetery (NHER 29344). The sites of National significance also include the Roman road known as the 'Fen Causeway', because it continues the line of what can more properly be called by that name (*i.e.* the Roman road crossing the Fens) from Denver in the west to the town of Brampton (and beyond) in the east (Gurney 2005, 29). This traverses the western half of the Sub-Unit on a roughly east-west line, predominantly crossing the intervening plateaux, but negotiating a major confluence of the River Wensum between Billingford and Worthing.

### 7.2.3. Regional

The 181 sites recorded as being of Regional significance are spread much more evenly across the Sub-Unit. There appears to be a closer concordance between site location and watercourses, particularly in the eastern portion of the Sub-Unit, where a large proportion are sited on the Valley deposits. Among the several more extensive sites within this group are a number of parks, such as those at North Elmham (NHER 30437), Gressenhall (NHER 50576) and Weston Park (NHER 33733).

### 7.2.4. Local

411 sites within Sub-Unit C have been assessed as being of Local significance. Like the Regionally significant sites, these too are spread widely across the Sub-Unit; a close relationship with the major river valleys is again evident. No obviously significant *lacunae* are apparent, although there are some gaps in the distribution, for example to the north of Bittering in the west of the Sub-Unit. No obvious patterns in the form of the sites — Monument, Find Spot, Building, *etc.* — are evident either.

### 7.2.5. Ungraded and Negligible

55 sites (slightly less than 8%) have been given a significance score of Negligible. The majority (37) are Find Spot records, for the most part isolated finds of known or probable medieval or post medieval date. The remaining Monument records relate to isolated field boundaries or other features of relatively recent (*i.e.* post medieval or later) date, and to sites of uncertain location or archaeological significance.

5 sites within the Sub-Unit have a score of Ungraded for significance. 2 relate to recent archaeological investigations at Beetley Quarry, the results of which have not yet been reported to the NHER. 2 relate to plots of land, both in the parish of Billingford, where archaeological work identified no finds or features. 1 is a cropmark site which has been incorporated into a more extensive record as a result of the NMP.

Sites scored as Ungraded and Negligible are included in the overall figures given below, but are not shown on the distribution maps accompanying each section. Figure 7.1 illustrates their distribution as a group. There appears to be no overall pattern to their distribution. There is a cluster of sites of Negligible significance at North Elmham, in the west of the Sub-Unit, reflecting the large amount of archaeological work that has taken place in the village.

## 7.3. Palaeolithic (500,000 BC – 10,001 BC)

Although 83 Monument sites of possible Palaeolithic date have been recorded within the Sub-Unit, many are of non-specific prehistoric date and are therefore largely irrelevant for a discussion of this period. 13 sites incorporate features or material dated specifically to the Palaeolithic period, equating to 0.2 sites per sq km (Table 7.3 and Fig. 7.2). The average for the county as a whole is only 0.1 sites per sq km, **indicating a relatively high site density for the period within the Sub-Unit**. This is accentuated when the individual geologies are looked at: 11 of the sites intersect with the combined River Valley deposits, equating to 0.5 sites per sq km. This is unsurprising given the long-known association between finds of Palaeolithic material and valley gravels (see Wymer 2005a, for example). **There is also a strong correlation between these Palaeolithic sites and past aggregate extraction within the river valleys**: of the 11 River Valley sites, all but 3 are co-located with a former quarry.

The majority of Palaeolithic sites within the Sub-Unit consist of Find Spots of one or more stone tools, most often handaxes, whose large size and distinctive shape makes them readily identifiable by members of the public and quarry staff. There are no Palaeolithic sites of National significance within Sub-Unit C, but 5 sites have been scored as being of Regional significance. These include the only Palaeolithic site within the Sub-Unit to relate to a professional archaeological excavation: NHER 13025 at Longham in the west of the Sub-Unit, where an Upper Palaeolithic blade and flake (and later prehistoric material) were recovered during excavations in advance of aggregate extraction at Salter's Lane. At 2 sites more than one handaxe has been recovered (NHER 3027, Great Witchingham, and NHER 3028, Lenwade), but none have produced any evidence of *in situ* remains, and while finds of this period are certainly of great significance as a group, individually their significance is somewhat lower. The remaining sites are of Local significance, although the cluster of sites along the Wensum Valley, between Lyng and Morton on the Hill (reflecting the extent of large-scale aggregate extraction), may have greater significance as a group, and may indicate the potential for further material to survive undisturbed elsewhere along the valley. 2 sites within this group (NHER 3055 at Sparham and NHER 3056 at Lyng) represent discoveries of palaeoenvironmental evidence, specifically finds of elephant teeth, rather than human activity.

As has already been described, **the distribution of the Palaeolithic sites correlates strongly with the extent of the combined River Valley deposits**, and also with where aggregate extraction has taken place in the past. Away from the quarries, stray finds are limited to five Palaeolithic handaxes and a later hammerstone recovered from Walsis Farm, Lenwade (NHER 3028) and another handaxe from a garden in North Elmham (NHER 17849). The latter overlies the River Terrace sands and gravels; the former overlies Brickearth, but its proximity to the edge of the River Valley gravels and the site description

suggest that it too should be regarded as deriving from River Valley deposits. The only sites recorded on the upland deposits of the west of the Sub-Unit were all identified during archaeological interventions (excavation or metal detecting); this contrasts with the lower-lying River Valley sites, which were almost entirely chance finds, whether or not related to aggregate extraction.

***Table 7.3. Palaeolithic sites in Sub-Unit C***

| Total no. Palaeolithic sites (exclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **13** | 0.2 | 0 | 0.0 | 0 | 0.0 | 5 | 0.1 | 8 | 0.1 |

## 7.4. Mesolithic (10,000 BC – 4001 BC)

80 sites of potential Mesolithic date have been recorded within the Sub-Unit, but as for the Palaeolithic period (see above), most have a generic prehistoric date and do not incorporate any evidence specifically dating to the Mesolithic. 16 sites incorporate material of exclusively Mesolithic date, and only these are illustrated on the distribution map (Fig. 7.3) and quantified below (Table 7.4). The resulting site density of 0.3 per sq km is above the average for the period, which equates to only 0.1 Mesolithic sites per sq km across the county as a whole.

The sites are distributed quite widely throughout the Sub-Unit. **There is a very strong preference for sites adjacent to watercourses or the edges of the combined River Valley deposits.** There appears to be no clear preference, however, for a particular geology; a site density of 0.4 per sq km is recorded equally on the diamicton, superficial glacial sand and gravel, and the River Valley deposits. There is also no strong correlation with former extraction, in contrast to the Palaeolithic sites, although there is clearly a relationship at specific sites such as Longham (NHER 7239 & 13025), Spong Hill (NHER 1012), Billingford (NHER 7206) and Leech Pit Wood (NHER 3018). These sites were excavated in advance of (or in response to the threat of) gravel extraction, thereby leading to the recovery of Mesolithic material. The failure for such material to be recorded by chance at quarry sites, *i.e.* by being identified and recorded by quarry staff, for example, may reflect the small size of most Mesolithic worked flint.

7 of the Mesolithic sites are Monument records, but these are all multi-period sites and at only one — Spong Hill (NHER 1012) — has a Mesolithic feature been identified. Even here, the feature was believed to be of natural origin, but it contained 9 microliths, burnt flint, burnt earth, and charcoal dated to 8280 ± 80 BP. Most of the sites represent single or small groups of Mesolithic flints (including a number of axeheads), most often recovered together with material of later date. Only 1 site, a multi-period site at Attlebridge (NHER

17217), has been recorded as a flint-working site of this period. Consequently, although 2 sites (Spong Hill and Billingford) have been scored as being of National significance, in both cases this is due to later activity at the site. Similarly, of the 5 sites given a Regional significance score, only the flint-working site at Attlebridge (NHER 17217) encompasses Mesolithic finds or features warranting this high score.

***Table 7.4. Mesolithic sites in Sub-Unit C***

| Total no. Mesolithic sites (exclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **16** | 0.3 | 0 | 0.0 | 2 | <0.1 | 5 | 0.1 | 9 | 0.1 |

## 7.5. Neolithic (4000 BC – 2351 BC)

109 sites of possible, probable or known Neolithic date have been recorded within the Sub-Unit. A substantial proportion of these are dated only generally to the prehistoric period, but they are included in Table 6.5, Figure 7.4 and the discussion below as, unlike for the Palaeolithic and Mesolithic periods, there is a strong possibility that at least some are of Neolithic date. The resulting site density of 1.7 Neolithic (or possibly Neolithic) sites per sq km is considerably more than the average number of sites for this period (1.2 per sq km across the county as a whole). Also, notably higher site densities are recorded on each of the Sub-Unit's dominant superficial geological groups: diamicton (2.8 sites per sq km), glacial/glaciofluvial sand and gravel (2.7 sites per sq km), and River Valley deposits (2.3 sites per sq km). This may reflect a genuine preference for these geologies but, more significantly, it also reflects a preference for valley-side or edge locations, where often several different geologies are exposed as narrow bands running along the slope. More in-depth analysis of the location and extent of each site would be required to test the validity of the apparent preferences evident from these figures, but it can be suggested that while they may in part reflect a genuine archaeological pattern (at least of discovery and recording, if not of past activity), this is almost certainly more muted than the figures might superficially imply. In the overall distribution there is a notable relative scarcity of Neolithic sites recorded in the central and northern parts of the Sub-Unit. The reasons for this are unclear, but the concentration of large-scale excavations in the west of the Sub-Unit, in response to extraction of the Plateau Gravels in recent decades, may be a factor.

9 Neolithic sites within the Sub-Unit have been scored as being of National significance. However, at only 2 sites is this high significance score warranted by remains of Neolithic date; at the remainder the site's significance is primarily dependent on evidence of later activity. At Spong Hill (NHER 1012), an Early Neolithic (and later) occupation site was identified during the extensive excavations carried out at this important multi-period site. Numerous pits were found, filled with occupation debris, and cereal cultivation was

indicated by possible quern fragments and grain impressions in pottery. Arrangements of post holes may have reflected the presence of roofed structures, a rare find for this period and region. The site occupies a relatively elevated position, on a spur of land overlooking the confluence of the Black Water and Scarning rivers (both tributaries of the Wensum). It overlies superficial glacial sand and gravel. At Weston Longville a possible low, oval, earthwork mound was identified by the NMP lying below the remains of a much more prominent Bronze Age round barrow (NHER 7718, SM 129). This may be a Neolithic precursor to the round barrow; such an arrangement of earlier and later funerary monuments is known from elsewhere in Norfolk, such as Howe's Hill, Sheringham (NHER 6292, SM 115).

28 Neolithic sites are recorded as being of Regional significance. These are predominantly located in the west of the Sub-Unit, clustered around minor watercourses, and in the central area, following the broad valley of the River Wensum. The majority (68%) are Monument sites, representing a broad range of site types, but only a proportion contain elements known to be of specific Neolithic date. The latter include a number of possible ceremonial and/or funerary monuments, chief amongst which is a possible hengiform monument or large elaborate barrow at Great Witchingham (NHER 1018). This complex site is visible as cropmarks, in a relatively low-lying position on the river terrace deposits, at the confluence of the Wensum with a tributary to its north. It is surrounded by a number of other possibly funerary and/or ceremonial features, including 1 (NHER 50706) of suggested Late Neolithic or Early Bronze Age date. A series of superimposed Neolithic hearths were discovered in a gravel quarry at Pockthorpe (Sparham; NHER 3023), further up the Wensum, in proximity to a number of Bronze Age round barrows. Because of the overlap between the two Study Areas, the cluster of multi-period sites excavated at Longham, described in Chapter 6, which include evidence of Neolithic activity, also fall within this group (see Section 6.5). None of the Find Spot sites are of particular significance for this period; most derive their significance from their evidence for later activity, or from their proximity to more substantial sites.

The 71 sites of Local significance are notably clustered towards the western and eastern ends of the Sub-Unit. Again, the reasons for this are not entirely clear, but it was a pattern that was also noted in Sub-Unit B (Section 6.5). Most (82%) are Find Spots, both of material of Neolithic date and of finds dated more broadly to the prehistoric period. Some represent stray finds, whilst others reflect more formal archaeological investigation, usually in advance of aggregate extraction or other development.

| *Table 7.5. Neolithic sites in Sub-Unit C* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total no. Neolithic sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
| **109** | 1.7 | 0 | 0.0 | 9 | 0.1 | 28 | 0.4 | 71 | 1.1 |

## 7.6. Bronze Age (2350 BC – 701 BC)

178 sites of potential or known Bronze Age date have been recorded in the Sub-Unit. **The average site density within the Sub-Unit of 2.8 sites per sq km is very high**, when compared to the 1.9 recorded within Sub-Unit A, 2.0 recorded within Sub-Unit B, 2.1 in Sub-Unit D, and 1.4 recorded across the county as a whole (see too Section 9.1.2). As for the Neolithic (Section 7.5 above), the site densities are even higher on each of the Sub-Unit's dominant superficial geological groups: diamicton (3.9 sites per sq km), glacial/glaciofluvial sand and gravel (3.7 sites per sq km), and River Valley deposits (4.0 sites per sq km). While this again reflects the fact that many of the sites extend across several different geological deposits, where they are exposed in bands along the sides of the valleys, it is clear from a visual assessment of the distribution that a greater number are confined solely to the River Valley deposits. This is borne out by the figures for sites lying entirely within the limits of these deposits, which comprise 49% of the Bronze Age sites but only 39% of the Neolithic. Similarly, the apparently high site density figures on the diamicton are drastically reduced when these figures are looked at, to only 0.6 sites per sq km for the Bronze Age. This is in part, however, due to the very limited occurrences of this deposit within the Sub-Unit, which are not large enough to enclose the full extent of any sizeable sites; an assessment of a larger area of this geology would be required to gauge the degree to which it was utilised in this period, but this lies beyond the scope of the present study.

The overall distribution of Bronze Age sites within the Sub-Unit again indicates a preference for locations within or on the edge of both minor and major river valleys (Fig. 7.5). The sites are concentrated in the west of the Sub-Unit, which has seen the greatest amount of fieldwork, and along the Wensum Valley towards its eastern end. Many of the latter are sites mapped by the NMP, and this reflects the lighter soils of this area, which are more productive for cropmark formation (see Section 7.13 below). The 13 sites of National significance follow this pattern. Only 8 of these encompass significant remains of Bronze Age date, however, and several of these would be assigned a lower score if judged on their remains of this period alone. 5 Nationally significant Bronze Age sites are associated with funerary monuments; they comprise the large surviving round barrow at The Warren, Weston Longville (NHER 7718, already described for the Neolithic), and a second surviving round barrow at Morton on the Hill (NHER 7731), both of which are Scheduled (SM 129 & 364 respectively). The latter site lies in close proximity to the cropmarks of three ring

ditches (NHER 45361), presumably the remains of an associated cemetery, which have also been given a National significance score as a consequence (but also in part because they are also co-located with the site of an Early Saxon inhumation cemetery, from which Bronze Age finds have also been recovered, NHER 29344). These funerary sites form part of a larger group which extends for nearly 2 km along the edge of the floor of the Wensum Valley; the other elements are predominantly of Regional significance and are described below. More broadly, they form part of a band of round barrows that traverses Norfolk's Boulder Clay Plateau, following a strip of lighter soils and also (presumably not coincidentally) the Nar and Wensum valleys (Ashwin 1996, 50, fig. 5). Other Nationally significant sites include a group of three round barrows (NHER 50704) at the multi-period site of Spong Hill, where a Late Neolithic to Early Bronze Age occupation site was also identified.

The 54 sites of Regional significance are spread rather more evenly throughout the Sub-Unit. There is a notable 'string' of Monument sites running along the edge of the floor of the Wensum Valley, from Foxford (Great Witchingham), almost as far as Attlebridge in the eastern part of the Sub-Unit. As mentioned above, these relate to several extensive, and probably inter-related, groups of prehistoric ceremonial and/or funerary monuments, starting in the northwest with the probable hengiform monument and surrounding features at Foxford (NHER 1018 and related), which has already been described for the Neolithic. Moving southeast down the valley, crossing its confluence with a tributary joining it from the north at Lenwade, one next encounters a group of barrows and related monuments, many now destroyed by quarrying, at the parish boundary between Weston Longville and Morton on the Hill. This includes the large Scheduled barrow at The Warren, which is of National significance (see above). Further down the valley are the surviving barrow and nearby ring ditches at Morton, which are again of National significance and described above, with a further group of ring ditches (NHER 50649) on the valley floor below them. While many of the features themselves had been recognised previously (see Lawson 1981, for example), the extent of this broad group, and the juxtaposition of the Foxford hengiform site, was not fully recognised prior to the NMP survey undertaken as part of this project (Albone *et al*. 2008). The Foxford site lies on the north side of the Wensum and to the southwest of the tributary feeding into it from the north, while the barrows are confined to the south side of the Wensum and to the east of the tributary. A further group of barrows is recorded as having existed at Sparham Pools (NHER 3021–2 & 50645), upriver from the Foxford site, suggesting that this pattern of clusters of such sites following the edge of the valley floor was once even more extensive; these barrows, however, have been destroyed by gravel extraction.

Bronze Age sites of Local significance are also distributed widely throughout the Sub-Unit, but there is again a concentration in the west and, to a lesser extent, the north. Some small

clusters stand out, such as the group of mainly fieldwalking and metal-detecting finds at Hoe and Gressenhall (not coincidentally, close to the offices of Norfolk Landscape Archaeology, who carried out some of the work) and a second cluster at Beetley to the northeast, where a group of 'pot boiler' sites has been recorded. The latter are a particular feature of the Sub-Unit for this period, although the precise date, identification and interpretation of such sites is rarely certain. 25 such sites, indexed in the NHER as 'BURNT MOUND', have been identified amongst the Bronze Age sites within Sub-Unit C, compared to 0 in Sub-Unit A and 9 in Sub-Unit B (most of which correlate with sites that also fall within Sub-Unit C); 5 are recorded within Sub-Unit D, all within the Nar Valley. An association with watercourses is typical of such sites, which are usually thought to be the product of heating rocks for warming water for 'sauna baths' and/or cooking (although alternative interpretations have also been put forward). When excavated, they are often found to be accompanied by a trough or pit, as was the case with the example excavated at Northwold, on the Norfolk Fen Edge (Crowson 2004). Such sites are recorded widely across Norfolk (713 records in total), but with concentrations along the Fen Edge (particularly towards the southwest; see Silvester 1991, fig. 49) and on the Boulder Clay Plateau, and a marked avoidance (apparently) of the lower slopes of the broader river valleys, the Broads and the Fens; the latter pattern may be at least as much a product of the processes leading to the discovery and recording of such sites, as it is a pattern of past activity. The Sub-Unit C sites conform to this pattern, being entirely located in the west of the Sub-Unit, along the edges of the Scarning River and Black Water tributaries of the Wensum. Many, however, including the group at Beetley, are known only from surface finds or verbal communications from members of the public, and further investigation would be required to confirm their existence, date and character.

***Table 7.6. Bronze Age sites in Sub-Unit C***

| **Total no. Bronze Age sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| **178** | 2.8 | 0 | 0 | 13 | 0.2 | 54 | 0.8 | 106 | 1.7 |

## 7.7. Iron Age (800 BC – AD 42)

129 sites of possible Iron Age date have been recorded within the Sub-Unit (Table 7.7, Fig. 7.6). **The resulting site density of 2.0 sites per sq km is significantly higher than that recorded in the contiguous Sub-Unit B** (1.5 Iron Age sites per sq km) **and in the county as a whole** (1.1 sites per sq km). This high site density may in part reflect the fact that the NMP has been completed for 86% of Sub-Unit C, compared to only 28% of the county, but does not explain the considerable variation between Sub-Unit C and Sub-Unit B, 91% of the latter having been completed by the NMP. In the analysis of the NMP results it was

noted that in contrast to the findings of the NHER synthesis — which was undertaken prior to the NMP survey and which found most evidence of Iron Age settlement, *etc.*, in the west of the Sub-Unit — almost all sites of this period mapped by the NMP were in the centre and east of Sub-Units B and C (Albone *et al*. 2008). The 'upland' clays and gravels of the west of the block, which form a greater proportion of Sub-Unit B, were relatively unproductive in terms of cropmarks and other NMP sites. The higher number of Iron Age sites recorded in Sub-Unit C may therefore in part reflect where the lighter soils of the river valleys have led to a greater number of sites being recorded from aerial photography. Nevertheless, it is the western part of both Sub-Units that has seen the greatest concentration of fieldwork in recent years (in many cases in response to aggregate extraction); this has led to the apparent concentration of sites of all periods in this area.

Iron Age sites are spread widely across the Sub-Unit, although there is a notable scarcity in its northernmost extension along the Wensum Valley. There is an apparent concentration of sites along the river and its tributaries, but this may be a reflection of the restricted topography of much of the Sub-Unit; at its western end, where a larger proportion of the dissected uplands is covered, a greater number of 'upland' sites are recorded. As for the Bronze Age, there is no clear preference for any of the dominant superficial geologies, with 3.0 sites per sq km recorded on the combined River Valley deposits, 3.4 on the glacial/glaciofluvial sand and gravel, and 3.8 on the diamicton. Again as for the Bronze Age, if the figures for sites found entirely on a particular geology are looked at, the site density on the diamicton drops to 0.2, but that on the River Valley deposits to only 0.9. As has already been stated (Section 7.6), the factors affecting the numbers of sites recorded and their distribution are numerous and complex; further investigation would certainly be repaid, but is beyond the scope of the current study.

13 Iron Age sites are of National significance, most lying in the western half of the Sub-Unit. One is the Roman road known as the 'Fen Causeway' (NHER 2796), the known or projected line of which runs eastnortheast-westsouthwest across the western half of the Sub-Unit. Like other Roman roads, the 'Fen Causeway' may have formalised one or more earlier trackways, and therefore an Iron Age date for some parts of it is possible. 5 sites relate to pre-Roman activity at or in the vicinity of Swanton Morley Roman fort (NHER 17486) and Billingford Roman small town (NHER 7206), accounting for the small cluster of sites to the south of the 'Fen Causeway', west of the centre of the Sub-Unit. Most relate to Iron Age (or non-specific 'prehistoric') finds or features identified at sites where the high significance score derives from more substantial remains dating to later periods. At the excavated multi-period site at Spong Hill (NHER 1012), however, an enclosure and other features relating to occupation in the Middle to Late Iron Age was identified.

The 38 sites of Regional significance are spread more widely throughout the Sub-Unit. As for Sub-Unit B (Section 6.7), they include the multi-period site excavated in advance of aggregate extraction at Longham (NHER 13025), where an extensive unenclosed settlement and a possible square mortuary enclosure or barrow have been identified. At least two other small, square, ditched enclosures with a possible funerary function fall within this group of Regionally significant sites (NHER 50650–1); they lie a little over 400m apart at Morton on the Hill, both in close proximity to the remains of Bronze Age round barrows. As for sites of National significance (see above), many derive their high significance score from evidence of earlier or later activity at the same site.

Sites of Local significance are also found widely across the Sub-Unit, with the exception of its northern extension along the Wensum Valley towards Guist. There appears to be a higher proportion of Find Spot sites in the west, and Monument sites in the centre and east; the latter distribution reflects the lighter soils of the Wensum Valley, which are more productive of cropmarks and therefore of NMP sites, which are almost invariably recorded as 'Monuments'. As for the Bronze Age, there is a cluster of sites at Gressenhall and Hoe, but no other striking clusters or patterns are apparent.

***Table 7.7. Iron Age sites in Sub-Unit C***

| Total no. Iron Age sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **129** | 2.0 | 0 | 0.0 | 13 | 0.2 | 38 | 0.6 | 77 | 1.2 |

## 7.8. Roman (AD 43 – AD 409)

171 sites of known or potential Roman date have been recorded in Sub-Unit C. This equates to a site density of 2.7 sites per sq km (Table 7.8), the highest density for this period in any of the Sub-Units, and significantly higher than the 1.5 sites per sq km recorded across the county as a whole. This in part reflects the presence of several substantial Roman period sites within the Sub-Unit, namely the 'Fen Causeway' Roman road (NHER 2796), Swanton Morley fort (NHER 17486) and Billingford small town (NHER 7206). Such sites often encompass multiple records and can also provide a relative date for other sites and features in the vicinity, thus resulting in a greater number of sites of this period being recorded.

Roman sites occur widely across the Sub-Unit, but there is a dense cluster in the northwest of its central portion, around the road, fort and town at Billingford and Swanton Morley (Fig. 7.7). The sites again appear to be relatively evenly distributed across the dominant superficial geologies, with the highest site density (5.2 per sq km) recorded on the

diamicton and the lowest (3.7 per sq km) recorded on the River Valley deposits. Again, the finer nuances of this distribution warrant further investigation, but the variation in the site density figures appears great enough to suggest a move away from the lower-lying slopes of the river valleys, at least in terms of the recorded evidence.

19 Roman sites within the Sub-Unit have been scored as being of National significance (compare Sub-Unit B, where only 6 such sites were given this significance score). These include the 'Fen Causeway', Swanton Morley fort and Billingford small town which, together with associated sites in their vicinity, account for the cluster of Nationally significant sites to the west of the centre of the Sub-Unit. The remainder are almost entirely located further to the west; only an Early Saxon inhumation cemetery at Morton on the Hill (NHER 29344), where Roman finds have also been recovered, is located in the eastern part of the Sub-Unit. Like the site at Morton, most of those in the west of the Sub-Unit derive their high significance score from other periods of activity at the site. An exception is the multi-period site at Spong Hill (NHER 1012), where a Roman farmstead and pottery kiln were excavated, and evidence of ironworking was also found. The only isolated findspot to be given a National significance score is the site at Billingford (in the modern village but not far from the Roman small town) from which a Roman amulet or talisman was recovered (NHER 39283), consisting of a tablet of gold sheet bearing a mixture of greek and latin characters and magic symbols. Such objects, which were worn as a protective charm, are very rare: the Billingford example is only the fourth to be found in the country.

Sites of Regional significance are distributed rather sporadically across the Sub-Unit. There is again a clear clustering around the substantial Roman sites at Billingford and Swanton Morley. From here, a 'string' of sites follows both sides of the Wensum Valley to the east, but to the west there is a notable gap around the Scarning River, before Regionally significant sites are again recorded at the westernmost end of the Sub-Unit. As for Sub-Unit B (Section 6.8), the group includes a number of possible Roman roads, or fragments of roads (NHER 14228, 50601, 51069 & 50909). Several buildings, settlements or farmsteads are also recorded (NHER 4378, 30600, 50747); they include a site excavated at Attlebridge (NHER 17217), in the east of the Sub-Unit, where a ring ditch dating to the 1st and 2nd centuries AD served as the foundation trench for a sequence of circular timber structures. (The site was later the location for a Late Saxon rural settlement.) The group also includes several substantial multi-period assemblages of metal-detected and fieldwalking finds; these are likely to reflect the presence of sites of some significance, the precise date and nature of which are currently unclear.

The 104 sites with a Local significance score are distributed much more evenly across the Sub-Unit, with only a slight concentration around Billingford and the area to its southeast. The majority (67%) are Find Spot sites, no doubt reflecting the better survival and greater

visibility of Roman material in the archaeological record. They include several accounts of Roman and other material being dredged from the floor of the Wensum Valley, in the vicinity of Billingford and Swanton Morley fort (which face each other across the river's flood-plain), and where the 'Fen Causeway' negotiates a major confluence in the river. NHER 2997, for example, records part of a Roman cauldron, together with a copper alloy bowl, animal bone and pottery, found in 1947. Another of these sites, NHER 2984, relates to a possible bridge between the two sites, as well as an extremely rare decorated Roman helmet and visor (from a second helmet), and has been assessed as being of National significance.

***Table 7.8. Roman sites in Sub-Unit C***

| Total no. Roman sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **171** | 2.7 | 0 | 0.0 | 19 | 0.3 | 45 | 0.7 | 104 | 1.6 |

## 7.9. Saxon (AD 410 – AD 1065)

90 sites of Saxon date have been recorded in the Sub-Unit, equating to a density of 1.4 sites per sq km. This compares to a density of only 1.1 Saxon sites per sq km across the county as a whole, suggesting that the Sub-Unit contains an above-average density of sites for this period. This density is also notably higher than in the contiguous Sub-Unit B, where for this period only 1.0 sites per sq km are recorded. The sites are distributed quite widely across the Sub-Unit, but there are several apparent lacunae, for example to the north of North Elmham, along the Scarning River southeast of Beetley, and along the Wensum between Easthaugh and Great Witchingham (Fig. 7.8). The most notable cluster forms a band across the northern part of the western half of the Sub-Unit; this reflects the greater amount of fieldwork that has taken place here, particularly within the parish of North Elmham, which is notable for its Saxon remains, and around Billingford, where Saxon finds, features and cropmarks have been identified in the vicinity of the Roman town. The limits of the Sub-Unit make it difficult to assess the site distribution in terms of topography, but any relationship with watercourses is not particularly striking, and may be less strong than in preceding periods. There are notably few isolated sites, as most occur in clusters or groups of two or more; the exceptions include sites like NHER 2920 at Gressenhall village, where a single sherd of Late Saxon Thetford ware was recovered, and NHER 36591, a multi-period finds scatter at Elsing, where Saxon metalwork and pottery has been found. The relationship with the Sub-Unit's dominant superficial geologies is also hard to interpret; the highest site density (3.3 per sq km) is again recorded on the diamicton, and the lowest (2.0 sites per sq km) on the River Valley deposits, but a visual assessment of the distribution indicates that most sites in fact overlie a range of different geological deposits.

Of the 16 sites assessed as being of National significance, 4 are extant churches, Listed as Grade I or II*. St Margaret's, Worthing (NHER 2829) and St Mary's, Bylaugh (NHER 3011) possess round western towers, generally dated to the Saxo-Norman period (*e.g.* Heywood 2005). The remaining two churches — St Mary the Virgin, East Bilney (NHER 2828) and St Andrew's, Longham (NHER 7277) — are both of medieval date but Saxon finds have been recovered in their immediate vicinity. **The Sub-Unit is remarkable for containing a large number of substantial and highly significant sites of certain or near-certain Saxon date**, many of which have been excavated. The most important sites or groups of sites are: the Early Saxon cemetery (NHER 25848), Middle and Late Saxon settlement (NHER 1013; one of the most extensively excavated in the country) and Late Saxon cathedral (NHER 1014) at North Elmham; the Early Saxon cemetery (the largest in England to have been entirely excavated) and settlement at Spong Hill (NHER 1012); the Early Saxon cemetery and settlement at Roosting Hills (Beetley Quarry; NHER 37159); a Middle Saxon to medieval settlement known from surface finds at Longham (NHER 7269); and an oval cropmark enclosure at Gressenhall which probably marks the site of a Late Saxon manor, comparable to Goltho in Lincolnshire (NHER 25989). All of these sites lie in the west of the Sub-Unit; those further to the east comprise the Roman fort at Swanton Morley (NHER 17486) and Roman small town at Billingford (NHER 7206), both of which primarily derive their significance from evidence of pre-Saxon activity (although Early Saxon buildings and Middle Saxon metalworking was also identified at Billingford), St Mary's church at Bylaugh (NHER 3011), and an Early Saxon cemetery at Morton on the Hill (NHER 29344). The latter is the sole Saxon site of National significance to be recorded in the east of the Sub-Unit. The reasons for this distribution may lie as much in the processes that lead to the discovery and further investigation of particular sites, as much as it does to genuine patterns of past activity.

27 sites are scored as being of Regional significance. These are more evenly spread throughout the Sub-Unit, but a concentration towards its western end is still apparent. There is a cluster, including several cropmark sites, around the Roman small town at Billingford, (see above). Notable sites include a Late Saxon rural settlement excavated at Attlebridge (NHER 17217), North Elmham Great Wood, an area of ancient woodland believed to have been in existence in the Saxon period (NHER 1087), and five Early Saxon brooches (perhaps indicating a cemetery?) recovered from a field at Billingford (NHER 17229).

The sites of Local significance again show a concentration towards the western end of the Sub-Unit, and in particular to the band running east-west across its northwestern portion (described above). The vast majority (87%) are Find Spot sites, sometimes recorded as isolated finds, but more often part of a larger, multi-period assemblage. The 6 Monument

sites predominantly comprise cropmark sites where a Saxon date is possible for some or all of the features.

***Table 7.9. Saxon sites in Sub-Unit C***

| Total no. Saxon sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **90** | 1.4 | 0 | 0.0 | 16 | 0.3 | 27 | 0.4 | 46 | 0.7 |

## 7.10. Medieval (AD 1066 – AD 1539)

261 sites of known, probable or possible medieval date have been recorded within the Sub-Unit, substantially more than for any preceding period. This equates to a density of 4.1 sites per sq km, well above the average of 3.2 medieval (or possibly medieval) sites per sq km recorded across the county overall. It is comparable to that recorded within Sub-Unit A, on the Crag to the north of Norwich, which was particularly productive of medieval sites (Section 5.10). The reasons for this high site density are not entirely clear, but it may reflect the clustering of medieval and later settlement along the river valleys.

The site distribution is similar to that seen in the Saxon period, in that the sites are spread widely across the Sub-Unit but with several apparent gaps, to the north of North Elmham for example (Fig. 7.9). There is again a concentration of sites in the west of the Sub-Unit, and a dense band running east-west across the north side of this area. There are smaller clusters around historic settlements that still exist, such as North Elmham, and areas like Billingford that have seen intensive archaeological investigation, often in advance of aggregate extraction (or the threat of it). A substantial proportion of the sites (30%) have been newly recorded or amended by the NMP. The relationship between site distribution and the Sub-Unit's dominant superficial geologies is again difficult to interpret. There is relatively little variation between the three main types or groups, with a site density of 7.1 per sq km recorded on the diamicton and 5.8 on the River Valley deposits. A visual assessment again indicates that many sites straddle two or more of these deposits, although with a greater number of sites (mainly Find Spots and Buildings) recorded as point data, this is likely to be a smaller proportion than in earlier periods. A slight preference for valley and valley-side positions, on the valley gravels or superficial sands and gravels, was noted amongst the NMP sites for Sub-Units B and C, and this would be borne out by the higher site density figures within Sub-Unit C (Albone *et al*. 2008, section 4.7.2).

27 medieval sites within the Sub-Unit have been scored as being of National significance. Of these, 12 are (or encompass) Grade I or II* Listed Buildings, 9 of which are surviving churches. The others are Great Witchingham Hall (NHER 7740), a post medieval Great

House, which incorporates some medieval architectural fragments; a house at North Elmham (NHER 16283), the earliest section of which dates from the 15th century; and the 12th-century chapel and later fortified manor at North Elmham (NHER 1014, SM 96), built on the site of a Late Saxon cathedral. Several of the other Nationally significant sites derive their high score from earlier activity at the same site. Notable exceptions include a moated manorial site at Beetley (NHER 2785, SM 35063) and Little Bittering DMV (NHER 7266, SM 386), both of which incorporate surviving earthworks which are Scheduled.

50 sites have been scored as being of Regional significance. 8 incorporate Listed Buildings, mostly post medieval structures built on earlier sites, but including the ruins of a medieval Benedictine priory at Lyng, known as St Edmund's Chapel (NHER 3048). Of the 30 Monument sites with a Regional significance score, 7 incorporate a moat or possible moated element, and at least 5 relate to other forms of settlement, including the possible sites of Morton/Helmingham and Bylaugh deserted medieval villages (NHER 7737 & 11524 respectively), and the site of a moated hospice at Beck Hall, Billingford (NHER 51208), where substantial earthworks still survive. The remaining sites are multi-period Find Spots, some (such as NHER 36591 at Elsing) incorporating a considerable proportion of medieval material. The ways in which waste material was disposed of during this period, however, for example through manuring, makes the significance of such assemblages difficult to gauge; it is often less than would be the case for a similar assemblage from an earlier period.

157 sites have been scored as being of Local significance. Approximately half are Find Spots; 2 are Buildings. Monument sites include the possible site of Morton church (NHER 7741) and of a hermitage sited on the Wensum's flood-plain between Morton Bridge and Attle Bridge (NHER 7727); both sites are uncertain.

***Table 7.10. Medieval sites in Sub-Unit C***

| Total no. Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **261** | 4.1 | 0 | 0.0 | 27 | 0.4 | 50 | 0.8 | 157 | 2.5 |

## 7.11. Post Medieval (AD 1540 – AD 1900)

347 sites of known or possible post medieval date have been recorded within the Sub-Unit. This equates to a site density of 5.4 per sq km (Table 7.11), considerably higher than the average of 4.3 sites per sq km for the county as a whole and 4.4 for the contiguous Sub-Unit, Sub-Unit B (Section 6.11). As for the medieval period (see Section 7.10 above), the reasons for high numbers of sites being recorded for this period are not entirely clear. 30% of the records (104 in total) relate to Buildings (*i.e.* undesignated) and Listed Buildings, a

higher proportion than in either Sub-Unit A or Sub-Unit B. Therefore the fact that the Sub-Unit encompasses several historic villages, such as North Elmham, Billingford and Lenwade, is almost certainly a factor.

Post medieval sites are distributed widely throughout the Sub-Unit, with very few areas that are apparently 'blank' (Fig. 7.10). As for Sub-Unit B, the distribution is dominated by several very extensive sites, including Elmham Park (NHER 30437), Bylaugh Park (NHER 30496), Weston Park (NHER 33733), Gressenhall Park (NHER 50576) and Swanton Morley airfield (which is of World War Two date but includes a post medieval structure in its record, NHER 2830). The historic settlements already described, and parishes that have been the focus of intensive archaeological investigation, form distinct clusters within the distribution, as at North Elmham, Gressenhall, and Attlebridge. The site distribution is too dense, and the limits of the Sub-Unit too restricted, for any clear idea as to their topographic pattern to be formed. It was noted in the NHER synthesis that the distribution of post medieval sites in Sub-Units B and C corresponded closely with the modern settlement pattern. The site density figures for the 3 dominant superficial geologies, which range from 7.4 sites per sq km (on the glacial/glaciofluvial sands and gravels) to 8.6 per sq km (on the diamicton), suggest a fairly even spread of sites across the different geological deposits.

25 sites are recorded as being of National significance. 13 of these are associated with a Grade I or II* Listed Building designation: 8 surviving churches, 2 halls, 1 smaller house, 1 model farm, and the predominantly Saxon and medieval site of North Elmham cathedral, where post medieval finds have been recovered. The 19th-century animal pound at North Elmham (NHER 14125) is also Listed (Grade II), as well as being Scheduled (SM 35076). As with North Elmham cathedral, many of the other sites derive their high significance score primarily from remains of earlier — or, in the case of Swanton Morley airfield, later — date. They include, however, the site of Little Bittering DMV (NHER 7266, SM 386), a settlement which appears to have survived into the early post medieval period (Cushion & Davison 2003, 53).

The 112 sites given a Regional significance score also include a large number (62) of Listed and undesignated Building records. The 38 Monument sites encompass a wide variety of site types and forms, including the former earthworks (visible on aerial photographs) of water meadows at Billingford (NHER 50893), a walled garden at Great Witchingham Hall (NHER 42851), Elmham Park (NHER 30437), the site of a 19th to 20th-century tannery (NHER 15386), the earthworks and cropmarks of a possible medieval to post medieval settlement at Longham (NHER 11696), the site of a former Naval Training School (NHER 2934), and the 3 railway lines that cut through the Sub-Unit (NHER 13584 &

13587–8). The 12 Find Spot sites are all multi-period assemblages which primarily derive their significance from earlier material and/or their association with more substantial sites. The 197 sites of Local significance again include a proportion (but only 15%) of Listed and non-Listed Building records. Find Spot sites are far more numerous, comprising 30% of the total; these are again predominantly multi-period assemblages, of negligible significance for this particular period. The 99 Monument sites again encompass a wide variety of types and forms, including a considerable number of medieval to post medieval field boundaries and other features recorded by the NMP.

***Table 7.11. Post Medieval sites in Sub-Unit C***

| Total no. Post Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **347** | 5.4 | 0 | 0.0 | 25 | 0.4 | 112 | 1.8 | 187 | 2.9 |

## 7.12. Modern (AD 1901 – AD 2050)

175 sites dating to the 20th–21st centuries are recorded within Sub-Unit C. This relatively low number when compared with post medieval sites reflects the understandably selective recording of modern sites, and the complete absence of any records of modern Find Spot sites. The resulting site density of 2.7 per sq km, however, is substantially higher than for the county as a whole, where 1.8 modern sites per sq km is the average. Together with the contiguous Plateau Gravels Sub-Unit (Sub-Unit B, see Section 6.12), it provides a notable contrast to Sub-Unit A where only 1.6 sites per sq km are recorded for this period (Section 5.12). It is likely to reflect the completion of the NMP survey — which consistently records high numbers of 20th-century military sites, often from contemporary or near-contemporary photographs — for 86% of Sub-Unit C but only 49% of Sub-Unit A, and only 28% of the entire county. A considerable number of the Sub-Unit C sites (nearly 60%) are buildings, both Listed and undesignated (Fig. 7.11); this is a higher proportion than in either Sub-Unit A or Sub-Unit B, but is close to the figure of 63% for the county as a whole.

Approximately 39 sites (22% of the total) relate to World War One, World War Two and Cold War military activity. The majority are of World War Two date; 3 possibly date from World War One and a single Cold War site (an ROC post, NHER 18080) has been recorded. The most significant sites are Swanton Morley airfield (NHER 2830), which incorporates three surviving World War Two Pickett-Hamilton forts, which are Scheduled (NHER 51063–5, SM 30607), as well as numerous other ancillary defences and structures; the World War Two RAF headquarters at Bylaugh Hall (NHER 44346), substantial portions of which may still survive; and the Cold War ROC post at Great Witchingham (NHER 18080), which is of a type unique in Norfolk and was identified as being of national significance by the Monuments Protection Programme (English Heritage 2001). In terms of

non-military archaeology, all of the sites recorded in fact date from earlier periods, but have persisted in use, often up to the present day.

The sites are distributed throughout the Sub-Unit, but a strong correlation with modern settlements (*e.g.* North Elmham, East Bilney, Lenwade) is clearly evident. The site density figures for specific geologies (or geological groups) are unusual, in that this is the only period, other than the Palaeolithic, Mesolithic and Bronze Age in which a higher density of sites is recorded on the River Valley deposits than the diamicton. The reasons for this are unclear. The location of modern settlement and transport links in the river valleys may be a factor, as may the use of the Wensum as a stop line in World War Two (Kent 1988, 191). In terms of the latter, however, only 44% of the recorded 20th-century military sites are located on River Valley deposits, and the World War Two stop line in any case appears to have comprised very few pillboxes and similar defences, most of the bridges across the Wensum being obstructed by anti-tank blocks (*ibid.*). 3 (or possibly 4) aircraft crash sites are recorded within the Sub-Unit, 2 of which are known to be of World War Two date.

***Table 7.12. Modern sites in Sub-Unit C***

| Total no. Modern sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **175** | 2.7 | 0 | 0 | 26 | 0.4 | 74 | 1.2 | 73 | 1.1 |

## 7.13. Survival and Visibility

Sites recorded as surviving as historic landscapes and major or minor earthworks are illustrated in Figure 7.12 and tabulated below, cross-referenced with the Sub-Unit's dominant superficial geologies (Table 7.13). The distribution map shows a landscape populated relatively densely by well-preserved sites, even without the inclusion of surviving buildings and structures, which are recorded at 135 sites within the Sub-Unit. Greater numbers of earthwork and 'historic landscape' sites along the major river valleys of the east and centre of the Sub-Unit would suggest preferential survival in these areas, contrasting with a scarcity of such sites on the higher ground of the west of the Sub-Unit. The overall densities recorded for each site type are slightly higher than in the contiguous Plateau Gravels Sub-Unit (Sub-Unit B, see Section 6.13). A more substantial difference is apparent when the densities recorded on different geologies (or geological groups) are looked at: specifically, the density of major and minor earthwork sites on the River Valley deposits is significantly higher than on either the diamicton or the glacial/glaciofluvial sands and gravels, in both Sub-Unit C and Sub-Unit B. This presumably reflects the unsuitability of the lower parts of the river valleys for arable agriculture. 7 of the earthwork and 'historic landscape' sites are scored as being of National significance (6 are wholly or partially Scheduled), 30 have been assessed as being Regionally significant, while 43 are of Local significance.

Cropmarks are also recorded widely across the Sub-Unit, but their distribution is very uneven, with numerous clusters and gaps evident. The site density across the three dominant superficial geologies is relatively even, suggesting that other factors, such as vegetation, precise soil type, and photographic coverage, may be more significant factors in their distribution. It is also the case that certain types of site, specifically complex, multi-phase sites (particularly those with excavation data allowing detailed phasing), and sites such as barrow cemeteries which comprise multiple elements, result in greater numbers of records, as each phase or element requires individual as well as collective recording. This accounts for some of the apparent clusters, including those around the barrow cemeteries at Morton on the Hill and the excavated Roman small town at Billingford. Overall, the density of cropmark sites is fairly high. It is notably higher than the density recorded in the contiguous Sub-Unit, Sub-Unit B (Section 6.13), particularly when specific geological deposits are looked at. The figures on each of the dominant superficial geologies are comparable to those recorded in the portion of Sub-Unit A (a particularly 'busy' area) for which NMP was completed (see Section 5.13). The apparently high density of cropmark sites on the diamicton, where the heavy soils would not be expected to be conducive to cropmark formation, warrants further investigation.

***Table 7.13. Survival and visibility of sites in Sub-Unit C relative to geology***

| | **Area (sq km)** | **Historic Land-scapes** | **per sq km** | **Major Earth-works** | **per sq km** | **Minor Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| ***Sub-Unit C*** | ***64.00*** | ***13*** | ***0.2*** | ***17*** | ***0.3*** | ***59*** | ***0.9*** | ***174*** | ***2.7*** |
| | | | | | | | | | |
| S_DIAMICTON | 12.44 | 5 | 0.4 | 3 | 0.2 | 15 | 1.2 | 55 | 4.4 |
| S_SAND_AND_ GRAVEL [glacial & glaciofluvial] | 21.77 | 6 | 0.3 | 8 | 0.4 | 28 | 1.3 | 98 | 4.5 |
| **River Valley deposits combined** | **21.60** | 8 | 0.4 | 12 | 0.6 | 39 | 1.8 | 86 | 4.0 |

## 7.14. Historic Landscape Character (PT)

In common with much of Sub-Unit B, with which it is contiguous, the historic landscape of Sub-Unit C is largely characterised by a mixture of piecemeal enclosure and 20th-century alteration. As for Sub-Unit B, although some piecemeal Parliamentary enclosure is evident, on the whole the historic landscape retains much of the irregular character of early piecemeal enclosure, a trait more apparent on the 1959 Ordnance Survey map than it is today. Some possible factors leading to the survival (or not) of various types of field and enclosure pattern in the modern landscape, including poor soil quality and the enclosure of former woodland, have already been discussed with reference to Sub-Unit B (see Section 6.14).

Sub-Unit C is notable for its areas of parkland and enclosed meadow, distinguishing it from Sub-Unit B, where heathland was once a notable feature. Topography, geology and soils are the principal factors behind this variation, the wide valley floor of the Wensum providing ample space for meadow and pasture, while the gravel terraces above became favoured for the construction of parks and gardens. Although there has been some loss to mineral extraction, for example at Swanton Morley, Beetley and Lyng, enclosed meadow is still a notable feature of the Sub-Unit, with much of the land adjacent to the Wensum and along its tributaries still being used for pasture. While some areas could have been meadow for much of their history, a great deal may be the product of post medieval improvement of former grazing marsh. Such extensive areas of enclosed meadowland are unusual for Norfolk; their presence here may reflect both the breadth of the river valley, and the free-draining sand and gravels of the valley floor, which lend themselves to efficient hay production. The mapping of two probable examples of post medieval water meadows by the NMP, with a third possible site located just outside the Sub-Unit (but within Sub-Unit B; Albone *et al*. 2008), is noteworthy in relation to this landscape type.

While some large estates are found on the Plateau Gravels of Sub-Unit B, designed landscapes surrounding large houses are a particular feature of Sub-Unit C, being found along the Wensum at Bylaugh, Great Witchingham, Weston Longville and Morton on the Hill, and extending outside the Sub Unit eastwards to Taverham and Costessey. This distribution is likely to reflect a number of factors. The scarcity of large estates on the Plateau Gravels and dissected claylands as a whole may be due to their relatively high fertility, their consequently higher land values making acquisition of land for parkland more difficult. The relatively poor soils of the Wensum Valley may have provided landowners with the opportunity to create parkland, if not on the scale of north and west Norfolk, at least with less expense than elsewhere in the central claylands. At the same time, the gravel terraces of the river valleys, which give attractive views down the valley slopes, may have been chosen in preference to the more subdued landscape of the clayland plateau.

Historically the sands and gravels of Sub-Unit C have been a major target for mineral extraction, with much of the Wensum Valley between Elsing and Morton, as well as more isolated portions of both the main river and its tributaries to the west, having been subject to large-scale exploitation. The resultant lakes have frequently been used for leisure activities and as nature reserves, as can be seen at Lakeside Country Club, Lyng, and Sparham Pools. There is no immediate threat of further extensive extraction within the river valleys, due to the environmental significance and vulnerability of such areas. In the long term, however, should further exploitation of their resources be contemplated, **due consideration should be given to the need to safeguard surviving areas of meadowland; these represent an unusual and characteristic historic landscape type**

**for this area, and have already been impacted upon severely by large-scale extraction**.

Within the broader Study Area, which extends across much of central Norfolk from the coast in the north to Breckland in the south, considerable variations in the character of the landscape are apparent. Rather than being a direct reflection of the underlying mineral deposits, it is soil type, and the human response to working those soils, which has shaped the historic landscape. Consequently, as for Sub-Unit B, while the HLC analysis of the River Valleys that make up Sub-Unit C can be usefully extrapolated to those valleys that immediately surround it, it is only poorly representative of the River Gravels Study Area as a whole, across which considerable divergence from the historic landscape types described above might be expected.

## 7.15. The Impact of Extraction

Past extraction has been quite widely distributed across the Sub-Unit. There is a clear concentration east-west through the centre of the Sub-Unit, and along the major river valleys. By contrast, little or no quarrying has been recorded at the eastern end of the Sub-Unit, or where it extends north towards Guist. In the central and eastern parts of the Sub-Unit most of the extraction sites, and particularly those that are relatively extensive, correlate with the location of River Valley deposits, mainly those along the Wensum Valley. To the west, the superficial glacial sands and gravels of the 'uplands' have been exploited, with extraction sited on both the Lowestoft Formation deposits and the glaciofluvial deposits; these are discussed in more detail in the assessment of Sub-Unit B (Section 6.15), as they more properly form part of the Plateau Gravels. Smaller extraction sites, mapped by the NMP from aerial photographs and historic maps, also occur fairly widely within the same central band as extraction as a whole. No particular clusters or patterns are apparent. They occur on a variety of deposits, and some may have been excavated for the extraction of marl, chalk or clay, rather than aggregate.

In all, 89 archaeological sites within Sub-Unit C have some form of mineral extraction recorded as having taken place within them (Table 7.14; Fig. 7.14), a relatively high number even given the large size of the Sub-Unit (compare Sub-Unit B, for example, Section 6.15). The impact that this extraction has had on any given site ranges from total destruction of the archaeological remains — which in some cases may only be known about because of the extraction, and attendant archaeological investigations, taking place — to a small gravel or sand pit located within an archaeological site but not impinging upon any known archaeological features.

Of the 89 sites affected, 10 are recorded as being of National significance, again a very high number compared to other Sub-Units. It is the case, however, that at least 2 of these sites — Spong Hill (NHER 1012) and Billingford Roman town (NHER 7206) — have seen intensive archaeological investigation in response to their destruction (or threatened destruction) by aggregate extraction, and this has contributed to their significance to an extent. 2 of the sites — Little Bittering DMV (NHER 7266) and Swanton Morley airfield (NHER 2830) — are partially Scheduled (SM 386 & 30607 respectively), but in neither case have the Scheduled areas been disturbed. Further to the east, at Sparham near the centre of the Sub-Unit, 2 earthwork round barrows were also Scheduled (NHER 3021–2, SM 266). These have been destroyed (or largely destroyed) by gravel extraction, and have been de-Scheduled as a consequence, although remnants of NHER 3021 may still survive. Further east again, at Weston Longville, the earthworks of another Scheduled round barrow of considerable size (NHER 7718, SM 129) still survive. While the site itself does not appear to have been damaged by extraction, quarrying in the surrounding area means that it is now entirely isolated from its topographic and archaeological context, with other prehistoric funerary monuments known from the vicinity wholly or partially destroyed.

Other sites affected by mineral extraction comprise 20 of Regional significance, and 54 of Local. Of the former, perhaps the most significant are the Bronze Age barrow cemeteries identified along the lower slopes of the Wensum Valley, at Sparham (NHER 3021-2 & 50645) and Weston Longville/Morton on the Hill (NHER 50646) (see above and Section 7.6). Both sites, which form part of a series of prehistoric ceremonial and funerary sites ranged along the valley, have been severely impacted upon by past extraction, with several elements having been entirely destroyed, and those remnants that do survive now detached from their original landscape context. With other sites, such as those at Longham in the west of the county (NHER 7239 & 13025), excavation in advance of aggregate extraction has significantly enhanced our understanding of past activity in the area. It is notable that 5 recorded 'pot boiler' or burnt mound sites (see Section 7.6 above) fall within the limits of Roosting Hill quarry at Beetley (NHER 2803–4 & 2806–8). Although individually such sites are of only Local significance, as a group their significance may have been substantially higher; they have presumably been destroyed.

***Table 7.14. Sites in Sub-Unit C co-located with former and existing extraction sites***
*(as of 6.3.08)*

| Total no. sites | International | National | Regional | Local |
|---|---|---|---|---|
| **89** | 0 | 10 | 20 | 54 |

There are 6 existing quarry sites within the Sub-Unit (some made up of more than one block of land), covering 1.66 sq km in total (Fig. 7.14). These are located at Stanfield (NCC Site No. 193), Beetley (East Bilney, NCC Site No. 275), Beeston with Bittering and Longham (NCC Site No. 32), Hoe (actually in Beetley, NCC Site No. 30), Swanton

Morley/Billingford (NCC Site No. 29) and Lyng (NCC Site No. 25). Very little of the East Bilney quarry (<0.1 sq km) actually falls within the Sub-Unit; a greater proportion lies within Sub-Unit B. These quarries are predominantly located in the centre and west of the Sub-Unit; only Lyng, which is now in 'aftercare', lies further to the east. As has been described in the period sections above, this concentration of recent aggregate extraction in the west of the Sub-Unit has led to a greater amount of archaeological fieldwork being carried out there, and consequently a greater number of sites (and in particular well-dated and well characterised sites of relatively high significance) being recorded there. Within the limits of the Sub-Unit, 32 archaeological sites intersect with these quarries. 5 are of National significance: the 'Fen Causeway' Roman road (NHER 2796), features and finds in the vicinity of Swanton Morley Roman fort (NHER 3003), Billingford Roman small town and associated cropmarks (NHER 7206 & 50976) and Little Bittering DMV (NHER 7266). In the case of Billingford, the site most severely impacted by extraction, it has been the subject of intensive archaeological investigations prior to the destruction of those parts of the town affected. 6 of the sites are of Regional significance; 3 are known from archaeological work undertaken prior to extraction (not in every case as part of planning process), while the remaining 3 were recorded only recently as part of the ALSF NMP survey. The 18 sites of Local significance are for the most part Find Spot sites or Monument sites known from work undertaken prior to extraction taking place; 6, however, are NMP sites, predominantly recording features of unknown or post-Roman date, which may have been destroyed without any other record being made of their existence.

In terms of future extraction, all of the sites in Sub-Unit C proposed in the draft MWDF are located in the west of the Sub-Unit, generally on higher ground and at a slight remove from the river valleys that have historically seen the greatest amount of exploitation (Fig. 7.15). Most but not all of the proposed sites lie adjacent to existing quarries. The proposed areas which to date have been relatively unaffected are part of a large block at Bintree and Billingford (MWDF site refs MIN 103 & 97), and, to a lesser extent, at Spong Hill (North Elmham, Site ref. MIN 21) and Hoe (Site ref. MIN 28). Totalling 1.78 sq km, **should all the proposed sites go ahead this would result in a near 100% increase to the areas of active extraction** (Appendix 2). While this represents only 3% of the total area of the Sub-Unit, or 6% when taken together with the currently active sites, it needs to be considered in light of the extensive historic extraction that has taken place within the river valleys.

Within the Sub-Unit, 24 archaeological sites are recorded as intersecting with one or more of the proposed mineral allocations (Table 7.15, Fig. 7.15). 2 sites are recorded as being of National significance. Swanton Morley airfield (NHER 2830) has already seen some extraction at its southwest corner, adjacent to the proposed site (MWDF Site ref. MIN 22), and only a small proportion the airfield would be affected. (The allocation has since been withdrawn from the MWDF, as planning permission has already been granted, NCC

2008b.) The second site is a multi-period site known from surface finds at Longham, where a Middle Saxon settlement is recorded (NHER 7269). While the bulk of this site also lies outside the proposed minerals allocation (MWDF Site ref. MIN 66), its eastern edge extends into it; further investigation would be required to better characterise this site and define its extent. 3 sites of Regional significance are recorded within the proposed allocations: 2 relate to the Bronze Age round barrow cemetery at Spong Hill (NHER 50705), an outlying element of which (NHER 50702) just falls within the proposed quarry (MWDF Site ref. 21), while the third (NHER 12147) is the cropmark of a fairly small square enclosure, possibly a Roman signal station, but also interpreted as one of a postulated group of Iron Age enclosures known as Thornham-type enclosures. The 17 Locally significant sites include several finds scatters and cropmarks that would benefit from further investigation of their date and character.

***Table 7.15. Sites in Sub-Unit C co-located with proposed minerals allocation sites*** *(as of 6.3.08)*

| Total No. Sites | International | National | Regional | Local |
|---|---|---|---|---|
| **24** | 0 | 2 | 3 | 17 |

## 7.16. The Broader Study Area

Study Area C, the broader area of aggregate type of which Sub-Unit C forms part, has been described briefly in Section 3.3.3. 14,590 archaeological sites have been recorded within, or partially within, this area (as of 2 June 2008). 543 of these sites also lie within Study Area B (Plateau Gravels), due to the overlap between the 2 Study Areas.

### 7.16.1. Geology

The density of archaeological sites within the Study Area, broken down by BGS ROCK type, is shown in Table 7.16 below. Through comparison with Table 7.1 above, and with the results for the other Study Areas, a number of features are immediately apparent. Firstly, the geological variety within Study Area C is clearly demonstrated, with more than four times the number of bedrock Rock types and more than twice the number of superficial Rock types being recorded by the BGS, when compared with the Sub-Unit (Table 7.1). In many cases these deposits occur across such limited areas that they are invalid for statistical analysis and can be excluded immediately from further consideration. Secondly, it is clear that there is a higher incidence of archaeological sites within the Study Area than within the Sub-Unit, both overall (15.1 sites per sq km compared to 11.1) and on most BGS Rock types. This is the opposite of the pattern in the contiguous Sub-Unit, Sub-Unit B, where a higher site density is recorded than in the corresponding Study Area. It goes against the fact that NMP has been completed for 86% of the Sub-Unit but only 15%

of the Study Area: given that the NMP generally increases the archaeological record of the areas it covers by at least 30%, **this would suggest that Sub-Unit C is in fact substantially 'quieter' in terms of recorded archaeological sites than its associated Study Area**. This may be accounted for in part by the fact that the Study Area encompasses a large portion of the city of Norwich, which alone accounts for 3767 archaeological sites. Even if these are excluded from the calculations, however, the site density within the Study Area would still appear to be slightly higher than in the Sub-Unit, particularly if the current extent of the NMP survey is considered. A variety of other factors may also have contributed towards this, including biases in the flying patterns of aerial photographers, and the occurrence of areas that have been intensively investigated (the parish of Fransham, for example, which has been subject to an intensive programme of fieldwalking) (see too Fig. 7.18). Thirdly, the overall site density within the Study Area is significantly higher than across the county as a whole, where an average of only 9.0 sites per sq km is recorded. **This appears to indicate a clear preference for river valley locations in patterns of past activity and/or a bias towards these areas in the preservation and discovery of archaeological sites.**

Chalk is the dominant bedrock within the Study Area, as it is within the Sub-Unit, being present across 79% of its area. Given this, it is unsurprising to find that the density of archaeological sites recorded on this particular geology (15.5 per sq km) follows the pattern seen in the figures overall, in being notably higher than for the Sub-Unit (where only 11.1 sites per sq km are recorded on the Chalk). It is also slightly higher than for the Study Area overall, although the difference is too small to gauge its significance. The second most dominant bedrock geology is Crag, classified as both B_SAND_AND_GRAVEL, where it is comparable to, and indeed part of, the geological deposit discussed in Chapter 5 (Sub-Unit A), and as B_SAND. The site density figures for the former are untypical in the context of Study Area C, in being lower for the Study Area (17.7 sites per sq km) than for the Sub-Unit (18.7 sites per sq km), perhaps reflecting the variation in coverage by the NMP. For both, however, the site density figures are higher than across the Crag Study Area as a whole, *i.e.* Study Area A, where 9.3 sites per sq km is the average (Table 5.18). This too may reflect the apparent preference for river valley locations noted above. No figures for the B_SAND Crag are available for comparison, nor for many of the other bedrock deposits, which are in any case present across too limited an area to make a valid analysis. Several, such as B_SANDSTONE and the Sandringham Formation B_SAND are dealt with in more detail in Chapter 8 (Sub-Unit D).

In terms of the superficial geology of the Study Area, the most significant deposits are the group called here 'River Valley deposits combined'. As for the Sub-Unit, this 'deposit' is an amalgam of the alluvial S_CLAY_SILT_SAND_AND_GRAVEL, which covers sub-alluvial aggregate sources, and the S_SAND_AND_GRAVEL river terrace deposits. It is these

sources of aggregate by which the Study Area is defined, and which have been heavily exploited in the past. (Head deposits have been excluded, as they are generally not suitable for exploitation as aggregate. Some small areas of River terrace and alluvium classified as S_CLAY_AND_SILT are also excluded, as their character is too uncertain and their extent too limited to warrant or necessitate inclusion here.) These River Valley deposits support a site density of 22.1 sites per sq km, with the figures for the individual deposits in the group indicating that the distribution is weighted towards the post-glacial river terrace deposits where 26.5 sites per sq km have been recorded. This is significantly higher than for the Study Area overall, suggesting a preference in terms of site location for the river valleys themselves, rather than the higher slopes or plateaux that overlook them. At the same time, the long sinuous boundaries of the deposits, which follow the floors and lower slopes of the river valleys, leads to a greater number of opportunities for intersections with site boundaries, and therefore some of the apparent preference may instead be a product of the querying method used. Nevertheless, the substantially higher site densities recorded on these deposits when compared with the Sub-Unit are still noteworthy, again suggesting that the site density within the latter is relatively low. The remaining superficial deposits are discussed in more detail elsewhere, are of little relevance, or are too limited in extent for any figures to be statistically valid.

Overall this brief analysis would suggest that in terms of numbers of archaeological sites, the Sub-Unit is only poorly representative of its wider Study Area. While some traits, such as an apparent preference for sites to be located on river valley deposits, are hinted at by the figures for the Sub-Unit, overall the site densities recorded within this smaller area are much lower, both overall and on the majority of individual geological deposits, than for the broader Study Area. This is almost certainly a reflection of the very extensive and varied nature of the Study Area, which reaches from the north Norfolk coast to the southern county boundary, and from the Broads to the Fens, and also of variations in the type and intensity of the archaeological work that has taken place. Nevertheless, as is the case for the HLC data, the Sub-Unit might be better viewed as representative of the area of dissected claylands immediately surrounding it, rather than Norfolk's river valleys as a whole.

***Table 7.16. Density of archaeological sites in Study Area C relative to geology***
Emboldened ROCK types are those that have been most heavily exploited in the past (information derived from Norfolk Minerals Resource GIS and NCC Minerals and Waste Planning Team quarries data). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Study Area (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***966.00*** | ***14,590*** | ***15.1*** |
| | | | | |
| B_CHALK | | 766.90 | 11,924 | 15.5 |
| B_CLAY_AND_SILT | Snettisham Clay member | 0.80 | 40 | 50.0 |
| B_MUDSTONE | | 17.74 | 188 | 10.6 |
| B_MUDSTONE_AND_ LIMESTONE_INTERBEDDED | | 0.01 | 0 | 0.0 |
| B_SAND [Crag] | Crag | 47.76 | 534 | 11.2 |
| B_SAND [Sandringham Sand Formation] | | 8.72 | 72 | 8.3 |
| B_SAND_AND_GRAVEL | Crag | 115.63 | 2041 | 17.7 |
| B_SANDSTONE | | 8.15 | 104 | 12.8 |
| B_SANDSTONE_AND_ MUDSTONE | | 0.02 | 0 | 0.0 |
| | | | | |
| S_CLAY_AND_SILT | | 10.88 | 87 | 8.0 |
| S_CLAY_SILT_AND_SAND | Brickearth | 27.90 | 595 | 21.3 |
| **S_CLAY_SILT_SAND_AND_ GRAVEL [alluvial]** | **Alluvium** | **153.19** | **3465** | **22.6** |
| S_CLAY_SILT_SAND_AND_ GRAVEL [other] | Head | 12.58 | 355 | 28.2 |
| S_DIAMICTON | | 319.86 | 3426 | 10.7 |
| S_GRAVEL | Head | 0.06 | 3 | 50.0 |
| S_GRAVEL_SAND_SILT_ AND_CLAY | Head & Tidal flat deposits | 1.17 | 10 | 0.9 |
| S_PEAT | | 18.92 | 228 | 12.1 |
| S_SAND | | 1.59 | 24 | 15.1 |
| S_SAND_AND_GRAVEL [glacial & glaciofluvial] | glacial, glaciofluvial & fluvial | 144.89 | 2749 | 19.0 |
| **S_SAND_AND_GRAVEL [river terrace]** | **River terrace deposits** | **100.78** | **2667** | **26.5** |
| S_SAND_AND_GRAVEL [other] | Beach deposits | 0.10 | 12 | 120.0 |
| S_SAND_WITH_CLAY_AND_ GRAVEL | Head | 0.14 | 12 | 85.7 |
| S_SHELLY_MUDSTONE | | 0.12 | 2 | 16.7 |
| | | | | |
| **River Valley deposits combined** | **Alluvium & River terrace sands and gravels** | **253.97** | **5605** | **22.1** |

### 7.16.2. Archaeological Significance

As only sites within the Sub-Unit have been scored for 'Archaeological Significance', it is not possible to assess the whole Study Area using the same criteria. The number, type and distribution of designated sites, however, can provide some indication as to the incidence of sites of high significance. In Table 7.17 below, figures are given for designated sites within both the Study Area and the Sub-Unit. What is immediately apparent is the higher numbers of Listed Buildings recorded in the Study Area. This was also true for Grade II Listed Buildings in both Study Area A and Study Area B, and may in part reflect the

avoidance of built-up areas in the selection of the Sub-Units (such areas being at little threat from aggregate extraction). In this case, where the trait is also evident amongst the Grade I and II* Listed Buildings, it is compounded by the presence of a substantial part of Norwich and, to a lesser extent, Thetford within the Study Area. This pattern is reflected in the distribution of Listed Building sites (Fig. 7.16), with dense clusters visible at Norwich, Thetford and other historic settlements, such as Burnham Market and Tasburgh.

In an assessment of archaeological significance Scheduled sites, which automatically qualify for a Significance score of National or higher, are of greater relevance. Clusters are again apparent at the historic centres of Norwich and Thetford, and stretching south from Norwich along the Tas Valley to the Roman town of *Venta Icenorum* (Caistor St Edmund), an area notable also for its prehistoric sites. Comparison with Study Areas A and B suggests that in broad terms the density of Scheduled sites within the river valleys as a whole is no more than average, although the small numbers of sites involved may hide more subtle patterning. However, **124 (58%) of the Scheduled sites lie wholly or partially on the combined River Valley deposits. As the latter make up only 26% of the Study Area, this figure is considerably higher than might be expected, again suggesting a preference for river valley locations** in the original choice of site and/or its subsequent preservation and discovery.

| ***Table 7.17. Designated archaeological sites in Study Area C*** | | | ***in Sub-Unit C*** | |
|---|---|---|---|---|
| **Designation** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***14,590*** | ***15.1*** | ***708*** | ***11.1*** |
| | | | | |
| Scheduled sites | 215 | 0.2 | 8 | 0.1 |
| Grade I & II* Listed Building | 795 | 0.8 | 14 | 0.2 |
| Grade II Listed Building | 2787 | 2.9 | 70 | 1.1 |

### 7.16.3. Archaeological Period

A breakdown of the Study Area and Sub-Unit C sites by period, and a comparison with the figures for the whole of Norfolk, are given in Table 7.18 below. It is readily apparent that, as has already been discussed, the overall site density across the Study Area is significantly higher than for either the Sub-Unit or the county as a whole. For most periods, however, this is not the case, with the densities recorded in the Sub-Unit often being more-or-less equal to, and in some instances greater than, those recorded in the Study Area. The principal exceptions are the Saxon, medieval and post medieval periods; this is largely accounted for by the fact that the Study Area encompasses several areas of historic settlement, including parts of Norwich and Thetford (see too Section 7.16.1 above). It may also be the case that the Sub-Unit contains a greater proportion of sites dated to more than one specific period, perhaps reflecting the high percentage (86%) of NMP coverage (the

NMP tending to result in more detailed recording of sites for which concrete dating evidence is frequently lacking).

Looking at the figures in chronological order, those for the Palaeolithic and Mesolithic period are only slightly higher in the Sub-Unit and Study Area than for the county as a whole. Ordinarily such small differences would be disregarded as statistically insignificant; however, they mask the fact that **51% of the Palaeolithic sites and 47% of the Mesolithic sites intersect with the combined River Valley deposits. Given that the latter occur across only 26% of the Study Area, this is a significant concentration**, equating to a site density of 0.3 and 0.5 sites per sq km respectively. For the Palaeolithic period, this is lower than the density recorded on the River Valley deposits within the Sub-Unit, perhaps reflecting the 'positive' impact that aggregate extraction has had on the archaeological record of that smaller, intensively quarried area.

For the Neolithic, Bronze Age, Iron Age and Roman periods, the highest site densities recorded vary between the Sub-Unit and Study Area, but in all cases the variation is relatively small (equating to between 0.1 and 0.6 sites per sq km), and in both areas the numbers of sites recorded are higher than for the county overall. The relative scarcity of Neolithic sites in the Sub-Unit is of interest, given the large numbers of Bronze Age sites recorded there and its significance as a location for prehistoric funerary and ceremonial monuments (see Section 7.6 above and Albone *et al.* 2008). As has been discussed above, the higher densities of Saxon, medieval and post medieval sites recorded in the Study Area when compared to both the Sub-Unit and the county as a whole, are to a large extent likely to be the product of areas of historic settlement (Norwich, Thetford, *etc.*) falling within its limits. Similarly, this probably accounts for the high number of modern sites recorded in the Study Area; the even higher density recorded in the Sub-Unit may result from the completion of the NMP survey — which routinely records 20th-century military sites — for 86% of its area, compared to only 15% of the Study Area and 28% of the county (although see Section 7.12 above).

Overall, the figures give the impression of both the Study Area and its associated Sub-Unit as a landscape relatively well-populated by archaeological sites of all periods, when compared to Norfolk as a whole. This reinforces the suggestion of a preference for river valley locations, whether in patterns of past activity, in site survival, in site discovery, or all 3. While this is hardly a new suggestion, the figures provided in this assessment both provide added evidence of this pattern, and hint at complexities and subtleties in the data, the further investigation of which lies beyond the scope of the present study.

| *Table 7.18. Archaeological sites in Study Area C by period* | | | | | | |
|---|---|---|---|---|---|---|
| | ***Sub-Unit C*** | | ***Study Area C*** | | ***in county*** *(as of 11.11.08)* | |
| | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***708*** | ***11.1*** | ***14,590*** | ***15.1*** | ***49,290*** | ***9.0*** |
| | | | | | | |
| Palaeolithic (exclusive) | 13 | 0.2 | 161 | 0.2 | 402 | 0.1 |
| Mesolithic (exclusive) | 16 | 0.3 | 280 | 0.3 | 727 | 0.1 |
| Neolithic (inclusive) | 109 | 1.7 | 1947 | 2.0 | 6768 | 1.2 |
| Bronze Age (inclusive) | 178 | 2.8 | 2089 | 2.2 | 7722 | 1.4 |
| Iron Age (inclusive) | 129 | 2.0 | 1739 | 1.8 | 6161 | 1.1 |
| Roman (inclusive) | 171 | 2.7 | 2530 | 2.6 | 8478 | 1.5 |
| Saxon (inclusive) | 90 | 1.4 | 2130 | 2.2 | 6227 | 1.1 |
| Medieval (inclusive) | 261 | 4.1 | 5597 | 5.8 | 17,463 | 3.2 |
| Post Medieval (inclusive) | 347 | 5.4 | 7461 | 7.7 | 23,624 | 4.3 |
| Modern (inclusive) | 175 | 2.7 | 2491 | 2.6 | 10,039 | 1.8 |

### 7.16.4. Survival and Visibility

It is not possible to derive numbers of surviving earthwork or 'historic landscape' sites from the NHER, as such information is not always recorded, and when it is, it is often recorded within the descriptive text, rather than in a specific field that can be interrogated. (Such information was recorded for the Sub-Unit as an additional, 'ALSF Survival' score.) The figures given in Table 7.19 below, however, which include all sites that have been recorded as containing earthwork elements (which may or may not still survive), can provide a rough characterisation of the form and potential survival of the archaeology of this area.

Overall, it can be seen that the Study Area contains a slightly higher density of both earthwork and cropmarks sites, when compared to the county as a whole. The far higher densities recorded in the Sub-Unit reflect the completion of the NMP survey for 86% of the area, whereas only 15% of the Study Area has been covered. This is manifested in the distribution of both types of site (Fig. 7.17), which strongly correlates with those areas for which NMP has been completed. The main exception in terms of earthworks is a cluster towards the southwest of the county, where the MOD's Stanford Training Area (STANTA) has favoured their preservation; conversely, there are relatively few such sites in the heavily arable northeast of the county. For cropmark sites, the main cluster outside of the area completed by the NMP lies to the south of Norwich, an area notable for its archaeology of all periods, where light soils are conducive to the formation of cropmarks and aerial photographers have been attracted to the Roman town of *Venta Icenorum* and surrounding sites; as for Study Area B (Section 6.16.4), there is a relative scarcity of cropmark sites in the southwest of the county. The high density of cropmark sites within the Sub-Unit, relative to the Study Area, is striking (2.7 per sq km as opposed to 1.2), suggesting that **there is good potential for future NMP work to record new cropmark sites elsewhere in the Study Area**. **The Sub-Unit's high density of earthwork sites,**

**twice the average recorded across Norfolk as a whole, is also notable, in a county where the survival of archaeological sites is generally poor.**

The density of cropmark and earthwork sites on the principal superficial geological deposits falling within the Study Area is also shown below (Table 7.19). In the context of Study Area C, it is the combined River Valley deposits that have greatest significance. On these, densities significantly higher than for the county as a whole are again recorded, both in the Study Area itself, and within the associated Sub-Unit in particular. For the latter, the impact of the NMP survey is again clear. When compared to both S_DIAMICTON and the glacial/glaciofluvial sands and gravels, it is notable that the highest density of earthworks in both the Study Area and the Sub-Unit is recorded on the combined River Valley deposits. As suggested above (Section 7.13), this probably reflects the unsuitability of the lower-lying portions of the river valleys, where such deposits are found, for arable agriculture or similarly destructive processes. Conversely, while cropmark sites are certainly not scarce, higher densities are consistently recorded on the glacial/glaciofluvial sands and gravels, and within the Sub-Unit also on the diamicton. As has already been discussed (Section 7.13), the high number of cropmark sites on the diamicton within the Sub-Unit is puzzling, as its heavier soils would not be expected to be productive of such sites. It is more than likely a product of the limited extent but long perimeter of the deposit within the Sub-Unit, and the fact that only the edges of the deposit were covered. The figure of 1.2–1.3 sites per sq km on the diamicton within Study Areas B and C is much more likely to be representative of the margins of Norfolk's Boulder Clay Plateau.

***Table 7.19. Survival and visibility in Study Area C relative to geology***

| | ***Sub-Unit C*** | | | | | ***Study Area C*** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
| ***Overall*** | ***64.00*** | ***100*** | ***1.6*** | ***174*** | ***2.7*** | ***966*** | ***853*** | ***0.9*** | ***1158*** | ***1.2*** |
| | | | | | | | | | | |
| S_DIAMICTON | 12.44 | 29 | 2.3 | 55 | 4.4 | 319.86 | 320 | 1.0 | 388 | 1.2 |
| S_SAND_AND_GRAVEL [glacial & glaciofluvial] | 21.77 | 50 | 2.3 | 98 | 4.5 | 144.89 | 224 | 1.5 | 403 | 2.8 |
| **River Valley deposits combined** | **21.60** | **62** | **2.9** | **86** | **4.0** | **253.97** | **476** | **1.9** | **487** | **1.9** |

***in county*** *(as of 11.11.08)*

| **Area (sq km)** | **Earthworks** | **per sq km** | **Cropmarks** | **per sq km** |
|---|---|---|---|---|
| **5497.99** | **4434** | **0.8** | **5510** | **1.0** |

### 7.16.5. The Impact of Extraction

Former and existing quarries occur only sporadically across the Study Area. (They include only those sites recorded by NCC and the BGS, quarries visible on aerial photographs or depicted on historic maps having only been mapped by the NMP within the four Sub-Units.) The greatest concentration falls within the Sub-Unit, forming an east-west band along the line of the River Wensum. Other notable clusters are evident along the Nar Valley, on the Yare at Norwich and around Reymerston, and along the Waveney Valley between Flixton and Kirby Row. More than half the total area of the quarries (13.13 sq km, or 57%) correlates with the combined River Valley deposits, falling on both the alluvium and the river terrace sands and gravels. Most of the remainder are sited on the superficial glacial and glaciofluvial sands and gravels on the slopes above (the latter are discussed in more detail in Chapter 6). 298 archaeological sites within the Study Area are recorded as being co-located with one or more of these former and extant quarry sites. This figure includes 6 which are wholly or partially Scheduled: the World War Two airfield at Swanton Morley (NHER 2830, SM 30607) and Little Bittering DMV (NHER 7266, SM 386) have already been discussed above and in Chapter 6, and at neither have the Scheduled areas been affected; the remaining sites comprise 3 round barrows, 1 at Gayton in the west of the county (NHER 3742, SM 30584), and 2 at Hethersett to the southwest of Norwich (NHER 9463–4, SM 198); the sixth site is the long barrow at the internationally significant site of Broome Heath, in southeast Norfolk (NHER 10597, SM 152). At none of these sites is extraction known to have caused extensive damage to the monument itself. By comparison, two probable Bronze Age barrows at Sparham were more-or-less wholly destroyed by post-war aggregate extraction, leading to their de-Scheduling (NHER 3021–2, SM 266; see Section 7.15 above).

Active quarries within the Sub-Unit are generally found concentrated in the same locations as those already described for former and existing sites, *i.e.* the valleys of the Wensum and other major rivers (Fig. 7.18). They are generally scarcer and more dispersed, however, with a slightly larger proportion located on higher ground, at the head of or overlooking the valley, rather than on the valley floor. (Only 53% of the total area of the existing quarries overlaps with the combined river valley deposits.) In total, the quarries occupy 6.01 sq km of land within the Study Area, representing 34 different sites, some of which are already in aftercare. 119 archaeological sites are recorded as being co-located with one or more of these active extraction sites. As was the case in Study Area B, the majority are located within the Sub-Unit, but with other notable clusters, for example at Trowse on the outskirts of Norwich. There are few existing quarry sites with no co-located archaeological remains within the Study Area. 1 of the archaeological sites affected is associated with a Scheduled Monument — Little Bittering DMV (NHER 7266, SM 386) — but the extraction does not extend into the Scheduled areas.

Within the Study Area, 40 allocations for future mineral extraction have been put forward in the draft MWDF (Fig. 7.18). Collectively their area totals 6.13 sq km; if they should all go ahead this would more than double the area of existing quarries, but still represents less than 1% of the Study Area as a whole. Their distribution contrasts with that seen amongst the former and existing extraction sites, in that there is no longer such a close correlation with river valley floors; rather, a higher proportion of sites are located in the upper reaches of the valleys, and on the higher slopes and plateaux overlooking them. The largest cluster within the Study Area is at the western end of the Sub-Unit, on the margins of the Plateau Gravels. This is a clear reflection of NCC's policy of curtailing extraction within Environmentally Sensitive Areas, of which the river valleys form a major component. It is borne out by the fact that only 1.84 sq km (30%) of the proposed allocations overlap with the combined River Valley deposits.

Within the Study Area, 98 known archaeological sites are co-located with one or more of the proposed minerals allocations. Only 8 are also co-located with an existing extraction site; although further sites lie adjacent or nearby an existing quarry, this is still a small proportion when compared to Study Area A, for example (Section 5.16.5). As for Study Area B (Section 6.16.5), **this implies that the impact of these proposed sites will be considerable, both in terms of disturbance caused to previously intact archaeological sites and landscapes, but also the potential to gain new knowledge about the historic environment of parts of the county that have not previously been investigated.**

4 of the archaeological sites falling within the proposed minerals allocations relate to Scheduled Monuments. Although the Scheduled elements of the World War Two airfield at Swanton Morley (three Pickett Hamilton forts, SM 30607) lie outside the area of proposed extraction (MWDF Site ref. MIN 22), the airfield itself (NHER 2830) is also of National significance. (This allocation has since been withdrawn from the MWDF as planning permission was granted in August 2008, NCC 2008b.) As has already been described for Study Area B, the early Bronze Age barrow at Coxford Abbey Quarry, Syderstone (MWDF Site ref. MIN 45), is believed to be one of the best preserved in the county (NHER 11280, SM 368). The two Scheduled areas falling within the proposed allocation at Caistor St Edmund (MWDF site ref. MIN 24) relate to a probable Late Neolithic to Early Bronze Age henge or hengiform enclosure (NHER 9582) and an associated D-shaped enclosure of unusual form and uncertain function (NHER 9583) (both SM 245). These monuments, together with other prehistoric sites in the vicinity, form part of an extensive prehistoric sepulchro-ritual landscape of National or even International significance. It is probable that a substantial number of non-Scheduled sites, which are nevertheless of considerable significance, also number amongst those which will potentially be affected by the proposed allocations.

***Table 7.20. Sites in Study Area C co-located with former, existing and proposed extraction sites*** *(as of 2.6.08)*

| | **Total no. sites** | **Scheduled sites** |
|---|---|---|
| ***Overall*** | ***14,590*** | ***217*** |
| | | |
| Former & existing quarries (excluding NMP quarries mapping) | 298 | 6 |
| Existing quarries | 119 | 1 |
| Proposed minerals allocations | 98 | 4 |

# 8. Sub-Unit D Assessment Results

Sub-Unit D contains all or part of 402 sites, incorporating all those intersecting with the Sub-Unit recorded in the NHER up to 27 March 2008.

## 8.1. Geology

The geology of Sub-Unit D is described in detail in Chapter 3. Its main characteristic, when compared to the other three Sub-Units, is its variety, being made up of a complex mosaic of bands and outcrops, bordered to the west by the Fenland Basin, and cut east-west by the Nar Valley and Middleton Stop Drain. Overall, it contains a very slightly lower density of archaeological sites than the average for the county as whole (8.9 per sq km, rather than 9.0). This is slightly surprising, given the quantity of archaeological work that has taken place on the Fen Edge, including the Fenland Survey (Silvester 1988; Hall & Coles 1994), which although largely located outside of the Sub-Unit, did cover the Nar Valley.

The solid geology of the Sub-Unit is classified as 3 BGS ROCK types. Most dominant are the Sandringham Sands (BGS ROCK type B_SAND), which occur across 25.39 sq km, or 56% of the Sub-Unit. These are a major source of Silica Sand, for which they have been extensively quarried in the past, and will continue to be exploited in the future. The second most extensive bedrock deposit is Mudstone, which occurs within the Sub-Unit as three distinct and discrete deposits. To the west, in the Fenland Basin, and extending along the river valleys is Kimmeridge Clay; this is the oldest geological stratum exposed within the county, and it underlies the more recent bedrock deposits to its east. To the east, and occurring within the Sub-Unit as a small outcrop at Middleton, is Gault Clay Formation. To the northeast, and exposed within the Sub-Unit only as narrow bands at Leziate, is Snettisham Clay. The third bedrock deposit mapped by the BGS within the Sub-Unit is Carstone; this too is a resource, which continues to be exploited for aggregate and also building stone. It is principally exposed as a ridge on the eastern edge of the Sub-Unit, but there is a substantial outcrop at Middleton/East Winch, with a smaller, isolated occurrence at Leziate. The interleaved Carstone, Sandringham Sands and Snettisham Clay together form the so-called 'Lower Greensand' belt, an almost continuous outcrop which runs north-south across west Norfolk, between Hunstanton and Downham Market.

For the most part, the solid geology of Sub-Unit D is overlain by superficial geological deposits (although there are significant bedrock exposures throughout the Sub-Unit). The most extensive of these is Lowestoft Formation diamicton, which, although patchy, occurs across some 28% of the Sub-Unit. More significant in terms of aggregate resources are the

Tottenhill Gravels. These heavily exploited gravels are widespread in the southwest of the Sub-Unit, where they occur in a band along the Fen-Edge. The Lowestoft Formation sands and gravels are also subject to extraction, although often seemingly as a by-product of or in conjunction with other mineral resources. These, however, along with the Sub-Unit's other superficial geologies, are too limited in extent for any analysis of site density, *etc.*, to be statistically valid. Comparable deposits, overlying Chalk bedrock and classified as Plateau Gravels, are assessed in detail in Chapter 6 (Sub-Unit B).

The average density of archaeological sites on each geology is given below (Table 8.1). The significance of the variations between each deposit is difficult to assess, however, as the complexity of the area means that many sites overlie several bedrock and superficial ROCK types, and whether the solid or the superficial geology is a significant factor — or both — is difficult to gauge. **The Sandringham Sands appear to support a relatively low site density**. This trend may relate to the fact that, at least in the northern part of the Sub-Unit, these had been extensively quarried at an early date, prior to the development of planning controls and routine investigation of archaeological sites affected by extraction, and prior to the undertaking of most of the major aerial reconnaissance campaigns. This was certainly a factor in the relatively low number of sites recorded here by the NMP survey; similar deposits further to the north, mapped as part of the NMP's Coastal Zone, were extremely productive of cropmark sites (Albone *et al*. 2007a). Conversely, **the higher density of archaeological sites recorded on the Tottenhill or Fen-Edge gravels may be a genuine pattern**, although whether related to intensive use in the past, or to better preservation and/or visibility of the archaeology, or both, is unclear. Here large numbers of sites have been recorded by the NMP, the free-draining soils being conducive to cropmark formation, and by other archaeological investigations, in particular those undertaken in the vicinity of Watlington Quarry. The relatively low numbers of sites recorded on the Carstone and diamicton also fit the expected pattern, both being areas where site visibility (principally as cropmarks on aerial photographs) might be expected to be poor.

***Table 8.1. Density of archaeological sites in Sub-Unit D relative to geology***
Emboldened ROCK types are those that have been most heavily exploited in the past, and where future extraction will be targeted (information derived from Norfolk Minerals Resource GIS and NCC Minerals and Waste Planning Team quarries data). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Sub-Unit (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***45.00*** | ***402*** | ***8.9*** |
| | | | | |
| B_MUDSTONE | various | 12.89 | 157 | 12.2 |
| **B_SAND [Sandringham Sand Formation]** | | **25.29** | **229** | **9.1** |
| **B_SANDSTONE** | **Carstone Formation** | **6.82** | **72** | **10.6** |
| | | | | |
| S_CLAY_AND_SILT | Tidal Flat Deposits & Nar Valley Formation | 3.32 | 45 | 13.6 |
| S_CLAY_SILT_SAND_AND_GRAVEL | Head | 3.21 | 36 | 11.2 |
| S_DIAMICTON | Lowestoft Formation | 12.45 | 133 | 10.7 |
| **S_GRAVEL** | **Tottenhill Gravels** | **8.22** | **124** | **15.1** |
| S_PEAT | | 2.24 | 31 | 13.8 |
| **S_SAND_AND_GRAVEL [glacial]** | **Lowestoft Formation** | **3.13** | **44** | **14.1** |

As discussed Section 2.2), the figures given for each geological deposit will be skewed by variations in the detail of the BGS mapping and the classification of deposits across different survey sheets. Compared to the other three Sub-Units, however, this does not appear to be a particular problem in Sub-Unit D, where the mapping and classifications are generally coherent, despite the area crossing three different survey sheets.

## 8.2. Archaeological Significance

The breakdown of Sub-Unit D sites by the provisional score assigned to them for 'Archaeological Significance' is shown in Table 8.2. 356 sites in Sub-Unit D have a provisional significance score of Local or higher. These are discussed in more detail in the period discussions below (Sections 8.3–8.12).

***Table 8.2. No. archaeological sites in Sub-Unit D by significance score***

| **Archaeological Significance score** | **No. of sites** | **Sites per sq km** |
|---|---|---|
| ***Overall*** | ***402*** | ***8.9*** |
| | | |
| International | 2 | <0.1 |
| National | 28 | 0.6 |
| Regional | 89 | 2.0 |
| Local | 237 | 5.3 |
| Negligible | 41 | 0.9 |
| Ungraded | 5 | 0.1 |

### 8.2.1. International

There are 2 sites of known International significance within the Sub-Unit (NHER 3453 & 17286), both part of a Middle Saxon 'productive' site at Wormegay. Here a dense concentration of predominantly Middle Saxon finds, from a relatively limited area, appears to indicate the site of an inhumation cemetery and probable settlement, perhaps representing a monastic site (see Section 8.9 below). Sites of such high significance are rare in the county, which contains no archaeological World Heritage Sites (a designation that would automatically lead to this score; see Section 4.1.1). The Wormegay sites are the only sites within any of the Sub-Units to be awarded an International significance score.

### 8.2.2. National

28 sites within the Sub-Unit are recorded as being of National significance; 6 of these are wholly or partially Scheduled. The sites are spread quite widely across the Sub-Unit, with a concentration at Watlington, where extensive excavations in advance of aggregate extraction combined with good aerial photographic evidence have allowed an extensive multi-period landscape to be recorded. Most of the sites occupy positions within or on the edges of both minor and major river valleys. The main exceptions are St Mary's Church, Middleton, a Grade II* Listed Building (NHER 3419), and the nearby motte and bailey castle, Middleton Mount (NHER 3394, SM 184), together with All Saints' Church, Ashwicken (NHER 3416, Grade II* Listed), and the site of All Saints' Church, Leziate (NHER 3409, SM 392). No obvious preference for a particular geology is immediately apparent.

### 8.2.3. Regional

89 sites within the Sub-Unit are recorded as being of Regional significance. These are again spread widely, albeit somewhat unevenly, across the Sub-Unit. They include several very large-scale sites, namely 3 railway lines (or former railway lines: Great Yarmouth to Sutton Bridge, NHER 13581; Lynn and East Dereham, NHER 13600; and the East Anglian railway, formerly Lynn and Ely, NHER 13594), and 2 major drains, remnants of the early post medieval drainage of the Fens (St John's or Downham Eau, now destroyed, NHER 2427, and Tong's Drain, NHER 23225). Again, most sites lie close to watercourses, but there is a cluster of sites, all Listed Buildings, on higher ground at Middleton. There are again no obvious signs of a bias towards a particular geology.

### 8.2.4. Local

The 237 sites assessed as being of Local significance are again found widely across the Sub-Unit. There some substantial 'gaps', however, or areas where fewer such sites are recorded, the significance of which is unclear. For the most part these gaps correspond with those parts of the Sub-Unit for which the NMP survey was not completed, or with areas where sites of higher significance have been recorded. Valley and valley-side sites again seem to dominate, although with so many sites, and such a dense network of drains and other watercourses, any pattern is difficult to make out. Other patterns are most likely to reflect the density and nature of archaeological work in the area, rather than a relationship with the underlying geology.

### 8.2.5. Ungraded and Negligible

41 sites (less than 5% of the total) have been given a significance score of Negligible. More than half (26) are Find Spot records, for the most part isolated finds of known or probable medieval or post medieval date. A multi-period Find Spot (NHER 51247), which on its own would warrant a higher significance score, is co-located with the major excavated site at Watlington (NHER 39458), its relative significance being diminished as a consequence. The 13 Monument records primarily derive from the NMP survey, and relate to isolated field boundaries or other features of relatively recent (*i.e.* post medieval or later) date, and to sites the location or archaeological significance of which are uncertain. A further record, NHER 51316, relates to an 11th or 12th-century font, Listed Grade II, which was taken from the now ruined church of St Michael's, Mintlyn (NHER 3410); its current location is of little significance.

5 sites within the Sub-Unit have a significance score of Ungraded. 2 relate to archaeological investigations undertaken at extraction sites, the results of which have not yet been reported to the NHER (NHER 39798 & 48990). 1 relates to an archaeological intervention which has been postponed indefinitely (NHER 48880), 1 relates to an archaeological evaluation where no finds or features were identified (NHER 38049) and 1 is a 'parent' record for fieldwalking undertaken along a pipeline (NHER 43961).

Sites scored as Ungraded and Negligible are included in the overall figures given below, but are not shown on the distribution maps accompanying each section. Figure 8.1 illustrates their distribution as a group. There is no clearly comprehensible pattern to their distribution, but there is a notable absence of such sites from the southernmost part of the Sub-Unit, perhaps reflecting a relative scarcity of archaeological work here. Also, Monument sites of Negligible significance appear to be clustered along the 2 main valleys,

along the Nar and Middleton Stop Drain, perhaps reflecting a high incidence of non-archaeological (or relatively recent) crop- and soilmarks in these areas.

## 8.3. Palaeolithic (500,000 BC – 10,001 BC)

Although 40 Monument sites of possible Palaeolithic date have been recorded within the Sub-Unit, many are of non-specific prehistoric date and are therefore largely irrelevant for a discussion of this period. 7 sites incorporate features or material dated specifically to the Palaeolithic period, equating to 0.2 sites per sq km (Table 8.3 and Fig. 8.2). This is slightly higher than the average site density for the county as a whole in this period (0.1 sites per sq km), although the small number of sites involved makes such broad figures difficult to interpret. In terms of distribution, there is a close correlation with mineral extraction, with 5 of the 7 sites recorded as being located within or having come from quarries or pits. Any relationship with watercourses is less clear, in part due to the small number of sites and in part due to the 'watery' nature of this heavily drained landscape. In terms of geology, the greatest density of sites is recorded on the superficial Tottenhill Gravels in the southwest of the Sub-Unit (3 sites, equating to a site density of 0.4 per sq km), but this is as likely to be a product of the extraction that has taken place here, as it is patterns of past activity.

The most significant of the Palaeolithic sites is NHER 2266, at Boon or Finch's Gravel Pit, Tottenhill. Here, an assemblage of Palaeolithic flints was recovered, although they may not all have come from this site and its National significance score is primarily derived from several Early Saxon cremations also found there. Nearby, 12 'early' Palaeolithic handaxes and a small number of flint flakes were recovered from an adjacent gravel pit (NHER 2268), but again, the site's high (Regional) significance score rests primarily on evidence for later activity at the site. The sites of Local significance are all Find Spot sites, 2 of individual objects (NHER 3332 & 3434) and 2 of several objects; 1 of the latter is made up of a group of flints of possible Palaeolithic date (NHER 18146), the other is the Findspot of 2 Palaeolithic handaxes and a flake (NHER 22702).

***Table 8.3. Palaeolithic sites in Sub-Unit D***

| Total no. Palaeolithic sites (exclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **7** | 0.2 | 0 | 0.0 | 1 | <0.1 | 1 | <0.1 | 4 | 0.1 |

## 8.4. Mesolithic (10,000 BC – 4001 BC)

41 Monument sites of potential Mesolithic date have been recorded within the Sub-Unit, but as for the Palaeolithic period (see above), most have a generic prehistoric date and do not

incorporate any evidence dating specifically to the Mesolithic period. 8 sites incorporate material of exclusively Mesolithic date, and only these are illustrated on the distribution map (Fig. 8.3) and quantified below (Table 8.4). The resulting site density of 0.2 Mesolithic sites per sq km is only slightly above that recorded across the county as a whole (0.1 such sites per sq km). This contrasts with the River Gravels Sub-Unit and Study Area (Chapter 7) where significantly higher numbers of Mesolithic sites were recorded on the alluvium and river terrace deposits of the floors and lower slopes of the river valleys (a third of the county's Mesolithic sites fall within the River Gravels Study Area).

As was the case with Palaeolithic sites, there is a correlation between the distribution of Mesolithic sites and mineral extraction, with 5 recorded as being the site (or future site) of a quarry or pit. Consequently, as for the preceding period, it is difficult to assess the significance of the distribution in relation to topography; there is perhaps a slightly greater tendency for sites to be located near or adjacent to watercourses, but there is in fact very little land where the Ordnance Survey does not show a drain, stream or pool (often created by earlier extraction) within a few hundred metres of a site. As for the Palaeolithic sites, which have a broadly similar distribution, there appears to be no clear preference for one geological type over another. The highest site density (0.6 sites per sq km) is recorded on the superficial Lowestoft Formation sand and gravel, but this figure is derived from only 2 sites, both of which overlap only the edges or very limited exposures of this deposit.

4 of the 8 Mesolithic sites are Monument records. Only 2 relate to actual features of Mesolithic (or possible Mesolithic) date; both of are of Regional significance, at least in part due to these early remains at the site, but both are also of uncertain date and character. At NHER 37638, an archaeological evaluation, undertaken in advance of mineral extraction at East Winch/Middleton, identified a quantity of worked flint, some of which was retrieved from, but had possibly been redeposited in, a ditch and a gully. The assemblage was dated only broadly to the Mesolithic to Bronze Age period, and so may represent post-Mesolithic activity; it was interpreted as likely to represent transient activity, including flintworking, typical for its Fen-Edge location (Bishop 2006). At NHER 37396, again at Middleton and again in advance of extraction, archaeological investigations recovered an assemblage of Late Mesolithic to Neolithic flints. Undated pits, which showed some correlation with the distribution of this material, relate to the same phase of activity (Trimble 2005, 5).

The remaining sites all relate to finds of Mesolithic material, at sites where there is no evidence of features or deposits of this date, or of assemblages surviving *in situ*. Several relate to historic finds of material in quarries, for example the 12 microliths found at Garbold's Pit, Runcton Holme, in 1936 (NHER 2397). As well as the 2 sites of Regional significance discussed above, 1 site has been assessed as being of National significance and 2 further sites as being of Regional significance. Of these, the most significant for this

period is NHER 20577 at Bawsey, where a relatively substantial assemblage of Mesolithic flints was recovered from a field surface, at the same location as a Neolithic arrowhead; such assemblages are important not only for the study of this period, but also have potential for studying the Mesolithic–Neolithic transition. The remaining sites are either of Local significance, or primarily derive their higher significance scores from activity of later date present at the same site.

***Table 8.4. Mesolithic sites in Sub-Unit D***

| Total no. Mesolithic sites (exclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **8** | 0.2 | 0 | 0.0 | 1 | <0.1 | 4 | 0.1 | 3 | 0.1 |

## 8.5. Neolithic (4000 BC – 2351 BC)

85 sites of possible, probable or known Neolithic date have been recorded within the Sub-Unit. A proportion of these are dated only generally to the prehistoric period, but they are included in Table 8.5, Figure 8.4 and the discussion below as, unlike for the Palaeolithic and Mesolithic periods, there is a strong possibility that at least some are Neolithic. This figure equates to a site density within the Sub-Unit of 1.9 Neolithic (or possibly Neolithic) sites per sq km; within the county as a whole, the average density of such sites is only 1.2 per sq km. **Sub-Unit D is therefore above average for this period and, notably, supports a higher density of Neolithic sites than any of the other Sub-Units**. (This constrasts with the results of the NMP survey, for which this area was the least productive of Neolithic sites, Albone *et al*. 2008; see below for further discussion.) Such blunt figures, however, hide the considerable clusters and lacunae evident amongst the data. Some relate to the type and intensity of archaeological fieldwork carried out there; for example, the cluster of sites in the centre of the Sub-Unit, on the south side of the Nar Valley at Wormegay, correlates with an area covered by the Fenland Survey. In contrast to earlier periods there is no clear relationship between overall site distribution and quarrying, although the NHER synthesis identified a correlation between extraction sites and Neolithic pottery, the fragility of which makes it a rare surface or casual find. To an extent, a relationship with topography is more apparent than for preceding periods, particularly in the central and southern part of the Sub-Unit, where a cluster of sites lies at the mouth of the Nar, with more isolated sites strung out southwards along the Fen Edge. The southern portion of the Sub-Unit is also notable in that away from the Nar and Fen Edge Neolithic sites are scarce or absent, accentuating the apparent clusters already described. This may reflect a general paucity of archaeological work in this area, as well as other factors.

Again in contrast to preceding periods, some patterns in the site distribution do seem to relate to the underlying geology. This is not the case for the bedrock deposits, on each of

which a more-or-less equal site density, still substantially higher than the county average, is recorded; even between the different LEX types present, there appears to be no obvious patterning. Between the superficial geological deposits, however, there is considerable variation. The highest site density (5.1 sites per sq km) is recorded on the Lowestoft Formation sands and gravels, but as these occur over a relatively limited area (3.13 sq km within the Sub-Unit) and as a considerable proportion of the sites (62.5%) relate to work by the Fenland Survey, this apparent preference may not be genuine. Similarly, the 4.5 sites per sq km recorded on the peat may also be a product of the small sample size of this deposit. A density of 3.0 sites per sq km on the Tottenhill Gravels, however, which are exposed across more than 8 sq km of the Sub-Unit, may be genuine, and is notably higher than for the Sub-Unit overall. Nevertheless, this again may reflect a high level of archaeological investigation, rather than more intensive use of this area in the past: work has been carried out both as part of the Fenland Survey and in advance of aggregate extraction (at Watlington Quarry, NCC Site No. 39), which may account for much of the high site density. The area is also notable for its cropmarks, although the NMP recorded only a small number of possibly Neolithic sites here. Conversely, the comparatively low site density (1.6 sites per sq km) recorded on Head deposits (BGS ROCK type S_CLAY_SILT_SAND_AND_GRAVEL) may reflect a genuine avoidance of these areas in the past, or more mundane factors, including the relatively recent origin of such deposits.

6 Neolithic sites within the Sub-Unit are recorded as being of National significance, but at only 1 (60 Acre Field, Watlington, NHER 11724) have features been identified that can be strongly suggested as being Neolithic in date. Here, a series of fragmentary ditches and possible trackways of probable Neolithic date have been recorded variously by excavation work undertaken in advance of aggregate extraction, and by the NMP (Albone *et al*. 2008). (The other 5 sites incorporate features of non-specific prehistoric date, and/or findspots of Neolithic or prehistoric material.) The 13 sites assessed as being of Regional significance comprise 11 Monument sites, but at none of these are features of Neolithic (rather than non-specific prehistoric) date recorded with any certainty. At Bawsey, for example, a possible penannular bank was identified on aerial photographs; it may be of Late Neolithic to Bronze Age date and associated with two round barrows to its south, but an anthropogenic origin as well as its date is uncertain (NHER 50842). At Tottenhill, fieldwalking by the Fenland Survey and others identified a possible prehistoric occupation site and/or a burnt mound (NHER 23238), but no specific dates for the material are recorded. Like almost all of the Regionally significant sites, both Monuments and Find Spots, these sites primarily derive their high significance score from evidence of later activity recorded at the same site, and/or from the significance of other nearby sites. The only exception is NHER 20577 at Bawsey, where significant quantities of Mesolithic material have been found in the same location as a Neolithic flint arrowhead (see Section 8.4 above). The 64 sites of Local significance, most of which (75%) are Find Spot records,

encompass a range of different finds types and assemblages. They include the findspots of several axeheads, and the lower half of a prehistoric saddle quern (NHER 3422) — a very rare find for Norfolk.

Overall, while the Sub-Unit is notable for its high density of Neolithic (or potentially Neolithic) sites — higher than for any of the other Sub-Units — it is also unusual for the almost complete absence of any evidence of the funerary and/or ceremonial sites which tend to dominate the archaeological record of other parts of the county (particularly in terms of the NMP results, see Albone *et al*. 2008). This is despite the fact that the assemblage of Neolithic sites comprises a higher proportion of Monument sites (40%) than any of the other Sub-Units (compare Sub-Unit A, where only 26% of the potentially Neolithic sites are Monument records). The apparent tendency for such sites — barrows, henges and hengiform monuments, cursus monuments and causewayed enclosures — to be located towards the northeast of the county, set against the abundant finds-based evidence for this period from the west of the county, is a pattern that warrants further investigation and analysis. It is of particular interest that the apparent absence of large Neolithic and Early Bronze Age monuments in the far west of Norfolk, on the eastern Fen-Edge, contrasts with their comparative abundance along the western side of the Fenland Basin.

***Table 8.5. Neolithic sites in Sub-Unit D***

| **Total no. Neolithic sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| **85** | 1.9 | 0 | 0.0 | 6 | 0.1 | 13 | 0.3 | 64 | 1.4 |

## 8.6. Bronze Age (2350 BC – 701 BC)

107 sites of potential or known Bronze Age date have been recorded in the Sub-Unit. The average site density for the period of 2.1 sites per sq km is on a par with those recorded in Sub-Units A (Crag) and B (Plateau Gravels), and is substantially higher than the 1.4 sites per sq km recorded across the county as a whole. (Compare, however, Sub-Unit C where a site density of 2.8 Bronze Age sites per sq km is recorded.) The sites are notably clustered in the centre of the Sub-Unit, around Watlington and Tottenhill, where partial coverage by the Fenland Survey coincides with both NMP mapping (of a comparatively 'busy' landscape) and extensive excavations in advance of aggregate extraction (Fig. 8.5). They are also clustered, to a lesser extent, at Wormegay to the east, an area that was also covered by the Fenland Survey and has been subject to other, non-intrusive investigations. There is a scattering of sites across the northern portion of the Sub-Unit, but they are very scarce to the south, even within those parts for which NMP was completed. This continues the pattern of the Neolithic sites. In terms of topography, no pattern is immediately

apparent, although a more intensive interrogation of the data might reveal more subtle relationships. Other than in the area around Watlington Quarry there is no distinctive relationship between site distribution and extraction, although for 34% of the sites 'mineral extraction' is recorded as a landuse. As for the Neolithic period, a correlation between quarry sites and the distribution of Bronze Age pottery was noted in the NHER synthesis.

Again as for the preceding period, there is a clear relationship between site distribution and geology, although, as is the case throughout this assessment, the multiplicity of factors affecting such relationships needs to be borne in mind. Amongst the bedrock deposits, there is a high density of sites over the Mudstone (3.0 sites per sq km), and in particular over the Kimmeridge Clay Formation of the Fen Edge. At the same time, the sites are mainly concentrated around Watlington, and their distribution may better reflect the extent of the overlying Tottenhill Gravels, rather than the underlying bedrock. For the superficial deposits, a very high density of sites (5.4 per sq km) is recorded over the Lowestoft Formation sands and gravels. This high density, however, may largely be a product of the small sample size (3.13 sq km) of this deposit; the sites are also concentrated around the 'island' of Wormegay, where a considerable amount of archaeological work has been undertaken, whereas other occurrences of Lowestoft Formation deposits are empty or nearly empty of Bronze Age sites. With its larger sample size (8.22 sq km), representing a larger proportion (72%) of the deposit within the county as a whole, the only slightly lower density of sites (4.6 per sq km) recorded on the Tottenhill Gravels is perhaps more valid. These deposits have proved to be highly conducive to the formation of cropmarks, and when combined with the information provided by the extensive excavations at Watlington Quarry (around which the sites are clustered), some of the reasons for the high density of sites (of any date, see Table 8.1), are clear. They do not preclude, however, the possibility that these deposits, which provided free-draining land on the edge of the Fenland Basin, close to the mouth of the Nar Valley, were favoured for exploitation in the past. The site densities on the other superficial deposits in the Sub-Unit are unremarkable, either because they are close to the overall density for the Sub-Unit or because the sample size of the deposits involved is too small to generate valid statistics. A very low site density (1.1 per sq km) is recorded on the Head deposits (S_CLAY_SILT_SAND_AND_GRAVEL); this continues the pattern seen in the Neolithic, and the reasons for it are equally enigmatic.

1 of the Bronze Age sites in Sub-Unit D has been scored as being of International significance. This is part of a Middle Saxon 'productive' site at Wormegay (NHER 17286; see Section 8.9 below), from which Bronze Age finds, including a fragment of a spearhead, have been recovered; without the later remains the site would be of only Local significance. 10 sites are classified as being of National significance. None is securely dated, and only 2 sites are thought likely to date specifically to the Bronze Age. NHER 3381 (SM 373) is a probable barrow, which still survives as an earthwork on Leziate Heath; the cropmarks recorded as NHER 50967, at Watlington, may also represent the remains of a round

barrow, although their archaeological origin is not certain. 3 other cropmark sites at Watlington, all ring ditches (NHER 50978–70), are thought more likely to represent Iron Age mortuary enclosures than Bronze Age barrows. At Blackborough End, an extensively excavated Iron Age and Roman site (NHER 37413), has produced Neolithic and/or Bronze Age flints, but no features dating to this period have been identified.

The 23 sites of Regional significance are more widely spread across the Sub-Unit, although there is still a slight cluster around Watlington and the Tottenhill Gravels. They comprise 21 Monument sites, several of which have been dated specifically to the Bronze Age, although few are securely dated. A round barrow at Bawsey (NHER 16286), the site of which has since been destroyed by extraction, was excavated in 1984, revealing the remains of a possible tree trunk coffin, as well as one primary and seven secondary burials and a variety of Early Bronze Age artefacts. The true nature of an ostensible 'Beaker settlement' at Garbold's Gravel Pit, Runcton Holme (NHER 2397) is uncertain, as it is based on an early 20th-century interpretation of material excavated from the pit. Many of the Regionally significant sites represent finds of Bronze Age or prehistoric material with no specific date made at more substantial sites dating to later periods.

The 58 sites of Local significance are dominated by finds, either Find Spot sites, which make up 53% of the total, or findpots of Bronze Age material made at multi-period Monument sites. The clustering of many of the Find Spot sites at Wormegay contrasts with the dominance of Monument sites at Watlington and Tottenhill, highlighting the considerable variation in the visibility of sites and the form and intensity of archaeological inquiry that have undoubtedly skewed any distribution patterns. A line of sites along the Fen Edge in the southern portion of the Sub-Unit, stretching south of Watlington to Stowbridge, is of note, given the general paucity of both Neolithic and Bronze Age sites in this area. It includes the site of two Bronze Age cremation urns (NHER 2409), recovered from Luddington's Gravel Pit in 1849.

A notable feature of the area during this period is 'burnt mounds' or 'pot boiler' sites. Although less numerous than in Sub-Unit C, where 25 were recorded (Section 7.6), 5 such sites are recorded in that portion of the Nar Valley falling within Sub-Unit D. 4 of these have been indexed in the NHER with a non-specific prehistoric date, but such features are thought to have been a particular feature of the Bronze Age (Crowson 2004, 37; they are discussed in more detail in Section 7.6). Unusually, 1 of the burnt mounds in Sub-Unit D (NHER 23205) is interpreted as being of Roman date, due to the quantities of Roman pottery recovered from amongst the burnt flint and ash on the field surface; a possible industrial function has been suggested (Silvester 1988, 128). A second spread of burnt flint recorded as part of the same site had been suggested as being of Iron Age date, but this is on the basis of a single sherd of pottery.

Overall, the Bronze Age (or potentially Bronze Age) sites recorded within the Sub-Unit follow many of the patterns seen amongst the Neolithic sites. Although the number of sites recorded is comparable to the site density seen in other Sub-Units, ring ditches and round barrows are relatively scarce, and those that have been recorded are somewhat insubstantial and uncertain when compared to other areas (such as the extensive funerary and/or ceremonial landscape recorded in the Wensum Valley, for example, Section 7.6). This trend was clearly reflected in the results for the NMP survey, with only 12 Bronze Age sites being recorded in Sub-Unit D compared to 23 in Sub-Unit A and 67 in Sub-Units B and C. This was due to a general lack of characteristically Bronze Age sites, such as barrows and ring ditches, which can be readily identified on aerial photographs (Albone *et al*. 2008). As for the Neolithic, the apparent absence of large monuments of this period, in contrast to other parts of Norfolk and the western Fen Edge, warrants further study. As Ashwin points out, however, evidence from this area for the use of natural hillocks and pre-existing mounds as places of interment cautions against an over emphasis of the apparent scarcity of barrows (Ashwin 1996, 51).

***Table 8.6. Bronze Age sites in Sub-Unit D***

| **Total no. Bronze Age sites (inclusive)** | **per sq km** | **Inter-national** | **per sq km** | **National** | **per sq km** | **Regional** | **per sq km** | **Local** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|
| **94** | 2.1 | 1 | <0.1 | 10 | 0.2 | 23 | 0.5 | 58 | 1.3 |

## 8.7. Iron Age (800 BC – AD 42)

92 sites of possible Iron Age date have been recorded within the Sub-Unit (Table 8.7, Fig. 8.6). (See Section 4.1.2 for details of adjustments made to the period dates used in queries for the Bronze Age and Iron Age.) The resulting site density of 2.0 sites per sq km is significantly higher than that recorded in the county as a whole (1.1 sites per sq km), but is on a par with that recorded in Sub-Unit A (1.7 sites per sq km) and Sub-Unit C (2.0 sites per sq km). This fairly high site density may in part reflect the fact that the NMP has been completed for 82% of Sub-Unit D, compared to only 28% of the county (but see also Sub-Unit B, where only 1.5 sites Iron Age sites per sq km have been recorded, despite the NMP having been completed for 91% of the area). As for the preceding period, a considerable cluster of sites is evident at Watlington and Tottenhill, where coverage by the Fenland Survey, favourable soils for cropmark formation, and extensive excavations in advance of extraction have combined to produce a dense assemblage of overlapping sites of all periods. Sites are again scarce in the southern part of the Sub-Unit. Any apparent patterning in relation to topography is complex: while many sites seem to be situated on higher ground, and in particular on the edge of the higher ground, overlooking the valleys and fen, a significant number appear to be on lower-lying ground, including a cluster of sites on the floodplain of the Nar Valley in the centre of the Sub-Unit. Again, there is no

direct correlation apparent between site distribution and the location of former and current extraction; mineral extraction is recorded as a landuse at 34% of the Iron Age sites, equal to the figure for the Bronze Age but notably higher than the 14% recorded for all the Sub-Unit D sites.

The relationship between site distribution and geology shows many similarities with the preceding period, but also significant differences. In terms of bedrock, the highest site density (3.2 per sq km) is again recorded on the Mudstone, and again this is likely to be more a reflection of the distribution of the overlying Tottenhill Gravels than the Mudstone itself. The site densities recorded on the other bedrock deposits (2.1 sites per sq km on both the sand and sandstone bedrock) are again little different from that for the Sub-Unit overall. **The most significant feature of the site densities recorded on each of the Sub-Unit's superficial geologies is that the Tottenhill Gravels support the highest density of sites** (5.0 per sq km), rather than the Lowestoft Formation sands and gravels (4.5 sites per sq km); this is in contrast to the figures for both the Neolithic and Bronze Age. Again, however, the favourability of the Tottenhill area for the formation of cropmarks, and the large amount of both extensive and intensive archaeological fieldwork that has taken place here, means that this very high site density should not be taken at face value. While the Lowestoft Formation sands and gravels, the peat, and the superficial clay and silt deposits also support high or moderately high site densities, the sample size for each deposit is too low to generate valid statistics. The site density on the diamicton (2.5 sites per sq km), which is present across 12.45 sq km of the Sub-Unit, is perhaps more representative of the Sub-Unit as a whole, or at least that area away from the Tottenhill Gravels. As for the Neolithic and Bronze Age periods, the lowest site density (1.6 per sq km) is recorded on the Head deposits.

2 Iron Age sites within the Sub-Unit (NHER 3453 & 17286) have been scored as being of International significance. Their significance, however, derives from the later, Middle Saxon, remains at the sites, rather than the fragments of Iron Age pottery and the Iron Age or Roman brooch also recovered at the same location. The 11 sites of National significance primarily comprise a dense cluster of 9 sites at Watlington/Tottenhill (NHER 39457–8 and subsidiary records), relating to a Late Iron Age to Roman period rural settlement and its contemporary landscape, which are both visible as cropmarks and have been the subject of recent, extensive excavations in advance of aggregate extraction. The 2 more isolated sites are both located in the northern part of the Sub-Unit. At Fosters End Drove, Blackborough End (East Winch; NHER 37413), traces of Iron Age activity have been recorded at the site of a much more extensive Roman period settlement, agricultural and industrial site. They include the probably deliberate deposition of a Middle to Late Iron Age jar within a pit, an act which perhaps had ceremonial or votive significance (Graham & McConnell 2007, *passim*). The second site, a rectangular cropmark enclosure partly

surrounding and apparently sealed by a medieval motte and bailey castle, Middleton Mount (NHER 3394, SM 184) is of suggested but very uncertain, non-specific prehistoric date. As for preceding periods, sites of Regional significance are more widely spread across the Sub-Unit, with a significant proportion found within its southern portion. 2 relate to settlement, the most substantial of which, Garbold's Gravel Pit at Runcton Holme, forms part of the southern group. Here finds and features relating to an Iron Age to Roman period farmstead and possible salt-working site were recorded over several decades as the site was subjected to quarrying. To the north, at Middleton, a rectilinear enclosure with conjoined trackways/corridors and annexes (NHER 27991), visible as cropmarks, has been interpreted as a possible farmstead (although other interpretations are also suggested). More unusually, a 1st-century BC ironworking site was excavated in advance of extraction at a Carstone quarry at East Winch/Middleton (NHER 12559). Here, iron deposits on top of the Carstone were exploited as a source for smelting; a gold torc was also subsequently recovered from the site. The 54 sites of Local significance are primarily made up of Find Spot records, or findspots of Iron Age or non-specific prehistoric material at sites where more substantial remains dating to a different period are also present.

***Table 8.7. Iron Age sites in Sub-Unit D***

| Total no. Iron Age sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **92** | 2.0 | 2 | <0.1 | 11 | 0.2 | 22 | 0.5 | 54 | 1.2 |

## 8.8. Roman (AD 43 – AD 409)

93 sites of known or potential Roman date have been recorded in Sub-Unit D. This equates to a site density of 2.1 sites per sq km (Table 8.8), which is considerably higher than the 1.5 sites per sq km recorded across the county as a whole. At the same time, while on a par with the density of sites recorded in Sub-Units A and B, it is also substantially lower than the 2.7 sites per sq km recorded in Sub-Unit C. In general terms, the distribution of the Roman sites is very similar to that seen in the Iron Age, a pattern that was also evident for the NMP evidence (Albone *et al*. 2008) (Fig. 8.7). A substantial cluster is evident around Watlington/Tottenhill, and a relatively even spread across the northern part of the Sub-Unit, with only a few sites recorded to the south of Watlington and none at all in the Sub-Unit's southernmost portion (in Stow Bardolph and Wimbotsham). There is, however, a clearer 'Fen-Edge' pattern to the distribution of the southern group of sites than is evident in earlier periods. The question of continuity (or discontinuity) across the transition (if that is what it was) between the Iron Age and Roman periods is highlighted within the Sub-Unit by sites such as Garbold's Gravel Pit, Runcton Holme (NHER 2397), and Watlington (NHER 39458), where settlement appears to have continued unbroken across this 'transition'. This is in contrast to Blackborough End (NHER 37413), where the settlement, agricultural and

industrial site seems to have been newly established in the late 2nd or early 3rd century AD (Graham & McConnell 2007).

Analysis of the density of Roman sites within the Sub-Unit in relation to geology shows some interesting divergences from the pattern seen in earlier periods. In terms of bedrock, while the highest density of sites is recorded on the Mudstone (3.9 sites per sq km), an above-average density of sites (2.5 per sq km) is also recorded on the Carstone. In contrast, a correspondingly low density (only 1.6 sites per sq km) is found on the Sandringham Sands, amongst which there is no obvious preference for a particular LEX type (Leziate, Mintlyn or Roxham/Runcton member). This latter pattern is the opposite of that anticipated prior to the assessment taking place; NMP mapping on the Leziate sands in northwest Norfolk, undertaken as part of the Coastal Zone mapping (EH Project No. 2913), recorded an extensive and complex pattern of cropmarks around Snettisham, related to a Late Iron Age to Roman period settlement and agricultural landscape (NHER 26626 and related records). (This apparent discrepancy is discussed in more detail in Section 8.13 below.) Conversely, the relatively high site density on the Carstone goes against the more general conclusions drawn from the NMP data (Albone *et al*. 2008), which identified a relative scarcity of NMP sites on this deposit. It is notable in this respect that the Roman sites on this deposit entirely comprise findspots of material of this period; the settlement at Fosters End Drove (NHER 37413) and a Roman kiln at Sandy Lane (NHER 3391), both at Blackborough End, are the only more substantial sites to encroach upon it, and even these only partially overlie its edges.

In terms of superficial geology and site distribution, there are again clear differences between the pattern seen amongst the Roman sites and that seen in earlier periods. While the Tottenhill Gravels again support a very high site density (5.2 sites per sq km), presumably for the same reasons described above, the density on the Lowestoft Formation sands and gravels (2.6 per sq km) is appreciably lower than that seen in the Neolithic, Bronze Age and Iron Age, particularly given that the overall site density has not significantly altered. With such a small sample of this deposit, the significance of this pattern is difficult to assess, but it appears to suggest a move away from these deposits, at least of activities that leave a recognisable imprint on the landscape. In particular, a relative scarcity of Roman period sites recorded on and around Wormegay 'island' warrants further investigation. Also in contrast to earlier periods, the lowest site density is recorded on the tidal flat and Nar Valley Formation deposits (S_CLAY_AND_SILT; 1.8 sites per sq km), but with such a small sample size this is unlikely to be of any great significance.

2 Roman sites within the Sub-Unit, both at Wormegay, have been scored as being of International significance (NHER 3453 & 17286), but as described above for the Iron Age, this significance is derived from Middle Saxon remains at the sites rather than the relatively

small quantities of Roman material recovered. The sites of National significance are again clustered at Watlington Quarry, with 11 of the records relating to finds and features recorded here (NHER 39458 and associated records). These represent the extensive Late Iron Age and Roman period rural settlement and landscape already described in Section 8.7 above. One exception is the site of an Early Saxon cemetery (NHER 2266) located at Boon or Finch's Gravel Pit only a few hundred metres to the east. Roman finds were recovered from the site in 1908 and suggested as being related to salt production, but such an interpretation may no longer be valid, and the site's significance is derived primarily from its Saxon remains. The other exception, and the only one to be located in the northern part of the Sub-Unit, is Fosters End Drove, Blackborough End (NHER 37413; see too Section 8.7 above). Here a Roman settlement and agricultural and industrial centre was established in the late 2nd century AD and continued in use up to the mid 4th century; remodelled on a number of occasions, it included a system of droveways and enclosures, a timber-framed aisled building, a second (later) timber building, an apsidal masonry building (perhaps a bath house), and several pottery kilns and corn dryers (Graham & McConnell 2007). Associated with the Nar Valley pottery industry (see below), this was clearly a site of some importance within the local economy.

The 28 sites of Regional significance are spread widely, but not particularly evenly, across the Sub-Unit. There is a notable line of such sites along the Fen Edge in the southern part of the Sub-Unit, stretching from Watlington southwards to Stowbridge. (A similar but less pronounced pattern was evident amongst both the Bronze Age and Iron Age sites, see above, and several in fact equate to the Roman sites.) These include the probable Iron Age to Roman period farmstead and possible saltworks identified at Garbold's Gravel Pit, Runcton Holme (NHER 2397), and a second possible farmstead, evident as cropmarks and surface finds, located only 0.5km to its north (NHER 29718 & 36707). At Luddington's Pit, also within this southern, Fen-Edge, group, a cluster of Roman rubbish pits and a possible four-post structure were identified during extraction taking place in the 1950s. To the north, a number of industrial sites are recorded, including an iron working site at Wicken Quarry, Leziate (NHER 3382) and a pottery kiln at Sandy Lane, Blackborough End (NHER 3391). Although more numerous, the sites of Local significance follow much the same pattern in terms of distribution as those more significant sites already described. Some sites of note include pieces of wood with peg holes in them found at Luddington's Gravel Pit (NHER 2412), two puddingstone querns found in a gravel pit at Middleton (NHER 3432), the possible Roman burnt mound, also at Middleton (NHER 23205; Section 8.6 above), and a scabbard chape for a sword found by a metal detectorist, again at Middleton (NHER 29323).

The exploitation of the Sub-Unit's mineral resources and other industrial processes such as salt making, are a particular feature of the archaeological record for this area of west

Norfolk in this period. In particular, a number of pottery kiln sites indicating the use of local clay deposits are recorded within the Sub-Unit, with others known from the surrounding area. 2, Sandy Lane, Blackborough End (NHER 3391) and Fosters End Drove, Blackborough End (NHER 37413), lie within the Nar Valley in the northern part of the Sub-Unit. These kilns were part of the Nar Valley pottery industry that flourished in the mid to later Roman period. Major production centres, such as Shouldham and Pentney, and smaller local workshops, such as the Sandy Lane site, appear to have been involved in the industry (Gurney 1990, 92). It has been suggested that the Fosters End Drove site, along with others in the area, may have been linked with military supply networks, and in particular the provisioning of the shore fort at Brancaster (Graham & McConnell 2007, *passim*). Further south, early records from a gravel pit at Tottenhill suggest that another possible kiln site was located here, and at least 1 kiln is also present at the 60 Acre Field site at Watlington Quarry (NHER 39458; Town 2004).

Metalworking, exploiting the naturally occurring sources of ore in the 'Lower Greensand' bedrock deposits, also appears to have been widespread. The most substantial evidence for this activity comes from the island of Wormegay, where extensive surface spreads of slag found in association with Roman pottery (NHER 3460) suggest that ore was probably quarried and certainly smelted here (Silvester 1988, 172). (Although the main part of this site lies just outside the Sub-Unit, some more marginal areas, recorded as NHER 19168, do fall within it.) Evidence of industrial activity and metalworking was also identified at Fosters Drove End, Blackborough End (NHER 37413), although the nature of the industry here is not yet clear (Graham & McConnell, 32). In addition, 2 sites within the Sub-Unit are suggested as possible salt works (NHER 2266 & 2397); admittedly this is on the basis of early records and perhaps outmoded interpretations, but a substantial Roman salt-production site undoubtedly existed at Manor Farm, Blackborough End (NHER 23181), just outside the limits of the Sub-Unit. Surface spreads of 'pot boilers', such as the example at Middleton where Roman pottery was also recovered (NHER 23205) may also represent further industrial sites (Silvester 1988, 170, 172). The proximity of a ready source of fuel, in the form of peat, in areas such as the Nar Valley may have been a significant factor in this proliferation of industrial activity (*ibid*., 172).

***Table 8.8. Roman sites in Sub-Unit D***

| Total no. Roman sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **93** | 2.1 | 2 | <0.1 | 13 | 0.3 | 28 | 0.6 | 49 | 1.1 |

## 8.9. Saxon (AD 410 – AD 1065)

44 sites of Saxon date have been recorded in the Sub-Unit, equating to a site density of 1 per sq km. This is a relatively low number of sites compared to the county average of 1.1 sites per sq km, but the difference is slight and the density is on a par with that recorded in both Sub-Unit A and Sub-Unit B. It may reflect a relatively low population density in this part of west Norfolk throughout much of the period (*e.g.* Penn 2005; Williamson & Skipper 2005), although the existence of at least 2 cemeteries, one Early and one Middle Saxon, suggests the existence of settlements nearby. The low number of sites contrasts with the above-average site density in the River Valleys Sub-Unit (Sub-Unit C; Section 7.9). The Sub-Unit D sites predominantly occur in several clusters spread across the area, with large groups at Ashwicken (Leziate), Middleton/East Winch, and Watlington/Tottenhill (some associated with the active quarry site NCC Site No. 39), and smaller groups (which may extend beyond the Sub-Unit) at Wormegay and Runcton Holme (Fig. 8.8). There does seem to be some relationship with topography, with sites occupying positions within valleys and/or adjacent to watercourses, or situated on 'islands' or outcrops overlooking the fens and marsh. Of the latter, the sites on Wormegay Island and on the eastern and western slopes of the Carstone outcrop at Middleton are the most obvious examples; sites adjacent to watercourses (both current and former) include those at Watlington/Tottenhill, Runcton Holme and Wallington.

The relationship between the distribution of the Saxon sites in Sub-Unit D and its bedrock and superficial geological deposits is very interesting, in that there are several apparent divergences from the pattern seen in earlier periods. For example, **amongst the bedrock deposits the highest site density (2.5 sites per sq km) is recorded on the Carstone deposits**, rather than the Mudstone, which supports only 1.2 sites per sq km. All of the Carstone sites are found on the north, west and east-facing slopes of the large outcrop at Middleton. Their distribution does not appear to reflect a bias in the visibility or recording of the area's archaeology: only 1 site (NHER 37413, Fosters End Drove, Blackborough End) relates to quarrying, and none relates to the Fenland Survey. Perhaps the more elevated ground and steep slopes of the outcrop were preferred in this period. Such apparent shifts are also evident between the superficial geologies. Only a relatively low site density of 1.3 sites per sq km is recorded on the Tottenhill Gravels; the figure of 2.6 sites per sq km on the Lowestoft Formation sands and gravels may simply reflect the small sample size for this deposit, as discussed above, but the 1.8 sites per sq km recorded on the diamicton could represent a genuine shift of activity onto these heavier soils, which again occupy a relatively elevated position overlooking the marsh and Fenland. Within the Nar Valley, a tendency for the medieval villages (with the exception of Wormegay) to be set back from the valley floor was noted by Silvester (1988, 172).

2 of the Saxon sites within the Sub-Unit as scored as being of International significance (NHER 3453 & 17286), the only sites within any of the Sub-Units to be given this significance score. They both form part of the same Middle Saxon 'productive site' at Wormegay. Here, intensive fieldwalking (including the Fenland Survey), together with metal-detecting, has recovered large numbers of Middle Saxon finds (and a small number dating to other periods), including pottery, coins, pins, brooches and other dress and strap fittings, from a well-defined area to the east of the church. A spread of human bone, from an area where pottery is absent, suggests the presence of an inhumation cemetery, while fragments of one or a pair of Viking brooches may indicate a Scandinavian burial. The restricted and short-lived nature of the site (the material is almost entirely Middle Saxon), its topographic 'island' setting, possibly together with the presence of a cemetery, has suggested that the site might be best interpreted as monastic (Rogerson 2003, 121).

The 7 sites of National significance form two distinct groups of 3, and a single isolated site — Fosters End Drove, Blackborough (NHER 37413). The remains at the latter are overwhelmingly of Roman date, and that some finds and features might be of Early Saxon date is only a theoretical possibility, rather than a likelihood (see Roberts & Wilkins 2003, 56). Of the remaining sites, the northern cluster relates to the development of the modern settlement of Middleton, which has been suggested as the site of a Late Saxon estate centre (Liddiard 2000, 33–5, 83). St Mary's Church, Middleton (NHER 3419), which is Listed Grade II*, is presumed to have Late Saxon or Saxo-Norman origins; the motte and bailey castle, Middleton Mount (NHER 3394), which is partially Scheduled (SM 184), may have been sited on or close a postulated Late Saxon manor house (Liddiard 2000, 34; Andrew Rogerson, NLA, pers. comm.), and excavations at the site recovered some slight evidence of Saxo-Norman activity, including a structure of this possible date (Ashwin 2001). Earthworks and cropmarks immediately to the north of the village (NHER 16287) represent enclosures and roads relating to a former village green; a Late Saxon origin is plausible for the complex. The southern group comprises an Early Saxon cemetery at Boon or Finch's Gravel Pit, Tottenhill (NHER 2266), an Early Saxon gully and two possible Early Saxon pits containing metalworking debris at 60 Acre Field, Watlington (NHER 39458), and further Saxon features and evidence of Saxon metalworking in Police House Field (NHER 39457), immediately to the northwest. All three sites lie within a few hundred metres of each other.

Sites of Regional significance again occur sporadically across the Sub-Unit, whether as clusters or single isolated sites, rather than forming an even pattern. For example, at Ashwicken (Leziate) in the northeast corner of the Sub-Unit, a cluster of 5 sites relates to the former or shrunken settlements of Leziate, Ashwicken and Glosthorpe, which are primarily medieval in date but are likely to have Saxon origins. At Wallington (Runcton Holme), in the southern part of the Sub-Unit, 2 records relate to the remains of St

Margaret's Church (NHER 50898), of which only the Grade II Listed tower still stands, and the deserted village (NHER 2421), allegedly depopulated in the late 16th century to make way for Wallington Park (NHER 30527), although this is unsubstantiated. Saxon origins are again suspected for both; a Middle or Late Saxon strap fitting has been recovered from the site of the village. The 18 sites of Local significance, the distribution of which to a great extent follows that of the more significant sites already described, are predominantly Find Spot records, either of individual finds, such as the Late Saxon copper alloy mount decorated with a human face found at Middleton (NHER 24141), or of larger, multi-period groups, such as the Middle and Late Saxon pot sherds recovered as part of a larger group of Roman to post medieval finds (NHER 42579).

***Table 8.9. Saxon sites in Sub-Unit D***

| Total no. Saxon sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **44** | 1 | 2 | <0.1 | 7 | 0.2 | 15 | 0.3 | 18 | 0.4 |

## 8.10. Medieval (AD 1066 – AD 1539)

207 sites of known, probable or possible medieval date have been recorded within the Sub-Unit. This equates to a site density of 4.6 sites per sq km, which is higher than that recorded in any of the other Sub-Units, and is also substantially higher than the average for the county (3.2 sites per sq km). The reasons for this high density are unclear; while a proportion of sites relate to work by the Fenland Survey or archaeological investigations undertaken in advance of aggregate extraction, this is too small to be the only factor leading to large numbers of medieval sites being recorded. The sites are not evenly distributed across the Sub-Unit (Fig. 8.9). Several apparent lacunae, some quite extensive, are evident, for example in the south of the Sub-Unit, to the northeast of Wimbotsham, where few sites have been recorded in any of the preceding periods, and relatively few sites have been recorded overall. In the centre of the Sub-Unit there is a sizeable 'gap' between Watlington/Tottenhill and South Runcton, despite finds of other periods having been recovered here. To the north, a lacuna is apparent in the area of what was Bawsey and Leziate Heath (see Faden's and Bryant's county maps, dated 1797 and 1826 respectively), which has since been heavily quarried for Silica Sands, a process that began before the advent of routine archaeological monitoring of such work. As might be expected, the medieval sites are for the most part very much clustered on the higher, more solid ground; those sites recorded on the lower-lying, wetter ground are generally confined to those in that part of the Nar Valley covered by the Fenland Survey.

In terms of geology, despite the greater number of sites overall, any possible preference for or avoidance of a particular geological deposit is in fact harder to distinguish than for

preceding periods, as the variations in site density are less clearly marked. On the bedrock deposits the difference between the highest site density (6.0 sites per sq km) and the lowest (5.3 sites per sq km), again recorded respectively on the Carstone and the Sandringham Sands, is relatively small compared to earlier periods. On the superficial geologies, the highest reliable site density recorded is again on the Tottenhill Gravels (7.8 sites per sq km; the higher site density of 8.9 per sq km, recorded on the Lowestoft Formation sands and gravels, is not necessarily representative due to the small sample size of this deposit). The occurrence of sites on this deposit, located primarily around Watlington, seems less dense than in preceding periods; most notably, there is an apparent scarcity of sites in the central part of Tottenhill parish, another area that has been extensively quarried. There is no further evidence of a possible shifting of activity onto the diamicton, as may be apparent in the Saxon period; in fact some areas of this deposit in the southeastern part of the Sub-Unit are relatively empty of medieval sites, as has already been described for the area between South Runcton and Watlington/Tottenhill.

The 2 sites within the Sub-Unit that are of International significance (NHER 3453 & 17286), which are of importance primarily due to their evidence for the Middle Saxon period, also appear amongst the medieval sites. Relatively small quantities of medieval material have been recovered from what is essentially a single 'productive site' at Wormegay. The 17 sites of National significance include 5 surviving churches — SS Peter and Paul's, Watlington (NHER 2286); St James', Runcton Holme (NHER 2431); All Saints', Ashwicken (NHER 3416); St Mary's, Middleton (NHER 3419); and St Michael's, Wormegay (NHER 3474) — all of which are Listed Grade I or II*. In addition, they include the site of All Saints' Church, Leziate (NHER 3409), which is Scheduled (SM 392), Blackborough Priory (NHER 3430), which is both Grade II Listed and Scheduled (SM 228), and the moated site of Wormegay Priory (NHER 3456), which is also Scheduled (SM 3456). The well-preserved secular sites comprise the motte and bailey castle known as Middleton Mount (NHER 3394, SM 184), the manorial site of Scales Hall, now the grounds of Middleton Towers (NHER 3395, SM 30552), and Wallington Hall (NHER 2425), built in the early 16th century (but with later additions and alterations) and Grade I Listed. The remaining sites primarily relate to finds and features identified during the extensive excavations undertaken at Watlington and Fosters End Drove, Blackborough End, where the main significance lies in the remains of earlier periods. The exception is NHER 16287, the cropmarks and earthworks of roads and enclosures arranged around a former village green ('Fair Green') at Middleton. Green and common-edge settlements are a notable feature of medieval Norfolk, particularly of the claylands (Williamson 2006, 168) on the edge of which Middleton sits, and relicts of their former layout are significant survivals.

The 53 sites with a Regional significance score are more evenly distributed across the Sub-Unit. 17 records relate to deserted or shrunken settlements (and their accompanying

churches), including the named settlements of Thorpland (NHER 2401), Wallington (NHER 2421), Leziate (NHER 3384 & 14772), Holt (NHER 3402), Glorestorp/Glosthorpe (NHER 3405, 50827), Foston (NHER 11960), Ashwicken (NHER 16290) and Runcton Holme (NHER 50903). 3 church sites — for Thorpland (NHER 2415), Foston (NHER 4289), and Wallington (NHER 50898) — are known. Other sites include moats — the site of Haveless Hall (NHER 3411) at Bawsey, and a partially excavated moated rectory at Wimbotsham (NHER 11874; Shelley 2003), located respectively at the far northwestern and far southeastern corners of the Sub-Unit. A pottery works, in operation from the later 12th century, has been identified at Blackborough End, Middleton (NHER 17915). At Wormegay, former earthworks within the probable bounds of Wormegay Park have been interpreted as possibly relating to a park lodge, of medieval or post medieval date (NHER 3457; Silvester 1988, 148). This group also includes 4 sites of ridge and furrow (see below).

The sites of Local significance comprise 40 Find Spot records, generally of pottery, coins and other metalwork, but also including an enamelled figure of Christ from a late 12th to early 13th-century Limoges crucifix, found at Wallington (Runcton Holme; NHER 37303). The 65 Monument records include 10 that relate to (generally levelled) ridge and furrow, 5 relating to moats or possible moats, 6 relating to settlements and 1 relating to a possible building. 34 records relating to enclosures, field boundaries and trackways potentially dating to this period are primarily a product of the NMP survey.

Ridge and furrow is a particular feature of Sub-Unit D, as noted in the NMP report (Albone *et al*. 2008), and, as has previously been observed, of west Norfolk as a whole (Silvester 1989, fig. 1; Liddiard 1999, fig. 1). 14 sites of medieval ridge and furrow are recorded within the Sub-Unit as a whole, 9 of which were recorded by the NMP. All of the latter sites lie to the south of the Nar Valley, leading to the suggestion that heavier, more poorly-drained soils in this area lead to if not greater use of ridge and furrow in the past, at least its better survival and visibility. This contrasts with the distribution of medieval field systems within the Sub-Unit, which were only recorded to the north of the Nar Valley, again suggesting that environmental factors such as lighter soils might have been a factor in the development of this form of enclosed landscape (Albone *et al*. 2008). As was noted in the NMP report, however, outside of the Sub-Unit other sites of medieval ridge and furrow have been recorded to the north of the Nar Valley. In addition, 2 of the ridge and furrow sites within Sub-Unit D which were not recorded by the NMP survey lie to the north of the River Nar. NHER 22143 is a small area of earthwork ridge and furrow recorded at Blackborough End, Middleton, in 1986; it was not visible on the aerial photographs consulted by the NMP Survey. Ridge and furrow has also been identified further to the northeast, at Wicken Quarry, Leziate, from sub-surface deposits or features uncovered during excavations in advance of mineral extraction (NHER 37504). Overall, it is difficult to

correlate the records of ridge and furrow with a particular geology: the sites occur on all of the bedrock deposits present within the Sub-Unit (although not the Snettisham Clay LEX type), and most of the superficial deposits (only peat and the Lowestoft Formation sands and gravels are excepted), with no obvious preference for one over another. Those sites still thought to substantially survive as earthworks are for the most part located on the edge of the Tottenhill Gravels (the earthworks in Stow Hall Park, NHER 30524, which overlie diamicton, are the exception). **Given the extreme rarity of surviving ridge and furrow in Norfolk, and the ongoing debate as to its past prevalence as an agricultural practice within the county** (see Williamson 2006, 58, for example), **such survivals are of particular importance**.

***Table 8.10. Medieval sites in Sub-Unit D***

| Total no. Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **207** | 4.6 | 2 | <0.1 | 17 | 0.4 | 53 | 1.2 | 106 | 2.4 |

## 8.11. Post Medieval (AD 1540 – AD 1900)

174 sites of known or possible post medieval date have been recorded within the Sub-Unit, equating to a density of 3.9 sites per sq km. Surprisingly, given the relatively high density of medieval sites recorded (Section 8.10 above), the number of post medieval sites is not only lower than is recorded in any of the other Sub-Units, but is also notably lower than the average recorded across the county as a whole (4.3 sites per sq km). The reasons for this apparent discrepancy are unclear; perhaps it reflects, at least in part, a fairly low population density — and wealth — relative to the other areas (*e.g.* Pound 2005, 100–1; see too Section 8.14 below). Another factor may be that only 17 records — 10% of the total — are Building or Listed Building records. Compared to Sub-Unit C, for example, where 104 (30%) of the post medieval records relate to Listed and undesignated buildings, this indicates that Sub-Unit D is relatively poorly represented in terms of its built historic environment.

The sites are distributed widely but irregularly across the Sub-Unit, with much the same pattern of clusters and lacunae that were seen in the medieval period again evident (Fig. 8.10). In contrast to the preceding period, there is little evidence of any overall pattern in the relationship between site distribution and topography, with significant numbers of sites recorded on the lower-lying ground where there was previously little evidence of activity. This is particularly the case in the northern part of the Sub-Unit with several sites recorded on the floodplain of the Nar and Middleton Stop Drain; further south, there is clearer evidence of sites clustering on the higher ground, with a line again visible along the Fen Edge between Watlington and Stowbridge. In contrast to the other Sub-Units in this period,

there is a notable scarcity of the very extensive sites, such as parks, that have dominated the distribution pattern in other areas. In Sub-Unit D there is only Wallington Park and Stow Hall Park, adjacent polygons in the southeastern corner of the Sub-Unit. Rather, there is a proliferation of extensive linear sites; these comprise not only the railways seen in earlier periods, but also, just appearing in the southern part of the Sub-Unit, features relating to the large-scale drainage of the Fens (Tong's Drain, NHER 23225, and St John's or Downham Eau, NHER 2427).

The density of post medieval sites recorded on each of the three bedrock deposits within the Sub-Unit mirrors closely the equivalent figures for the Sub-Unit overall (Table 8.1 above; and also the Roman period, Section 8.8 above). The highest density of post medieval sites (5.5 per sq km) is found on the Mudstone, again clustered in the area around Watlington and the Tottenhill Gravels. The densities recorded on the Sandstone and Sandringham Sands are relatively equal (4.7 and 4.4 sites per sq km respectively), with a very slightly higher density of sites on the Sandstone. This contrasts with many of the preceding periods, where either the density on the Sandstone and Sandringham Sands was almost entirely equal (the Neolithic, Bronze Age and Iron Age periods), or the highest density of sites was recorded on the Carstone (the Saxon and medieval periods). On the superficial deposits there are again clear contrasts with earlier periods. The highest site density (7.5 per sq km) is recorded on the Head deposits, on which a low (often the lowest) site density is recorded in most of the preceding periods. Many of the sites appear to relate to field boundaries and enclosures of relatively recent (medieval or later) origin, mostly visible as cropmarks. At the same time, the sample size for the Head deposits is relatively small (only 3.21 sq km), as is that for the Peat, on which the second highest site density is recorded (16 sites over 2.24 sq km, or 7.1 per sq km). The relatively large sample of the Tottenhill Gravels, however, supports the next highest site density — 6.7 sites per sq km — which is still substantially higher than that recorded across the Sub-Unit overall; a high density of sites is recorded on this deposit in all of the preceding periods. The lowest density of sites is recorded on the Lowestoft Formation sands and gravels; this has supported a high density of sites in previous periods, but the sample size is too small to accord these statistics much significance.

Of the 2 sites of International significance within the Sub-Unit, 1 (NHER 17286) encompasses finds of post medieval date. As has already been described in many of the period sections above, the significance of this site relates primarily to its remains of Middle Saxon date. The 17 post medieval sites of National significance include 10 Listed and/or Scheduled sites. They comprise 4 standing churches — St James', Runcton Holme (NHER 2431, Listed Grade I), All Saints', Ashwicken (NHER 3416, Listed Grade II*), St Mary's, Middleton (NHER 3419, Listed Grade II*), and St Michael's, Wormegay (NHER 3474, Listed Grade II*) — all of which were built in the Late Saxon and/or medieval period, but all

of which remained in use in the post medieval period (and indeed into the 20th century). The site of a fifth church — All Saints', Leziate (NHER 3409), which is Scheduled (SM 392) — also falls within this group; despite the parish having been united with Ashwicken and the chancel having been illegally pulled down by the parson, the church remained in use into the 18th century and was demolished in the 19th century. The other sites comprise the remains of Wormegay and Blackborough priories (NHER 3456, SM 20824, & NHER 3430, SM 228, Listed Grade II, respectively), Wallington Hall, built in the late 16th century, with later alterations (NHER 2425, Listed Grade I), and Middleton Mount (NHER 3394, SM 184) and Scales Hall Manor at Middleton Towers (NHER 3395, SM 30552), both of which are predominantly medieval in date but encompass later elements. The other, undesignated, sites of National significance comprise those relating to or surrounding the major excavations that have taken place at Watlington (*e.g.* NHER 39458 and related) and Blackborough End (NHER 37413), but also the cropmarks and earthworks of the former green-side settlement at Fair Green, to the north of Middleton (NHER 16287), where again many of the features are likely to have medieval (or earlier) origins.

The sites of Regional significance include the railways and drains already described, and 3 of the Sub-Unit's recorded parks, Stow Hall Park (NHER 30524), Wallington Park (NHER 30527), and Watlington Hall Park (NHER 31972). (A fourth park at Middleton (NHER 31971), which is actually an amalgamation of two 19th-century landscape parks, is now occupied by housing and a golf course, and is of only Local significance.) While none of the 3 parks is included in English Heritage's *Register of Historic Parks and Gardens*, they all appear in a local inventory (NCC n.d.). As well as preserving various parkland and garden features, both Stow Hall Park and Wallington Park preserve a number of earthworks within their bounds. The regionally significant sites also include 9 Grade II Listed Buildings, 4 of which are clustered at Middleton while the remainder are more widely spread across the Sub-Unit.

Amongst the sites of Local significance, a number of drainage mills and pumps and the site of a duck decoy testify to the low-lying, wetland character of much of the area. Brickworks at Bawsey (NHER 3413), Leziate (NHER 3414), East Winch (NHER 15049) and Shouldham Thorpe (NHER 50587), and brick kilns at Leziate (NHER 3415) and Tottenhill (NHER 36520), together with the route of the Leziate Quarry tramway (NHER 13582), which at one time served Bawsey Brickworks as well as the quarry, indicate the widespread exploitation of the area's mineral resources.

***Table 8.11. Post Medieval sites in Sub-Unit D***

| Total no. Post Medieval sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **174** | 3.9 | 1 | <0.1 | 17 | 0.4 | 53 | 1.2 | 91 | 2.0 |

## 8.12. Modern (AD 1901 – AD 2050)

41 sites dating to the 20th–21st centuries are recorded within Sub-Unit D. This relatively low number in comparison with sites of post medieval date reflects the understandably selective recording of modern sites, and the complete absence of any record of modern Find Spot sites. The resulting density of 0.9 sites per sq km is extremely low, substantially lower than that recorded in any of the other Sub-Units or in the county as a whole (where 1.8 modern sites per sq km is the average). This is despite the fact that the NMP survey, which is usually productive of 20th-century sites, has been completed for 82% of the Sub-Unit, compared with only 28% of the county. One factor in this low number of sites being recorded is likely to be the paucity of building records — both Listed and undesignated — for the Sub-Unit; such sites have often remained in use up to the present day, thus bolstering the number of 'modern' sites recorded. (Compare Sub-Unit C, Section 7.12, where a density of 2.7 modern sites per sq km is recorded, over 60% of which are buildings.) It is also a reflection of the very low number of 20th-century military sites recorded in this part of Norfolk; only 4 such sites were recorded here by the NMP, in part due to the lack of wartime photographic coverage for this part of Norfolk. This in turn reflects a relative dearth of the most numerous type of World War Two military site — anti-invasion defences such as pillboxes — in this part of the county (Kent 2005), far as it is from the 'Coastal Crust' of the north and east coast, from strategically important centres such as Great Yarmouth, and the major river-based stop-lines of east Norfolk.

Only 8 (20%) of the 41 modern sites in Sub-Unit D relate specifically to 20th-century military activity. All are of World War Two date, other than a Royal Observer Corps post at Middleton (NHER 21969), which opened in 1960. The sites are spread widely across the Sub-Unit, with only a small cluster of 3 sites evident at Stow Bardolph (Fig. 8.11); these relate to defences at Stow Bridge, including anti-tank blocks (NHER 32375), a spigot mortar emplacement (NHER 35921), and a possible weapons pit (NHER 35922). The other defensive sites are also relatively small scale, comprising the site of a mobile searchlight at East Winch (NHER 50846), a searchlight or gun emplacement at Watlington (NHER 50965), a possible depot at Bawsey (NHER 50854), and the shelter for a decoy airfield at Wormegay (NHER 34319).

Of the remaining, non-military sites, the vast majority originated in earlier periods, but have either continued in use up to the present day (for example, St James' Church, Runcton Holme, NHER 3419), or also encompass finds or features of recent origin (*e.g.* a post medieval to modern pit recorded at Fosters End Drove, Blackborough End, a predominantly Roman period site, NHER 37413). Such records account for all those of National significance, and almost all those of Regional significance. Only the surviving World War Two decoy site shelter (NHER 34319) has been accorded a Regional or higher significance score in its own right.

No aircraft crash sites are recorded within the Sub-Unit.

***Table 8.12. Modern sites in Sub-Unit D***

| Total no. Modern sites (inclusive) | per sq km | Inter-national | per sq km | National | per sq km | Regional | per sq km | Local | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| **41** | 0.9 | 0 | 0.0 | 4 | 0.1 | 15 | 0.3 | 18 | 0.4 |

## 8.13. Survival and Visibility

Sites recorded as surviving as historic landscapes and major or minor earthworks are illustrated in Figure 8.12 and tabulated below, cross-referenced with the Sub-Unit's dominant and aggregate geologies (Table 8.13). The distribution map shows a landscape populated only moderately densely with well-preserved (*i.e.* earthwork or historic landscape) sites; even if surviving buildings and structures were included, such survivals are only recorded at 35 sites (compare Sub-Unit C, Section 7.13, where 135 sites with surviving buildings or structures are recorded). The pattern of site distribution shows no obvious relationship with topography, in contrast to Sub-Unit C, where higher numbers of earthwork and 'historic landscapes' are recorded along the major river valleys (Section 7.13). Rather, the sites occur in clusters, for example in the northeast corner of the Sub-Unit, on former common and warren land where there has been preferential survival of earthworks, or in the southeast of the Sub-Unit, where the adjacent parks of Wallington and Stow Hall not only survive as historic landscapes in their own right but, in the case of the former, also preserve a number of earthwork sites within their bounds. It is interesting to note that a relatively high number of well-preserved sites are recorded in this southern portion of the Sub-Unit, given the overall scarcity of sites here when compared to other areas. There is little variation in site densities across the different geological deposits, with average (for the Sub-Unit) or near-average numbers of earthworks and historic landscapes recorded on most geologies. The exception is the Lowestoft Formation sands and gravels (S_SAND_AND_GRAVEL), on which a slightly higher density of all three site-types is recorded. However, with such small numbers of sites overall, and with a sample size of only 3.13 sq km of the deposit, the significance of this pattern is unclear.

Of the 44 'historic landscape' and surviving (or potentially surviving) earthwork sites recorded in total, 6 have been assessed as being of National significance, and 15 as Regionally significant. The remainder are of Local significance, with the exception of NHER 50755, the earthworks and cropmarks of possible drainage ditches of medieval to post medieval date, the significance of which is Negligible.

Cropmark sites are recorded widely across the Sub-Unit, but there are very clear gaps and clusters in their distribution, even in those areas for which the NMP survey was completed.

There is an apparent lacuna, for example, over the Carstone and Gault Formation outcrop at Middleton, and within the huge mineral quarry at Leziate, where early extraction had removed large sections of the landscape prior to the earliest available aerial photography. In the latter case, **a cluster of cropmark sites recorded around the eastern edge of the quarry testifies to its former potential for cropmark sites**. The cluster of sites at Watlington reflects not only the responsive nature of the soils overlying the Tottenhill Gravels (S_GRAVEL), but also the complex nature of the archaeology in this area, informed as it is by the extensive excavations that continue at Watlington Quarry.

Overall the density of cropmark sites recorded in the Sub-Unit (2.6 per sq km) is unremarkable. It is substantially higher than the 1.0 cropmark sites per sq km recorded across the county as a whole, but this is unsurprising, given the relatively free-draining soils across large proportions of the area, and the fact that the NMP survey has been completed for 82% of the Sub-Unit but only 28% of the county. The average density in Sub-Unit D is comparable to that recorded in the other Sub-Units, but is substantially lower than the 4.2 sites per sq km recorded in the eastern portion of Sub-Unit A for which the NMP was completed — a particularly busy area (Section 5.13). In contrast to the earthwork and 'historic landscape' sites, the density of cropmark sites recorded on each of the dominant and aggregate deposits varies widely. Of the bedrock deposits, the highest density of cropmarks is recorded on the Mudstone, but this may simply reflect the large number of sites recorded at Watlington, on the overlying Tottenhill Gravels. The slightly below-average number of sites recorded on the Sandringham Sands is contrary to the expectation held prior to the start of the project: extensive cropmarks relating to an Iron Age to Roman period settlement and agricultural landscape were mapped on this bedrock at Snettisham in the Coastal Zone (Albone *et al*. 2007a), and similarly dense areas of cropmarks were expected in Sub-Unit D. The results of this assessment, however, would suggest that the favourability of the Sandringham Sands for cropmark formation is variable at best, and that the profusion of marks evident at Snettisham might instead reflect variations in the overlying superficial geology or soils, agricultural regimes and landuse, or past human agency (or, most probably, a combination of these and other factors). Amongst the superficial geological deposits, by far the highest density of cropmark sites is recorded on the Tottenhill Gravels, in particular, as has already been described, in a cluster around Watlington. As was noted in the NMP report (Albone *et al*. 2008), however, while these 'Fen-Edge' gravels are undoubtedly responsive to cropmark formation, the density evident around Watlington does not continue further to the south, despite the continuation of the deposit, with few sites recorded to the south of Runcton Holme. This indicates that the density of sites recorded at Watlington is as much the result of a variety of local factors — topography, soils, photographic coverage and, not least, the extensive excavations undertaken there in advance of extraction — as it is of the underlying geology.

The apparently high density of cropmark sites recorded on the diamicton, where relatively heavy soils would not be expected to be conducive to cropmark formation, is a trend that is also evident in Sub-Units B and C. It warrants further investigation.

***Table 8.13. Survival and visibility of sites in Sub-Unit D relative to geology***

| | Area (sq km) | Historic Land-scapes | per sq km | Major Earth-works | per sq km | Minor Earth-works | per sq km | Crop-marks | per sq km |
|---|---|---|---|---|---|---|---|---|---|
| ***Sub-Unit D*** | ***45.00*** | ***7*** | ***0.2*** | ***5*** | ***0.1*** | ***34*** | ***0.8*** | ***115*** | ***2.6*** |
| | | | | | | | | | |
| B_MUDSTONE | 12.89 | 2 | 0.2 | 3 | 0.2 | 14 | 1.1 | 62 | 4.8 |
| **B_SAND [Sandringham Sand Formation]** | **25.29** | **5** | **0.2** | **4** | **0.2** | **22** | **0.9** | **59** | **2.3** |
| **B_SANDSTONE [Carstone]** | **6.82** | **1** | **0.1** | **1** | **0.1** | **6** | **0.9** | **17** | **2.5** |
| | | | | | | | | | |
| S_DIAMICTON | 12.45 | 3 | 0.2 | 1 | 0.1 | 12 | 0.9 | 39 | 3.1 |
| **S_GRAVEL** | **8.22** | **2** | **0.2** | **0** | **0.0** | **9** | **1.1** | **56** | **6.8** |
| **S_SAND_AND_ GRAVEL [glacial]** | **3.13** | **1** | **0.3** | **1** | **0.3** | **5** | **1.6** | **11** | **3.5** |

## 8.14. Historic Landscape Character (PT)

The Sub-Unit predominantly falls within what has been characterised as Norfolk's 'Western Escarpment' (Williamson 1993, 13–4, fig. 1.2), a landscape that has often been overlooked in landscape histories of Norfolk, as it lies between several more 'distinctive' areas: the 'Good Sands' region of northwest Norfolk (to its northeast), Breckland (to its southeast), and the Fens (to its west). The area is notable for the diversity of its landscape, reflecting variations in both its topography and geology. The overall topography of the Sub-Unit is that of a terrace, aligned north-south, that gently rises to the north and is crossed by several marshy valleys that run westwards to the Fens (Dymond 1985, 30). Its field morphology marks it out from surrounding areas in that it exhibits the slightly irregular sinuous lines of piecemeal enclosure, interrupted only by the former warrens on the Sandringham/Leziate Sands of the northern part of the Sub-Unit, and the 'island' of Wormegay surrounded by the marshland of the Nar Valley.

Over much of the period covered by HLC (*i.e.* the last 200 years), the density of settlement within the Sub-Unit has been low compared to the central and eastern parts of Norfolk, and within each parish settlement tends to be concentrated around a single village with the occasional isolated farmstead. The parish of Middleton to the north of the centre of the Sub-Unit does not exhibit this pattern of nucleation, and has four hamlets, whereas Leziate, Ashwicken and Mintlyn, immediately to its north, have had very little settlement for the last few hundred years, up until the production of the 1959 Ordnance Survey map. Several deserted or shrunken medieval settlements, however, are recorded.

This is a varied landscape of heath, warren, woodland, fen and arable land, occupying a dissected terrace rising from the Fens. Many of the fields found on the higher ground of the Sub-Unit are the product of modern alterations to the piecemeal enclosure of open fields. These are quite distinct from many of the fields seen in much of west Norfolk, reflecting the heavier, more fertile soil of the Sub-Unit. Rather than the rectilinear 18th and 19th-century enclosure so dominant on the 'Good Sands' to the northeast and the Fens to the west, the fields here were enclosed much earlier and reflect a landscape of gradual change, instigated by a succession of small landowners. Against this background, the number of records of ridge and furrow within the Sub-Unit is notable (see Section 8.10 above), although these records cannot be correlated with a particular historic landscape type, occurring as they do on a variety of different types ranging from 20th-century enclosure to woodland plantation and informal parkland.

On the lower ground to the west of the Sub-Unit, and within the Nar Valley at Wormegay, piecemeal Parliamentary enclosure of earlier fen enclosure is evident, on land that was presumably farmed as pasture. While this form of enclosure dominates the landscape, the area has also been subject to 20th-century alterations, as improved drainage led to increased arable cultivation.

Large-scale mineral extraction is now an important part of the character of much of the modern landscape of the Sub-Unit. Former heaths and warrens, once found throughout the area but a particular feature of its northern portion, are now either actively exploited for their underlying mineral deposits, or are the site of lakes and woodland occupying disused workings. Future mineral extraction will no doubt continue to increase the extent of this evolving landscape type; **where possible, in the north of the Sub-Unit, areas of warren and heath warrant preservation, so that something of the original landscape character might remain**.

Elsewhere in the Sub-Unit **there are also surviving landscape character types that may deserve consideration when sites of extraction are proposed. Areas reflecting the piecemeal enclosure of arable land still exist**: it is this historic landscape type that would have made the area even more distinctive 200 years ago, when it sat between the pasture of the Fens and the Nar Valley, and the open countryside of the warrens, commons and heaths to the north.

The historic landscape character of Sub-Unit D is representative of the broader Study Area as a whole in that it reflects the varied topography and geology to be found on the 'Western Escarpment', rising from the Fens at Feltwell in the south to Hunstanton in the north. Within the Sub-Unit, soils of peat, sand, loam and clay give rise to landscapes of fen, warren and early arable enclosure, and these can be found throughout the Study Area.

## 8.15. The Impact of Extraction

Past and current extraction in Sub-Unit D has been both extensive and widely distributed across the Sub-Unit, with a particular concentration in the northern part of the area, and especially on the former commons and warrens at Bawsey and Leziate (see Section 8.14 above). Here, the main target for the extraction has been the Sandringham Sands, a major source of Silica Sand for glass making and other industrial purposes. However, it also covers a small outcrop of Carstone at Leziate, a deposit which appears to have also been a target for extraction, at Blackborough End. Further to the south, Sandringham Sand Formation bedrock and superficial sands and gravels have been targeted in the Nar Valley, at Wormegay and Pentney, while in the southernmost part of the Sub-Unit, almost all of the recorded extraction has been sited on the Fen-Edge Tottenhill Gravels.

100 archaeological sites are recorded as being co-located with past and current extraction sites (Fig. 8.14); 96 are defined by polygons that overlap with the boundary of 1 or more mapped quarry sites, while a further 4 sites have 'mineral extraction' recorded as a landuse. Neither of the 2 'sites' relating to the Internationally significant Middle Saxon site at Wormegay has been affected, but 16 sites of National significance do fall within this group. This is a very high number, even higher than that recorded in Sub-Unit C (Section 7.15). 14 (88%) of these sites, however, are part of a dense cluster recorded at Watlington/Tottenhill. Most relate to the extensive excavations and other work that has been undertaken here in advance of aggregate extraction, or to cropmarks recorded in the two main areas affected: Police House Field and 60 Acre Field. Of the group, only NHER 2266, the site of an Early Saxon cemetery and findspot of Palaeolithic, Neolithic and Roman material, remains separate, and is located at an older extraction site a few hundred metres to the east of the modern quarry. The other 2 Nationally significant sites are both located to the north, and comprise the remains of Blackborough Priory (NHER 3430, SM 228, Listed Grade II), which is bordered on two sides by extraction sites, but otherwise does not appear to have been substantially affected, and the predominantly Roman site at Fosters End Drove, Blackborough End (NHER 37413) which has again been the subject of extensive archaeological excavations in advance of extraction, and indeed would not be known about if it were not for this work having taken place.

The other sites co-located with past or current extraction consist of 21 of Regional significance and 53 of Local. The Regionally significant sites are more evenly distributed across the Sub-Unit than those of National significance described above, but a number of small groups are evident. At Mintlyn Wood, in the northwest corner of the Sub-Unit, the earthworks of a partially excavated Bronze Age barrow still survive (NHER 16286), together with the earthworks of a second possible barrow, rabbit warren or natural mound (NHER 50593), and the possible earthworks of a penannular ring bank (NHER 50842). All 3 sites have been destroyed by extraction. In the southern part of the Sub-Unit, 4

Regionally significant sites are recorded within Luddington's Gravel Pit, an area of historic quarrying; they comprise: a group of Roman rubbish pits and various finds from other periods (NHER 2405), hut circles and a possible Roman 4-post structure (NHER 2413), the site of Thorpland DMV (NHER 2403), and the site of its associated church, St Thomas' (NHER 2415). The sites of Local significance are also widely spread, but again seem to occur in clusters. The largest group correlates with the extensive Silica Sands quarry at Leziate; a good proportion relate to the NMP mapping for the area.

***Table 8.14. Sites in Sub-Unit D co-located with former and existing extraction sites*** *(as of 27.3.08)*

| Total no. sites | International | National | Regional | Local |
|---|---|---|---|---|
| **100** | 0 | 16 | 21 | 53 |

There are 9 existing quarry sites within the Sub-Unit, some made up of more than 1 block of land, covering 4.82 sq km in total (Fig. 8.14). These are located at Leziate/Bawsey (NCC Site No. 1), Middleton/East Winch (NCC Site Nos 45, 295, 296 & 297), Wormegay/Pentney (NCC Site No. 41), Wormegay (NCC Site No. 40), Watlington/Tottenhill (NCC Site No. 39), and Stow Bardolph (NCC Site No. 635). Although more extensive in the north, 1 or more active sites are present in most parts of the Sub-Unit, which itself encompasses the main concentration of active extraction in this part of the county. Within the limits of the Sub-Unit, 52 archaeological sites intersect with these quarries. 13 are of National significance, but as has already been discussed, most of these sites are clustered around 2 areas of quarrying at Watlington/Tottenhill, and almost all derive their high significance score from information discovered through work undertaken in advance of — and necessitated and funded by — aggregate extraction. The only exception is Blackborough Priory (NHER 3430, SM 228) where, again as already discussed, the mapped extraction only overlaps the very edge of the site, and is not recorded as having impacted upon it, or upon the Scheduled area, in any way. 11 of the sites are of Regional significance. Several relate to sites investigated in advance of, and essentially discovered by, aggregate extraction taking place there. Others previously known about were also excavated in advance of extraction taking place, while yet more have been recorded only recently as part of the NMP survey, too late for any negative impact from the extraction to be mitigated. Of the 22 sites of Local significance, few appear to have been the subject of intensive investigation prior to extraction taking place, suggesting that some sites of greater potential could have been lost.

Future extraction within the Sub-Unit, as proposed in the draft MWDF, also appears to be spread throughout the area, although avoiding the extensive portion of Leziate and Bawsey that has already been quarried away (Fig. 8.15). Most lie close or adjacent to existing quarries; only MWDF Site ref. MIN 95 at Runcton Holme, in the southern part of the Sub-Unit, represents a break with the current pattern, although even here the site borders an

area of historic quarrying (Luddington's Pit) on its western side. **Totalling 3.92 sq km, should all the proposed sites go ahead it would represent an 81% increase to the area of active extraction** (Appendix 2). **It represents 9% of the total area of the Sub-Unit, or nearly 20% of the land area when taken together with the currently active sites**. This is a massive proportion, far greater than for any of the other Sub-Units, and **the cumulative impact of such extensive extractive activity both on the historic environment and historic landscape character of the area should be borne in mind in any consideration of whether and where future extraction should take place**.

Within the Sub-Unit, 44 archaeological sites are recorded as intersecting with one or more of the proposed mineral allocations (Table 8.15, Fig. 8.15). This is again a massive number of sites when compared to the other Sub-Units; even in Sub-Unit C, which covered a larger area (64 sq km), only 24 archaeological sites are recorded as being at potential risk. What is more, 5 of the sites are recorded as being of National significance. 2 (NHER 29697 & 39457) are sites within an area of existing quarrying at Watlington (Police House Field, in Tottenhill parish). The edge of these sites just encroaches onto a proposed extension to the west (MWDF Site ref. 77); at present, no archaeological sites are recorded within the proposed extension, but the proximity of the excavated Iron Age and Roman period settlement and agricultural landscape in the existing quarry suggests that significant remains are likely to be present. At Blackborough Priory, part of which is Scheduled (SM 228) and part Listed Grade II, three different minerals allocations (MWDF Site refs MIN 29, MIN 31 & MIN 30) encroach upon the boundaries of the site, and indeed of the Scheduled area, in some cases severely. Wallington Hall (NHER 2425), which is Listed Grade I, falls within MWDF Site ref. MIN 95, at Runcton Holme. A probable Bronze Age barrow which survives as an earthwork at Leziate is also Scheduled (NHER 3381, SM 373); it is one of few surviving earthwork examples of such sites in Norfolk. It falls within MWDF Site ref. MIN 42 (the boundary of this proposed allocation has since been altered but it is not clear whether the barrow still falls within the site, NCC 2008b).

The sites of Regional and Local significance again include several recorded during excavations or other investigations that have taken place prior to extraction in adjacent areas, and/or relate to sites which are only partially encroached upon by an allocation. There is also a high proportion, however, that are more seriously affected, and that require further investigation to better define their character and extent. Within MWDF Site ref. MIN 42 at Leziate they include the cropmarks of a double ring ditch (NHER 11694), almost certainly representing the remains of a Bronze Age funerary and/or ceremonial monument linked to the surviving earthwork barrow 200m to the northwest (NHER 3381, see above). (The boundary of this proposal has since been altered, excluding the cropmark site, NCC 2008b.) The cropmarks of enclosures of probable Late Saxon to medieval date, thought to be associated with the shrunken medieval settlement of Leziate (NHER 16289), are also

visible within this area (these too may now fall outside the proposal's amended boundaries). Within MWDF Site ref. MIN 95 at Runcton Holme, there are 3 sites of Regional significance (as well as the Nationally significant site of Wallington Hall). These comprise Wallington Park (NHER 30527), which is included on local lists of historic parkland (NCC n.d.), the site of Wallington DMV (NHER 2421), parts of which still survive as earthworks, and also the remains of its church, St Margaret's (NHER 50898), of which the Grade II Listed tower still stands.

***Table 8.15. Sites in Sub-Unit D co-located with proposed minerals allocation sites*** *(as of 27.3.08)*

| Total No. Sites | International | National | Regional | Local |
|---|---|---|---|---|
| **44** | 0 | 5 | 12 | 24 |

## 8.16. The Broader Study Area

Study Area D, the broader area of aggregate type of which Sub-Unit D forms part, is described briefly in Section 3.3.4. 2206 archaeological sites have been recorded within, or partially within, this area (as of 2 June 2008). 183 of these sites also lie within Study Area C (River Valley Gravels) and 1 falls within Study Area B (Plateau Gravels); these are mainly extensive sites, such as railway lines, that cross through many different landscape types, but there is also an overlap between Study Area C and the other three Study Areas.

### 8.16.1. Geology

The density of archaeological sites within the Study Area, broken down by BGS ROCK type, is shown in Table 8.16 below. The complex geological make-up of the Study Area is immediately apparent, with a wide variety of bedrock and superficial deposits present, as was also the case in Study Area C (Section 7.16; but contrast Study Areas A and B). Overall the Study Area supports a density of 8.2 sites per sq km; this is lower, but not substantially so, than the average in the Sub-Unit, which was 8.9. While this suggests that the Sub-Unit is generally representative of its corresponding broader area of geological type (*i.e.* the 'Lower Greensand' and Fen Edge Gravels), this does not take into account the varying levels of NMP coverage for the two areas. The NMP survey has been completed for 82% of the Sub-Unit but only 37% of the Study Area; given that the NMP typically increases the archaeological record of the areas it covers by at least 30%, this would suggest that the Study Area is potentially somewhat busier — and perhaps busier than the Sub-Unit — than the current site density figures would suggest. It is also the case, however, that **the site density figures for both the Study Area and the Sub-Unit are not only lower than the average for the county (9.0 sites per sq km), but are also the lowest recorded on any of the aggregate Study Areas assessed by the project**.

Seven different Bedrock deposits (as defined by BGS ROCK type) are recorded within the Study Area (Table 8.16). Three of these — the Chalk, Snettisham Clay and interbedded Mudstone and Limestone — are present across such a small area that any site density figures generated for them are meaningless, and they can be omitted from any further analysis. As was the case within the Sub-Unit, the highest valid site density (12.1 sites per sq km) is recorded on the Mudstone. To what extent this reflects areas of intensive fieldwork, such as the Fenland Survey, and to what extent it reflects properties of the overlying superficial geologies or soils (*e.g.* propensity to form cropmarks) is unclear; both are likely to be significant factors. Moderately high site densities (10.3 sites per sq km), higher than the average for the Study Area as a whole, are also recorded on the Carstone (B_SANDSTONE) and Dersingham Formation (B_SANDSTONE_AND_MUDSTONE). The long, irregular outlines of both these deposits are likely to have exaggerated, to an extent, the density of sites recorded on them. Conversely, **the lowest site density (8.0 sites per sq km), slightly lower than that for the Study Area overall, is recorded on the Silica Sands**: Leziate, Mintlyn, Roxham and Runcton Sand members, all part of the Sandringham Sands **Formation** (BGS 2008). This is slightly surprising, as well-drained geologies such as these might be expected to have been intensively exploited in the past. The masking of these deposits by heavier superficial geologies and soils, together with other environmental factors affecting the use of these deposits in the past and the survival and visibility of their archaeology in the present day, have instead combined to produce a relatively poor record of archaeological sites.

In terms of its superficial geology, 14 different BGS ROCK types are recorded within the Study Area, but the extent of at least six of these (S_GRAVEL, S_GRAVEL_SAND_SILT_AND_CLAY, S_SAND, S_SAND_AND_SILT, S_SAND_WITH_CLAY_AND_GRAVEL, and S_SEDIMENT_SHELL) is so limited that they cannot be used for meaningful analysis. The site density figures for both the glacial and post-glacial superficial sand and gravel deposits are also of uncertain significance: the very high site density (18.4 sites per sq km) recorded on the Lowestoft Formation and glaciofluvial deposits are at least in part a product of the dispersed nature of these deposits, which occur as multiple small exposures, with consequently greater opportunities to intersect with site boundaries; a larger sample of the county's post-glacial alluvial and river terrace gravels is discussed in detail in Chapter 7. **The highest valid site density — 14.2 sites per sq km — is recorded on the Tottenhill Gravels.** As has already been discussed above for the Sub-Unit, these have both proved to be productive of cropmark sites (although not uniformly so) and have been the subject of extensive archaeological investigations prior to aggregate extraction. Unfortunately the relatively limited occurrence of these gravels within the Study Area, and, indeed, within the county as a whole, means that it is difficult to assess how consistently 'busy' they might be; certainly, there is evidence to suggest that the number and complexity of archaeological sites recorded at

Watlington, both from cropmarks and excavated evidence, would not necessarily be reproduced further to the south (see Section 8.13 above; Albone *et al*. 2008). An above-average site density (9.3 sites per sq km) is also recorded on the diamicton, comparable to that recorded on the larger sample of this deposit assessed in Chapter 6 (Study Area B, Plateau Gravels). Unsurprisingly a very low site density (5.6 sites per sq km) is found on the Peat; only 1 site, a group of undated posts embedded in mudflats at Snettisham (NHER 41418) is recorded on the Shell banks within the Wash, resulting in an even lower site density of 3.8 per sq km.

Overall this (admittedly brief) analysis would suggest that Sub-Unit D is broadly representative of its wider Study Area, with similar densities of sites generally being recorded both overall and on individual geologies (or, at least, the 'busiest' geologies being busy in both). In considering these figures, however, it is necessary to bear in mind that the NMP survey has been completed for only 37% of the Study Area but for 82% of the Sub-Unit, and potentially the Sub-Unit might be found to be rather 'quieter' than the Study Area that surrounds it. Within both, a below-average density of sites is recorded, when compared to the county as a whole and to the other Study Areas and Sub-Units. While areas of extremely high site density, such as Norwich, may account for a large proportion of this variation, the fact that the NMP has been completed for only 28% of the county also needs to be kept in mind.

***Table 8.16. Density of archaeological sites in Study Area D relative to geology***
Emboldened ROCK types are those that have been most heavily exploited in the past, and where future extraction will be targeted (information derived from Norfolk Minerals Resource GIS and NCC Minerals and Waste Planning Team quarries data). Those in grey are too limited in extent to generate meaningful site density figures.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within Study Area (sq km)** | **No. of sites** | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***270.00*** | ***2206*** | ***8.2*** |
| | | | | |
| B_CHALK | | 3.28 | 62 | 1.8 |
| B_CLAY_AND_SILT | Snettisham Clay member | 0.94 | 54 | 57.4 |
| B_MUDSTONE | various | 48.63 | 588 | 12.1 |
| B_MUDSTONE_AND_ LIMESTONE_INTERBEDDED | | 0.22 | 5 | 22.7 |
| **B_SAND [Sandringham Sand Formation]** | | **161.82** | **1295** | **8.0** |
| **B_SANDSTONE** | **Carstone** | **41.94** | **433** | **10.3** |
| B_SANDSTONE_AND_ MUDSTONE | Dersingham Formation | 13.16 | 135 | 10.3 |
| | | | | |
| S_CLAY_AND_SILT | Tidal Flat Deposits & Nar Valley Formation | 25.58 | 269 | 10.5 |
| S_CLAY_SILT_SAND_AND_ GRAVEL | Alluvium & Head | 26.12 | 350 | 13.4 |
| S_DIAMICTON | Lowestoft Formation & Devensian till | 48.67 | 451 | 9.3 |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | **10.25** | **146** | **14.2** |
| S_GRAVEL [other] | Raised & Storm Beach deposits | 2.65 | 76 | 28.7 |
| S_GRAVEL_SAND_SILT_ AND_CLAY | Head | 1.16 | 7 | 6.0 |
| S_PEAT | | 35.22 | 196 | 5.6 |
| S_SAND | Bank deposits | 3.27 | 5 | 1.5 |
| **S_SAND_AND_GRAVEL [glacial & glaciofluvial]** | **Lowestoft Formation & glaciofluvial** | **5.55** | **102** | **18.4** |
| **S_SAND_AND_GRAVEL [post-glacial river terrace]** | **River terrace deposits** | **6.21** | **49** | **7.9** |
| S_SAND_AND_SILT | Storm Beach deposits | 0.68 | 22 | 32.4 |
| S_SAND_SILT_AND_CLAY | Marine and inter-tidal deposits | 9.14 | 10 | 1.1 |
| S_SAND_WITH_CLAY_AND_ GRAVEL | Head | 0.05 | 5 | 100.0 |
| S_SEDIMENT_SHELL | Shell bank | 0.26 | 1 | 3.8 |

### 8.16.2. Archaeological Significance

As only sites within the Sub-Unit have been scored for 'Archaeological Significance', it is not possible to assess the Study Area as a whole using the same criteria. The number, type and distribution of designated sites, however, can provide some indication as to the incidence of sites of high significance. In Table 8.17 below, figures are given for designated sites within both the Study Area and the Sub-Unit. It is immediately clear that a higher density of all designated sites, but particularly Grade II Listed Buildings, is recorded within the Study Area than within the Sub-Unit. This is not unusual; it is a pattern that is apparent in all the other areas covered by the assessment and, at least in terms of Listed Buildings,

reflects the avoidance of built-up areas in the selection of the Sub-Units, given the relatively low risk of extraction in such areas. The density of sites recorded within both Study Area and Sub-Unit D, however, are fairly low compared to other areas, and there is a particular scarcity of Grade II Listed Buildings. This reflects the fact that this part of Norfolk is, and has historically been, relatively lightly settled. The distribution of the designated sites is shown in Figure 8.16. It can be seen that a large number of the Listed Buildings (more than 100 records, or a third of the total) are clustered at the historic market town of Downham Market, in the southwest of the Study Area. The remainder are distributed quite evenly throughout the Sub-Unit, clinging to the higher ground overlooking the Wash and Fens. Large gaps in the northwestern and southeastern parts of the Study Area correspond with the coastal marshes between Heacham and North Wootton and the fenland between West Dereham, Wretton and Feltwell respectively.

In an assessment of archaeological significance Scheduled sites, which automatically qualify for a Significance score of National or higher, are of greater relevance. These are mainly found in the central part of the Study Area, on the higher ground between the Babingley and Gaywood rivers, Middleton Stop Drain and the Nar Valley. Again, Scheduled sites are more-or-less absent from the lower-lying ground in the northwest and southeast of the Study Area, but also along the Fen Edge between Watlington and Hilgay (here the moated site of East Hall Manor, NHER 2465, SM 30563, is the only exception). There is no obvious preference for one particular geology or another, other than the secondary effect of the topographic pattern already described. Comparison with the other Study Areas suggests that the density of Scheduled sites in Sub-Unit D is fairly average, although the small numbers of sites involved may hide more subtle patterning.

| ***Table 8.17. Designated archaeological sites in Study Area D*** | | | ***in Sub-Unit D*** | |
|---|---|---|---|---|
| **Designation** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***2206*** | ***8.2*** | ***402*** | ***8.9*** |
| | | | | |
| Scheduled sites | 44 | 0.2 | 6 | 0.1 |
| Grade I & II* Listed Building | 49 | 0.2 | 6 | 0.1 |
| Grade II Listed Building | 240 | 0.9 | 15 | 0.3 |

### 8.16.3. Archaeological Period

A breakdown of the Study Area and Sub-Unit D sites by period, and a comparison with the figures for the whole of Norfolk, is given in Table 8.18 below. **It is readily apparent that, as has already been discussed, the overall site density across both the Study Area and the Sub-Unit is lower than that recorded across the county as a whole. Comparison with the other areas assessed by the project indicate that the 'Lower**

**Greensand' and Fen-Edge Gravels in fact support the lowest site density of any of the selected aggregate types**.

This apparent scarcity of sites, however, masks considerable variation between the relative densities recorded for individual periods. Within the Study Area, the site density figures generally match (more or less) the average for the county throughout the prehistoric and Roman periods. It is only in the medieval and later periods that significantly lower site densities are recorded in the Study Area. Within the Sub-Unit, site densities significantly higher than both the average for the county and the broader Study Area are recorded for the Neolithic to Roman periods. This is likely to at least in part reflect the higher percentage of NMP coverage for the Sub-Unit (82%) when compared to both the Study Area (37%) and the county as a whole (28%). It is also a reflection of the several extensive excavations carried out in this area, usually in advance of aggregate extraction, for example at Watlington/Tottenhill and Blackborough End. It might also, however, indicate a genuine preference for the environment offered by some parts of the Sub-Unit, for example the free-draining peninsula overlooking the Fens and Nar Valley on the Tottenhill Gravels at Watlington. (Although see Sections 8.5 and 8.6 above for discussion of the apparent dearth of prehistoric sepulchro-ritual monuments in the area.) Further analysis of the data would be needed, however, to begin to distinguish between the various different factors behind this general trend.

Again within the Sub-Unit, below-average site densities are recorded for the Saxon, post medieval and, in particular, modern periods, but curiously a very high site density is recorded for the medieval period. As has been discussed above (Section 8.10), the reasons for this are unclear, particularly given the low density of sites recorded in the preceding and succeeding periods, and the low number of medieval sites recorded in the broader Study Area. It is a question that warrants further investigation. The relatively low number of modern sites recorded — half the average recorded across the county as a whole — is almost certainly a reflection of both the general scarcity of strategic World War Two military defences in this area, and of designated and undesignated building records (see Section 8.16.2 above).

| *Table 8.18. Archaeological sites in Study Area D by period* | | | | | | |
|---|---|---|---|---|---|---|
| | ***Sub-Unit D*** | | ***Study Area D*** | | ***in county*** *(as of 11.11.08)* | |
| | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** | **No. of sites** | **per sq km** |
| ***Overall*** | ***402*** | ***8.9*** | ***2206*** | ***8.2*** | ***49,290*** | ***9.0*** |
| | | | | | | |
| Palaeolithic (exclusive) | **7** | 0.2 | 31 | 0.1 | 402 | 0.1 |
| Mesolithic (exclusive) | **8** | 0.2 | 48 | 0.2 | 727 | 0.1 |
| Neolithic (inclusive) | **85** | 1.9 | 382 | 1.4 | 6768 | 1.2 |
| Bronze Age (inclusive) | **94** | 2.1 | 399 | 1.5 | 7722 | 1.4 |
| Iron Age (inclusive) | **92** | 2.0 | 362 | 1.3 | 6161 | 1.1 |
| Roman (inclusive) | **93** | 2.1 | 448 | 1.7 | 8478 | 1.5 |
| Saxon (inclusive) | **44** | 1.0 | 278 | 1.0 | 6227 | 1.1 |
| Medieval (inclusive) | **207** | 4.6 | 778 | 2.9 | 17,463 | 3.2 |
| Post Medieval (inclusive) | **174** | 3.9 | 863 | 3.2 | 23,624 | 4.3 |
| Modern (inclusive) | **41** | 0.9 | 307 | 1.1 | 10,039 | 1.8 |

### 8.16.4. Survival and Visibility

It is not possible to derive numbers of surviving earthwork or 'historic landscape' sites from the NHER, as such information is not always recorded, and when it is, it is often recorded informally within the descriptive text, rather than in a specific field that can be interrogated. (Such information was recorded for the Sub-Unit as an additional, 'ALSF Survival' score.) The figures given in Table 8.19 below, however, which include all sites recorded as containing earthwork elements (which may or may not still survive), can provide a rough characterisation of the form and potential survival of the archaeology of the area. These are shown cross-referenced with the Study Area's dominant geological deposits and/or those that have or will be targeted by extraction. Comparable information for sites containing 'cropmark' elements is also given. The distribution of these sites is illustrated by Figure 8.17.

Overall, it is clear that both the Study Area and Sub-Unit contain a higher density of both earthwork and cropmark sites than is recorded across the county as a whole. The density of cropmark sites within Sub-Unit D is particularly striking, but is comparable to the figures recorded within the project's other Sub-Units. The density of earthwork sites is also relatively high, the highest recorded within any of the Study Areas and surpassed only by the 1.6 earthwork sites per sq km recorded within Sub-Unit C.

On individual geological deposits there is considerable variation in the form and survival of the archaeological sites, but not all of the patterns are easy to comprehend or explain. Amongst the bedrock deposits, the Mudstone supports a consistently high density of both earthwork and cropmark sites. To a large extent, the figures for the cropmark sites are perhaps a better reflection of the overlying Tottenhill Gravels, on which the largest cluster of sites is recorded (at Watlington/Tottenhill), than it is of the Mudstone itself. At the same

time, a second cluster is evident on tidal flat deposits overlying the Kimmeridge Clay formation Mudstone in the mouth of the Babingley River north of North Wootton; these relate to inter-tidal features such as sea banks and saltern mounds but indicate the potential of such areas for cropmark sites (albeit of relatively recent date). Earthwork sites are also well represented, with the highest density of such sites within the Study Area being recorded on this deposit. Conversely, as has already been discussed, a relatively low density of cropmark sites is recorded on the Sandringham Sands (B_SAND). Contrary to expectations, although still average (or close to average) for the Sub-Unit and Study Area overall, and still higher than the average for the county, this bedrock appears to be *relatively* unproductive of cropmark sites, even when compared to what might be expected to be less productive bedrock geologies, such as the Mudstone and Sandstone.

The pattern evident on the principal superficial geologies is even more complicated. **A very high density of cropmark sites is recorded on the Tottenhill Gravels.** The complex multi-phase sites recorded at Watlington/Tottenhill, visible as cropmarks and also the subject of extensive excavations in advance of aggregate extraction, account for a large proportion of these sites. As has already been described, the relatively limited extent of this geology makes it difficult to assess how much of a determining factor this geological deposit has been in the distribution of the cropmark sites; certainly, the density of cropmark sites on this deposit peters out to the south of Runcton Holme. Somewhat surprisingly, **the Tottenhill Gravels also support a relatively high density of earthwork sites (more than twice the average for the county)**. These are again clustered in the Watlington/Tottenhill area, although on the margins of the densest cluster of cropmark sites. Conversely, within the Study Area a very low density of sites is recorded on the Peat (0.5 earthwork sites and 0.8 cropmark sites per sq km). This is hardly surprising giving the topographic and landuse context of this geological type. Those sites that are recorded tend to be found on or close to the edge of the deposits; those located further into the peats warrant further investigation as a group. The high density of both earthwork and cropmark sites recorded on the Peat within the Sub-Unit can be accounted for by the small size of the sample, which is too small to generate meaningful statistics.

| *Table 8.19. Survival and visibility in Study Area D relative to geology* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***Sub-Unit D*** | | | | | ***Study Area D*** | | | | |
| | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** | **Area (sq km)** | **Earth-works** | **per sq km** | **Crop-marks** | **per sq km** |
| ***Overall*** | ***45.00*** | ***62*** | ***1.4*** | ***115*** | ***2.6*** | ***270.00*** | ***353*** | ***1.3*** | ***389*** | ***1.4*** |
| | | | | | | | | | | |
| B_MUDSTONE | 12.89 | 22 | 1.7 | 62 | 4.8 | 48.63 | 129 | 2.7 | 166 | 3.4 |
| **B_SAND** | **25.29** | **43** | **1.7** | **59** | **2.3** | **161.82** | **236** | **1.5** | **221** | **1.4** |
| **B_SANDSTONE** | **6.82** | **9** | **1.3** | **17** | **2.5** | **41.94** | **53** | **1.3** | **86** | **2.1** |
| | | | | | | | | | | |
| S_DIAMICTON | 12.45 | 20 | 1.6 | 39 | 3.1 | 48.67 | 69 | 1.4 | 103 | 2.1 |
| **S_GRAVEL [Tottenhill Gravels]** | **8.22** | **16** | **1.9** | **56** | **6.8** | **10.25** | **19** | **1.8** | **61** | **6.0** |
| S_PEAT | 2.24 | 6 | 2.7 | 9 | 4.0 | 35.22 | 19 | 0.5 | 27 | 0.8 |

| ***in county*** *(as of 11.11.08)* | | | | |
|---|---|---|---|---|
| **Area (sq km)** | **Earthworks** | **per sq km** | **Cropmarks** | **per sq km** |
| **5497.99** | **4434** | **0.8** | **5510** | **1.0** |

### 8.16.5. The Impact of Extraction

Former and existing extraction sites are found throughout the Study Area. (Only sites recorded by NCC and the BGS have been assessed, quarries visible on aerial photographs or depicted on historic maps having only been mapped by the NMP within the four Sub-Units.) Their distribution is somewhat sporadic, with the greatest concentration evident within the Sub-Unit (a reflection of the criteria used to select these areas for detailed assessment, see Section 2.3). A low-density scatter of sites is evident in the northern part of the Sub-Unit, with relatively few recorded in its southernmost portion, and those that are being relatively small in scale. Unsurprisingly, there is a close correlation between the distribution of the quarries and the Sandringham Sands and Carstone bedrock, and with the superficial gravels, particularly the Tottenhill/Fen-Edge Gravels. Extraction has also taken place within the Nar Valley, presumably targeting bedrock aggregate deposits below the Peat. 121 archaeological sites within the Study Area are recorded as being co-located with one or more of these former and extant quarry sites. Only 1 relates to a Scheduled Monument: Blackborough Priory (NHER 3430, SM 228, Listed Grade II), which, as has been described above (Section 8.15), is bordered on two sides by extraction sites, but does not appear to have been substantially affected. It is clear, however, from the more detailed assessment undertaken within the Sub-Unit, that a considerable number of significant archaeological sites which are not Scheduled have also been impacted upon, in some cases severely, by past extraction.

Those quarries recorded as existing sites by NCC are also found concentrated within the Sub-Unit (Fig. 8.18); in fact, only NCC Site No. 48, a Carstone pit at Snettisham, lies wholly outside this area. The existing sites within the Study Area are almost entirely located on the

Sandringham Sands, Carstone or Tottenhill Gravels; the exception is a small quarry (NCC Site No. 635) located close to the Fen Edge at Stow Bardolph, which overlies the Kimmeridge Clay Formation. In total, the quarries occupy 5.49 sq km or 2% of the Study Area, representing 10 sites (some comprising several blocks of land). 57 archaeological sites are recorded as being co-located with one or more of these active extraction sites, only one of which — Blackborough Priory (NHER 3430, SM 228, see above) — relates to a Scheduled Monument. All of the existing quarries are co-located with at least one and often several archaeological sites.

Within the Study Area, 23 allocations for future minerals extraction have been put forward in the draft MWDF (Fig. 8.18). Collectively, they cover an area of 9.78 sq km or 3.6% of the Study Area, a larger area and a larger proportion than for any of the other Study Areas. If they should all go ahead, it would almost treble the area of existing quarries, and push the area under extraction up to nearly 6%, a considerable proportion. This is particularly an issue given that the allocations are not evenly distributed but again concentrated in and around the 45 sq km of the Sub-Unit, which has been the focus of most extraction in the past. Most of the allocations lie adjacent to existing quarries. The principal exceptions are Site ref. MIN 95 at Runcton Holme which, as has already been described (Section 8.15 above), borders an area of historic quarrying (Luddington's Pit), and three proposals (Site refs MIN 41, 42 & 94) at Roydon and Leziate, surrounding Grimston Warren and Roydon Common. **The impact on the historic environment of such sites, which break with the existing pattern of extraction, is likely to be greater, both in the disturbance of previously intact archaeological sites but also the potential to examine areas that have previously seen little systematic archaeological investigation.**

74 archaeological sites fall within one or more of the proposed minerals allocations; few of the allocations contain no archaeological sites at all. **As has been demonstrated by the more detailed assessment undertaken for the Sub-Unit** (Section 8.15 above)**, a considerable proportion of the archaeological sites affected are of Regional significance or higher; it is likely that the Study Area as a whole contains a similar proportion of significant sites that will be impacted upon.** Furthermore, many of the sites of lesser significance would benefit from further investigation of their character and extent in order to assess more fully the likely impact of any extraction on the archaeological record. 2 of the sites falling within the proposed allocations relate to Scheduled Monuments. Blackborough Priory (NHER 3430, SM 228) is encroached upon by three allocations (MWDF Site refs MIN 29, MIN 31 & MIN 30), while the earthwork of a probable Bronze Age barrow at Leziate (NHER 3381, SM 373) is entirely encompassed by MWDF Site ref. MIN 42 (although the boundaries of the proposal have since been amended, NCC 2008b); both lie within the Sub-Unit and are described in Section 8.15 above.

| ***Table 8.20. Sites in Study Area D co-located with former, existing and proposed extraction sites*** *(as of 2.6.08)* | | |
|---|---|---|
| | **Total no. sites** | **Scheduled sites** |
| ***Overall*** | ***2206*** | 44 |
| | | |
| Former & existing quarries (excluding NMP quarries mapping) | 121 | 1 |
| Existing quarries | 57 | 1 |
| Proposed minerals allocations | 74 | 2 |

# 9. Conclusions and Recommendations for Future Work

The results of the assessment of each aggregate Sub-Unit and Study Area, as described in Chapters 5–8, are summarised and compared below. It should be borne in mind that **while the assessment has identified many apparent patterns in the archaeological data, more work is needed to investigate their causes, and separate those which are the product of recovery, recording and statistical biases from those which are of archaeological significance**.

## 9.1. The Character of Norfolk's Aggregate Landscapes

The topographic and geological character of each of the four Sub-Units and Study Areas evaluated by this project varied widely, as described in Chapter 3, from the light soils of the Norwich Crag to the heavier soils of the upland Plateau Gravels, the low-lying River Valleys and the distinctive ridge of the 'Lower Greensand' and Fen-Edge Gravels. Significant variations are also evident in the historic environment record for each area, although in few cases is the relationship a simple 'cause and effect': the factors affecting the creation, preservation and recovery of the archaeological record being far more complex and interconnected — and often enigmatic — than that.

### 9.1.1. Geology

Numbers of archaeological sites, as represented by records in the NHER, and their intersections with specific geographic entities (whether the polygon defining a Sub-Unit or the mapped extent of a geological deposit) have been used to characterise the archaeology of each area and each aggregate type. Table 9.1 below shows the 8 aggregate geologies identified within Norfolk (based on BGS ROCK and LEX type), with the density of archaeological sites recorded on each. Due to the use of an 'intersect' query to calculate numbers of sites (Section 4.1.2), the density on each deposit will be slightly exaggerated to a greater or lesser degree depending on its cohesion and the regularity (or otherwise) of its boundary (or boundaries), compared to the average across the county as a whole. Even so, the broad pattern of the distribution of archaeological sites is clear. **Only the Sandringham Sands support a site density lower than the county average.** As discussed in Chapter 8, the reasons for this low site density, which is contrary to what was expected prior to the start of the project, are unclear, but they almost certainly relate —

whether as a cause or an effect (or both) — to the low site density in this part of Norfolk overall (see Table 9.2 below).

**All other aggregate-bearing geologies, both bedrock and superficial, exhibit an above-average density of archaeological sites.** These range from the marginally higher densities recorded on the Crag and Carstone bedrocks, to the extremely high densities (up to more than three times the county average) found on some of the superficial aggregate deposits. While the long sinuous boundaries of the river terrace and alluvial deposits, and multiple detached occurrences of the Corton Formation sands, may have exaggerated the results for these geologies, the figures are still high enough to suggest that other factors must also be at work. The fact that virtually 100% of the Corton Formation sand has been covered by the NMP survey (Table 9.11) is almost certainly a contributing factor to the high site density recorded on that deposit. Nevertheless, as for the river terrace and alluvial deposits, preferential use of these areas in the past, and preferential preservation and visibility of archaeological sites in these areas, may also be reflected in the figures.

***Table 9.1. Density of archaeological sites in county relative to aggregate-bearing geologies***
Derived from Table 4.1.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within county** (sq km) | **No. of sites** (as of 11.11.08) | **per sq km** |
|---|---|---|---|---|
| ***Overall*** | | ***5497.99*** | ***49,290*** | ***9.0*** |
| | | | | |
| **B_SAND [Sandringham Sand Formation]** | **various** | 166.07 | 1361 | **8.2** |
| **B_SAND_AND_GRAVEL** | **Crag** | 1317.59 | 14,480 | **11.0** |
| **B_SANDSTONE** | **97% Carstone** | 52.35 | 623 | **11.9** |
| | | | | |
| **S_CLAY_SILT_SAND_AND _GRAVEL [alluvial]*** | **Alluvium** | 196.89 | 4167 | **21.2** |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | 11.36 | 155 | **13.6** |
| **S_SAND [glacial]** | **Corton Formation** | 86.50 | 1895 | **21.9** |
| **S_SAND_AND_GRAVEL [glacial & glaciofluvial]** | **various** | 778.46 | 10,319 | **13.3** |
| **S_SAND_AND_GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | 105.40 | 2946 | **30.0** |

* Alluvium is not strictly an aggregate-bearing geology, but BGS Resource Mapping indicates that in almost every case sub-alluvial resources are either indicated or inferred.

### 9.1.2. Archaeological Period

The figures in Table 9.1 are translated into a more schematic classification of Norfolk's aggregate landscape in Table 9.2 below, *i.e.* the Sub-Units and Study Areas used during this assessment. It is again clear that in most areas, and in most periods, the site densities recorded in aggregate-bearing areas are higher than the average across the county as a whole. **The very high density of sites recorded in the river valleys (on river terrace sands and gravels and on alluvium) is again apparent, with Sub-Unit and Study Area**

**C exhibiting above-average site densities in every archaeological period.** This is despite the NMP survey having been completed for only 15% of the Study Area, the lowest coverage of any of the areas assessed (Table 9.10). It is also the River Gravels areas that exhibit the greatest divergence from the county average, both overall (with **68% more sites being recorded in Study Area C**) and in terms of individual periods. At the same time, some of the more subtle variations hidden in the crude figures given above and for the project areas, begin to become apparent. The paucity of medieval and post medieval sites in Study Area B, for example, perhaps reflects an avoidance of the Boulder Clay Plateau for settlement in the historic period. The relatively low incidence of Roman period sites in this area is also of note.

***Table 9.2. Density of archaeological sites*** *(sites per sq km)* ***in Sub-Units and Study Areas by period, relative to county average***
Derived from Tables 5.20, 6.18, 7.18 & 8.18. Figures in red/blue represent relative site densities greater/lower than the county average. Variations equivalent to or greater than 0.5 sites per sq km are emboldened.

| | County | Sub-Unit A | Study Area A | Sub-Unit B | Study Area B | Sub-Unit C | Study Area C | Sub Unit D | Study Area D |
|---|---|---|---|---|---|---|---|---|---|
| ***Overall*** | ***9.0*** | ***+0.8*** | ***+0.3*** | ***+0.7*** | ***-0.6*** | ***+2.1*** | ***+6.1*** | ***-0.1*** | ***-0.8*** |
| | | | | | | | | | |
| Palaeolithic (exclusive) | ***0.1*** | -<0.1 | -<0.1 | -<0.1 | - | +0.1 | +0.1 | +0.1 | - |
| Mesolithic (exclusive) | ***0.1*** | +0.2 | - | +0.1 | - | +0.2 | +0.2 | +0.1 | +0.1 |
| Neolithic (inclusive) | ***1.2*** | **+0.6** | +0.1 | +0.4 | +0.3 | +0.5 | **+0.8** | **+0.7** | +0.2 |
| Bronze Age (inclusive) | ***1.4*** | +0.5 | - | **+0.6** | **+0.7** | **+1.4** | **+0.8** | **+0.7** | +0.1 |
| Iron Age (inclusive) | ***1.1*** | +0.6 | - | +0.4 | +0.2 | **+0.9** | **+0.7** | **+0.9** | +0.2 |
| Roman (inclusive) | ***1.5*** | **+0.8** | +0.2 | +0.5 | -0.1 | **+1.2** | **+1.1** | **+0.6** | +0.2 |
| Saxon (inclusive) | ***1.1*** | -0.1 | -0.1 | -0.1 | +0.1 | +0.3 | **+1.1** | -0.1 | -0.1 |
| Medieval (inclusive) | ***3.2*** | **+0.9** | -0.3 | +0.4 | **-0.8** | **+0.9** | **+2.6** | **+1.4** | -0.3 |
| Post Medieval (inclusive) | ***4.3*** | +0.6 | +0.2 | +0.1 | **-0.6** | **+1.1** | **+3.4** | -0.4 | **+1.1** |
| Modern (inclusive) | ***1.8*** | -0.2 | +0.2 | +0.5 | +0.1 | **+0.9** | **+0.8** | **-0.9** | **+0.7** |

### 9.1.3. Archaeological Significance

The number of Scheduled Monuments (or, more accurately, NHER sites associated with one or more Scheduled Monuments) on each geological deposit within the county is given in Table 4.1. It is immediately apparent that the small number of sites involved (only 535 or 0.1 per sq km overall) prevents much meaningful analysis being done using the relatively crude methods employed in this assessment. It is still immediately apparent, however, that **the post-glacial river terrace deposits support the highest density of Scheduled sites (0.7 per sq km, more than 7 times the county average), followed by**

**S_CLAY_SILT_SAND_AND_GRAVEL alluvium and the Carstone, each with a density of 0.4 Scheduled sites per sq km.** While a proportion (16%) of the river terrace sites lie within the city of Norwich, there does not appear to be an overwhelming bias towards this area. Similarly, 11 (14%) of the river terrace sites relate to barrows, a site type which tends to be over-represented amongst Scheduled Monuments due to the relatively common occurrence of earthwork survivals; a further 6 sites encompass one or more ring ditches. While the location of such sites may often be associated with the county's network of river valleys (see Ashwin 2005b, 20, for example), this percentage is actually quite low when compared to Norfolk as a whole, where 29% of the Scheduled sites are indexed with a barrow, or 31% with a barrow and/or a ring ditch. This reinforces the impression that while biases in the data undoubtedly exist, **all three of these deposits are of the highest archaeological significance**.

Table 9.3 below shows similar information for the Sub-Units and Study Areas, together with the results of the significance scoring for the Sub-Units. The inadequacy of Scheduled Monument distribution as an indicator of archaeological significance in anything but the broadest terms is clear. Nevertheless, the figures, together with those for the significance scoring, again demonstrate the importance of the River Gravels Study Area, although it is noteworthy that a marginally lower density of Scheduled sites is recorded within its corresponding Sub-Unit; significance scoring for a greater proportion of the River Gravels Study Area would allow such patterns to be investigated in more detail. Considerable numbers of Scheduled and 'significant' (Regional and above) sites are also recorded on the Plateau Gravels, although this is not reflected in the figures for the relevant aggregate geology (S_SAND_AND_GRAVEL). This is likely to be a product, at least in part, of the extensive excavations that have been carried out here in advance of aggregate extraction (at Longham and Billingford, for example), as well as the preservation of earthworks on the heavier soils of the Boulder Clay Plateau. The low numbers of Nationally significant and Scheduled sites on the Crag is also striking.

The historic built environment, while worthy of interest in this context, is of less direct relevance in an archaeological assessment and is consequently excluded from further consideration here.

***Table 9.3. Density of sites of Regional or higher significance, and of sites associated with Scheduled Monuments***
Derived from Tables 5.2, 5.19, 6.2, 6.17, 7.2, 7.17, 8.2 & 8.17. Figures in red/blue represent site densities greater/lower than the county average.

| **Project area** | **Aggregate type** | **Area** (sq km) | **Inter-natio-nal** | **per sq km** | **Nat-ional** | **per sq km** | **Reg-ional** | **per sq km** | **Sche-duled** | **per sq km** |
|---|---|---|---|---|---|---|---|---|---|---|
| ***County*** | | ***5497.99*** | | | | | | | ***535*** | ***0.1*** |
| | | | | | | | | | | |
| **Sub-Unit A** | Crag | 45 | 0 | 0 | 13 | 0.3 | 90 | 2 | 5 | 0.1 |
| **Study Area A** | | 596 | | | | | | | 36 | <0.1 |
| | | | | | | | | | | |
| **Sub-Unit B** | Plateau Gravels | 45 | 0 | 0 | 33 | 0.7 | 101 | 2.2 | 8 | 0.2 |
| **Study Area B** | | 327 | | | | | | | 78 | 0.2 |
| | | | | | | | | | | |
| **Sub-Unit C** | River Gravels | 64 | 0 | 0 | 56 | 0.9 | 181 | 2.8 | 8 | 0.1 |
| **Study Area C** | | 966 | | | | | | | 215 | 0.2 |
| | | | | | | | | | | |
| **Sub-Unit D** | 'Lower Greensand' & Fen-Edge Gravels | 45 | 2 | <0.1 | 28 | 0.6 | 89 | 2.0 | 6 | 0.1 |
| **Study Area D** | | 270 | | | | | | | 44 | 0.2 |

### 9.1.4. Survival and Visibility

Associated with a site's 'significance', although not always directly so, are factors relating to its survival or preservation, and to its visibility. Such questions are given particular import in the Scheduling criteria, where better-preserved sites — and particularly those with above-ground remains — score more highly. The scoring system devised for use in this assessment (Section 4.1.1) deliberately separates the scores for Survival from Significance, in order to avoid too great a bias towards upstanding sites (in a county where relatively few survive). Instead, while a consideration of the potential for survival is taken into account, the Significance score is applied independently of Survival, and even destroyed sites can be of Regional or higher significance (thus allowing their importance to be taken into consideration when judgements are made about adjacent sites).

The assessment considered the survival of earthworks and cropmarks in particular, not least in order to inform an evaluation of the impact made by the NMP survey, and its potential in any future work (Section 9.2.2). The figures in Table 9.4 give a broad indication of the variation in survival and visibility found across the project areas. In general, above-average numbers of earthworks (not all of which still survive) and cropmarks are recorded in most of the Sub-Units and Study Areas. Those where relatively low or below-average densities are recorded stand out for this reason: Sub-Unit and Study Area A, and to a

lesser extent Study Area C, where low numbers of earthworks are recorded; Study Area B, where the density of cropmarks is only slightly above that recorded across the county as a whole. Often there are relatively straightforward explanations — or at least partial explanations — for these broad patterns. The light soils of Sub-Unit and Study Area A, overlying the Crag, are intensively cultivated, leading to poor earthwork preservation. The low density of cropmark sites in Study Area B may reflect the general paucity of such sites in Breckland, in the southwest corner of this Study Area (Section 6.16.4). The low number of earthwork sites recorded in Study Area C, which contrasts with the high density within the corresponding Sub-Unit, is more difficult to explain; it perhaps reflects, at least in part, the completion of the NMP survey for 86% of the Sub-Unit but only 15% of the Study Area. Certainly, the extent of the NMP survey is likely to be the major factor determining the variation in the figures for each project area (Table 9.4), and on each aggregate-bearing geology (Table 9.5).

***Table 9.4. Survival and visibility of archaeological sites in project areas***
Derived from Tables 5.21, 6.19, 7.19, & 8.19.

| **Project area** | **Aggregate type** | **Area** (sq km) | **Earthworks** *(as of 11.11.08)* | **per sq km** | **Cropmarks** *(as of 11.11.08)* | **per sq km** |
|---|---|---|---|---|---|---|
| ***County*** | | ***5497.99*** | ***4434*** | ***0.8*** | ***5510*** | ***1.0*** |
| | | | | | | |
| **Sub-Unit A** | Crag | 45 | 26 | **0.6** | 104 | **2.3** |
| **Study Area A** | | 596 | 496 | **0.8** | 1127 | **1.9** |
| | | | | | | |
| **Sub-Unit B** | Plateau Gravels | 45 | 60 | **1.3** | 110 | **2.4** |
| **Study Area B** | | 327 | 371 | **1.1** | 298 | **0.9** |
| | | | | | | |
| **Sub-Unit C** | River Gravels | 64 | 100 | **1.6** | 174 | **2.7** |
| **Study Area C** | | 966 | 853 | **0.9** | 1158 | **1.2** |
| | | | | | | |
| **Sub-Unit D** | 'Lower Greensand' & Fen-Edge Gravels | 45 | 62 | **1.4** | 115 | **2.6** |
| **Study Area D** | | 270 | 353 | **1.3** | 389 | **1.4** |

On individual aggregate geologies more nuanced variations are apparent (Table 9.5). **Above-average densities of cropmark and earthwork sites are recorded on every one of the 8 aggregate geologies identified by the project, indicating the high archaeological value of such deposits**. The variation between the lowest and highest densities is considerable: equivalent to 1.5 sites per sq km in the case of earthwork sites and 6.3 sites per sq km for cropmarks.

**The highest density of earthwork sites (2.7 per sq km) is recorded on the alluvial deposits of Study Area C**, where presumably the low-lying nature of the topography favours pasture or other non-arable land use, thus preserving earthwork remains. (This is not, however, reflected in the Study Area figures, Table 9.4.) The lowest density of such sites is found on the Crag, bearing out the average and below-average figures recorded within Study Area A and Sub-Unit A respectively. **A high density of earthwork sites (2.5**

**per sq km) is also recorded on the superficial glacial, Corton Formation, sand, which is surprising, given the extremely high density of cropmark sites (7.7 per sq km) also recorded here**; normally, the arable agriculture associated with cropmark formation might be expected to have levelled most traces of earthwork sites. Virtually 100% coverage of this area by the NMP survey may again be an important factor in this, as may the coastal location of part of the deposits, where high numbers of 20th-century military earthworks have been recorded. It may also be the case that the figures reflect a shift in the last 60+ years from a more pastoral or mixed faming economy to arable agriculture on an industrial scale, with sites that survived long enough to be recorded as earthworks in the NHER (whether from historic aerial photographs or other sources) having since been levelled. **Relatively high densities of cropmarks are also recorded on the other superficial geologies, in particular the Tottenhill Gravels (albeit across a very limited area), the river terrace sands and gravels, and the glacial/glaciofluvial sands and gravels**. The lowest density of cropmark sites, and an unremarkable number of earthwork sites, is recorded on the Sandringham Sand Formation bedrock, reflecting the generally low number of archaeological sites on this deposit.

***Table 9.5. Survival and visibility of archaeological sites on aggregate-bearing geologies***

| | **BGS LEX type** (where relevant) | **Area within county** (sq km) | **Earthworks** *(as of 11.11.08)* | **per sq km** | **Cropmarks** *(as of 11.11.08)* | **per sq km** |
|---|---|---|---|---|---|---|
| ***Overall*** | | ***5497.99*** | ***4434*** | ***0.8*** | ***5510*** | ***1.0*** |
| | | | | | | |
| **B_SAND [Sandringham Sand Formation]** | **various** | 166.07 | 246 | **1.5** | 230 | **1.4** |
| **B_SAND_AND_ GRAVEL** | **Crag** | 1317.59 | 1584 | **1.2** | 2653 | **2.0** |
| **B_SANDSTONE** | **97% Carstone** | 52.35 | 70 | **1.3** | 105 | **2.0** |
| | | | | | | |
| **S_CLAY_SILT_SAND_ AND_GRAVEL [alluvial]** | **Alluvium** | 196.89 | 533 | **2.7** | 362 | **1.8** |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | 11.36 | 20 | **1.8** | 61 | **5.4** |
| **S_SAND [glacial]** | **Corton Formation** | 86.50 | 214 | **2.5** | 664 | **7.7** |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **various** | 778.46 | 1096 | **1.4** | 2047 | **2.6** |
| **S_SAND_AND_ GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | 105.40 | 215 | **2.0** | 289 | **2.7** |

### 9.1.5. Historic Landscape Character

It is difficult to make a broad comparison of the historic landscape character of each aggregate type, as an analysis of the HLC data was only made for those areas lying within each Sub-Unit, and not for either the Study Areas as a whole or each aggregate-bearing

geology. In general terms, while the historic landscape character of Sub-Units A and D was felt to be generally representative of their broader Study Areas, that of the contiguous Sub-Units B and C was felt to be representative only of the dissected claylands immediately surrounding them. This is in part a reflection of the extensive nature of their respective Study Areas, which stretch across much of central Norfolk, from the coast in the north to the county boundary in the south.

The HLC analysis undertaken for the project serves to highlight the variation — in terms of topography, soils and land use, for example — between the different areas and geologies that make up Norfolk's aggregate resource. **Whether it is the predominantly arable landscape of Sub-Unit A, the surviving piecemeal enclosure in Sub-Unit B, the enclosed meadowland and landscape parks of Sub-Unit C, or the varied landscape of heath, warren, woodland, fen and arable of Sub-Unit D, the distinctive nature of each area — and its vulnerability — is clear.** The impact of past extraction, discussed in more detail in Section 9.1.6 below, is very apparent, with Sub-Units C and D having witnessed considerable alteration to their historic landscape in the last 100 years or so.

### 9.1.6. The Impact of Extraction

As has been described above (Section 9.1.5), the analysis of the HLC data for the Sub-Units identified Sub-Units C and Sub-Units D as having been particularly affected by past extraction. By comparison, Sub-Unit A, and to a lesser extent Sub-Unit B, remained largely untouched, at least until recently.

The impact of past, current and future extraction within each of the Sub-Units and Study Areas is discussed in detail in the main part of this report (Chapters 5–8). There are two main themes that warrant further discussion and analysis here: the impact of extraction in terms of the area of land affected, expressed as a proportion of any given Sub-Unit, Study Area or geological deposit; and the number and significance of the archaeological sites affected by this extraction. While other questions might be equally valid — for example the information gained and value added to archaeological sites discovered and/or investigated as part of a programme of works necessitated by the extraction — further analysis is beyond the scope of the current study.

An analysis of the impact of active and proposed extraction within each of the project areas is detailed in Table 9.6 below. (To this might be added the more expansive dataset for past quarrying developed for the Minerals Resource GIS, described in Section 2.2, but this is not uniform enough to be subjected to this type of analysis.) **It clearly demonstrates that in terms of land area it is the 'Lower Greensand' deposits and Fen-Edge Gravels of Sub-Unit and Study Area D that have been most severely impacted upon.** In total,

nearly 20% of the Sub-Unit and nearly 6% of the Study Area has either been subject to recent extraction, or could be subject to extraction in the near future. While it is unlikely that all of the allocations proposed in the MWDF will go ahead, the potential vulnerability of the area's historic landscape and its archaeological resource is clear. By contrast, the relatively small proportion of Sub-Unit A that has been subject to recent extraction is also apparent; while the new MWDF allocations have the potential to increase this, most still fall within the Sub-Unit, and the proportion of land affected remains relatively small. Other trends, such as increased extraction of the Plateau Gravels, and a reduction — albeit slight — of extraction in the River Gravels areas, are also apparent (see too Table 9.7).

***Table 9.6. Area of active and proposed extraction in Sub-Units and Study Areas***

| **Project area** | **Aggregate type** | **Area** (sq km) | **Active Quarries** (sq km) | **% of project area** | **MWDF Minerals Allocations** (sq km) | **% of project area** |
|---|---|---|---|---|---|---|
| ***County*** | | ***5497.99*** | ***18.42*** | ***0.3*** | ***40.43*** | ***0.7*** |
| | | | | | | |
| **Sub-Unit A** | Crag | 45 | 1.23 | **2.7** | 1.68 | **3.7** |
| **Study Area A** | | 596 | 1.62 | **0.3** | 2.69 | **0.5** |
| | | | | | | |
| **Sub-Unit B** | Plateau Gravels | 45 | 1.06 | **2.4** | 4.08 | **9.1** |
| **Study Area B** | | 327 | 2.68 | **0.8** | 8.22 | **2.5** |
| | | | | | | |
| **Sub-Unit C** | River Gravels | 64 | 1.90 | **3.0** | 1.78 | **2.8** |
| **Study Area C** | | 966 | 6.01 | **0.6** | 6.13 | **0.6** |
| | | | | | | |
| **Sub-Unit D** | 'Lower Greensand' & Fen-Edge Gravels | 45 | 4.82 | **10.7** | 3.92 | **8.7** |
| **Study Area D** | | 270 | 5.49 | **2.0** | 9.78 | **3.6** |

The high level of both active and future extraction within Study Area D is also apparent from Table 9.7 below, where a considerable proportion of both the Sandringham Sands and the Tottenhill Gravels are, and will continue to be, subject to extraction. The potential for increased extraction on both these deposits in the future, and on the accompanying Carstone, is indicated by the higher proportion of MWDF allocations than existing quarries. Similarly increased extraction is proposed for most of the other aggregate deposits. A reduction is proposed only for the alluvium and river terrace sands and gravels; this is in line with NCC's policy of ending extraction within river valleys, although it is clear that some extraction is still proposed. Despite this policy **in the case of the river terrace gravels, the area of proposed extraction is only slightly less than the area of active extraction**. It may in fact be the Environmentally Sensitive Areas (ESAs), which are to a large extent coincident with the county's major river valleys, that are to be avoided, rather than the river valleys themselves.

| *Table 9.7. Area of active and proposed extraction on aggregate geologies* | | | | | | |
|---|---|---|---|---|---|---|
| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within county** (sq km) | **Active Quarries** (sq km) | **% of de-posit** | **Minerals Allocations** (sq km) | **% of de-posit** |
| ***Overall*** | | ***5497.99*** | ***18.42*** | ***0.3*** | ***40.43*** | ***0.7*** |
| | | | | | | |
| **B_SAND [Sandringham Sand Formation]** | **various (Roxham, Mintlyn, Leziate, *etc.*)** | 166.07 | 4.04 | **2.4** | 5.88 | **3.5** |
| **B_SAND_AND_ GRAVEL** | **Crag** | 1317.59 | 2.51 | **0.2** | 4.58 | **0.3** |
| **B_SANDSTONE** | **97% Carstone** | 52.35 | 0.56 | **1.1** | 1.15 | **2.2** |
| | | | | | | |
| **S_CLAY_SILT_SAN D_AND_GRAVEL [alluvial]** | **Alluvium** | 196.89 | 2.12 | **1.1** | 1.01 | **0.5** |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | 11.36 | 0.50 | **4.4** | 0.67 | **5.9** |
| **S_SAND [glacial]** | **Corton Formation** | 86.50 | 0.20 | **0.2** | 1.04 | **1.2** |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **various** | 778.46 | 5.60 | **0.7** | 10.89 | **1.4** |
| **S_SAND_AND_ GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | 105.40 | 1.17 | **1.1** | 0.98 | **0.9** |

In terms of the impact upon archaeological sites, whether from past, current or future extraction, it is clear from the analysis detailed for each project area in Chapters 5–8 that there is considerable variation in the number and type of archaeological sites affected. **The largest number of sites affected is found in Study Area D, where the equivalent of 0.4 sites per sq km has been affected by past or active extraction, while 0.3 per sq km are at threat from future minerals allocations.** Unsurprisingly, given the relatively small proportion that has been quarried, Study Area A contains the fewest affected sites. **Study Areas B and C contain the highest number of Scheduled sites to be affected.** This again is hardly surprising, given that these areas support the highest numbers of Scheduled sites overall. While in several cases only the margins of the Scheduled site are encroached upon by the boundaries of the quarry, often leaving the Scheduled areas untouched, in others either the Scheduled remains are severely impacted upon (for example, the potentially Internationally significant prehistoric cropmarks at Caistor St Edmund, SM 245, in Study Area C, which falls within an MWDF minerals allocation), or the site is cut off from the surrounding landscape and any associated archaeology. Several Scheduled sites within the assessment area have been destroyed already by past extraction (in Study Area C, for example; Section 7.15). There are also large numbers of undesignated, but nevertheless highly significant archaeological sites that have been affected by or remain at threat from aggregate extraction. While the archaeological investigations attendant upon planning consent for future mineral extraction will undoubtedly add to our knowledge of these sites (and discover new ones), their impact needs to be managed in a strategic way, assessing the vulnerability and value of the archaeological resource in each area.

## 9.2. Recommendations for Future Work

The work undertaken by the project has raised a wide variety of potential research questions, and has highlighted those parts of the county — and its aggregate-bearing geologies — that require further study. The recommendations for future work made below focus strongly on those methodologies utilised by the project reported on here, and on those questions relating most directly to the aggregate resource. This is not to say that other areas for further research are not equally pressing; some potential topics raised by the various phases of the project, and gaps in our knowledge where alternative methodologies might be usefully deployed, are outlined briefly in Section 9.2.9 below. These might form the basis for, or an element of, future projects focused on Norfolk's aggregate resource, but might be of equal value for other parts of the county.

### 9.2.1. Development of the Norfolk Minerals Resource GIS

The Norfolk Minerals Resource GIS, created in the first phase of the project (Stage One, Phase 1; see Section 2.2) is a powerful tool for investigating the historic environment of the county in relation to its aggregate resources and their exploitation. It continues to be added to (for example, the data on active quarries and MWDF minerals allocations provided by NCC's Minerals and Waste Planning Team in March 2008), and will continue to be used by NLA for minerals-related work.

**There is huge potential for the Minerals Resource GIS to be developed further. For example, additional information could be added, concerning palaeoenvironmental data or records relating to current ecology. Certainly, its incorporation into and enhancement by future aggregates-related projects should be seen as a priority.** Enhancement of the palaeoenvironmental resource, and of data relating to the Palaeolithic period, would be of particular value (see too Sections 9.2.7 & 9.2.8).

### 9.2.2. Expansion of NMP Coverage

**The NMP survey (Stage Two, Phase 3; Section 2.4) was completed for an area of 138 sq km, recording 544 archaeological sites, 320 (59%) of which were entirely new discoveries. The results led to a 0.8% increase to the NHER as a whole, and an increase to the NHER in those areas covered of more than 30%.** They are reported on in detail in a separate report (Albone *et al.* 2008).

**So effective is the NMP at identifying and recording new archaeological sites, as well as enhancing our knowledge of those that are already known about, its completion**

**for a greater proportion of the county should be regarded as a priority.** As Table 9.8 and Table 9.9 demonstrate, **Norfolk's aggregate geologies are particularly productive of NMP sites, with above-average NMP site densities recorded in most project areas and on most geologies**. While a few register marginally below-average densities of such sites — Sub-Units B and D, the Sandringham Sand Formation bedrock — it should be remembered that the overall figures for the NMP include a high proportion of the coast, an area where the productivity in terms of NMP sites is even more extreme (the average density of NMP sites in the Coastal Zone was 5.0 per sq km).

***Table 9.8. No. of NMP sites in Sub-Units and Study Areas, relative to area for which NMP survey has been completed***
Including sites recorded up to the end of the Norfolk Aggregates Assessment Project (Project 5241MAIN). Map objects falling outside county or completed areas excluded.

| Project area | Aggregate type | Area with NMP completed (sq km) | No. of sites | per sq km |
|---|---|---|---|---|
| ***County*** | | ***1539.36*** | ***6194*** | ***4.0*** |
| | | | | |
| **Sub-Unit A** | Crag | 22 | 106 | **4.8** |
| **Study Area A** | | 247 | 1227 | **5.0** |
| | | | | |
| **Sub-Unit B** | Plateau Gravels | 41 | 157 | **3.8** |
| **Study Area B** | | 79 | 380 | **4.8** |
| | | | | |
| **Sub-Unit C** | River Gravels | 55 | 227 | **4.1** |
| **Study Area C** | | 146 | 702 | **4.8** |
| | | | | |
| **Sub-Unit D** | 'Lower Greensand' & Fen-Edge Gravels | 37 | 136 | **3.7** |
| **Study Area D** | | 100 | 397 | **4.0** |

***Table 9.9. No. NMP sites on aggregate geologies, relative to area for which NMP survey has been completed***
Including sites recorded up to the end of the Norfolk Aggregates Assessment Project (Project 5241MAIN). Map objects falling outside county or completed areas excluded.

| BGS ROCK type | BGS LEX type (where relevant) | Area with NMP completed (sq km) | No. of sites | per sq km |
|---|---|---|---|---|
| ***County*** | | ***1539.36*** | ***6194*** | ***4.0*** |
| | | | | |
| **B_SAND [Sandringham Sand Formation]** | **various** | 65.69 | 255 | **3.9** |
| **B_SAND_AND_ GRAVEL** | **Crag** | 836.60 | 3827 | **4.6** |
| **B_SANDSTONE** | **97% Carstone** | 11.13 | 59 | **5.3** |
| | | | | |
| **S_CLAY_SILT_SAND_AND_G RAVEL [alluvial]** | **Alluvium** | 52.11 | 384 | **7.4** |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | 7.09 | 60 | **8.5** |
| **S_SAND [glacial]** | **Corton Formation** | 86.08 | 858 | **10.0** |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **various** | 272.83 | 2117 | **7.8** |
| **S_SAND_AND_ GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | 21.70 | 221 | **10.2** |

**Given the particular effectiveness of NMP on (most) aggregate geologies, and the vulnerability of such deposits to future extraction (Table 9.7), greater NMP coverage of Norfolk's aggregate landscapes should be given the highest priority. Certainly, an air photo interpretation survey to NMP or NMP-equivalent standards, which utilises as wide a range of historic and modern aerial photography as possible, should be seen as strongly advisable prior to any planning decisions being made. This is particularly the case on those geologies that are especially productive of NMP sites, namely the river terrace sands and gravels, the Tottenhill Gravels and the glacial/glaciofluvial sands and gravels.** (The superficial Corton Formation sand also supports a high density of NMP sites, but there is already virtually 100% coverage of this deposit, see Table 9.11 below.) **Even the river valley deposits (river terrace and alluvium), which are ostensibly at little threat from future extraction, would benefit from such work, not only because extraction in these areas is still being proposed (Section 9.1.6 above), but also because the historic aerial photographs used by the NMP allow details of sites already lost to extraction to be recorded. This aspect of the survey is of particular importance in these areas, which have seen a considerable amount of extraction in the past.**

Cross-referencing the figures for NMP coverage given in Tables 9.10 and 9.11 below, with those for the NMP results and for current and future extraction given above, allows a case to be made for prioritising different parts of the county (or different geologies) dependent upon the specific impetus and aims of the proposed project. **Targeting of Study Area D, and of the Carstone in particular, might be seen as particularly beneficial, given the currently low proportion covered by NMP, the relatively high site density, and the high incidence of both past and future extraction.**

***Table 9.10. Proportion of Sub-Units and Study Areas covered by NMP***
Projected figures forecast proportion covered by end of current Thetford-Norwich-A11 Corridor NMP project (EH Project No. 5313), to be completed April 2010.

| **Project area** | **Aggregate type** | **Area** (sq km) | **Area covered by NMP** (to May 2008; sq km) | **%** | **Projected NMP coverage** (by April 2010; sq km) | **%** |
|---|---|---|---|---|---|---|
| ***County*** | | ***5497.99*** | ***1539.36*** | ***28*** | ***2192.61*** | ***40*** |
| | | | | | | |
| **Sub-Unit A** | Crag | 45 | 22 | **49** | 28 | **62** |
| **Study Area A** | | 596 | 247 | **41** | 307 | **52** |
| | | | | | | |
| **Sub-Unit B** | Plateau Gravels | 45 | 41 | **91** | 41 | **91** |
| **Study Area B** | | 327 | 79 | **24** | 126 | **39** |
| | | | | | | |
| **Sub-Unit C** | River Gravels | 64 | 55 | **86** | 55 | **86** |
| **Study Area C** | | 966 | 146 | **15** | 339 | **35** |
| | | | | | | |
| **Sub-Unit D** | 'Lower Greensand' & Fen-Edge Gravels | 45 | 37 | **82** | 37 | **82** |
| **Study Area D** | | 270 | 100 | **37** | 100 | **37** |

***Table 9.11. Proportion of aggregate-bearing geologies covered by NMP***
Projected figures forecast proportion covered by end of current Thetford-Norwich-A11 Corridor NMP project (EH Project No. 5313), to be completed April 2010.

| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within county** (sq km) | **Area covered by NMP** (sq km) | **%** | **Projected NMP coverage** (sq km) | **%** |
|---|---|---|---|---|---|---|
| ***Overall*** | | ***5497.99*** | ***1539.36*** | ***28*** | *2192.61* | *40* |
| | | | | | | |
| **B_SAND [Sandringham Sand Formation]** | **various** | **166.07** | **65.69** | **40** | **65.69** | **40** |
| **B_SAND_AND_ GRAVEL** | **Crag** | **1317.59** | **836.60** | **63** | **969.53** | **74** |
| **B_SANDSTONE** | **97% Carstone** | **52.35** | **11.13** | **21** | **11.13** | **21** |
| | | | | | | |
| **S_CLAY_SILT_SAN D_AND_GRAVEL [alluvial]** | **Alluvium** | **196.89** | **52.11** | **26** | **94.40** | **62** |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | **11.36** | **7.09** | **62** | **7.09** | **62** |
| **S_SAND [glacial]** | **Corton Formation** | **86.50** | **86.08** | **100** | **86.40** | **100** |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **various** | **778.46** | **272.83** | **35** | **424.77** | **73** |
| **S_SAND_AND_ GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | **105.40** | **21.70** | **21** | **44.14** | **45** |

### 9.2.3. NHER Enhancement and Synthesis (AC)

Enhancement of the existing NHER records for each Sub-Unit was undertaken prior to the assessment phase of the project being undertaken. In total, 1333 records were enhanced, and 28 new records created as a result of this process. The work provided an opportunity to update and standardise the database records to ensure that they contained the greatest possible level of detail, and to add all relevant index terms to maximise retrieval of these records when interrogating the NHER. This enhancement process also ensured that the records could be efficiently and accurately scored during the assessment; **a preliminary phase of enhancement would form a vital precursor to any further site scoring**.

In addition to the enhancement, a synthesis of the existing archaeological information for each Sub-Unit was also produced, along with a gazetteer of the sites in each area. **These NHER syntheses provided invaluable contextual information that was used in the interpretation and analysis of the NMP data, and in the assessment overall.**

### 9.2.4. Analysis of HLC Data

The analysis of Norfolk's HLC data that was undertaken for this project, while brief, has been successful in characterising the landscape of each of the Sub-Units — and at times

their broader Study Areas — over the last 200 years. The impact of recent changes to the character of these areas, in particular through mineral extraction, has been highlighted. **Further and more detailed analysis, better able to encompass the variation seen across a number of the Study Areas (B and C in particular), would be beneficial, in order to gain a better understanding of those elements of the landscape that might warrant preservation or restoration. An integrated analysis of the relationship between HLC and other information held by the NHER (including that provided by NMP),** which was beyond the scope of the current study, **would also be of use, both for Norfolk's aggregate-bearing areas and more widely within the county.**

### 9.2.5. Further Site Scoring

Scoring archaeological sites, for Significance and other variables, was undertaken as the preliminary phase of the assessment (Stage Four, Phase 5; Sections 2.7 & 4.4.1). As a result**, the extents of 1783 archaeological sites can now be mapped thematically, according to Significance, cross-referenced with a score for their Survival or with other subjective or objective datasets. While crude, such information has immediate applications within the planning system; although it does not negate the need for an assessment of each vulnerable site on an individual basis, the ability to assess potential threats at a strategic level is invaluable.**

So successful has the process been, that it is already being continued for other parts of Norfolk. **The availability of such information for a greater part of Norfolk's aggregate-bearing landscapes is now a priority, particularly for those areas that are to be targeted by future extraction.** As has already been described, such work should ideally be preceded by a phase of NHER enhancement, allowing the scoring process to be as efficient and well founded as possible. The availability of NMP data is also an advantage, as detail of sites previously identified from aerial photographs, but not yet subject to NMP, is often very limited.

### 9.2.6. Further Archaeological Assessment and Characterisation

The assessment of each project area involved the quantification and evaluation of the NHER record, and other data, for each Sub-Unit and Study Area. This enabled the historic environment of each area to be characterised, providing a context within which to assess proposals for future aggregate extraction. Table 9.12 below details figures for the percentage of each aggregate geology covered by the assessment.

**It is immediately apparent that of all the aggregate-bearing geologies, the Corton Formation sand has been barely covered by the assessment. This geology effectively forms a fifth Study Area, which should be made the subject of its own, individual assessment.** (Within the current project, there were only sufficient resources for the assessment of four Study Areas.) The fact that the NMP coverage for this area is already virtually 100% (Table 9.11) makes it ideally placed for assessment, although further NHER enhancement and site scoring would be necessary (Sections 9.2.3 & 9.2.5). **The coverage of the Crag bedrock is also relatively low; this reflects the exclusion from Study Area A (and therefore the assessment) of those parts of this deposit overlain by diamicton (Section 3.3.1); this area too would benefit from additional assessment work, again preceded by NHER enhancement and scoring.**

In undertaking the assessment, many patterns were identified in the data: in the distribution of archaeological sites, for example, and their relationship with environmental factors, including geology. While some of these patterns are undoubtedly related to variations in the level of archaeological investigation in a particular area, or to the survival or visibility of sites on certain soils, others may be of greater archaeological significance, potentially demonstrating a preference for or avoidance of certain areas in the past. Further investigation of the validity of such patterns is beyond the scope of the present study. **Future work might be directed towards a more detailed assessment of certain areas, in order to come to a more finely tuned understanding of such patterns. The particularly extensive and varied aggregate deposits — the river valley deposits (river terrace sand and gravel, and alluvium), the glacial/glaciofluvial sands and gravels — perhaps stand to benefit the most from such treatment.** A study of a single river valley system, for example, encompassing headwaters, mature valley and valley mouth, could elucidate and expand upon many of the trends identified by the assessment in the River Gravels Sub-Unit and Study Area (Study Area D). Similarly, the variations across the glacial and glaciofluvial sands and gravels, which are dispersed across much of the central portion of the county, are likely to be considerable, in terms of soils, topography, and other factors; what variations might be apparent amongst the archaeological data have yet to be revealed.

| *Table 9.12. Proportion of Sub-Units and Study Areas covered by assessment* | | | | |
|---|---|---|---|---|
| **BGS ROCK type** | **BGS LEX type** (where relevant) | **Area within county** (sq km) | **Area assessed** (sq km) | **%** |
| ***Overall*** | | ***5497.99*** | ***2022.00*** | ***37*** |
| | | | | |
| **B_SAND [Sandringham Sand Formation]** | **various (Roxham, Mintlyn, Leziate, *etc.*)** | 166.07 | 160.89 | **97** |
| **B_SAND_AND_ GRAVEL** | **Crag** | 1317.59 | 616.71 | **47** |
| **B_SANDSTONE** | **97% Carstone** | 52.35 | 44.05 | **84** |
| | | | | |
| **S_CLAY_SILT_SAND_ AND_GRAVEL [alluvial]** | **Alluvium** | 196.89 | 153.31 | **78** |
| **S_GRAVEL [Tottenhill]** | **Tottenhill Gravels** | 11.36 | 10.25 | **90** |
| **S_SAND [glacial]** | **Corton Formation** | 86.50 | 1.46 | **2** |
| **S_SAND_AND_ GRAVEL [glacial & glaciofluvial]** | **various** | 778.46 | 584.99 | **75** |
| **S_SAND_AND_ GRAVEL [post-glacial river terrace]** | **River Terrace deposits** | 105.40 | 97.74 | **93** |

### 9.2.7. Palaeoenvironmental Data

Palaeoenvironmental data was encompassed only incidentally by the present study; such data as was included generally comprised casual finds of animal remains, usually made during extraction. This and other information relating to the past environment is only recorded on an opportunistic basis in the NHER: where it is available, it is recorded, but the resulting dataset remains extremely limited and is far from comprehensive. In any case, the fact that the main unit of record for the NHER — and consequently also for this assessment — is an archaeological 'site', is not necessarily conducive to the recording of palaeoenvironmental data, which is typically extensive in range and non-site based. Similar methodological 'gaps' were also evident in the Suffolk and Gloucestershire assessment projects (Hill *et al.* 2008a, 1; Mullin 2005, 74), and the need to develop palaeoenvironmental datasets is recognised in the Regional Research Frameworks (Austin 1997, 7–8; Medlycott in prep., Palaeolithic and Mesolithic).

**A more detailed analysis of Norfolk's aggregate landscape as a palaeoenvironmental resource would need to be the subject of a separate study. The county's river valleys, where significant deposits are most likely to be preserved, would be particularly suitable for investigation, as has already taken place in Suffolk (**Hill *et al.* 2008a; 2008b)**. Such work could benefit from and complement that being undertaken for Norfolk's Geodiversity Action Plan, where there is considerable potential in the overlap between geology, landforms, Palaeolithic and palaeoenvironmental resources** (Tim Holt-Wilson, GeoSuffolk, pers. comm.). NAU Archaeology's proposed

'Predictive Modelling and Hazard Mapping Project', currently at Project Design stage, may address some of these issues (Ward 2008).

### 9.2.8. The Palaeolithic Resource

The Palaeolithic archaeology of the Eastern Counties is of considerable importance in the national, and indeed international, context. The fact remains, however, that while individual sites of the type encountered during the assessment (for the most part findspots of handaxes) are of interest, the likelihood is that most finds of Palaeolithic material are made at some distance from their original location, moved there by the action of glaciers and rivers. The greatest potential lies in the discovery of *in situ* remains, most often found in eroding coastal or valley locations, and also in the larger assemblages found in river valley and terrace deposits, often encountered during extraction (as with the cluster found between Lyng and Morton on the Hill in Sub-Unit C, Section 7.3). Isolated surface findspots may contribute to our overall understanding of the period, but the sites themselves (*i.e.* in terms of the ground they occupy) have a relatively low inherent value. The difficulties of interpreting material of this period, and the need for better strategies for discovering and recording it, are discussed in the Regional Research Framework Review (Medlycott in prep., Palaeolithic & Mesolithic).

Given their great antiquity, and their consequent incorporation into deposits moved by glacial or fluvial action, it could be argued that of all the archaeological sites covered by the assessment, it is those of Palaeolithic date that demonstrate the closest relationship with the county's geology. This would suggest that the occurrence of Palaeolithic material or 'sites' might be more easily predicted than for sites of other periods; it is certainly the case that densities of Palaeolithic 'sites' significantly higher than the county average were recorded on the combined River Valley deposits in Study Area C (Section 7.16.3), although this is in part a product of the extraction that has taken place here (which has led to their recovery). **Given the vulnerability of such deposits to exposure and subsequent destruction by aggregate extraction, the use of more sophisticated techniques to analyse, model and predict the potential location of Palaeolithic material — and of *in situ* remains in particular — should be seen as a priority for the county. Such work, which would need to encompass palaeoenvironmental data and would benefit from geoarchaeological techniques (for example, landform mapping), was clearly beyond the scope of the present study.** The identification of Palaeolithic resources is a stated aim of NAU Archaeology's proposed 'Predictive Modelling and Hazard Mapping Project' (Ward 2008, 5). **At the same time, the continuing need for regular expert examination of areas exposed during large-scale extraction, as identified in Suffolk (SCC Archaeological Service 2007), needs to be borne in mind.**

**9.2.9. Other Areas of Potential Research** (SM/ST)

The main investigative work undertaken by the current project was the completion of an NMP survey for a proportion of the project area (Section 9.2.2 above; Albone *et al*. 2008). While the potential for NMP to record large numbers of sites on certain aggregate-bearing geologies is extremely high, there are other areas where NMP is less successful, and/or might be complemented by other methods of investigation. For example, due to a variety of factors relating to geology, landuse and aerial photographic coverage, several areas within the project's Sub-Units produced comparatively poor NMP results. This was despite the fact that excavations in these areas in advance of aggregate extraction had revealed complex and extensive archaeological remains (for example, the extensive Roman site at Fosters End Drove, Blackborough End, in Sub-Unit D, NHER 37413). Furthermore, at some sites excavations revealed evidence of unenclosed settlement or pit groups, *i.e*. the type of features that are not readily identifiable (or dateable) from aerial photography. In addition, the wealth of fieldwalking and metal-detected finds recorded within the county, including those recorded by the Portable Antiquities Scheme (PAS), provides yet further indications of settlement and other activity, as yet recorded only as finds scatters, even where NMP has taken place (for example, NHER 30600, the multi-period finds scatter and probable Roman settlement on the diamicton at East Bilney, in Sub-Unit C). Given these gaps in what can be provided by NMP, with site types that are difficult to recognise or that occur on unsympathetic geologies, other means of detecting and characterising them prior to excavation are invaluable. In particular, **a project characterising pre-excavation surface assemblages, that attempted to create models for interpreting finds assemblages in a more meaningful way, would have huge benefits for both planning and research within the county and the wider region. This is particularly the case given that each year the Norfolk Finds Identification and Recording Service, together with the PAS, typically records in excess of 20,000 archaeological finds from the county.** Iron Age and Roman settlement evidence might be a particularly productive area for research, given the extensive sites excavated within the county (often in advance of aggregate extraction), difficulties encountered by the NMP (described above and in more detail in Albone *et al*. 2008), and the seemingly relatively direct correlation between dense scatters of Roman finds and settlement or other activity (Andrew Rogerson, NLA, pers. comm.). Finds relating to other periods or to other types of site might be equally suitable for such analysis.

In addition to the broader themes already described, the various phases of the project — in particular the NHER syntheses, analysis of the NMP results, and the assessment itself — have raised a considerable number of more specific questions, some of which would undoubtedly reward further investigation. **Many of these questions have direct relevance in the context of the recently revised Regional Research Framework (Medleycott in prep.). While in most cases it is not possible to point to a direct or**

**causal relationship (between geology and density of archaeological sites of a particular period, for example), the patterns identified, and the multiple factors that lie behind them, nevertheless still warrant further research.** The extent to which apparent clusters (for example those evident amongst the Iron Age and Roman sites recorded by the NMP) merely reflect biases in discovery and recording, rather than genuine patterns of past activity, would be particularly beneficial in assessing what the raw distribution maps actually tell us. More specifically, the distribution of Neolithic and Bronze Age settlement and funerary/ceremonial monuments within the county, and the continuing scarcity of the latter in west Norfolk (Section 8.4–5), remains an important research question. The high density of Saxon sites recorded within Sub-Unit and Study Area C is of interest, particularly given the relatively low productivity of this period for NMP, and the high significance of some of the sites in question (North Elmham, Spong Hill, Beetley Quarry, *etc*.). The relatively high density of medieval sites within Sub-Unit A when compared to earlier periods, in particular its extensive finds scatters, might also reward further research, especially given the detailed evidence for former settlement recorded in the eastern portion of the Sub-Unit by the NMP (Albone *et al*. 2008, 58). **It is also the case that questions such as these, which have arisen through a study of Norfolk's aggregate-bearing landscapes, are for the most part queries that remain equally valid for other parts of the county.**

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## Websites

Archaeology Data Service: http://ads.ahds.ac.uk/

Norfolk Heritage Explorer: http://www.heritage.norfolk.gov.uk/

# Appendix 1: Sub-Unit Gazetteers

*Available in digital format only*

# Appendix 2: Minerals Allocations

The tables below show all those minerals allocations included in the Minerals and Waste Development Framework (NCC 2008a) which fall within one or more of the project's Sub-Units. Revisions made since February 2008 (see NCC 2008b, for example) have not been incorporated. The information is primarily derived from digital datasets supplied by NCC's Minerals and Waste Planning Team in March 2008.

***Sub-Unit A***

| Site Reference No. | Location/Name | Parish | Area within Sub-Unit (sq km) |
|---|---|---|---|
| MIN 37 | Land at Mayton Wood | Buxton with Lammas, Frettenham | 0.24 |
| MIN 64 | Horstead Quarry Extension, Grange Farm | Horstead with Stanninghall | 0.24 |
| MIN 65 | Land on Trafford Estate, Stanninghall Road, Frettenham | Horstead with Stanninghall | 0.53 |
| MIN 96 | Spixworth | Harsham St Faith and Newton St Faith, Spixworth | 0.67 |
| ***Total*** | | | ***1.68*** |

***Sub-Unit B***

| Site Reference No. | Location/Name | Parish | Area within Sub-Unit (sq km) |
|---|---|---|---|
| MIN 8 | Land off Stoney Lane | Beetley | 0.15 |
| MIN 9 | Land to West of Fakenham Road | Beetley | 0.07 |
| MIN 10 | Land to East of Fakenham Road | Beetley | 0.08 |
| MIN 11 | Land North of Field Lane | Beetley | 0.20 |
| MIN 12 | Land South of Field Lane | Beetley | 0.16 |
| MIN 13 | Land South of Rawhall Lane | Beetley | 0.13 |
| MIN 14 | Land North of Stoney Lane | Beetley | 0.19 |
| MIN 22 | OS Field No 2700, Land to East of Former Railway Line, Beetley Quarry | Hoe | 0.05 |
| MIN 28 | Land at Manor Farm | Hoe | 0.40 |
| MIN 51 | Land west of Bilney Road | Beetley | 0.14 |
| MIN 63 | (Site A) Beck Farm, East Bilney | Beetley | 0.02 |
| MIN 66 | Land adjacent to Longham Hall | Longham | 0.22 |
| MIN 67 | Southern extension to Bittering Quarry known as Spreadoak | Longham | 0.47 |
| MIN 72 | High House Farm, Gressenhall | Beetley | 0.23 |
| MIN 89 | (Site B) Beck Farm, East Bilney | Beetley | <0.01 |
| MIN 97 | Bintree Woods, Bintree | Billingford, Bintree | 0.91 |
| MIN 103 | Land to the South of Yarrow Road, Near Bintree | Bintree, Billingford | 0.38 |
| MIN 106 | Land to the North of Short Lane | Billingford | 0.26 |
| ***Total*** | | | ****4.06*** |

* When calculated on whole figures, the total allocation within the Sub-Unit is 4.08 sq km.

### *Sub-Unit C*

| Site Reference No. | Location/Name | Parish | Area within Sub-Unit (sq km) |
|---|---|---|---|
| MIN 12 | Land South of Field Lane | Beetley | 0.02 |
| MIN 14 | Land North of Stoney Lane | Beetley | 0.02 |
| MIN 21 | Land at Foxburrow Farm, Beetley Quarry | Beetley/North Elmham | 0.12 |
| MIN 22 | OS Field No 2700, Land to East of Former Railway Line, Beetley Quarry | Hoe | 0.05 |
| MIN 28 | Land at Manor Farm | Hoe | 0.31 |
| MIN 63 | (Site A) Beck Farm, East Bilney | Beetley | 0.05 |
| MIN 66 | Land adjacent to Longham Hall | Longham | 0.22 |
| MIN 67 | Southern extension to Bittering Quarry known as Spreadoak | Longham | 0.47 |
| MIN 89 | (Site B) Beck Farm, East Bilney | Beetley | 0.04 |
| MIN 97 | Bintree Woods, Bintree | Billingford, Bintree | 0.30 |
| MIN 103 | Land to the South of Yarrow Road, Near Bintree | Bintree, Billingford | 0.18 |
| MIN 106 | Land to the North of Short Lane | Billingford | 0.01 |
| ***Total*** | | | ****1.79*** |

* When calculated on whole figures, the total allocation within the Sub-Unit is 1.78 sq km.

### *Sub-Unit D*

| Site Reference No. | Location/Name | Parish | Area within Sub-Unit (sq km) |
|---|---|---|---|
| MIN 5 | Land off East Winch Road | East Winch | 0.06 |
| MIN 6 | Land off East Winch Road/Mill Drove | Middleton | 0.10 |
| MIN 17 | Land at Lower Farm | East Winch | 0.02 |
| MIN 20 | Western extension to Pentney Quarry | Pentney | 0.14 |
| MIN 29 | Priory Farm, Blackborough End | Middleton | 0.07 |
| MIN 59 | Off of Mill Drove, Blackborough, Land within ref area C/97/2005 | Middleton | 0.07 |
| MIN 40 | Land to the East of Grandcourt Farm | East Winch | 0.40 |
| MIN 95 | Land at Wallington | Runcton Holme | 1.99 |
| MIN 42 | Land at Church Farm and Pott Row Woods, Ashwicken | Leziate, Bawsey, Grimston | 0.19 |
| MIN 39 | Land at Wicken East, East Winch Road, Ashwicken | Leziate | 0.08 |
| MIN 74 | Watlington, Near King's Lynn | Tottenhill | 0.15 |
| MIN 75 | Watlington, Near King's Lynn | Tottenhill | 0.05 |
| MIN 76 | Watlington, Near King's Lynn | Tottenhill | 0.12 |
| MIN 77 | Watlington, Near King's Lynn | Tottenhill | 0.10 |
| MIN 30 | Priory Farm, Blackborough End | Middleton | 0.03 |
| MIN 31 | Priory Farm, Blackborough End | Middleton, Wormegay, East Winch | 0.34 |
| ***Total*** | | | ****3.91*** |

* When calculated on whole figures, the total allocation within the Sub-Unit is 3.92 sq km.