ArcHeritage

SURVEY OF AGGREGATES EXTRACTION AND ARCHAEOLOGY BACKLOGS: NORTH-WEST REGION

RESEARCH REPORT

Report Number 2010/83.1 Revised January 2011

English Heritage Project No ALSF-5786 MAIN

By Glyn Davies and Rowan May

ArcHeritage

ArcHeritage is a trading name of York Archaeological Trust. The Trust undertakes a wide range of urban and rural archaeological consultancies, surveys, evaluations, assessments and excavations for commercial, academic and charitable clients. It can manage projects, provide professional advice and monitor archaeological works to ensure high quality, cost effective archaeology. Its staff have a considerable depth and variety of professional experience and an international reputation for research, development and maximising the public, educational and commercial benefits of archaeology. Based in York and Sheffield its services are available throughout Britain and beyond.

ArcHeritage, Campo House, 54 Campo Lane, Sheffield S1 2EG

Phone: +44 (0)114 2728884 Fax: +44 (0)114 3279793

www.archeritage.co.uk

CONTENTS

NON-TECHNICAL SUMMARY 2

KEY PROJECT INFORMATION 2

1 INTRODUCTION 3

1.1 Scope of Report 3

1.2 Background 3

1.3 The Study Area 4

1.4 Project Archive 4

2 AIMS AND OBJECTIVES 4

2.1 Aims 4

2.2 Objectives 5

3 METHODOLOGY 5

3.1 Research Methodology 5

3.2 Sources Consulted 6

3.3 Methodology for Assessing Levels of Project Completeness 7

4 SOFTWARE AND STRUCTURE OF THE DATABASE 8

5 BRIEF OVERVIEW OF THE DATA 16

5.1 Aggregates Provision in the North-West of England 16

5.2 Initial Quantification 21

5.3 Identification of Gaps in Knowledge 22

5.4 Proposals for Further Research to Address Perceived Omissions 23

5.5 Chronological and Spatial Trends 24

5.5.1 Temporal variation in aggregates projects 24

5.5.2 Significance of archaeology on quarry sites 27

5.5.3 Variation between hard and soft rock 28

5.5.4 Spatial variation 30

5.5.5 Use of archaeological techniques 32

5.5.6 Archaeological period represented 34

5.6 Potential of Incomplete or Inappropriately Disseminated Projects 36

6 CONCLUSIONS 42

7 ACKNOWLEDGEMENTS 43

8 REFERENCES 43

APPENDIX 1: GAZETTEER OF SITES 44

APPENDIX 2: DISTRIBUTION MAP 45

APPENDIX 3: PROJECT SUMMARY TABLE 46

NON-TECHNICAL SUMMARY

In 2009, ARCUS were commissioned by English Heritage to undertake a survey of archaeological fieldwork undertaken as a result of hard and soft aggregates extraction in the north-west region. This covered the counties of Cheshire, Lancashire, Greater Manchester and Merseyside. The survey was part of an English Heritage project to identify archaeological sites with incomplete or inadequate levels of dissemination, and to assess the potential of these sites. The survey consisted of desk-based research, and consultations with county HERs, museums and archaeological units. The results of the survey have been stored in a database, which will be publicly accessible through the ADS website.

Following the closure of ARCUS in October 2009, this report was completed by the same project staff who are now part of ArcHeritage.

KEY PROJECT INFORMATION

Project Name	Survey of Aggregates Extraction and Archaeology Backlogs: North-West Region
ArcHeritage Project No.	5353
Report status	Final
Type of Project	Desk based study
English Heritage Project No	ALSF-5786 MAIN
Author	Glyn Davies and Rowan May
Illustrations	Glyn Davies
Editor	Anna Badcock
Report Number and Date	September 2010 revised January 2011/83.1

1 INTRODUCTION

1.1 Scope of Report

This report presents the results of a desk-based study of aggregate sites the in north-west of England. The study covered the counties of Lancashire, Greater Manchester, Cheshire and Merseyside. The study was undertaken to identify and quantify archaeological projects arising from aggregates extraction which currently have incomplete or inappropriately low levels of dissemination. The study was concerned with the extraction of aggregates from both hard rock (crushed rock) and soft rocks (sand and gravel). The project was funded by the Aggregates Levy Sustainability Fund (ALSF) administered by English Heritage.

1.2 Background

The extraction of aggregates has impacted on many archaeological sites and landscapes. Aggregates extraction has therefore led to a significant number of the rural archaeological projects undertaken over the last century. These projects have ranged from watching briefs to large-scale excavations of multi-period landscapes taking place over several years. They have had a range of funding sources, including the public purse, local and national archaeological societies, and the aggregates industry itself.

It has been recognised that, although considerable sums of money have been invested in aggregates related archaeological fieldwork, there has often been inadequate provision for analysis and dissemination. The production of 'grey literature' has often been the end publication even for sites of regional or national significance. Quarry sites have often developed significant publication backlogs and this problem has often been complicated by factors related to the operation of quarries; quarries are often worked in several stages with a similar number of archaeological stages, there are often long gaps between different stages of archaeological work and more than one archaeological company may have worked on the same quarry at different phases of the project. There are consequently many unfinished archaeological projects related to aggregate extraction, the results of which may range from local interest to international significance. It is likely that the information from some of these projects could contain significant unpublished data that could aid our understanding of past human landscapes and activities, and assist in the protection of the historic environment, particularly within aggregate search areas or areas with active aggregate quarries.

As part of a number of initiatives to assess the state of the historic environment, English Heritage funded a pilot study to quantify the current situation regarding archaeological rescue projects with incomplete or inadequate dissemination within three counties with a long history of aggregates extraction (ARCUS 2007). The pilot study was undertaken with a view to assessing an effective methodology for extending the project to the entire country. The pilot study covered the counties of Derbyshire, Nottinghamshire and Oxfordshire, and identified 258 archaeological projects related to aggregates extraction, of which 105 (41%) were considered to have incomplete or inappropriate levels of dissemination. Of these 105 sites, 79% were of regional or national significance.

During the pilot study, the methodologies for collection and recording were refined, and the results were recorded in a database. Following the pilot study, the project has been extended to cover additional aggregate-producing areas of the country. This report is concerned with the north-west region.

1.3 The Study Area

The study covers the north-west region of England, comprising the counties or metropolitan boroughs of Cheshire, Lancashire, Greater Manchester and Merseyside. Cumbria is not covered by this report. The region is geologically diverse, and aggregate deposits are also varied, coming from hard rock and soft rock sources.

Cheshire produces the greatest percentage of sand and gravel aggregates for the region (68% in 1995), the main sources being fluvio-glacial deposits in the Vale Royal and Macclesfield districts. These deposits are typically found in small patches along with boulder clay (Brown 2009, 109). There are sandstone resources in central and west Cheshire (Red Triassic), and on the Pennine fringe to the east (gritstone). Some of the sandstone quarries are, or have been, used for the production of crushed rock aggregates.

Lancashire's aggregate resources comprise sand and gravels, sandstone and limestone. Sands and gravels derive from glacial, fluvial and fluvio-glacial sources, as well as some beach or dune sands and windblown sands. Fluvial sands are located along the major river valleys, while fluvio-glacial and glacial sands are found mainly in the lowland areas. Hard rock has historically been the main source of aggregate production in Lancashire. Limestone is found in a number of areas, although it is mainly worked in the vicinity of Carnforth. Gritstone quarries have been worked since the 19th century, initially for building stone, but converted to crushed rock production in the 1930s. Most of these quarries are located on moorland edges.

The Greater Manchester area contains ten metropolitan boroughs, most of which have large urban areas. Of these boroughs, there are working quarries in Bolton, Bury, Oldham, Tameside and Wigan. Sand and gravel quarries are mainly concentrated in Bury and Wigan, in the Irwell and Roch valleys, with the other boroughs generally producing crushed rock (sandstone and gritstone).

Merseyside currently has no working aggregate quarries and the HER did not have any data on relevant sites or archaeological projects. This is probably a result of the urban nature of much of Merseyside.

1.4 Project Archive

The data generated as a result of this project will be archived in the form of a database transferred in its entirety to English Heritage (Historic Environment Enabling Programme) and will be mounted with the Archaeology Data Service (ADS) as a publicly accessible dataset.

In addition to the database, the illustrated project report will be submitted to English Heritage in bound format. A pdf version of the report, complete with illustrations and appendices, will be compiled for digital dissemination via the ADS and English Heritage websites.

2 AIMS AND OBJECTIVES

2.1 Aims

The general aim of the project was to continue the successful methodology refined during the pilot study, and to extend this to the north-west region of England.

The project aimed to identify and quantify all excavation projects that relate to soft and hard aggregates extraction, and which currently have incomplete or inappropriately low levels of archive completion, assessment, analysis and/or dissemination, with a view to forming a

strategy to disseminate the information currently inaccessible within this corpus.

2.2 Objectives

The more specific objectives of the project were:

- to add to the database (developed in the pilot) of historic environment interventions associated with aggregate extraction from 1900 to the present;
- to allow projects that are currently inactive and are incomplete or have had inappropriately low levels of archive completion, assessment, analysis and/or dissemination, to be identified;
- where levels of intervention and/or dissemination are unacceptably low, to propose an appropriate level of further intervention/dissemination;
- to analyse the data collected to identify trends, significant omissions and possible future research (including the potential for cross-project synthetic research) which will assist English Heritage in formulating a strategy to address incomplete or inadequate archive completion, assessment, analysis and/or dissemination for historic environment projects associated with aggregate areas;
- to review the project methodology and data structure and make recommendations that might lead to improvements in project methodology and/or project outcomes, in order to inform future projects of this type; and
- to report on the findings of the project.

3 METHODOLOGY

3.1 Research Methodology

The project comprised a rapid desk-based assessment of existing information only, and therefore excluded fieldwork and site visits to assess primary archives. The assessment included locating projects through the review of published articles and notes in local journals, examination of publicly available databases of archaeological projects, consultation of county Historic Environment Records (HERs), and consultation archaeological units working in the area.

Basic locational data for aggregates extraction in each county was gained from the British Geological Survey (BGS) Directory of Mines and Quarries, current Local Mineral Plans and the North-West Regional Aggregates Working Party (NWRAWP) annual reports. The plotting of quarry sites and known projects on a GIS database has not been part of the project remit.

For the purposes of this project, previous desk-based assessments were not normally considered as a discrete stage of fieldwork within an archaeological project, but during the data collection it became clear that for many of the aggregates extraction schemes, desk-based assessment was the only record of archaeological input into the planning process. This may indicate ongoing quarrying projects, or a lack of any follow-up archaeological investigations. For this reason desk-based assessments have been noted in the database where no follow-up work is known.

The recovery of stray finds has been excluded from the project, unless collection was undertaken in a methodical way, or where archaeological features were also recorded at the same time.

Following the initial collation of data, consultations were carried out to verify the data and to address omissions identified during the previous phase of work. The consultations were

carried out by telephone and e-mail and were undertaken to:

- determine the current status of outstanding projects;
- determine the potential of projects for further work and/or dissemination;
- identify previously unrecorded projects.

The resulting information has been presented in a relational database. Due to the nature of the assessment, there are unavoidable gaps in the information available. These have been flagged for later consideration.

3.2 Sources Consulted

Existing datasets

Cheshire Historic Environment Record

Lancashire Historic Environment Record

Greater Manchester Historic Environment Record

Merseyside Historic Environment Record

Archaeological Investigations Project (AIP)

Archaeology Data Services (ADS)

Cheshire Archaeological Bulletin

Journal of the Chester Archaeological Society

Journal of the Chester and North Wales Architectural, Archaeological and Historic Society

Transactions of the Lancashire and Cheshire Antiquarian Society

Transactions of the Historic Society of Lancashire and Cheshire

Lancashire Archaeological Journal

Lancashire Archaeological Bulletin

Contrebis

Greater Manchester Archaeological Journal

Manchester Archaeological Bulletin

Journal of the Merseyside Archaeological Society

Archaeology North-West: CBA Group 5

Antiquity

Antiquaries' Journal

The Archaeological Journal

Proceedings of the Prehistoric Society

Archaeological Excavations: Ministry of Public Works

Follow-up consultations

Oxford Archaeology North (OAN)

Liverpool Museums Field Archaeology Unit (LMFAU)

Birmingham Archaeology (BUFAU)

West Yorkshire Archaeology Service (WYAS)

ARCUS

3.3 Methodology for Assessing Levels of Project Completeness

Fieldwork projects considered during the project included all kinds of archaeological fieldwork (geophysics, evaluation, fieldwalking, building recording, excavation, etc.) associated with both the buried and the built historic environment, carried out in association with and/or in preparation for aggregates extraction from 1900 to the present day. Fieldwork carried out for other kinds of development is excluded from this brief.

The tag of incomplete or inappropriate archive completion, assessment, analysis and/ or dissemination, is intended to:

- flag up the need to consider the project(s) within any strategy devised by English Heritage to improve the completion of the work and dissemination of historic environment information to an appropriate level and to the widest possible audience;
- help ensure that all stakeholders involved in the planning process have easy access to all information derived from fieldwork within the historic environment with a view to enabling informed decisions to be made regarding the management and regulation of heritage assets.

Incomplete archive completion, assessment, analysis and/or dissemination is typically where a project has stalled or been terminated before its results have been made available to the various constituencies, both public and professional, that make up the historic environment and development control sectors.

It is recognised that projects that produced only negative results may be regarded as complete providing they have a suitable HER entry. Other projects which are disseminated only as interim notes or where HER entry has not taken place are, for the purposes of this project, regarded as incomplete.

Inappropriate archive completion, assessment, analysis and/or dissemination, for the purposes of this project, is where it is believed that further work on the project archive and/or further dissemination of the existing results of a project may be desirable. This could include cases where a project may benefit from wider circulation of grey literature reports and/or further formal publication where there is potential for popular presentation of the outcomes.

Appropriate levels of dissemination, for the purposes of this project, are deemed to have been reached when:

- the data retrieved from any fieldwork is publicly accessible;
- the results have been disseminated and are publicly accessible to a level commensurate with the significance of the results; and
- the archive has been deposited as appropriate.

For projects completed after 1991 this is guided by a MAP2 assessment if it exists. For projects undertaken prior to this date, or those without MAP2 assessments, professional judgement has been used about the appropriateness of work and dissemination undertaken.

As a guide, an appropriately completed and disseminated project should have as a minimum:

- a publicly accessible archive;

- a completed HER entry;
- a publicly accessible report written to the appropriate level in digital and/or hard copy format, summarising and interpreting the data.

A limited print run grey literature report available only through the SMR/HER or originating archaeological unit is regarded as inappropriate dissemination. This is because there are examples where work carried out in the last ten years and reported on is effectively unavailable because the limited copies of the reports have been lost or are no longer available from the originating unit.

In addition, a final report may be deemed inappropriate where it is believed that it:

- does not cover (without good reason) all elements of the archive;
- is too summary in form;
- where the data covered would benefit from further analysis.

This judgement is by definition subjective, and will be based on an understanding of the level of knowledge at the time the report was written; i.e. a report published in 1973 will be judged against the standards of the time and not against current practices and knowledge.

Where it is unclear what level of work and/or dissemination has taken place, a project is regarded as inappropriately disseminated. This is designed to flag up the need for further work at a later date, outside the scope of this brief, to determine the actual status of the project in question.

4 SOFTWARE AND STRUCTURE OF THE DATABASE

Aggregates database

The data is presented as a database file (.mdb) in Microsoft Access 2007 format. Each known archaeological intervention is presented as a single record. Where multiple interventions have taken place over time within a single quarry, these are presented as multiple records.

The content and layout out of the database has been modified to take account of the recommendations of the pilot study and the requirements of associated projects which are also using the database.

Changes to the layout have subdivided the form for individual records into sections based on the type of data contained. This is designed for ease of use and does not affect the database structure. The layout on the form is followed in the description of fields below.

Each record contains 61 fields, as follows.

1. National ID (AutoNumber) a unique record number used when different databases are combined to a national database for English Heritage. No information should be added to this when inputting data to the database

2. Project ID (AutoNumber): a unique record number used when inputting data. The record is auto generated and consists of a 4 digit name as a prefix for the research project with a continuous number sequence following, e.g. ARC1 for the pilot project and NW09 for the north-west region.

3. Name of project (free text): an individual project name for the site under consideration, where this is known. Not necessarily the same as the quarry name (e.g. Fleak Close, recorded within Swarkestone Quarry).

4. Region (glossary): English Heritage regions. Drop-down selection from the following:

North-East

North-West

Yorkshire

West Midlands

East Midlands

East of England

South-West

South-East

London

5. County (glossary): Geographical counties, not unitary authority names, a dropdown box with a list of English counties. The counties used are the post 1974 county names including the metropolitan counties such as Greater Manchester and Merseyside.

6. Valley system (glossary): Constrained for the north-west region project to:

Artle Beck

Bollin

Bradshaw Brook

Calder

Dane

Darwen

Dee

Douglas

Eagley Brook

Etherow

Glaze Brook

Greta

Groal

Hindburn

Hodder

Irk

Irwell

Keer

Landgen Brook

Lune

Medlock

Mersey

Moss Brook

Pilling Brook

Ribble

Roch

Roeburn

Stock Beck

Tame

Weaver

Wenning

Wyre

N/A Not applicable (used for non-fluvial and hard rock aggregates extraction)

7. Name(s) of quarry(ies) (free text): It has not been possible within the terms of the project to conduct a full historical review of changing quarry names and ownerships. For each quarry, therefore, a single quarry name has been adopted within this field, to ensure consistency, e.g. 'Stanton Harcourt' is used in place of 'Vicarage Field', 'Vicarage Pit', 'Beard Mill' etc.

8. Aggregate deposit type (glossary):

- Soft (sand, sand and gravel)
- Hard (crushed rock – limestone, sandstone)
- Unknown

9. Grid reference easting (world co-ordinates) (number): constrained to a six-figure integer.

10. Grid reference northing (world co-ordinates) (number): constrained to a six-figure integer

11. HER/SMR location (glossary): Location of HER record relating to the site. Constrained for the north-west region project to:

Cheshire

Lancashire

Greater Manchester

Merseyside

None

12. HER/SMR number (free text): site, event or report number, blank if HER record was not located, multiple numbers can be added separated by a semi-colon.

13. Scheduled Monument number (free text): if applicable

14. Listed building number (free text): if applicable

15. Funding body (glossary)

Department of Environment (DoE)

Ministry of Works (MoW)

Local Authority

Manpower Services

Aggregates Industry

Individual

Other

Unknown

16 Archaeological organisation undertaking work (glossary): This box contains a dropdown list of archaeological organisations that have undertaken work in the north-west region. For projects not associated with an organisation there is a category called UN (unaffiliated).

The current list contains:

ARCUS Archaeological Research and Consultancy, University of Sheffield

ASWYAS Archaeological Services: West Yorkshire Archaeology Service

BUFAU Birmingham University Field Archaeology Unit and Birmingham Archaeology

Castlering Archaeology

CPAT Clwyd and Powys Archaeological Trust

GAP Gifford and Partners Ltd

GAT Gwynedd Archaeological Trust

GMAU Greater Manchester Archaeology Unit

GSBP Geophysical Sruveys Bradford Prospection

L–P or LPA LP Archaeology

LMFAS Liverpool Museum Field Archaeology Section/Unit

LUAU Lancaster University Archaeology Unit (later OAN)

NA Northamptonshire Archaeology

NAA Northern Archaeological Associates

NPAL North Pennines Archaeology Ltd

OAN Oxford Archaeology North (previously LUAU)

RAHS Radcliffe Archaeological and Historical Society

ULRAU University of Liverpool Rescue Archaeology Unit

UMAU University of Manchester Archaeological Unit

UN Unaffiliated

17. Year or year range of intervention (free text).

18. Period 1-4 (number): period allocation for the project

0= Period 0 (pre1900)

1 = Period 1 (1900-1945)

2 = Period 2 (1946-1971)

3 = Period 3 (1972-1990)

4 = Period 4 (1991-present)

The allocation was made on the recorded start date of the project, e.g. a project with year range 1942-1955 would be assigned to Period 1.

19. Size of project (glossary): This was used as a broad assessment of the relative scope of the project, as judged from the available documentation. The following terms were used:

Small: Minor and/or non-intrusive works, e.g. test-pitting, a small-scale watching brief or geophysical survey

Medium: Intervention involving a significant excavation element, such as evaluation trenching, or more extensive landscape survey work

Large: A large-scale set-piece excavation, or multi-stranded investigations over a larger area

Very large: Long term and spatially extensive investigations including possibly numerous large-scale excavations and/or extensive landscape survey/environmental sampling.

20. Nature of fieldwork (primary) (glossary): Identification of the primary type of fieldwork undertaken during the project.

Survey/geophysics

Fieldwalking

Evaluation

Excavation (used for pre-PPG16 rescue excavation in addition to post-PPG 16 mitigations)

Building recording

Environmental

Finds

Watching brief

Unknown

21. Site code Fieldwork (primary) (free text): if applicable

22. Nature of fieldwork (secondary): (glossary). As in field 20, this allows for secondary fieldwork elements, for example an excavation stemming from discoveries during evaluation.

23. Site Code Fieldwork (secondary) (free text): if applicable

24. Fieldwork required by regulatory conditions (glossary):

Scheduled monument consent

Planning condition

Not required

Unknown

Archaeological Period (There are a series of yes/no boxes which can be ticked to confirm the presence of an archaeological period on the site. More than one box can be ticked if required)

25. Palaeolithic

26. Mesolithic

27. Neolithic

28. Bronze Age

29. Iron Age

30. Roman

31. Early medieval

32. Medieval

33. Post-medieval

34. Modern

35. Undated Prehistoric

36. Early prehistoric

37. Later prehistoric

38. Prehistoric or Roman

39. Multi-period

40. Uncertain

41. Site type class (glossary): NMR Monument Class descriptors were used, as follows:

Agriculture and subsistence

Civil

Commemorative

Commercial

Defence

Domestic

Gardens and parks

Industrial

Maritime

Object

Recreation

Religious, ritual or funerary

Transport

Unassigned

Water and drainage

Multiple

42. Nature of discoveries (free text): A summary of the project results where known. (This field formerly contained information on the organisation undertaking the work. This has now been separated into a separate field, no. 16).

43. Current project status (glossary): Older projects were considered complete by definition. The status of more recent projects was determined where possible in consultation with the organisations responsible.

Active	Multi-stage projects where more fieldwork is expected, or projects where post-excavation work is ongoing
Stalled	Multi-stage projects where more fieldwork is expected, but a significant time-lapse has occurred
Complete	Completion of all anticipated fieldwork, with post-excavation complete and a client report submitted

Not known

44. Most recent project stage (glossary):

In the pilot this originally only contained stages identified in MAP2. This was found to be problematic when dealing with projects not following MAP2 and additional terms have been added to cope with such projects.

Ongoing fieldwork

Fieldwork complete

Post-excavation in progress

Developer report submitted

Publication work in progress

Publication complete

Evaluation (MAP2)

Excavation (MAP2)

Site archive completion (MAP2)

Assessment (MAP2)

Analysis (MAP2)

Dissemination (MAP2)

Archive deposition (MAP2)

45. Archive location known/unknown (glossary):

Known

Unknown

46. Archive details (free text): Location and accession numbers, where available. Includes developer reports where submitted to SMR/HER.

47. Published references (free text): The following abbreviations of journal titles were used:

A	Antiquity
AIP	Gazetteer of Archaeological Investigations undertaken in England: Archaeological Investigations Project (AIP)
AJ	Antiquaries' Journal
ANW	CBA Archaeology North West
B	Britannia
BAB	British Archaeological Bibliography
BA	British Archaeology
CA	Current Archaeology
JCAS	Journal of the Chester Archaeological Society
JRS	Journal of Roman Studies
MA	Medieval Archaeology
PPS	Proceedings of the Prehistoric Society
TAJ	The Archaeological Journal
TLACAS	Transactions of the Lancashire and Cheshire Antiquarian Society

48. Significance of data retrieved from project (glossary):

Local:	Negative or limited archaeological evidence, meriting a grey literature report or a brief note in a local journal
Regional:	Significant archaeological evidence, meriting a longer report in a local journal
National:	A major archaeological site, meriting full publication in a national journal or in monograph form
International:	Term not used.

In cases where an organisation has carried out a number of interventions over time within a single quarry, the assessment of importance has been made on the total evidence, rather than on a single season's work.

49. Dissemination complete (glossary): Is dissemination of the project complete and of an appropriate level?

Yes

No

Not known

This assessment was based on the *significance of data retrieved from project attributes* described above, as follows:

Projects with *local* significance should have a grey literature report available in a local SMR/HER if results were negative or negligible, and a brief local journal note in addition, if small-scale archaeological evidence was recovered.

Projects with *regional* significance should have a full treatment in a local/county

journal.

Projects with *national* significance should have full publication in a national journal, or full monograph publication.

50. Suggested level of dissemination (glossary): Only completed if dissemination was regarded as incomplete or inappropriate.

Assessment

Analysis

Publication

Proposed further work (There are a series of yes/no boxes which can be ticked to confirm the work required to complete the suggested level of dissemination as suggested in field 50. More than one box can be ticked if required).

51. Completion of archive

52. Full assessment and appropriate analysis

53. Analysis of assessed material

54. Deposition of archive

55. Brief journal note

56. Short journal article

57. Inclusion in Synthetic Regional/National Study

58. Monograph or major journal article

59. Wider dissemination of grey literature report

60. Popular publication/ dissemination

61. Associated projects (free text)

5 BRIEF OVERVIEW OF THE DATA

5.1 Aggregates Provision in the North-West of England

The Department of Communities and Local Government have produced guidelines on the provision of aggregates in England up to 2020 (Dept of Communities and Local Government 2009). These guidelines provide figures on the expected total use of aggregates and the expected sources including land-won production, marine production, alternative materials (recycled) and imported aggregates. Within the guideline's figures are all the regions of England; these figures are provided in **Table 1**. It should be noted that the North-West Region as defined by the Department of Communities and Local Government does not coincide exactly with the study area for this project. The Department of Communities and Local Governments North-West Region includes Cumbria in addition to the counties in this study. This means that when considering the figures used in the analysis for aggregates provision in the North-West this discrepancy should be borne in mind.

Regions	Guidelines for land-won production		Assumptions			
	Land-won Sand & Gravel	Land-won Crushed Rock	Marine Sand & Gravel	Alternative Materials	Net Imports to England	totals
South-East England	195	25	121	130	31	502
London	18	0	72	95	12	197
East of England	236	8	14	117	7	382
East Midlands	174	500	0	110	0	784
West Midlands	165	82	0	100	23	370
South-West	85	412	12	142	5	656
North-West	**52**	**154**	**15**	**117**	**55**	**393**
Yorkshire & Humber	78	212	5	133	3	431
North-East	24	99	20	50	0	193
England	**1028**	**1492**	**259**	**993**	**136**	**3908**
%	26.3	38.2	6.6	25.4	3.5	100.0

Table 1: National and regional guidelines for aggregates provision in England, 2005-2020 (million tonnes). (After Department for Communities and Local Government 2009.)

Nationally land-won production provides almost 2/3 of the aggregates used, while marine, alternative and imported material together make up approximately 35%; this dominance of land-won production can be seen clearly in **Figure 1**.

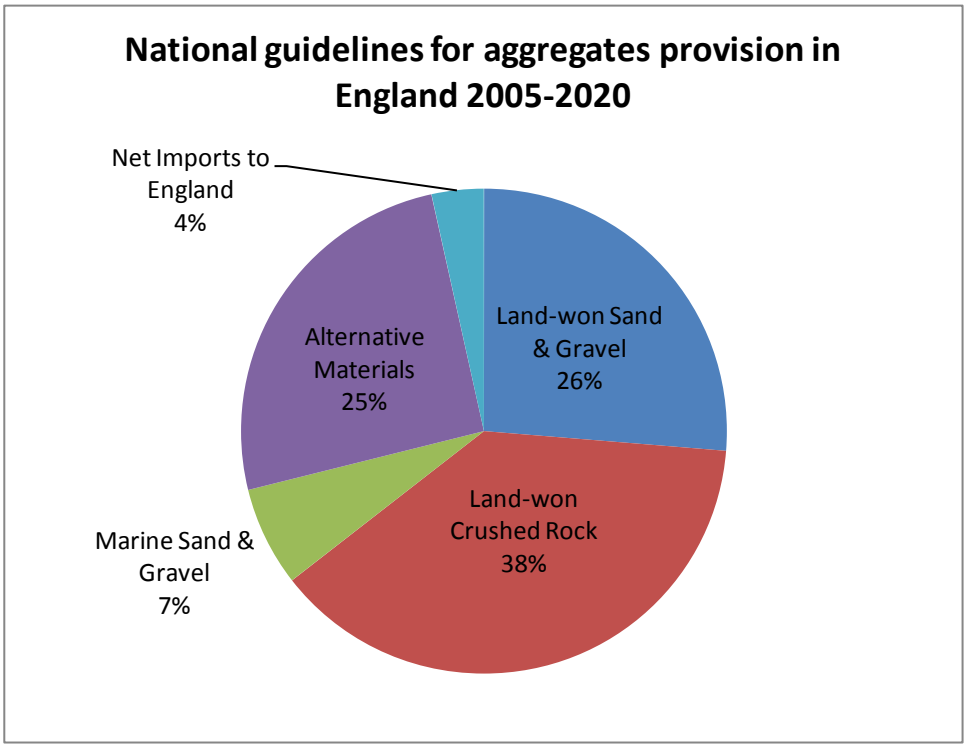

Figure 1 National guidelines for aggregates provision in England 2005-2020

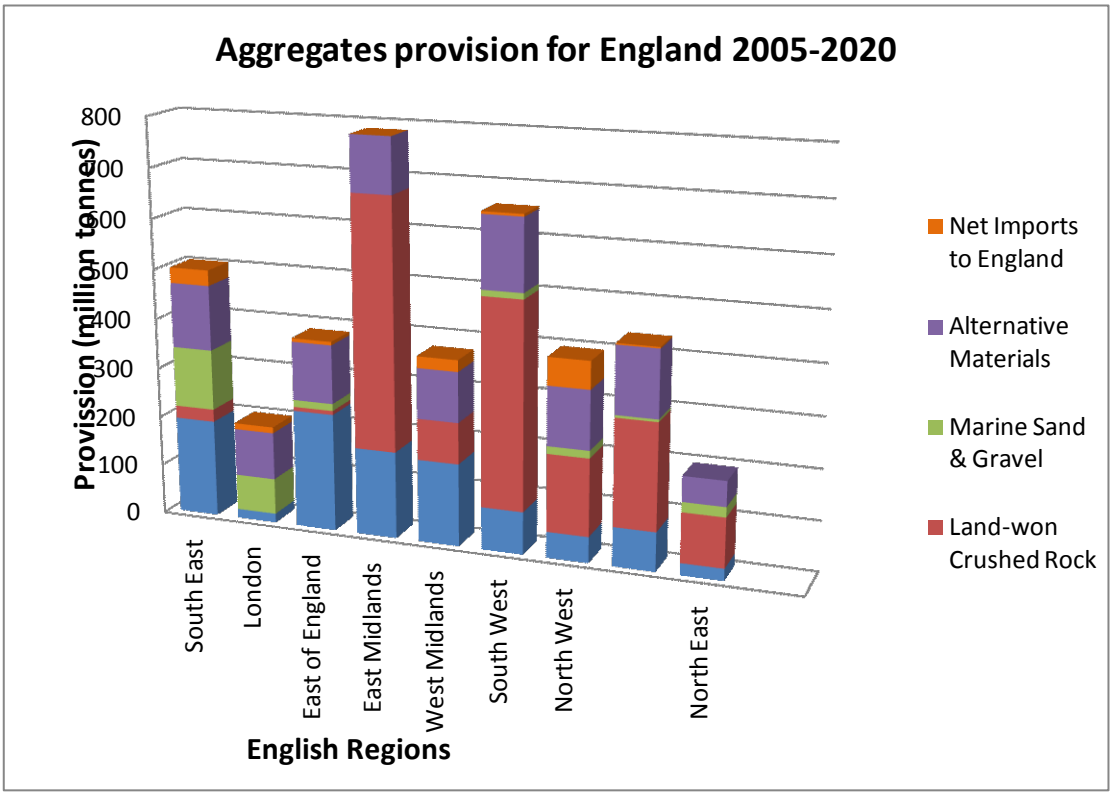

Figure 2 Aggregates provision for England regional breakdown by source

The breakdown of aggregates sources by regions (**Figure 2**) shows that there are significant variations across the country in the total use of aggregates by regions and in the sources of aggregates used. To make these regional variations clearer these figures have been converted to percentages with the different sources expresed as a percentage of the regions' total provision (**Table 2 Figure 3**).

Regions	Guidelines for land-won production		Assumptions			
	Land-won Sand & Gravel	Land-won Crushed Rock	Marine Sand & Gravel	Alternative Materials	Net Imports to England	
South-East England	38.84	4.98	24.10	25.90	6.18	100.00
London	9.14	0.00	36.55	48.22	6.09	100.00
East of England	61.78	2.09	3.66	30.63	1.83	100.00
East Midlands	22.19	63.78	0.00	14.03	0.00	100.00
West Midlands	44.59	22.16	0.00	27.03	6.22	100.00
South-West	12.96	62.80	1.83	21.65	0.76	100.00
North-West	**13.23**	**39.19**	**3.82**	**29.77**	**13.99**	**100.00**
Yorkshire & Humber	18.10	49.19	1.16	30.86	0.70	100.00
North East	12.44	51.30	10.36	25.91	0.00	100.00
England	**26.3**	**38.2**	**6.6**	**25.4**	**3.4**	**100.0**

Table 2 National aggregates provision, source use as a percentage of regional totals

The percentage figures used in **Figure 3** divides the country into two obvious groups, London and the south east and the rest of the country. In London and the south east marine and alternative materials are now the primary sources of aggregates while across the rest of the country land-won sand and gravel and crushed rock predominate with alternative material becoming more important. The North-West generally follows this pattern but with a slight local variation, whereby imported aggregates are much more important that elsewhere in the country; 13.99% of aggregates provision in the North-West is from imported material, four times the national average of 3.48%. In fact 40% of all imported aggregates in England is required for the north-west provision (**Table 3, Figure 4**), much higher than elsewhere in England. This is due to a shortfall in aggregates provision in the North-West from other sources. In addition the percentage of land won aggregates in the North-West is the lowest (52.42%) of anywhere in the country outside London and the South-East, which also suggests that traditional sources can no longer provide sufficient aggregates for this region.

This background on the provision of aggregates in the North-West should be borne in mind when considering the analysis below.

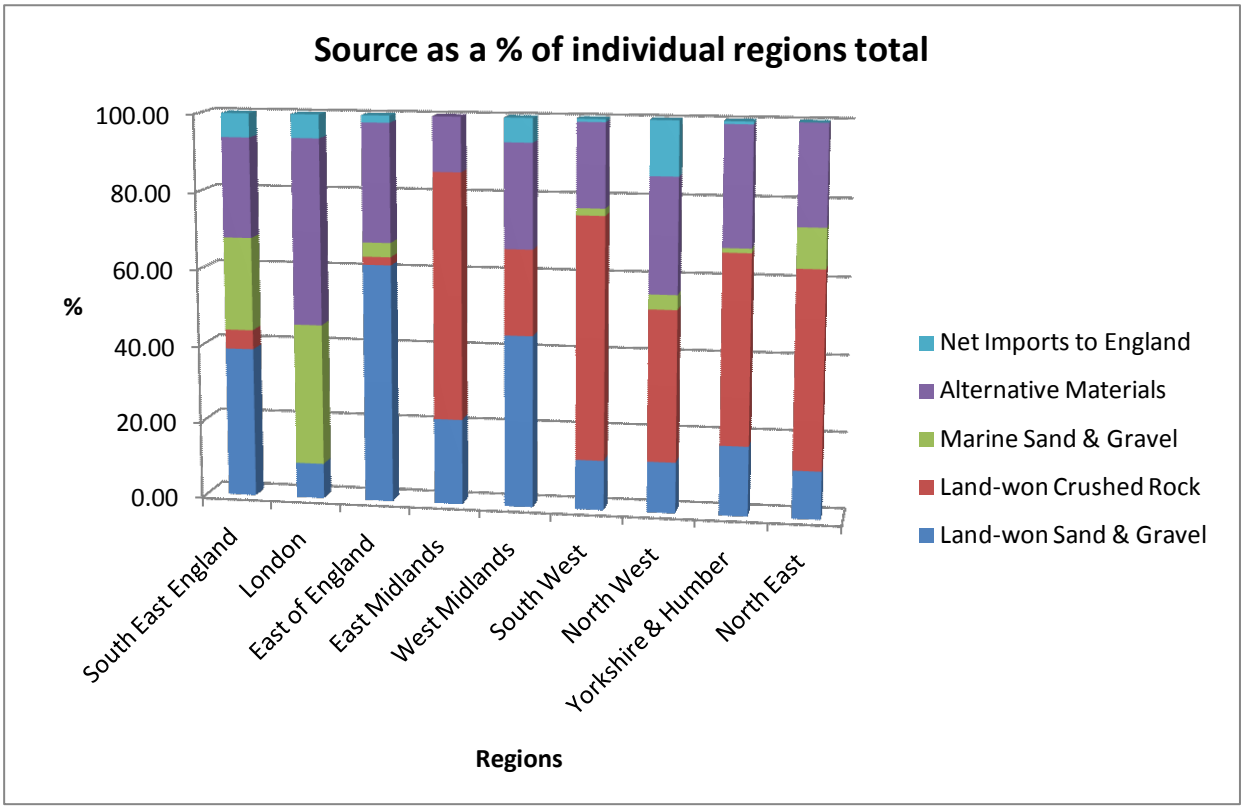

Figure 3 National aggregates provision, source as a percentage of regional totals

Regions	Guidelines for land-won production		Assumptions		
	Land-won Sand & Gravel	Land-won Crushed Rock	Marine Sand & Gravel	Alternative Materials	Net Imports to England
South-East England	18.97	1.68	46.72	13.09	22.79
London	1.75	0.00	27.80	9.57	8.82
East of England	22.96	0.54	5.41	11.78	5.15
East Midlands	16.93	33.51	0.00	11.08	0.00
West Midlands	16.05	5.50	0.00	10.07	16.91
South-West	8.27	27.61	4.63	14.30	3.68
North-West	**5.06**	**10.32**	**5.79**	**11.78**	**40.44**
Yorkshire & Humber	7.59	14.21	1.93	13.39	2.21
North-East	2.33	6.64	7.72	5.04	0.00
Total	99.90	100.00	100.00	100.10	100.00

Table 3 National aggregates provision, regional sources as a percentage of the total for each source

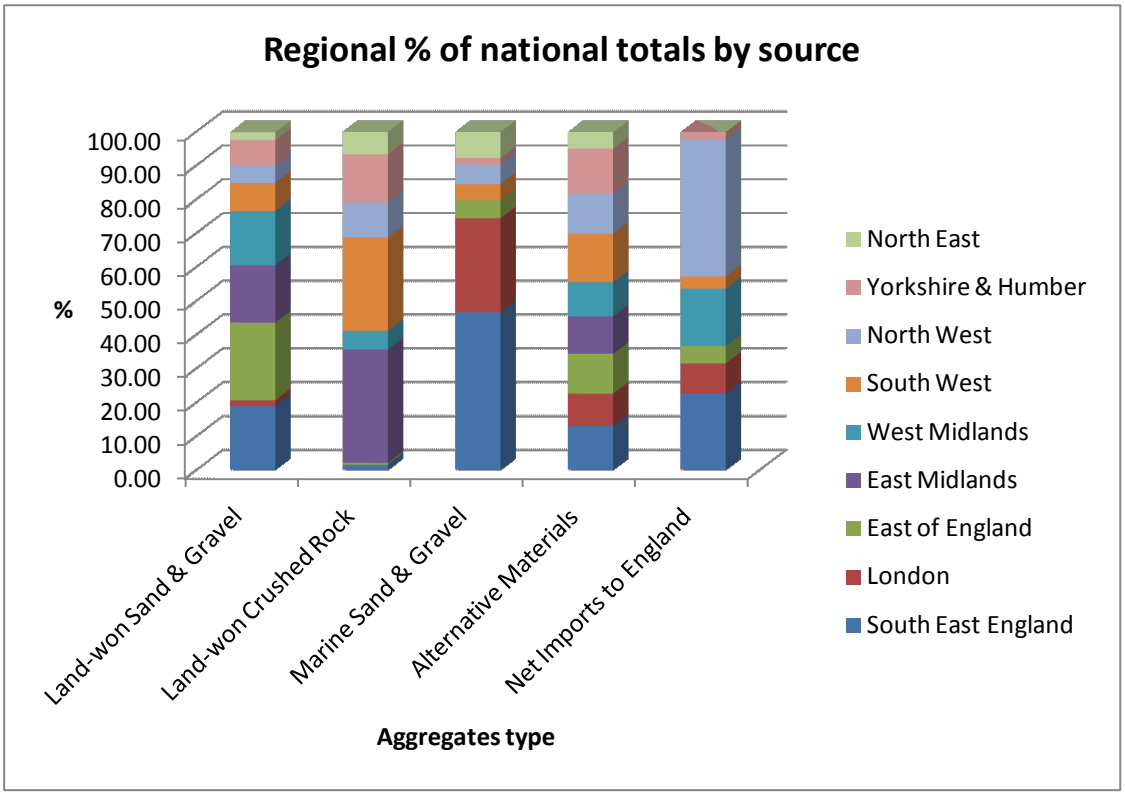

Figure 4 Nation aggregates provision, regional sources as a percentage of the total for each source

5.2 Initial Quantification

The database contains 44 records, relating to 34 quarries or areas of quarrying (Appendix 2). Due to the small quantity of available data, chance finds and desk-based assessments have been included in the database, the latter to identify quarry sites where no further archaeological work appears to have been carried out, although in some cases the desk-based assessment had recommended further work. Twenty-six of the quarrying episodes had archaeological fieldwork, with 14 sites having had desk-based assessments only. The vast majority of the recorded projects relate to Period 4: 1991 to the present day.

	Archaeological projects /Sites	Sites on SMR/HER	Sites with known archive	% archive known
Cheshire	25	24	8	32
Greater Manchester	9	9	0	0
Lancashire	10	8	7	70
Total	44	41	15	34

Table 4 Number of archaeological projects/sites by county

Within the study area Cheshire had most of the archaeological projects on quarry sites, approximately half of the total number. Greater Manchester and Lancashire had similar numbers to each other approximately a quarter each (**Table4, Figure 1**). No appropriate sites/archaeological projects were identified in Merseyside and there are no aggregates quarries currently active. This was noted in **section 1.3** where it was also noted that is probably related at least in part to the urbanised nature of much of the area. The availability of suitable geology for aggregates extraction will be another limiting factor. Another

potential factor is the limited extent of the antiquarian tradition in the area with few active societies until the second half of the 20th century; this means that earlier quarries may not have been examined for their archaeological potential prior to the advent of rescue archaeology and commercial archaeology working within the planning framework.

For many of the sites the locations of the archives were not identified, and this proved particularly problematic for desk-based assessments and some of the longer running sites.

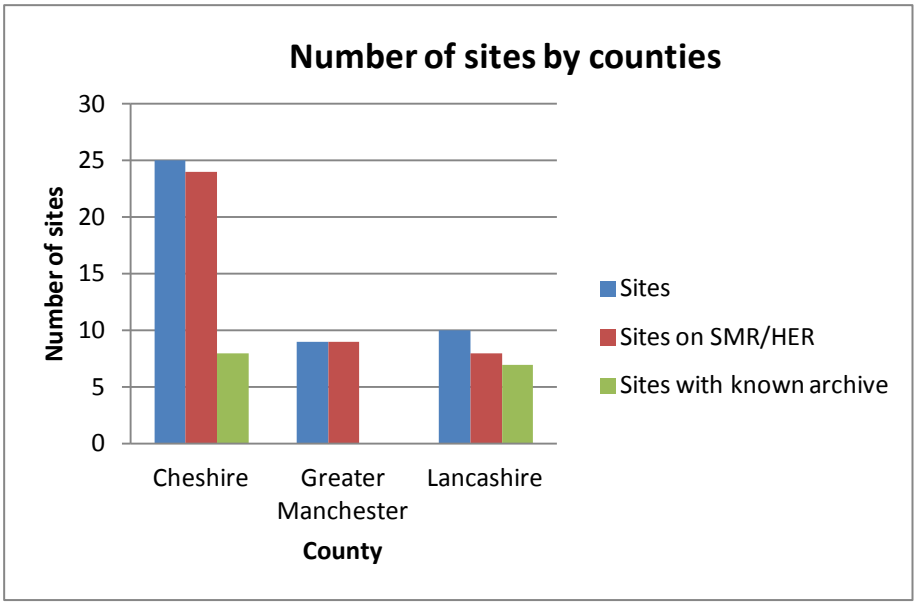

Figure 5 Number of archaeological projects/sites by counties

Some of the interventions reflect ongoing work at large quarries (**Table 5**), with Pilsworth Quarry, Greater Manchester, having the largest number of recorded interventions (5), although this was much less evident than in the pilot study areas. In most of the quarries identified, phases of archaeological work were undertaken within a period of no more than 10 years from the initial phase of work (usually desk-based assessment). On several occasions, phases of work were undertaken by more than one archaeological contractor, which may have led to difficulties in providing adequate publication.

	No. of interventions	Earliest	Latest
Arclid, Cheshire	4	1990	2009
Crown Farm, Cheshire	2	1991	2008
Pilsworth, Greater Manchester	5	1996	2006
Southworth Hall Farm, Cheshire	2	1980	1993

Table 5 Archaeological interventions at long running quarries

5.3 Identification of Gaps in Knowledge

Records of any archaeological interventions associated with quarrying pre-1991 have been very difficult to track down. Unlike in the pilot study areas, journal records for the North-West region are scarce.

As with the pilot study, it was evident that the structure of the HER databases consulted is not geared towards a search of this nature. The databases are mainly designed to be

accessed by grid reference, and the reason for archaeological intervention being conducted is not recorded as a searchable field, so it is not possible to conduct a search for sites arising from aggregate extraction. The only way to identify aggregate sites would be to cross reference HER sites from the map layer in known quarrying areas and cross-reference them with the records on the database to ascertain which were associated with aggregate extraction. The amount of time that this would take, anticipated as several days in each HER, ruled out the collation of HER identifiers for unknown quarrying sites. The British Geological Survey currently have a GIS containing information on previous planning applications associated with quarrying ,which could provide a useful method of locating aggregate sites where archaeological work may have taken place.

The main source of information on recent and ongoing projects was the grey literature reports held at the HERs. In some cases it was necessary to search through the reports, which were not always catalogued. The Archaeological Investigations Project (AIP) has a record of grey literature reports held by SMRs (HERs) for the post-1991 period. This was used to identify relevant grey literature reports for HERs which did not have an easily searchable catalogue. This may be one reason for the lack of identification of pre-1991 archaeological interventions, which have not been catalogued by AIP and were therefore not seen at the HERs. Additionally, as the bulk of grey literature reports have been deposited as part of the post-PPG16 planning guidance, this resource frequently does not exist for pre-1991 projects.

The literature search included county archaeological journals, supplemented where possible with major national publications. For the pilot study, this was the most useful starting place for gathering information; however, for the North-West region, this was less helpful. The main problem appeared to be that there are a variety of local publications for the North-West, rather than one major journal for each county, as was the case in the pilot regions. Tracking down copies of all the local journals was difficult, as few of the university libraries visited had complete runs of all the journals. In addition, there does not seem to have been the tradition for publishing excavation reports for local projects, even as notes, in several of the journals, as was seen in the Derbyshire, Nottinghamshire and Oxfordshire journals.

There were several problems encountered in consulting archaeological units. In several cases, the units had no database of projects or rapid means to access information on projects arising from aggregate extraction. Not all units replied, possibly being reluctant to share information on ongoing projects with a potentially competing commercial organisation, despite the research nature of the project. It was also difficult to get information on the location of archives from published sources, grey literature reports and units, meaning that any archives located in private collections or outside the main county depositories, would be difficult and time-consuming to identify.

5.4 Proposals for Further Research to Address Perceived Omissions

The previous pilot study identified and ironed out any problems with the basic aims and methods for regional studies of aggregates backlogs. There is, however, a problem with data collection between areas; this is down to variations between HER/SMRs, and local antiquarian/archaeological publishing tradition and practices. This can lead to significant variations in the quantity of time needed to collect basic data. It is suggested that a brief assessment of local HERs and journals is undertaken in future so as to identify the quality of data sources. This can then be used to more accurately allocate resources during the data collection stage, rather than having to adapt once the project is underway.

A further problem identified with local HER/SMRs relates to ongoing or potentially ongoing projects. This concerns initial assessments and evaluations that make recommendations for

further work to mitigate proposed quarry development. Quarries can be active for several years and it was sometimes difficult to identify, from the HER/SMR, if a quarry was still active, if mitigation was ongoing or when a project was expected to be completed. This could be clarified in some cases by examination of the case files. Part of the problem with the HERs may be due to records not being updated but part is due to the nature of information on the record and what is input although this does vary between HERs and also between recent and old data.

5.5 Chronological and Spatial Trends

In the pilot project the analysis of the results of the study were primarily undertaken based on the planning periods but in this study due to the small sample size in all but planning period 4 such an analysis is not possible. The analysis in this case has been undertaken by themes, e.g. chronology, space, techniques etc.

5.5.1 Temporal variation in aggregates projects

The vast majority of the recorded projects (37, 84%) relate to Period 4: 1991 to the present day (**Table 6**). Only five excavations have been identified pre-dating this period, all but one of these in Cheshire. Three other pre-1991 projects consist of chance finds, one from 1793 (Period 0), one from 1923 (Period 1) and one from 1990 (Period 3). The five pre-1991 projects consist of two from Period 2 (1946-1971), and three from Period 3 (1972-1990). The Period 2 projects, dating to 1949-50 and to 1967 were undertaken by local archaeological societies or enthusiasts. This was also the case for two of the Period 3 projects, which consisted of the recording of Roman roads exposed in section in quarry faces, with the third (and largest) undertaken by University of Liverpool Rescue Archaeology Unit on a multi-period site at Southworth Hall Farm. All of the Period 3 projects were in Cheshire.

	Period 0	Period 1	Period 2	Period 3	Period 4	Total
Small	1	1	1	3	23	**29**
Medium					13	**13**
Large			1	1		**2**
Very large						**0**
Total	**1**	**1**	**2**	**4**	**36**	**44**

Table 6 Project size and period

This chronological trend appears to reflect a lack of local society rescue activity in association with aggregates quarrying in the years prior to 1970. It has been stated (Cowell and Innes 1994, 10) that Merseyside in particular had a relative lack of an archaeological tradition until the 1970s, when there was a growth in regional archaeological units, usually based at county museums or councils, and rescue units (often based at universities). The regional units initially spent much of their time on survey and compiling information on known sites for the Sites and Monuments Records, and most of the rescue archaeology was associated with town centre redevelopments. It was not until the publication of PPG16, and the vast increase in developer-funded archaeology, that systematic recording of archaeological remains associated with mineral extraction was undertaken.

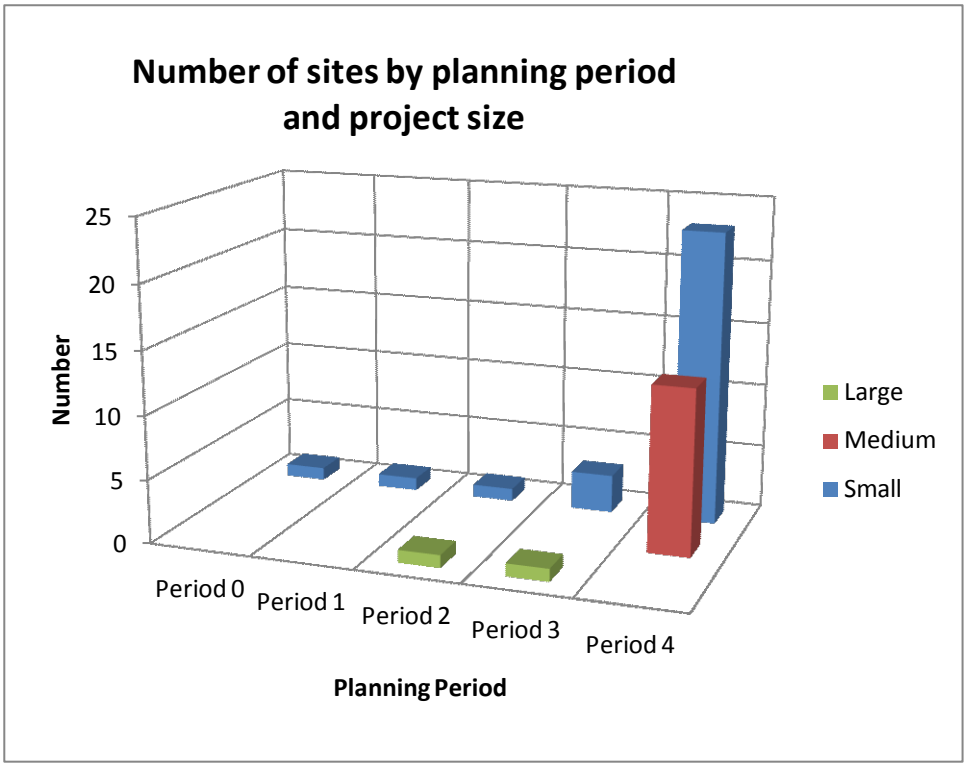

Figure 6 Number of archaeological projects by planning period and project size

Of the four counties examined as part of the north-west region survey, Cheshire has by far the largest number of archaeological interventions associated with aggregates quarrying. The 44 identified quarrying activities with archaeological interventions break down into 25 for Cheshire, ten for Lancashire and nine for Greater Manchester. Merseyside has no recorded archaeological interventions associated with quarrying.

Calculation of the average number of projects per year across the whole study area shows how the number of projects has increased dramatically in Period 4 (**Table 7, Figure 7**).

	Period 1	Period 2	Period 3	Period 4
Small	0.022	0.038	0.167	1.278
Medium				0.722
Large				
Very large		0.038	0.056	
Total	**0.022**	**0.077**	**0.222**	**2.000**

Table 7 Average number of projects per year

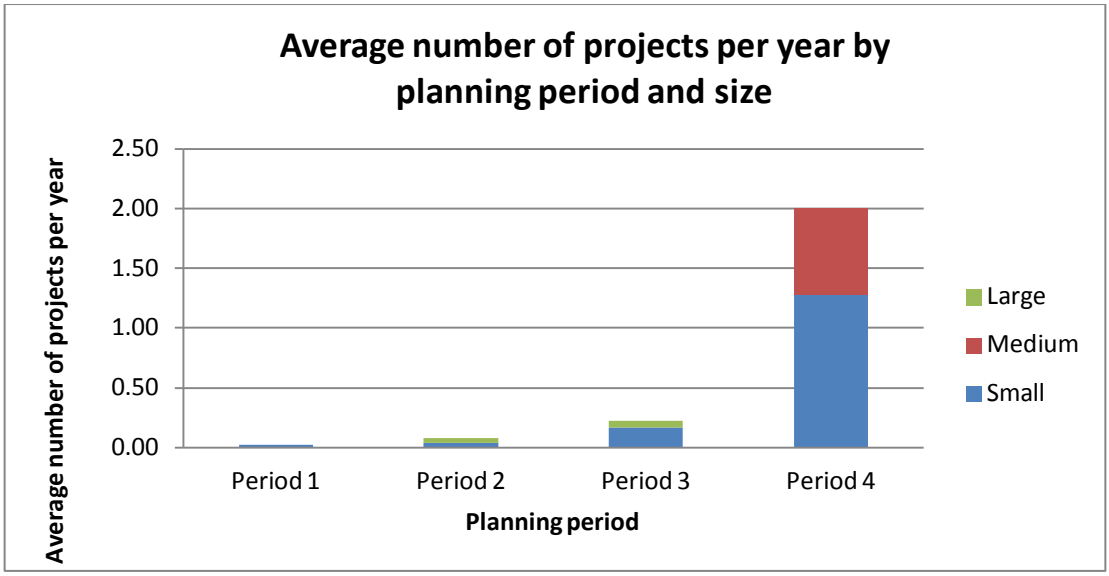

Figure 7 Average number of projects per year

The variation in the number of archaeological projects is probably associated with differences in geology. There appears to be a bias towards archaeological interventions for soft aggregate quarries rather than for hard rock. The NWRAWP annual monitoring report for 1997 recorded 23 aggregate quarries in Cheshire, of which 14 have recorded archaeological projects. All 14 quarries with archaeological interventions relate to soft aggregate extraction. The nine other quarries are all hard rock, with one exception.

It is possible that this bias reflects both a greater archaeological potential in the lower lying valley and plain areas where sand and gravel are located, and the limitations of archaeological non-intrusive techniques in assessing the potential for buried remains. It is also the case that sand and gravel quarries often extend over larger areas due to the shallowness of the exploited deposit and are therefore more likely to contain archaeology. The valleys with sand and gravel sub-soils are more likely to have been a focus of human activities, particularly settlement and arable cultivation. Whilst settlement and activity have been undertaken on the higher ground, earthwork remains are easy to identify and exclude from quarrying areas, whilst sub-surface remains may be more ephemeral and more difficult to detect. Techniques such as aerial survey can identify cropmarks depending on the depth over overlying soil and vegetation cover, working well on arable and pasture but often producing poor results on moorland and land with heavy vegetation cover such as scrubland, whilst geophysical survey is dependent on the depth of overburden and local geology and interpretation can be difficult in areas with strong and messy geological signals.

A large proportion of the Lancashire and Greater Manchester aggregate sources are derived from hard rock (sandstone and limestone), although areas of sand and gravel do exist. Recent research on the archaeological potential of the Ribble Valley may lead to a greater number of archaeological interventions if future quarrying is undertaken in this area (Quartermaine 2007).

Studies on the wetland areas of the north-west region have suggested that Greater Manchester and Merseyside have had a lower density and extent of settlement throughout all archaeological periods (Hall *et al* 1995, 127). It has also been argued that the climate and soils for much of the Greater Manchester region were not ideal for early agricultural practice, and that these areas would therefore see less human settlement and farming activity in the later prehistoric periods than the areas to the east of the Pennines, such as

Yorkshire and Derbyshire (Hall *et al* 1995, 128). Additionally, the large urban areas within the Greater Manchester and Merseyside regions mean that aggregates extraction is limited in scope to areas outside historic settlement zones.

It is not possible to identify any trends in the size of projects due to the small number of projects in Periods 0 to 3, but it is noticeable how few large projects there have been over the years in the north-west region. Comparison with the pilot study areas shows that there were far higher percentages of medium and large projects than in the north-west region where 65% of all projects were small (**Table 8**).

	pilot study areas		North-west region	
	number	%	number	%
small	83	32.17054	**29**	65.90909
medium	128	49.6124	**13**	29.54545
large	40	15.50388	**2**	4.545455
very large	7	2.713178	**0**	0
	258		44	

Table 8 Project size in the north-west region and the pilot study area

5.5.2 Significance of archaeology on quarry sites

The significance of the archaeology uncovered in the projects varied between negligible and nationally significant (**Table 9, Figure 8**). As may be expected, sites of local archaeological significance formed the greatest number. Only one site of national importance was identified, and this was a chance find of a medieval log boat, discovered in the first quarter of the 20th century. The relatively high number of locally significant sites (75%) fits with the number of small projects in that, in general terms, it is not unreasonable to find a correlation between locally significant sites and smaller projects.

	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Local	1			2	30	**33**
Regional			2	2	6	**10**
National		1				**1**
Not Known						**0**
Total	**1**	**1**	**2**	**4**	**36**	**44**

Table 9 Project significance and planning period

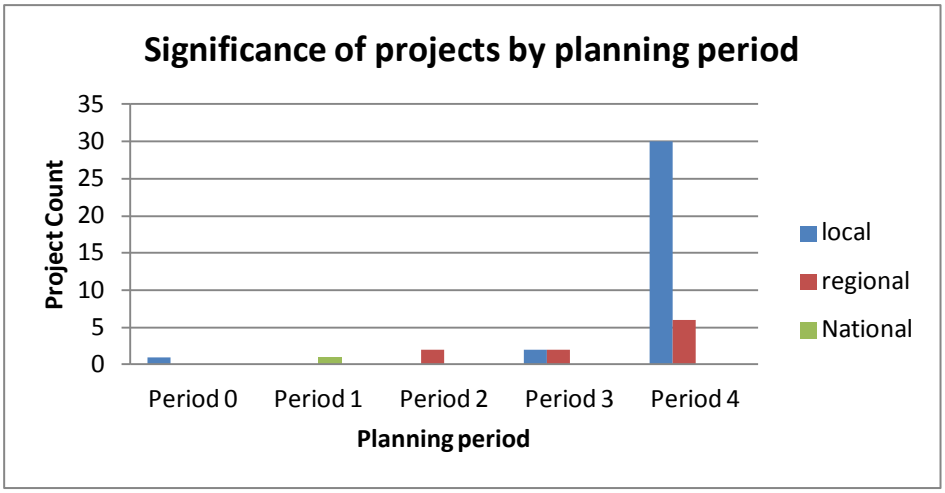

Figure 8 Project significance and planning period

5.5.3 Variation between hard and soft rock

Aggregate production, on land, can be subdivided between soft rock (sand and gravel) and hard rock (crushed rock). Within the north-west region 75% of quarries with archaeological interventions are soft rock and while only 25% are hard rock (**Table 10, Figure 9**). This is almost exactly the reverse of the production from hard and soft rock seen in the local provision for aggregates (**Table 2**). This would appear to suggest that soft rock quarries are much more archaeologically productive that hard rock quarries, and this may in part be true, but other factors may be relevant. Relative productivity per unit area, with hard rock quarries a higher tonnage of aggregates per unit land area will be produced due to the greater depth of extraction in most hard rock quarries; this means that fewer hard rock quarries are required to produce a larger output of aggregates. In addition, we need to consider whether archaeological evaluations on hard rock and soft rock quarries are equally effective; it has been noted that there are problems with evaluations of hard rock quarries particularly in reference to subterranean or deeply buried archaeology (Davies 2010).

	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Soft Rock			1	3	29	**33**
Hard Rock	1	1	1	1	7	**11**
Total	**1**	**1**	**2**	**4**	**36**	**44**

Table 10 Rock type by planning period

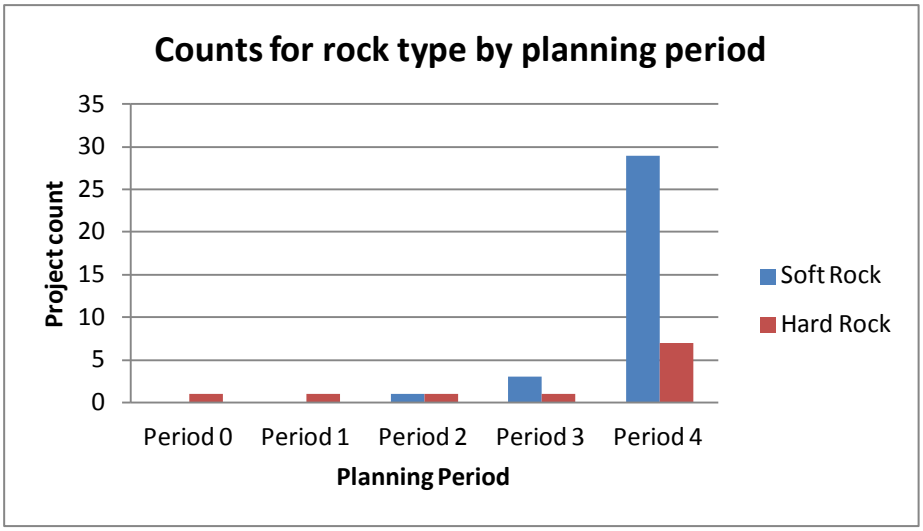

Figure 9 Rock type by planning period.

An examination of the significance of the archaeology by rock type (**Table 11, Figure 10**) shows that in both cases locally significant sites predominate but with slightly more regionally and nationally significant sites associated with hard rock quarries. However, the difference is very small and with such small numbers of hard rock sites one should be careful in drawing conclusions that this difference is significant.

	Local	Regional	National	Total
soft	24	9	0	**33**
hard	7	3	1	**11**
	31	**12**	**1**	**44**

Table 11 Rock type by significance

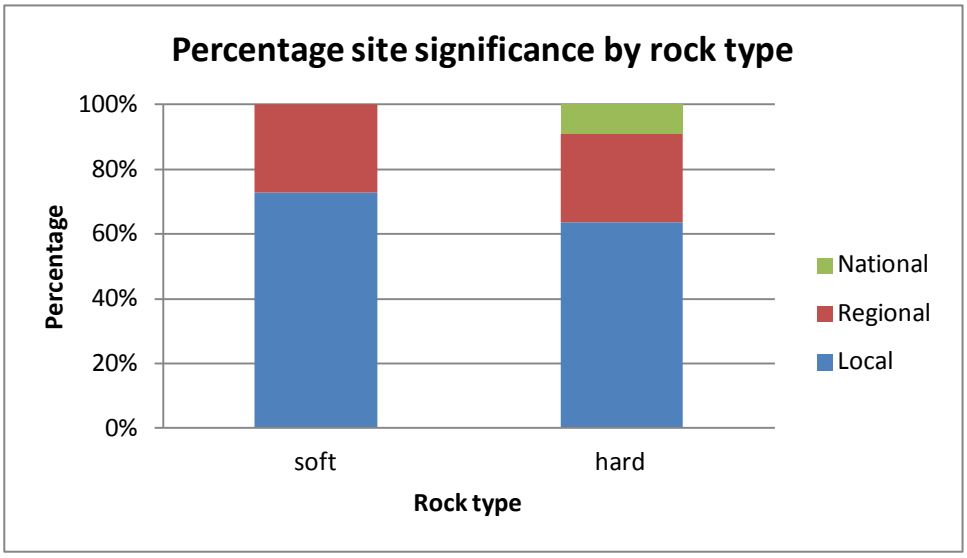

Figure 10 Rock type by significance

5.5.4 Spatial variation

In contrast to the pilot project, where two major rivers systems dominated the drainage system, in the north-west region a larger number of smaller rivers are involved in the drainage pattern. With a total of only 44 archaeological interventions divided between 7 rivers and hard rock sites the numbers of archaeological projects per river are too small to enable any significant comparisons to be drawn (**Table 12, Figure 11**). A few observations can, however, be made. The Weaver and the Dane rivers account for almost two thirds of the soft rock aggregates sites, 10 projects each. There is one apparent difference between the rivers in that there are more medium sized archaeological projects on the Weaver (four), than the Dane (one). Examination of significance for these two rivers (**Table 13, Figure 12**) shows a comparable pattern; in this case there are three regionally important sites on the Weaver and only one on the Dane. As noted above a potential correlation between significance and size is not unsurprising but of greater interest is why there appears to be a difference between the two rivers; it could be that there are larger more significant sites on the Weaver that the Dane but the sample sizes are too small to be certain of this.

River	Project size	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Roch	s					1	**1**
	m					4	**4**
	l						**0**
Moss Brook	s					2	**2**
	m					1	**1**
	l						**0**
Ribble	s					1	**1**
	m					1	**1**
	l						**0**
Wyre	s					1	**1**
	m						**0**
	l						**0**
Weaver	s				1	5	**6**
	m					4	**4**
	l						**0**
Dane	s				2	7	**9**
	m					1	**1**
	l						**0**
Bollin	s			1		1	**2**
	m						**0**
	l						**0**
Hard Rock	s	1	1			6	**8**
	m					1	**1**
	l			1	1		**2**
Total		**1**	**1**	**2**	**4**	**36**	**44**

Table 12 Project size by period and by river

(Project Size s=small, m=medium, l=large)

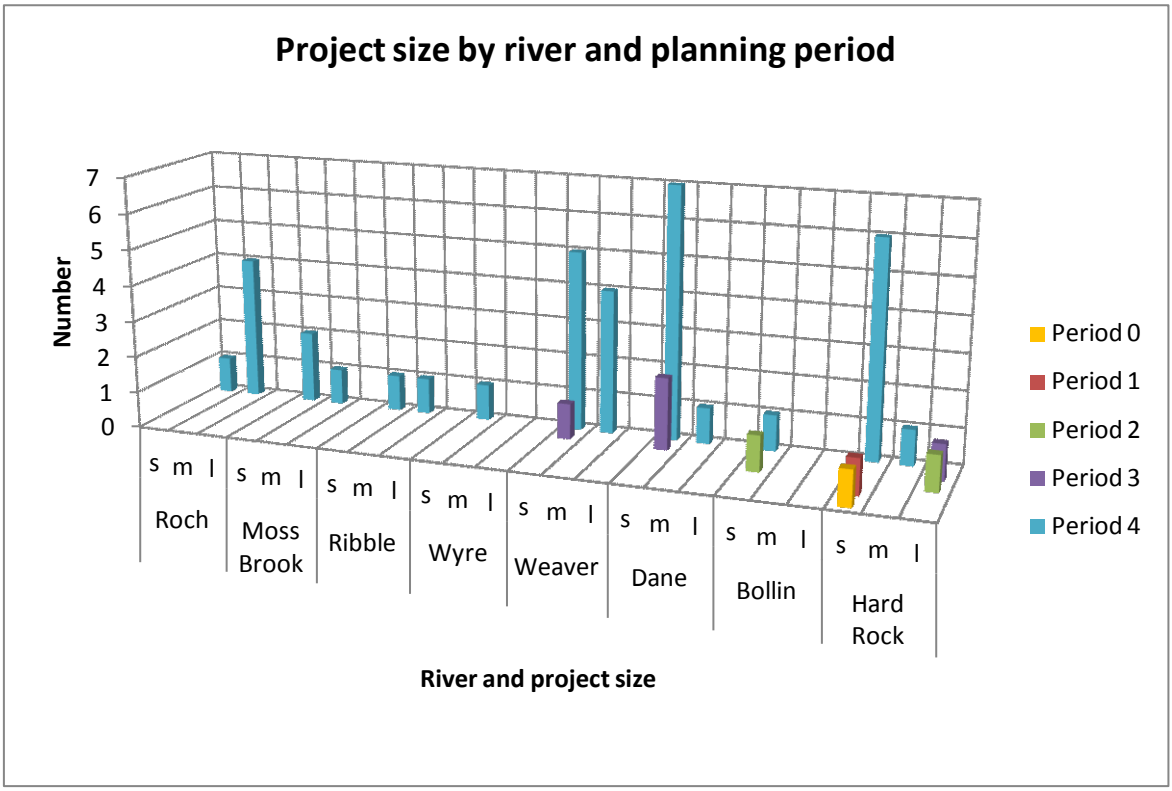

Figure 11 Project size by period and by river

With the other rivers the sample sizes are almost too small to speculate but on the Roch there is a change to the usual pattern with regard to project size. In this case there are four times as many medium-sized as small-sized projects. However, here only one project is regionally significant suggesting there is no correlation between project size and significance.

With regard to the different rivers the main conclusion to be drawn is that one should be careful of attempting to identify patterns or draw conclusions from small sized samples.

River	significance	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Roch	l					4	**4**
	r					1	**1**
	n						**0**
Moss Brook	l					3	**3**
	r						**0**
	n						**0**
Ribble	l					1	**1**
	r					1	**1**
	n						**0**
Wyre	l					1	**1**
	r						**0**
	n						**0**
Weaver	l				1	6	**7**
	r					3	**3**
	n						**0**
Dane	l				1	8	**9**

	r				1		**1**
	n						**0**
Bollin	l					1	**1**
	r			1			**1**
	n						**0**
Hard Rock	l	1				6	**7**
	r			1	1	1	**3**
	n		1				**1**
Total		**1**	**1**	**2**	**4**	**36**	**44**

Table 13 Project significance by period and by river

(Significance l=local, r=regional, n=national)

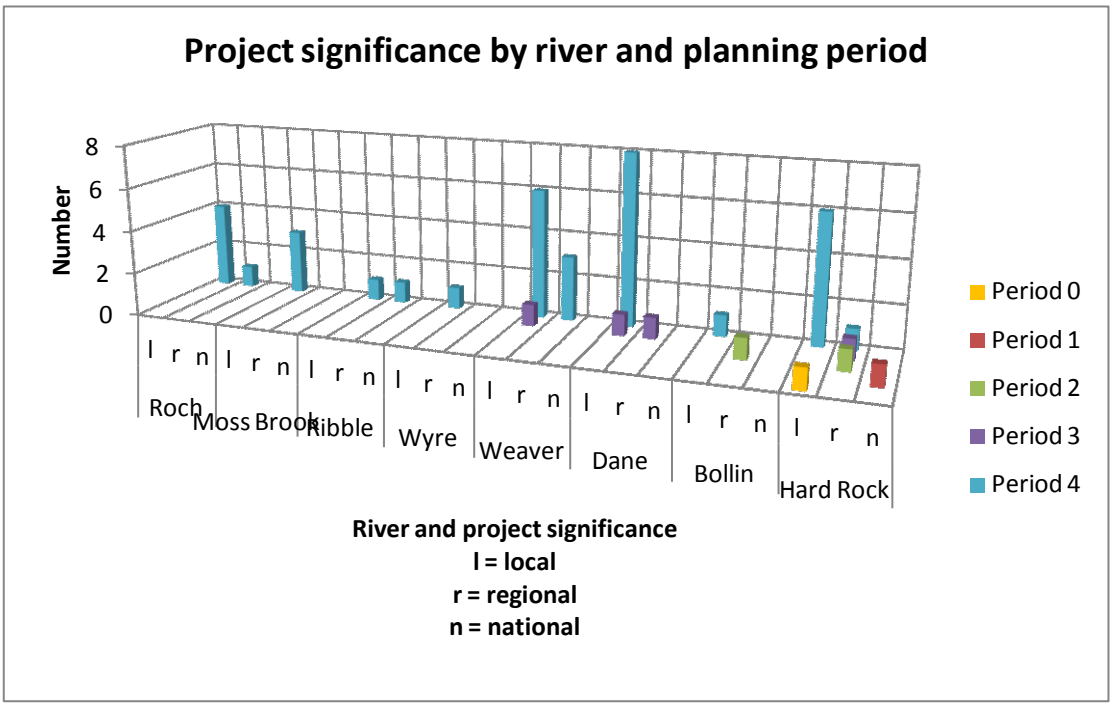

Figure 12 Project significance by period and by river

5.5.5 Use of archaeological techniques

A range of archaeological techniques have been used in the projects identified in this study. The figures in **Table 14** and **Figure 13** are cumulative and will total higher than the number of projects as on some projects several techniques were used.

The most commonly used technique was desk-based assessment with a total of 21 undertaken; these were only used in period 4, post PPG16, and reflect the development of commercial archaeology related to the planning process. The next most commonly used technique was watching briefs where a total of 14 were identified; again these were only used in period 4. Evaluations, building recording, geophysical surveys and environmental studies are four other techniques that have only been used on quarry sites in the North-West since the advent of PPG16.

	stage	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Excavation	P			2	1		**3**

	S					1	**1**
Evaluation	P					5	**5**
	S					4	**4**
Watching Brief	P					5	**5**
	S					9	**9**
Finds	P	1	1		1		**3**
	S						**0**
Survey/Geophysical	P					3	**3**
	S						**0**
Fieldwalking	P						**0**
	S						**0**
Environmental	P						**0**
	S					1	**1**
Building Recording	P					2	**2**
	S					2	**2**
DBA	P					21	**21**
	S						**0**
Unknown	P				2		**2**
	S						**0**
Total	P	1	1	2	4	36	**44**
	S	0	0	0	0	17	**17**

Table 14 Techniques used in Primary and Secondary stages of fieldwork

(Stage p=primary fieldwork stage, s=secondary fieldwork stage)

Two techniques have been used prior to PPG16: excavation and isolated finds, if the latter can be described as a technique. There has only been one recorded excavation since PPG16 and three before. The relative rarity of recorded excavations since PPG16 probably relates to the preponderance of locally significant sites discussed earlier; it may also be that further excavations have been undertaken but not yet reported or recorded on HERs. There have been no isolated finds since the advent of PPG16 but there were three prior to it. As isolated finds have often occurred during the operational use of a quarry it may be that what would previously have been recorded as an isolated find is now being discovered by a watching brief, these often being required for quarry stripping operations. In addition, it may be that with modern mechanised quarry operations there is less opportunity to make isolated finds of archaeologically significant remains than there was in the past.

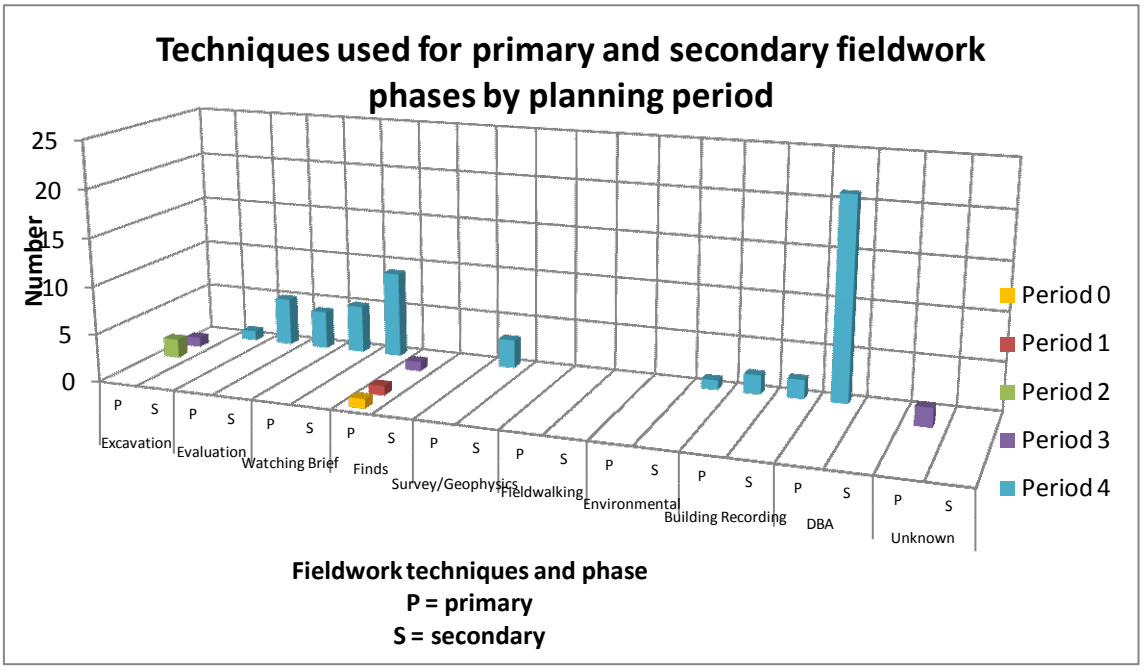

Figure 13 Techniques used in Primary and Secondary stages of fieldwork

5.5.6 Archaeological period represented

Each archaeological project identified in the study was assigned to an archaeological period. Where possible the archaeological projects or sites were assigned to a specific time periods, e.g. Neolithic or Roman. In many cases sites could not be assigned to a specific period due to multiple periods being represented in the archaeological record. In these cases projects were assigned to a multi-period category. This could be quite specific e.g. later prehistory or more general like multi-period (**Table 15, Figure 14**).

The earliest site was Palaeolithic and the latest was modern. Almost half the sites were classified as multi-period. This is not surprising as many quarries, both soft and hard rock, cover large areas. It is therefore to be expected that these quarry sites will include numerous archaeological elements from a number of periods.

Of the single period sites post-medieval sites were the most common with ten sites while there were five Roman sites. For most of the other periods the number assigned to different periods were too few to enable any analysis. It has not, therefore, been possible to draw any significant patterns out from the analysis of the data on period representation.

Period	significance	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Palaeolithic	l						**0**
	r				1		**1**
	n						**0**
Mesolithic	l						**0**
	r						**0**
	n						**0**
Neolithic	l						**0**
	r						**0**
	n						**0**
Bronze Age	l						**0**

	r						**0**
	n						**0**
Iron Age	l						**0**
	r						**0**
	n						**0**
Roman	l	1			2		**3**
	r					2	**2**
	n						**0**
Early medieval	l						**0**
	r						**0**
	n		1				**1**
Medieval	l						**0**
	r						**0**
	n						**0**
Post-medieval	l					8	**8**
	r					2	**2**
	n						**0**
modern	l					1	**1**
	r						**0**
	n						**0**
Prehistoric	l					2	**2**
	r						**0**
	n						**0**
Early prehistoric	l						**0**
	r						**0**
	n						**0**
Later prehistoric	l						**0**
	r						**0**
	n						**0**
Prehistoric or Roman	l						**0**
	r						**0**
	n						**0**
Uncertain	l					4	**4**
	r						**0**
	n						**0**
Multi-period	l					14	**14**
	r			2	1	2	**5**
	n						**0**
none	l					1	**1**
	r						**0**
	n						**0**
Total		**1**	**1**	**2**	**4**	**36**	**44**

Table 15 Site significance by archaeological period and planning period

(Significance l=local, r=regional, n=national)

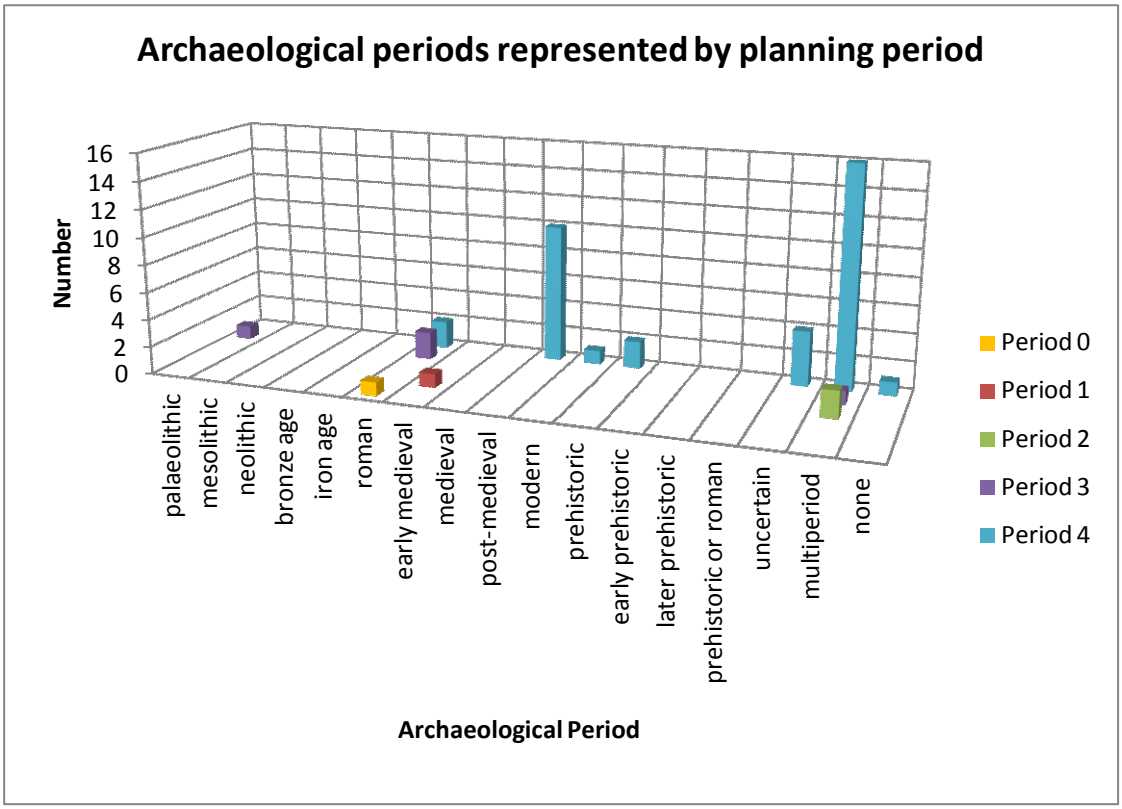

Figure 14 Site significance by archaeological period and planning period

5.6 Potential of Incomplete or Inappropriately Disseminated Projects

All sites were classified as to the completeness or appropriateness of the dissemination of results as could be identified from available data. **Table 16** and **Figure 15** provide the summary of this assessment. The most striking feature was the large number of sites which were classified as dissemination completeness 'unknown'. It should be noted that a number of these were sites that were identified from desk-based assessments which identified archaeological potential and recommended further work but where it was not possible to identify whether further work had been undertaken or what stage such work might be at. It is possible that some of these sites did not proceed but it is unlikely that none of them proceeded.

In general approximately a third of sites have had completed dissemination at an appropriate level with just under a third incomplete. There is a suggestion that more recent sites, period 4, are more likely to be incomplete but the numbers in earlier periods are too low to be certain of any trends in the data. It would be expected that more recent sites would still be being worked upon and as such higher levels of project incompleteness on more recent sites might be expected.

	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Yes	1		2	2	11	**16**
No		1		2	7	**10**
Not Known					18	**18**
Total	1	1	2	4	36	**44**

Table 16 Completeness of project dissemination

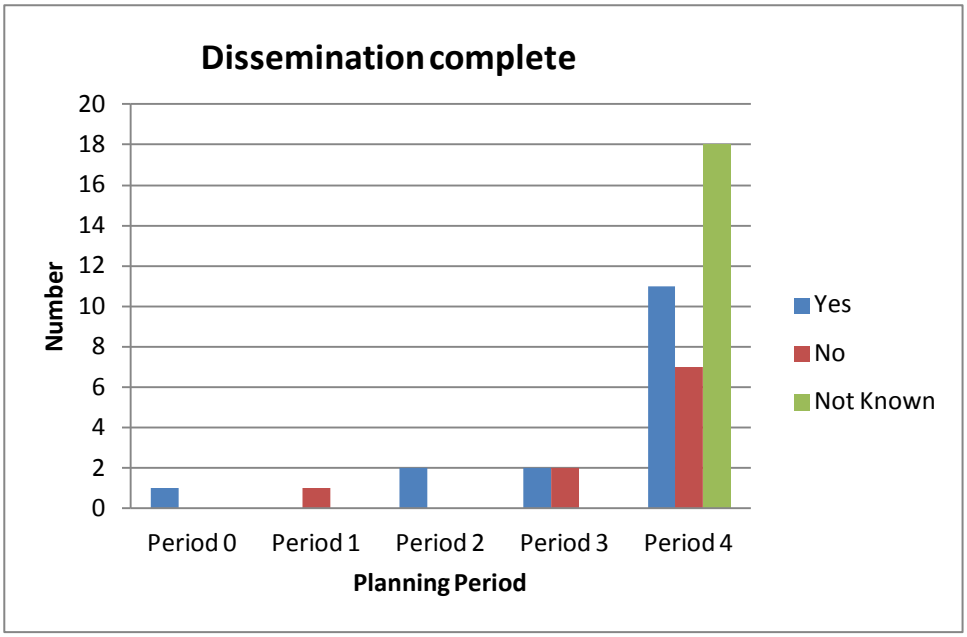

Figure 15 Completeness of project dissemination

In order to assess if the completeness of dissemination might be related to the significance of the project, and therefore the potential complexity of analysis and publication required and the completeness of dissemination was broken down by significance and planning period (**Table 17, Figure 16**).

For Period 4 it is noticeable that there are over twice as many complete as incomplete locally important sites, for regionally important sites none have been completed and three are incomplete. There is still the problem with the large number of sites whose completion is not known but the difference between the locally and regionally important sites does appear clear.

This difference appears to hold for all periods if the combined score for all periods of complete, incomplete and 'unknown' sites are plotted as pie charts for locally and regionally important sites (**Figures 17 and 18**). As can be seen from **Figures 17** and **18** the relative proportions of complete to incomplete sites for locally and regionally significant sites is virtually reversed. It should be borne in mind that this pattern is probably true for all archaeological sites or projects; the more complex the site analysis and publication, the more likely that publication will be delayed or incomplete.

	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
local complete	1			1	11	**13**
local incomplete				1	4	**5**
local unknown					16	**16**
regional complete			2	1		**3**
regional incomplete				1	3	**4**
regional unknown					2	**2**
national complete						**0**
national incomplete		1				**1**
national unknown						**0**
Total	1	1	2	4	36	**44**

Table 17 Significance of sites with incomplete/inappropriate dissemination

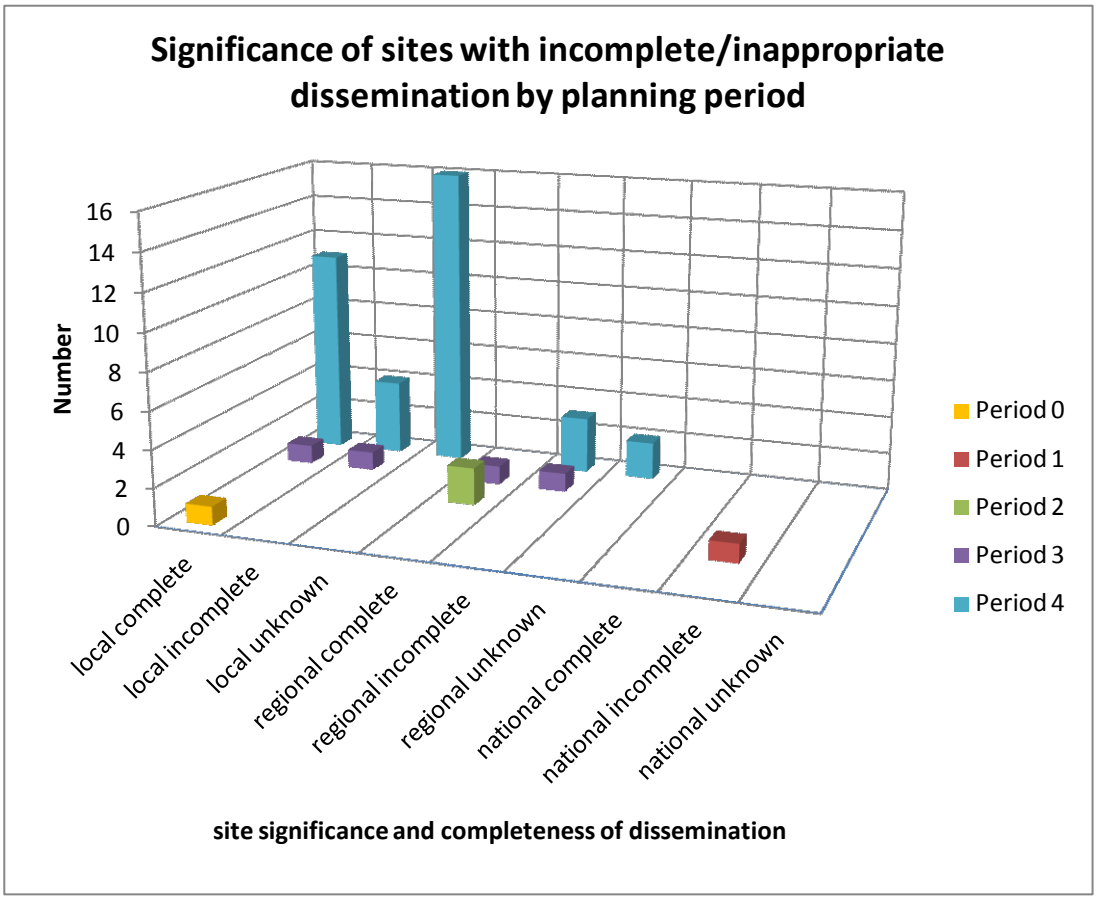

Figure 16 Significance of sites with incomplete/inappropriate dissemination

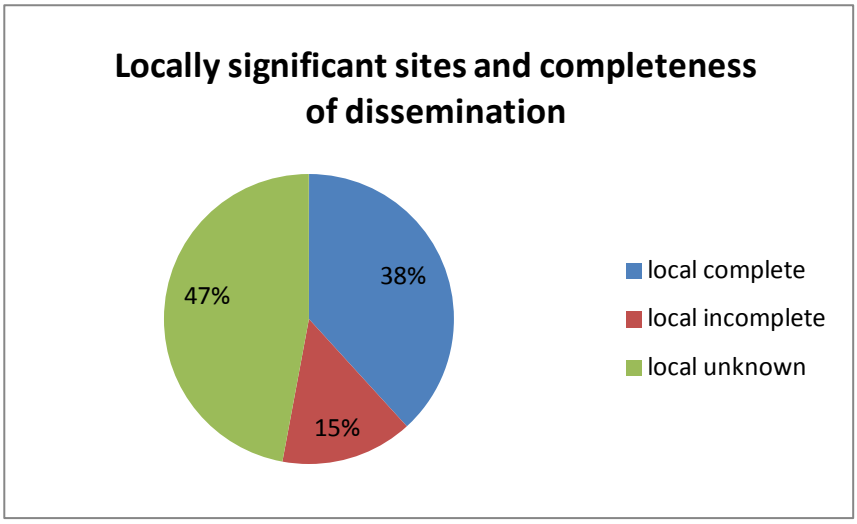

Figure 17 Locally significant sites and completeness of dissemination

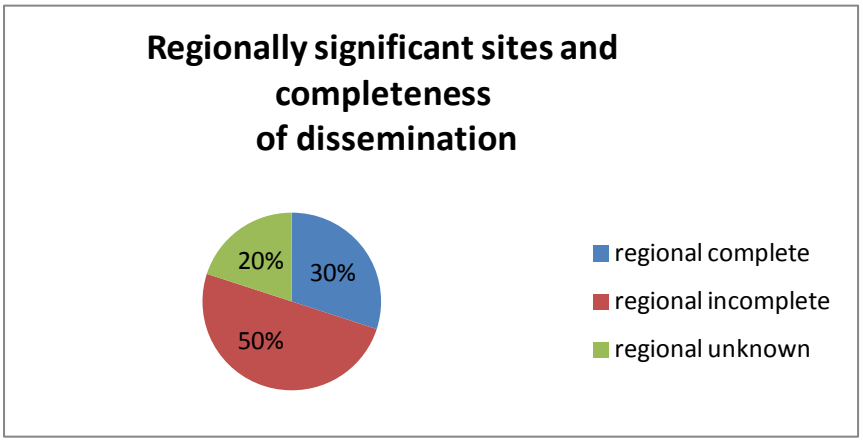

Figure 18 Regionally significant sites and completeness of dissemination

To further understand the relationship between site complexity and completeness of dissemination it was decided to examine the status of the site, i.e. whether the project is complete or still active. **Table 18** and **Figure 19** provide information on the status of the projects by planning periods.

This demonstrated that it was often difficult to identify the status of a project from the HER database. For approximately two thirds of the Period 4 projects it was not possible to identify the status of the project.

This might appear to contradict the earlier information on project completeness where there were less 'not known' and more 'complete' dissemination projects but in the analysis of dissemination completion this was assessed by determining if appropriate dissemination existed for the fieldwork completed. In multiphase quarry projects it is possible that earlier phases of fieldwork will have been written up before all the fieldwork on site has been completed. **Table 17** is therefore an assessment of the completeness of dissemination for known fieldwork while **Table 18** is an assessment of whether the HER records identify whether all potential phases of fieldwork on a quarry site have been completed.

Table 18 and **Figure 19** therefore show that HER records that are incomplete or not updated can be difficult to extract accurate data from.

	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
Complete	1	1	2	3	9	**16**
Active					3	**3**
Not Known				1	24	**25**
Total	1	1	2	4	36	**44**

Table 18 Project Status

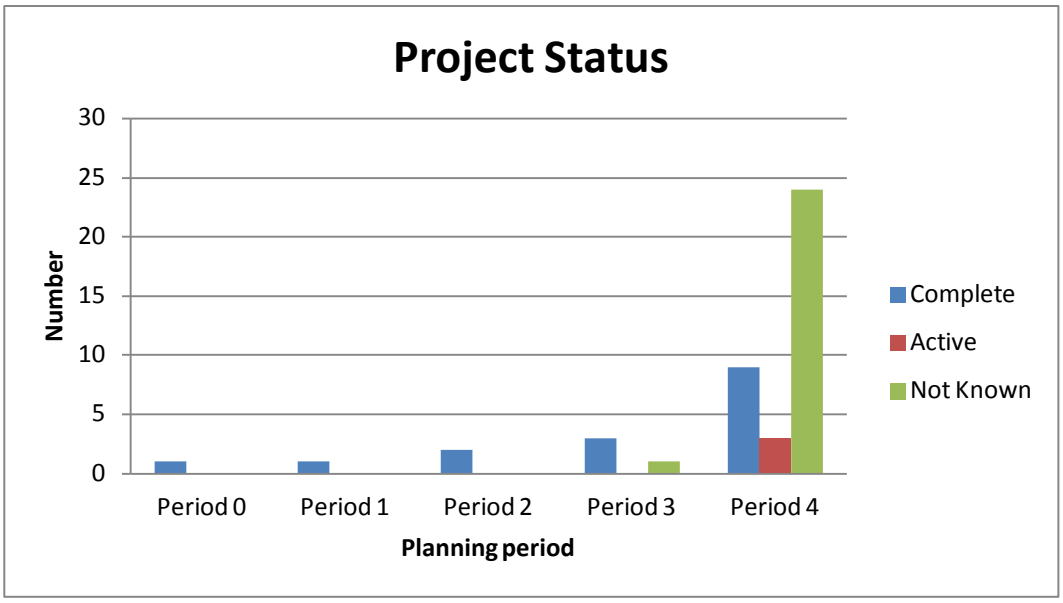

Figure 19 Project status

Assessment was made for all sites where dissemination was identified as being complete to determine what further work was required to complete the analysis and publication of currently identified fieldwork.

	Period 0	Period 1	Period 2	Period 3	Period 4	**Total**
completion of archive					5	**5**
assessment & analysis					4	**4**
brief journal note				2	4	**6**
short journal article		1			8	**9**
inclusion in synthetic study					1	**1**
deposition of archive					2	**2**
Total	0	1	0	2	24	**27**

Table 19 Elements of further work proposed to complete dissemination cumulative totals

Table 19 and **Figure 20** provide cumulative totals for all the different elements of work that are required to complete the dissemination of results from known quarry sites in the North-West. This means that if more than one element of work is required to complete a project all the separate elements will have been included in the totals. This table and graph therefore identify the totals for all the different elements of work required to complete dissemination. The elements of work can be classified as either analysis, publication or archiving; analysis would include assessment and analysis, publication would include brief journal note, short journal article and inclusion in synthetic study, and archiving would include the completion

and deposition of an archive. A category was included for monograph publication but no sites were assessed as requiring this. Elements of work for analysis have been recommended four times, publication 16 times and archiving seven times. This suggests that analysis and archiving are generally being completed and it is at the publication stage itself that the main problem occurs in disseminating the results of an archaeological project.

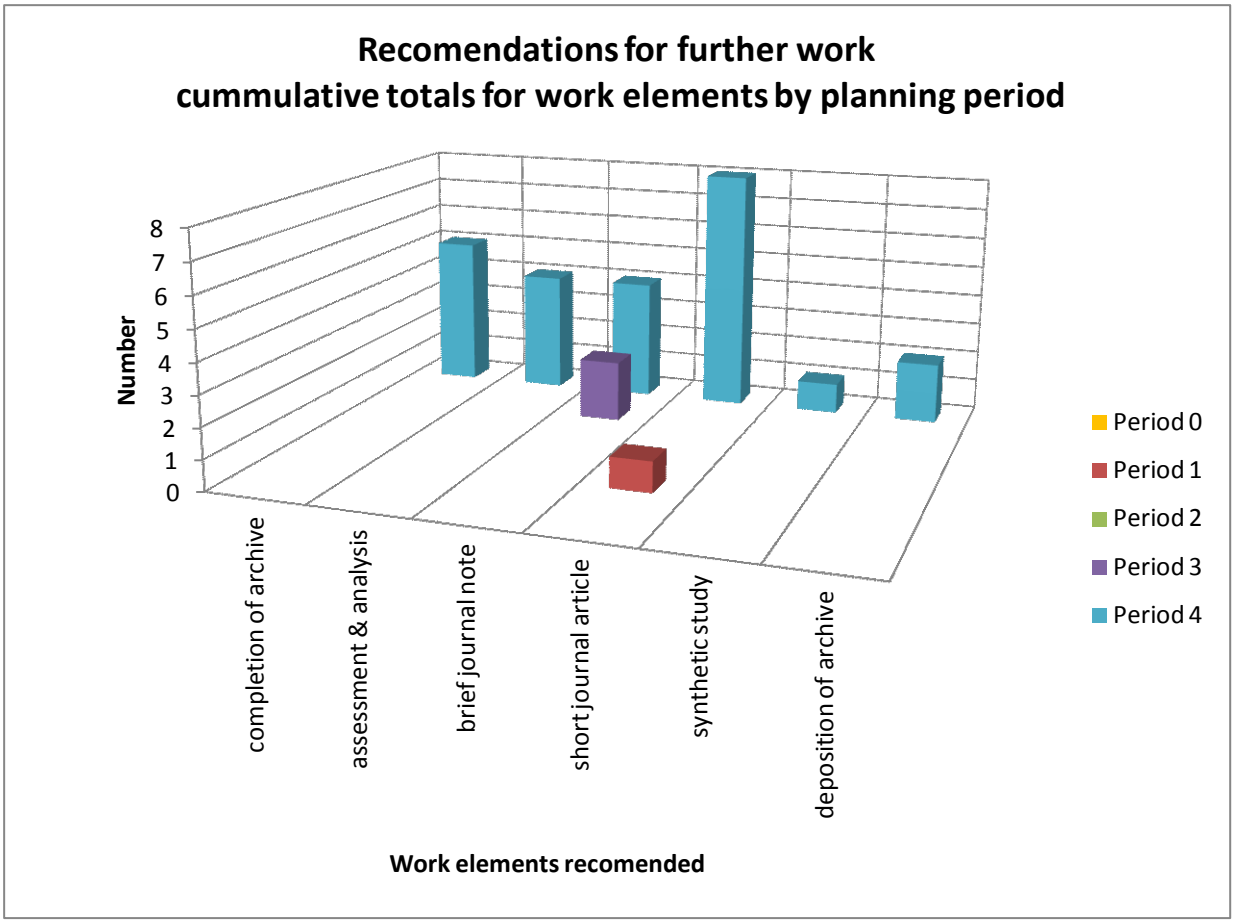

Figure 20 Elements of further work proposed to complete dissemination cumulative totals

Table 20 and **Figure 21** show data on the recommended final publication level for incomplete projects identified in this study. The most commonly recommended publication levels are short journal article and brief journal notes, which have been recommended eight and six times respectively. Only one site has been recommended for more detailed publication, being inclusion in a synthetic study. The level of publication recommended is proportionate with the significance of the sites as identified in this study, the majority of sites being of local interest with some being of regional interest.

	Period 0	Period 1	Period 2	Period 3	Period 4	Total
Completion of archive					2	**2**
Full assessment and analysis					1	**1**
Deposition of archive					1	**1**
Brief journal note				2	4	**6**
Short journal article		1			7	**8**
Inclusion in synthetic study					1	**1**
Total	**0**	**1**	**0**	**2**	**16**	**19**

Table 20 Recommendations for final publication level

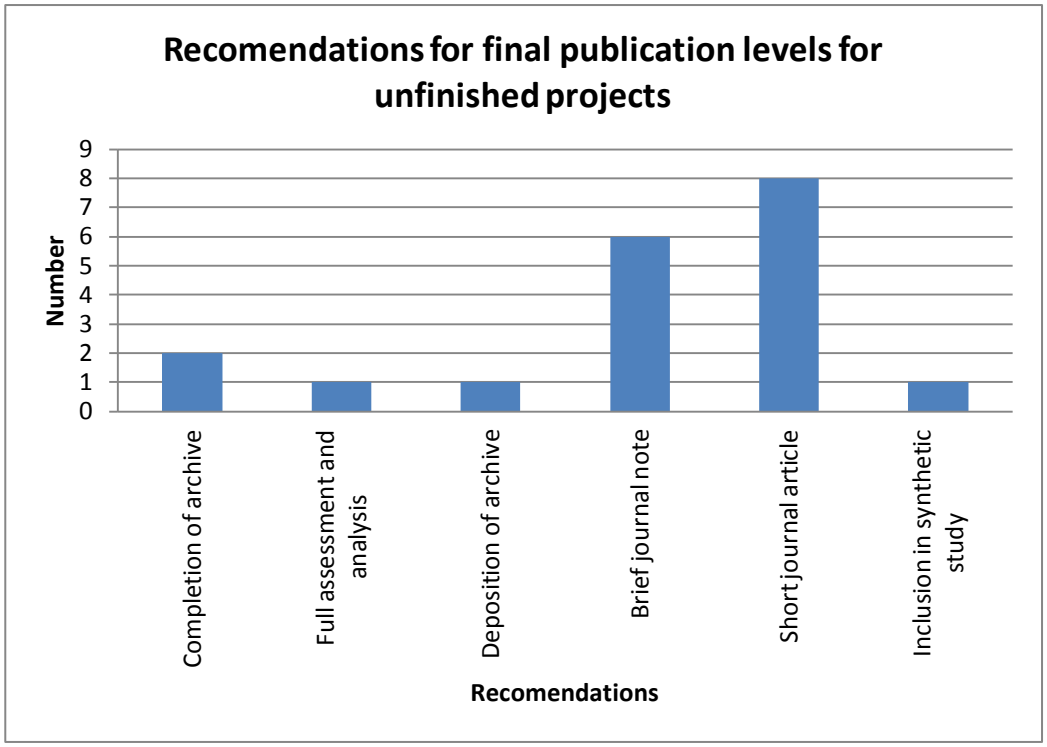

Figure 21 Recommendations for final publication level

6 CONCLUSIONS

This project was designed to extend the pilot study on the identification and quantification of project arising from aggregates extraction into the north-west region, Lancashire, Cheshire, Greater Manchester and Merseyside. The aim was to collect data on aggregates projects and to assess the current levels of dissemination of the results of the projects and identify where this is incomplete or inappropriate. Full details of all the projects identified are provided in the database, this also includes project specific recommendations regarding the work required to complete an appropriate level of analysis and publication for each project. In addition a summary of the proposals for further work for each project is provided in a table in Appendix 3.

A series of specific project objectives were identified and the following is an assessment of how they were completed:

- sites in the north-west were added to the database (developed in the pilot) of

historic environment interventions associated with aggregate extraction from 1900 to the present;

- projects that are currently inactive and are incomplete or have had inappropriately low levels of archive completion, assessment, analysis and/or dissemination, were identified;
- where levels of intervention and/or dissemination were unacceptably low, proposals were made for an appropriate level of further intervention/dissemination;
- the data collected was analysed to identify trends, significant omissions and possible future research, which will assist English Heritage in formulating a strategy to address incomplete or inadequate archive completion, assessment, analysis and/or dissemination for historic environment projects associated with aggregate areas;
- the project methodology was reviewed and recommendations made regarding potential improvements to the project methodology, in order to inform future projects of this type; and
- this report and the database summarise the findings of the project.

7 ACKNOWLEDGEMENTS

We would like to thank the HER/SMRs and their staff in Merseyside, Greater Manchester, Lancashire, Cheshire. In addition the following archaeological organisations where contacted and provided information for the project, Oxford Archaeology North, Liverpool Museum Field Archaeology Service, Castlerigg Archaeology, Birmingham University Field Archaeology Unit, Giffords, Gwynedd Archaeological Trust, Greater Manchester Archaeology Unit, University of Manchester Archaeology Unit, Northern Archaeological Associates, Clwyd Powys Archaeological Trust, Northamptonshire Archaeology and North Pennine Archaeology Ltd.

8 REFERENCES

ARCUS 2007, Identification and Quantification of Projects Arising from Aggregates Extraction: Pilot Study.

Brown, T. 2009. *The Environment and Aggregate-Related Archaeology*. Heritage Marketing Publications: Great Dunham and Oxbow Books: Oxford joint publication.

Cowell, R.W. and Innes, J.B. 1994. *The Wetlands of Merseyside. North West Wetlands Survey Volume 1*. Lancaster University Archaeology Unit: Lancaster.

Davies, G. 2010. Hard Rock Aggregates and Subterranean Archaeology. Unpublished report for English Heritage.

Department of Communities and Local Government. 2009. *National and Regional Guidelines for Aggregates Provision in England, 2005-2020*. TSO: London.

Hall, D., Wells, C.E. and Huckerby, E. 1995. *The Wetlands of Greater Manchester. North West Wetlands Survey Volume 2*. Lancaster University Archaeology Unit: Lancaster.

Quartermaine, J. 2007. *Aggregate Extraction and the Geoarchaeological Heritage of the Ribble Valley*. Unpublished Oxford Archaeology North report 2006-7/619.

APPENDIX 1: GAZETTEER OF SITES

1	Montcliffe Quarry Extension	Greater Manchester
2	Pilkington Quarry Extension	Greater Manchester
3	Lomax Farm, Pilsworth	Greater Manchester
4	Pilsworth Southern Extension	Greater Manchester
5	Hill Top Farm, Pilsworth	Greater Manchester
6	Pilsworth South-Eastern Ext	Greater Manchester
7	Morley's Hall, Astley	Greater Manchester
8	Nook Lane, Astley Moss	Greater Manchester
9	Investigations nr Radcliffe	Lancashire
10	Southworth Hall Farm, Winwick	Cheshire
11	Ribblesdale Cement Works	Lancashire
12	Tarnacre, Garstang	Lancashire
13	Rigby House Quarry	Lancashire
14	Crown Farm, Oakmere	Cheshire
15	Crown Farm Quarry, Oakmere	Cheshire
16	Fourways, Oakmere	Cheshire
17	Cherry Orchard, Oakmere	Cheshire
18	Astbury, Congleton	Cheshire
19	Tunshill, Butterworth	Lancashire
20	Brownlow Farm, Congleton	Cheshire
21	Bent Farm, Congleton	Cheshire
22	Eaton Hall Quarry	Cheshire
23	Town Farm Quarry, Norley	Cheshire
24	Fishpool Lane, Delamere	Cheshire
25	Lea Forge Farm, Wybunbury	Cheshire
26	Forest Hill Quarry, Sandiway	Cheshire
27	Mere Farm Quarry, Chelford	Cheshire
28	Cobden Farm, Commonside	Cheshire
29	Arclid Quarry, South Arclid	Cheshire
30	Lapwing Lane, Chelford	Cheshire
31	Adlington Estate	Cheshire
32	Southworth Hall Farm, Croft	Cheshire
33	Higher Brockholes	Lancashire
34	Oakmere	Cheshire
35	Arclid Quarry South	Cheshire
36	Lobslack Quarry, Oakmere	Cheshire
37	Scout Moor Quarry Extension	Lancashire
38	Bradley's Sand Pit	Lancashire
39	Dunald Mill, Nether Kellet	Lancashire
40	Henbury	Cheshire
41	Captain's Farm, Pilsworth	Greater Manchester
42	Bellmanpark Quarry	Lancashire
43	Arclid Quarry, western extension	Cheshire
44	Arclid Quarry, southeast ext	Cheshire

APPENDIX 2: DISTRIBUTION MAP

APPENDIX 3: PROJECT SUMMARY TABLE

Project information												Proposals for further work									
Project ID	Name of project	County	Year of intervention	Nature of fieldwork (primary)	Nature of fieldwork (secondary)	Current project status	Most recent project stage	Archive location known/ unknown	Significance of data retrieved from project	Dissemination complete?	Suggested level of dissemination	Completion of archive	Full assessment and analysis	Analysis of assessed materials	Deposition of archive	Brief journal note	Short journal article	Inclusion in synthetic study	Monograph or article	Wider dissemination of report	Popular publication
1	Montcliffe Quarry Extension	Greater Manchester	1992	DBA		not known		Unknown	local	Not known											
2	Pilkington Quarry Extension	Greater Manchester	2008	DBA		active		Unknown	local	Not known											
3	Lomax Farm, Pilsworth	Greater Manchester	1996-1998	DBA	building recording	not known	fieldwork complete	Unknown	local	No	publication						Y				
4	Pilsworth Southern Extension	Greater Manchester	1998-2001	evaluation	Watching Brief	not known	fieldwork complete	Unknown	local	No	publication						Y				
5	Hill Top Farm, Pilsworth	Greater Manchester	2005-2006	building recording	excavation	not known	fieldwork complete	Unknown	regional	No	publication						Y				
6	Pilsworth South-Eastern Ext	Greater Manchester	2002		Watching Brief	not known	fieldwork complete	Unknown	local	Yes											
7	Morley's Hall, Astley	Greater Manchester	1995	watching brief		complete	fieldwork complete	Unknown	local	Yes											
8	Nook Lane, Astley Moss	Greater Manchester	2006	watching brief		complete	fieldwork complete	Unknown	local	Yes											

9	Investigations nr Radcliffe	Lancashire	1949-1950	excavation		complete	publication complete	Unknown	regional	Yes											
10	Southworth Hall Farm, Winwick	Cheshire	1980	excavation		complete	publication complete	Unknown	regional	Yes											
11	Ribblesdale Cement Works	Lancashire	1992-1999	DBA		complete	developer report submitted	Unknown	local	Yes											
12	Tarnacre, Garstang	Lancashire	2003	DBA		not known	developer report submitted	Known	local	Not known											
13	Rigby House Quarry	Lancashire	1993-1997	survey/geophysics	evaluation	not known	developer report submitted	Known	local	Yes		Y									
14	Crown Farm, Oakmere	Cheshire	1991	survey/geophysics	evaluation	complete	developer report submitted	Known	regional	Not known	assessment	Y	Y			Y					
15	Crown Farm Quarry, Oakmere	Cheshire	1998/2008	watching brief	Watching Brief	active	fieldwork complete	Known	local	Not known	assessment	Y	Y			Y					
16	Fourways, Oakmere	Cheshire	1998	DBA		complete	developer report submitted	Known	local	Yes											
17	Cherry Orchard, Oakmere	Cheshire	2000-2007	DBA	Watching Brief	not known	developer report submitted	Unknown	local	Yes		Y									
18	Astbury, Congleton	Cheshire	1923	antiquarian/amateur observation and finds collection		complete	fieldwork complete	Unknown	national	No	publication		Y				Y				

19	Tunshill, Butterworth	Lancashire	1793	antiquarian /amateur observation and finds collection		complete	fieldwork complete	Unknown	local	Yes											
20	Brownlow Farm, Congleton	Cheshire	2007	DBA		not known		Unknown	local	Not known											
21	Bent Farm, Congleton	Cheshire	1993-1998	watching brief	Watching Brief	not known	fieldwork complete	Unknown	local	Yes											
22	Eaton Hall Quarry	Cheshire	2005-2006	watching brief		not known	fieldwork complete	Unknown	local	Yes											
23	Town Farm Quarry, Norley	Cheshire	2001-2008	DBA	Watching Brief	not known	fieldwork complete	Known	regional	Not known	publication						Y	Y			
24	Fishpool Lane, Delamere	Cheshire	1992-1999	evaluation	Watching Brief	complete	developer report submitted	Known	local	Yes						Y					
25	Lea Forge Farm, Wybunbury	Cheshire	1991-1992	DBA	evaluation	not known	fieldwork complete	Unknown	regional	No	publication						Y				
26	Forest Hill Quarry, Sandiway	Cheshire	2003-2008	DBA	Watching Brief	not known	ongoing fieldwork	Unknown	local	Not known	assessment										
27	Mere Farm Quarry, Chelford	Cheshire	1996	DBA		not known		Unknown	local	Not known											
28	Cobden Farm, Commonside	Cheshire	1995	DBA		not known		Unknown	local	Not known											
29	Arclid Quarry, South Arclid	Cheshire	2001	DBA	environmental	complete	developer report submitted	Known	local	Not known											

30	Lapwing Lane, Chelford	Cheshire	1991	evaluation		not known		Unknown	local	Not known	analysis		Y			Y					
31	Adlington Estate	Cheshire	1995	DBA		not known	developer report submitted	Unknown	local	Not known											
32	Southworth Hall Farm, Croft	Cheshire	1993-1998	DBA	evaluation	not known		Unknown	regional	No	publication						Y				
33	Higher Brockholes	Lancashire	1993	evaluation		not known	developer report submitted	Known	regional	Not known	publication						Y				
34	Oakmere	Cheshire	1982	unknown		complete	publication complete	Unknown	local	Yes											
35	Arclid Quarry South	Cheshire	1990	unknown		not known		Unknown	regional	No	publication					Y					
36	Lobslack Quarry, Oakmere	Cheshire	1984	antiquarian /amateur observation and finds collection		complete	fieldwork complete	Unknown	local	No	publication					Y					
37	Scout Moor Quarry Extension	Lancashire	2006-2008	DBA	Watching Brief	not known	fieldwork complete	Known	local	Not known	assessment	Y	Y								
38	Bradley's Sand Pit	Lancashire	2007	DBA		not known	developer report submitted	Known	local	Yes											
39	Dunald Mill, Nether Kellet	Lancashire	1994	DBA		not known	developer report submitted	Known	local	Not known											
40	Henbury	Cheshire	1967	excavation		complete	publication complete	Unknown	regional	Yes											

42	Captain's Farm, Pilsworth	Greater Manchester	2005-2006	building recording	evaluation	not known		Unknown	local	No	publication						Y				
43	Bellmanpark Quarry	Lancashire	1996-1998	survey/geophysics	building recording	complete	developer report submitted	Known	local	No	publication				Y	Y					
44	Arclid Quarry, Western Ext	Cheshire	2006	DBA		complete	developer report submitted	Known	local	Not known											
45	Arclid Quarry, southeast ext	Cheshire	2009	DBA		active	developer report submitted	Known	local	Not known											

Note Project ID 41 was discarded as a duplicate record.