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**THE RIVER WEAR VALLEY BETWEEN
DURHAM CITY AND CHESTER LE STREET:
THE POTENTIAL FOR
AN INCREASE IN VISITOR USE.**

GRAEME SMART

**THE UNIVERSITY OF DURHAM
DEPARTMENT OF GEOLOGICAL SCIENCES**

MAY 1998

**This dissertation is submitted in fulfilment of the requirements
for the degree of M.Sc. in Environmental Management Practice**

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ABSTRACT

The study considers the feasibility, desirability and potential means of promoting an increase in visitor use of the River Wear valley between Durham City and Chester-le-Street, both as a means of reducing visitor pressure on the historic centre of Durham City and of financially benefiting the local economy.

An Environmental Assessment of the study area is undertaken, using recognised procedures, to ascertain whether it has the potential to attract an increase in visitor use and how this can be best achieved without sustaining damage to its own environment. An assessment is also made of the potential of a larger geographical area, surrounding the study area, to provide the visitors needed for the increase. Specific potentially damaging consequences of increasing visitor use of a rural area are discussed.

From this data, restrictions on the possible ways an increase in visitor use could be achieved are discussed, before an environmentally acceptable and sustainable proposal is identified and considered in detail. The environmental impact of the proposal and its sustainability are then assessed.

Finally, the potential benefits of the selected proposal are discussed and areas where further investigation and ongoing monitoring are necessary, identified.

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1.0 INTRODUCTION.

1.1 Historical Background.

Durham City has long been an important and strategically placed administrative and religious centre (Musgrove, 1990). When, in AD 975, followers of St. Cuthbert, the former bishop of Lindisfarne, fled Danish raids and settled at "Dunholme", building a cathedral church as a shrine to the saint, they established Durham as an important centre of religious pilgrimage (Adey, et al, 1990). Its importance as such continued throughout mediaeval times, conferring status and wealth on the bishops of Durham (Emsley, 1970); status and wealth manifest in fine mediaeval buildings, many of which still survive.

The attraction of the city continues today: as a tourist destination, with the peninsula (Fig. 1.1), on which the Norman Cathedral, Durham Castle and other associated historic buildings stand, being the centre of attention (Pers. comm., Martin Roberts).

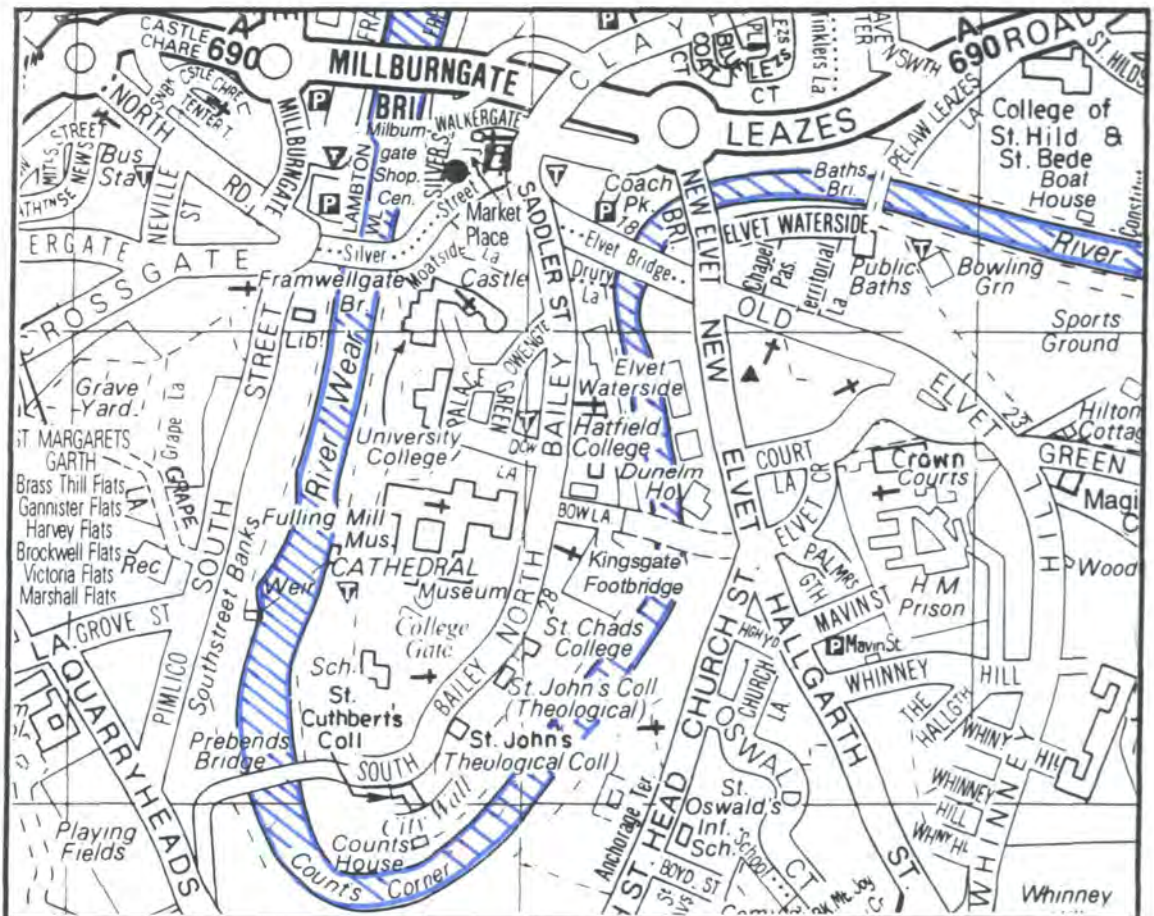


Fig. 1.1 The Peninsula in Durham City



1.2 Background to the Study.

This study originated from a request from an officer of Durham City Council, Martin Roberts, to investigate how the River Wear valley to the north of Durham City could be utilised to reduce the detrimental effects being caused to Durham City by a perceived over-abundance of tourists there. By encouraging visitors to explore further than the confines of the peninsula it was hoped to reduce overcrowding in that area as well as promoting an increase in the number of tourists staying over-night in the city.

In 1997 an estimated 500,000 people visited the cathedral (Northumbria Tourist Board, 1997). Such high tourist volumes lead to overcrowding and congestion within the restricted confines of the historic city centre (Pers. comm., Martin Roberts). An additional problem lies in the fact that many of the more affluent, often foreign tourists spend little time in the City (Pers. comm., Martin Roberts). Its geographical location and the restricted size of the peninsula have led to many tour companies organising the itinerary of their tours to include Durham City as a lunch-time stopover of two to three hours between over-night stops in York to the south and Edinburgh to the north (Pers. comm., Martin Roberts). It is widely recognised that tourists spend more money in the towns and cities where they spend the night, when compared to those where they stop for a few hours (Pers. comm., Martin Roberts). So, currently, while the local economy of Durham City is subject to the financial cost of wear and tear to the fabric of historic buildings caused by large numbers of tourists, and provision of adequate facilities and services for them in the City as a whole, there is a desire for these same tourists to make a greater financial contribution to the local economy (Pers. comm., Martin Roberts). Encouraging a switch from lunch-time stop-overs to over-night visits has the potential to benefit the local economy financially as well as reducing overcrowding on the peninsula at peak times.

1.3 Study Content.

This study accepts the premise that there is a significant degree of overcrowding caused by high tourist volumes in Durham City, and that such numbers are damaging to its

environment. However, it does not immediately set out to investigate how the River Wear valley to the north of Durham City can be utilised to reduce this overcrowding. Rather, it initially investigates whether the river valley area can accommodate an increase in "visitor use", without sustaining damage to its own environment. The term "visitor use" is used deliberately so as to include tourism and visits for "recreational use" by local residents. The study then investigates whether the study area has the necessary potential to attract an increase in visitor use and whether there are sufficient potential visitors to be attracted. With this information it is possible to identify a means by which an increase in visitor use can be achieved, having due regard to the desire, expressed above, to benefit the local economy and the environment of the peninsula, but without having a detrimental impact on the environment of the study area.

1.4 Study Methodology.

The investigation takes the form of an Environmental Assessment of the study area by desk research, supplemented where necessary by field investigation. From the data thus gained, criteria restricting the range and design of potential proposals to increase visitor use of the study area are considered. A detailed proposal is then formulated and its environmental impact assessed. Areas where further investigation will be required prior to implementation of the proposal are identified, including the identification of indicators to allow continuous monitoring of future environmental impact of the proposal throughout its life.

2.0 ENVIRONMENTAL ASSESSMENT OF THE STUDY AREA.

Environmental assessment of the study area, with specific regard to assessing the potential for an increase in visitor use, was initiated by desk research of available published information, coupled with frequent familiarisation visits within the study area by car, bicycle and on foot. During the desk research it became evident that, in some areas, more data was required than could be provided by the published information. These areas were then prioritised; priority being given to providing the information that would be the most useful to the research remit and which could be accurately provided by field survey, having regard for the field survey techniques, time and manpower available. The specific field research undertaken is considered in detail later.

2.1 Format of the Desk Top Study.

Consideration of the current situation within the study area is based upon the non-mandatory Environmental Impact Assessment check-list from "Environmental Assessment: A guide to the procedures" (Department of the Environment, 1989), as listed in Morris and Therivel (1995). Reference is made to areas additional to those on the list so as to reflect the specific remit of this research, i.e. to consider "visitor use" of the study area. Accordingly, the following areas have been considered:

- Location and description of the study area.
- Geology.
- Soils.
- Landscape.
- Archaeological and historical heritage.
- Flora and fauna.
- Climate.
- Air.
- Water.
- Noise.
- Population.

- Communications.
- Current level of visitor use.
- Current accessibility.

2.2 Location and Description of the Study Area.

The study area is located wholly within the County of Durham in the North East of England (Fig. 2.1a) and falls within two administrative districts within the county, these being the districts of Chester-le-Street and Durham City (Fig. 2.1b).

The study area is the lower valley of the River Wear between the outskirts of the City of Durham and the town of Chester-le-Street (Fig. 2.1c). The direct distance between the two is approximately 8.8 km while the river itself (due to the many bends and meanders in this section) is approximately 18.5 km long between Lumley Bridge at Chester-le-Street in the north and Milburngate Bridge in Durham City .

The boundary of the study area was not formally identified initially. When dealing with issues of tourism and recreational use, an area cannot be considered in isolation but within the context of its surroundings. Whether the area lies close to areas of high population density, within reach of existing tourist attractions, or within a region already regarded as a tourist destination or one well served with communication links, will have a marked effect on the level of visitor use made of that area. That being said, the area that is to be considered in the greatest detail had to be formally identified to make the project manageable.

The extent of the study area was, therefore, initially defined using grid squares on the 1:25,000 Ordnance Survey maps of the region (Fig.2.2). However, after consideration, such a boundary was considered to be too arbitrary. It randomly dissects fields, roads and population areas. A more logical boundary was therefore defined using topographical and man-made features within the landscape which form a more natural dividing line, separating the study area from the surrounding area (Fig.2.2).

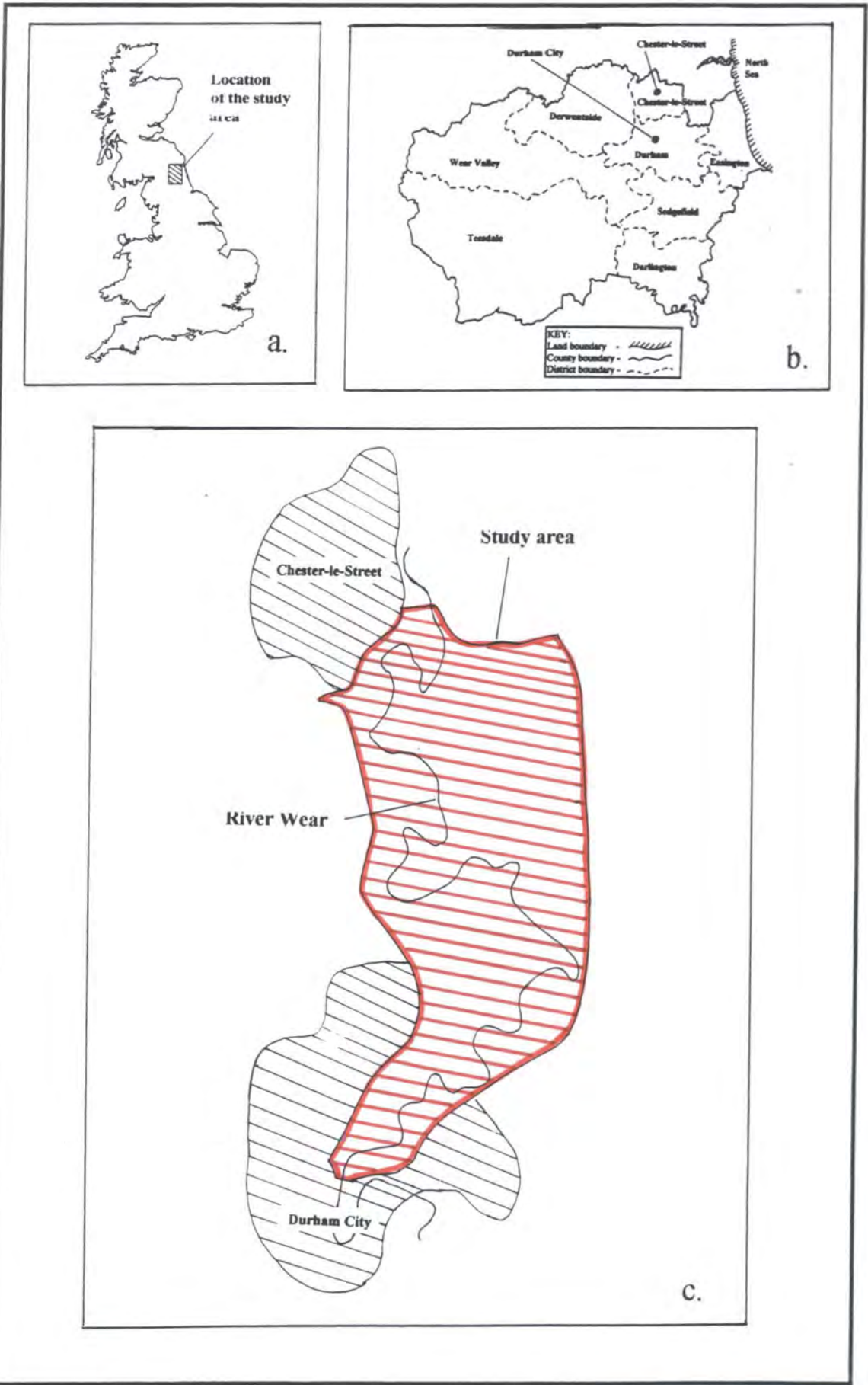
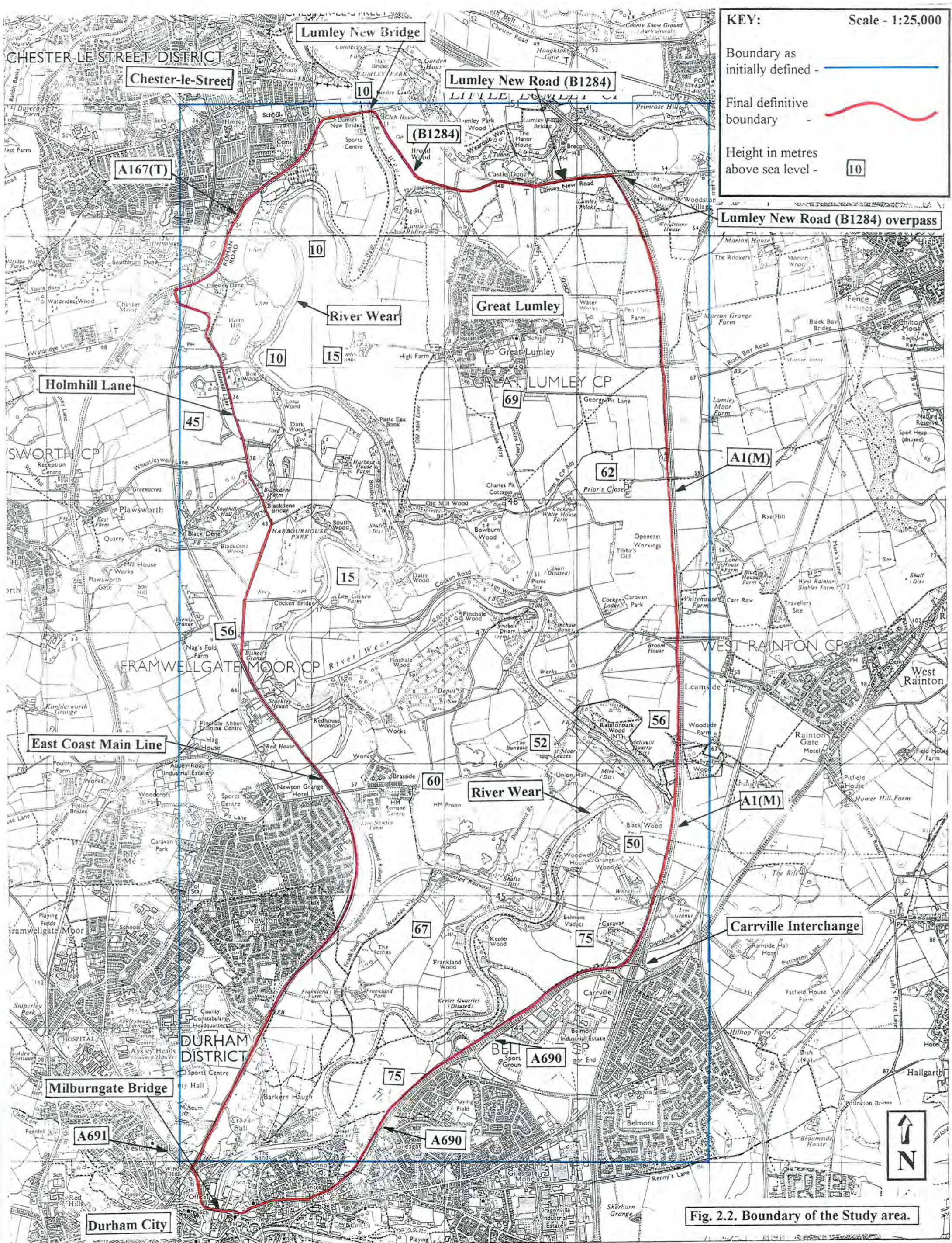





Fig. 2.1 Location of the Study Area. a. National Context, b. Regional Context, c. Local Context.



KEY: Scale - 1:25,000

Boundary as initially defined - 

Final definitive boundary - 

Height in metres above sea level - 

Lumley New Road (B1284) overpass

Carrville Interchange

Fig. 2.2. Boundary of the Study area.

2.3 Geology

The geology of the study area was appraised by considering;

- Solid geology.
- Structure.
- Quaternary geology.
- Designated geological sites.

2.3.1 Solid Geology.

The solid geology at the surface of the whole of the study area, according to Johnson and Robson (1995), dates from the Upper Carboniferous period. Uppermost of these Carboniferous deposits are the Middle Coal Measures consisting of thinly bedded sandstones, mudstones and coal dipping generally to the east and south. These overlie the Lower Coal Measures, the boundary between the two being marked by the Harvey Marine Band (Fig 2.3).

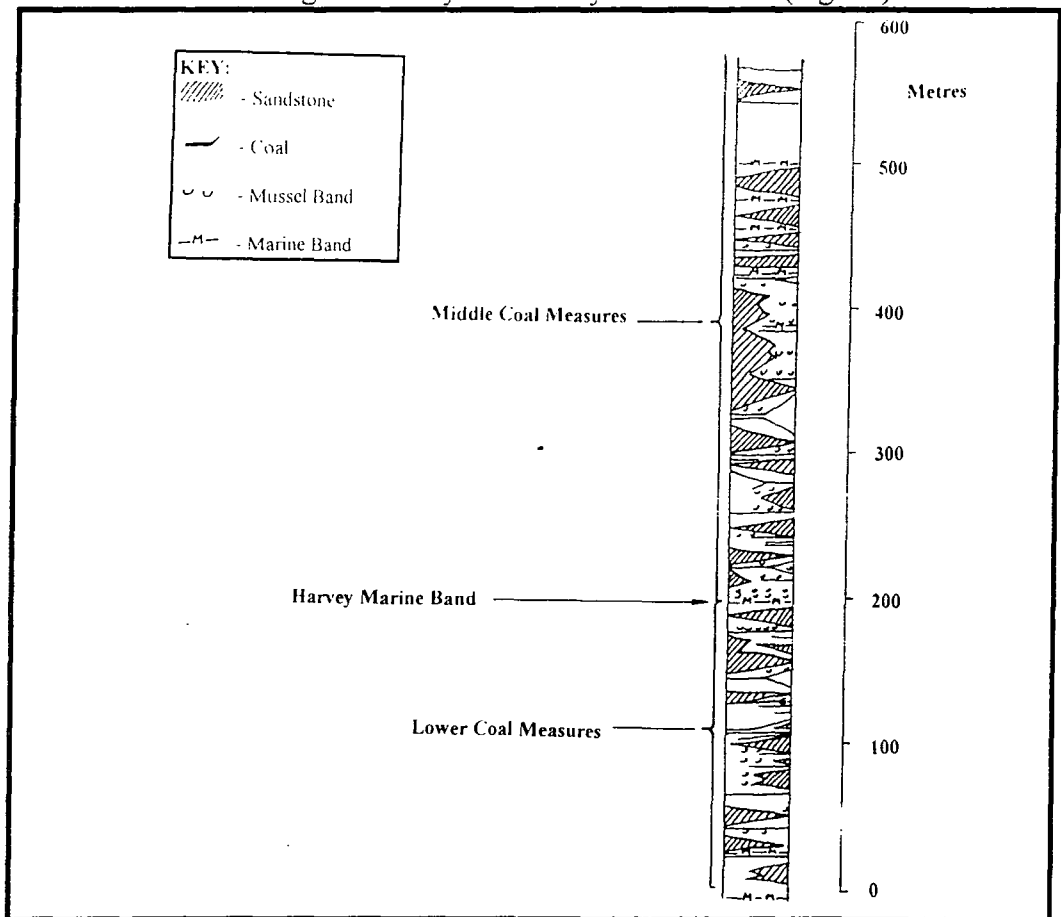


Fig. 2.3 Generalised vertical section of the Lower and Middle Coal Measures. (After Smith and Francis, 1967)

In the Durham Coalfield in general, of which the study area is part, the Lower Coal Measures probably overlies the Millstone Grit Series; a formation consisting of mudstones, shales, sandstones, limestones and a few thin coals. However, this formation has been recorded in only a few deep bores in other parts of the Durham Coalfield and their presence in the study area is therefore only assumed, not proven.

Smith and Francis (1967) believe that Upper Coal Measure deposits that are found in adjacent districts were also laid down in the study area but were later removed by erosion. They also indicate that nothing is known of pre-Carboniferous history of the district and that the Carboniferous strata are thought to lie unconformably (i.e. not in stratigraphical sequence) on "older rocks".

The Westphalian sediments (the Middle and Lower Coal Measures at the surface) are a cyclothem series of deposits. A cyclothem is a series of beds formed during one sedimentary cycle. Jones et al (1995) describe each as being typically about 15m thick (Fig. 2.4) but note that there is an appreciable variation largely dictated by variation in the thickness of the sandstone deposit.

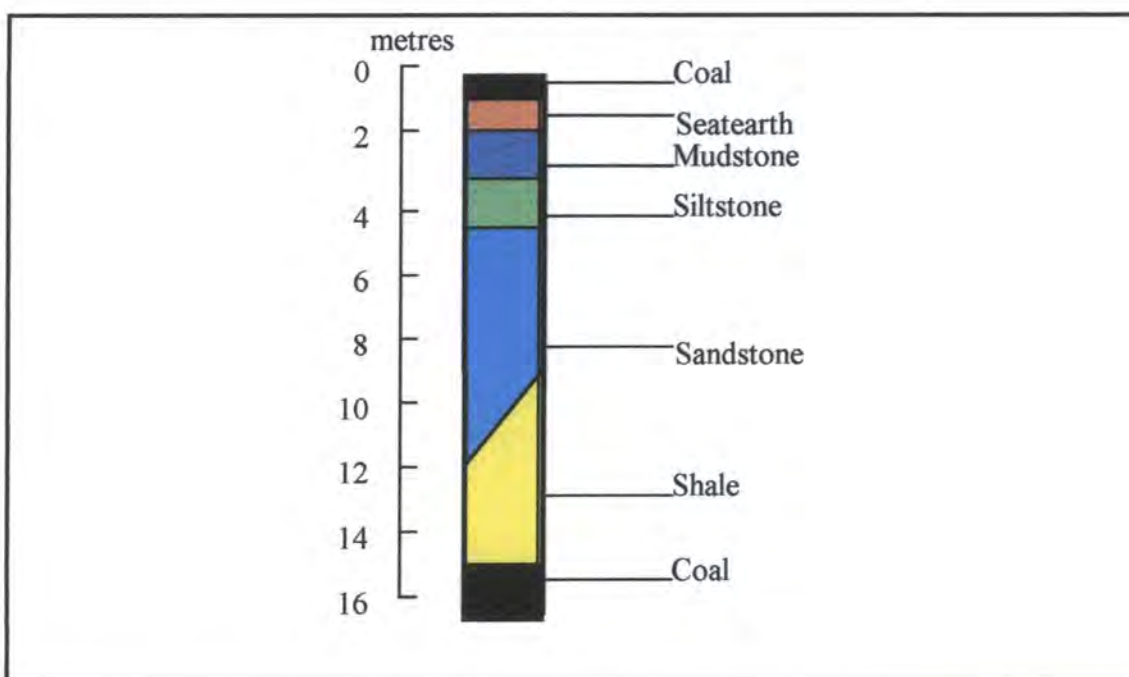


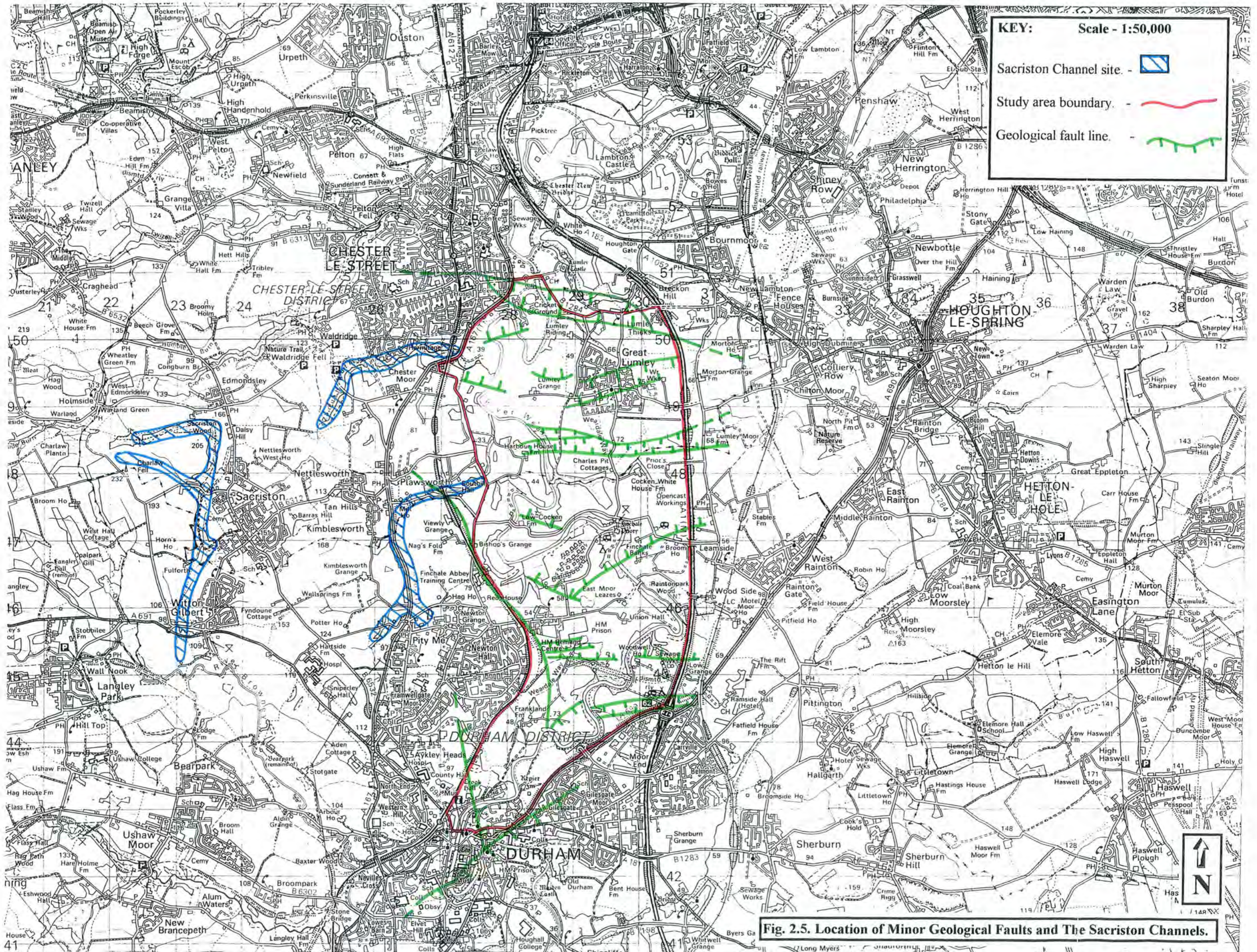
Fig. 2.4 Typical Westphalian Cyclothem. (After Jones et al, 1995)

2.3.2 Structure.


Turner et al (1995) indicate that subsurface structural information on the coal measures is sparse, other than for the coastal sections. The Durham Coalfield is bounded to the north by the Hauxley fault and to the south by the Butterknowle fault. Both faults are east-north-east trending and downthrow to the south; the Hauxley fault by about 100m and the Butterknowle by about 250m. Both of these major faults lie well beyond the boundaries of the study area but the study area itself is crossed by many other, more minor faults (Geological Survey of Great Britain (England and Wales), 1978) (Fig. 2.5). A more detailed consideration may need to be made of these should any major structural works be required as part of the proposals resulting from this research.


2.3.3 Quaternary geology.

According to Lawson (1996) the surface geology is dominated by glacial boulder clays with areas of fluvo-glacial sands and gravels. Smith and Francis (1967) divide these deposits into Upper Stony Clays; Middle Sands, Gravels and Clays; and Lower Boulder Clay. These glacial deposits were laid down in the late Devensian period which lasted from 122,000 BP to 10,000 BP. Lunn (1995) indicates that these particular sediments were deposited between 26,000BP and 13,000BP by the ice sheet which covered the area at that time. This ice sheet originated to the north and west of the region but the direction of flow was heavily influenced by the local topography. Lunn (1995) suggests that the deposits in the study area resulted from ice flowing from the west via the Tyne Gap in the Pennines and then in a south easterly direction into the study area. The thickness of the glacial boulder clay varies from less than nine metres in places east of the river to up to 50 metres in the Wear Buried Valley. As the name suggests the Wear Buried Valley is a former course of the river which became deepened by glacial and meltwater erosion and later filled with glacial deposits; predominantly water-laid deposits.



KEY: Scale - 1:50,000

Sacriston Channel site - 

Study area boundary - 


Geological fault line - 

Fig. 2.5. Location of Minor Geological Faults and The Sacriston Channels.



At Low Cocken Farm the present course of the river lies above the Wear Buried Valley where glacial deposits are some 45m thick (Fig. 2.6). Further to the south the course of the Wear Buried Valley lies further to the west of the present day river.

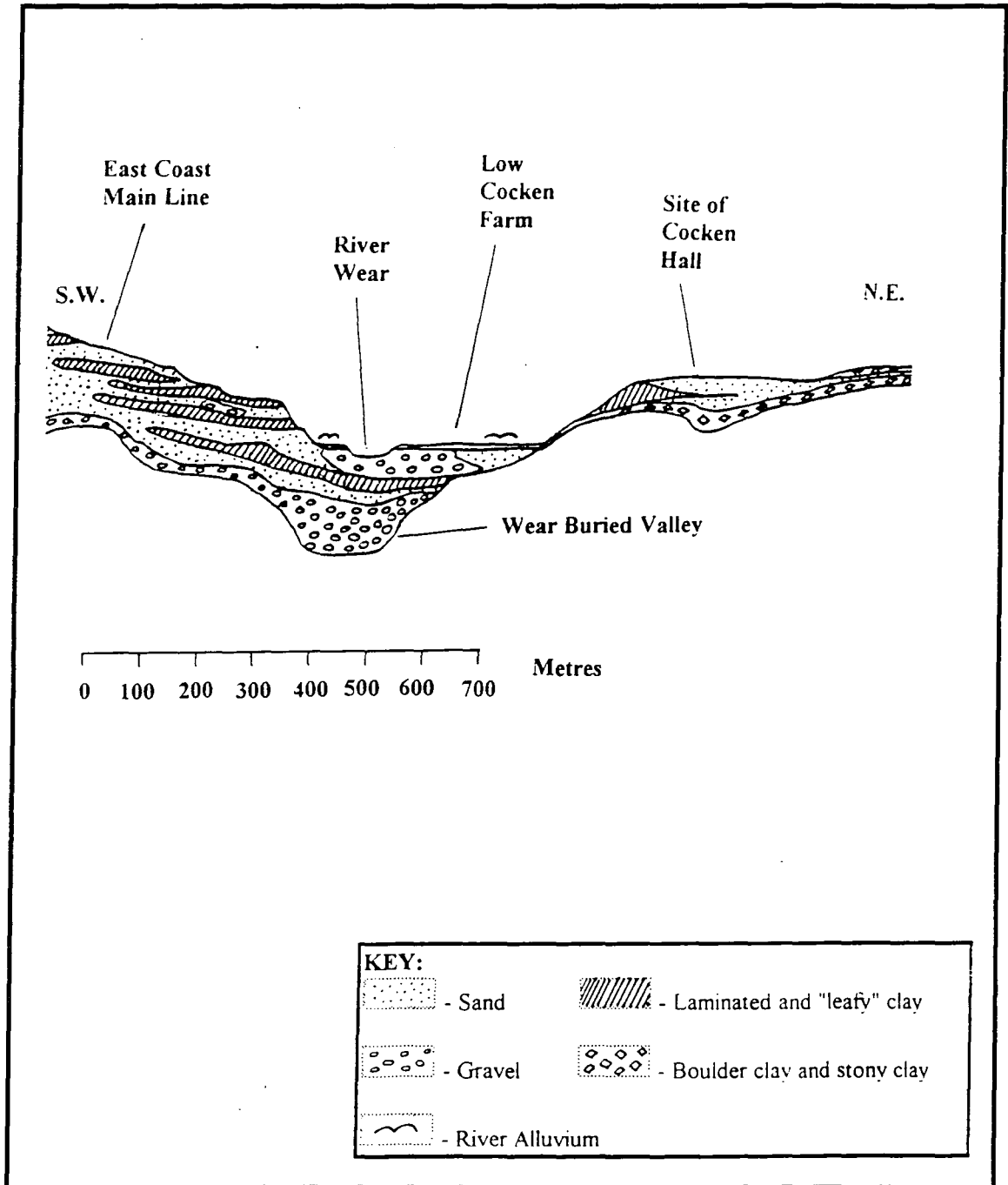


Fig. 2.6 Sectional View of the Wear Buried Valley at Low Cocken Farm.

(After Smith and Francis, 1967)

According to Johnson (1995) in general, boulder clay away from buried valley systems, is about 15m in thickness.

2.3.4 Designated Geological Sites.

Within the study area Durham County Council has one County Geological Site, identified as scientifically valuable for its geology: the Sacriston Channels. This is not a discrete site but impinges on the western edge of the study area (Fig. 2.5).

A more detailed consideration may need to be made of this site should any major structural work be required in its vicinity as part of the proposals resulting from this research.

2.4 Soils.

Lawson (1997) describes the soils within the Wear Lowlands, the landscape classification area which contains the study area, as being predominantly heavy drift derived cambic stragnogleys (Brickfield) in the west with typical stragnogleys (Dunkeswick) on the valley terraces to the east. The river valley itself contains pockets of typical brown alluvial soils (Alun) with larger areas of typical brown sands (Newport).

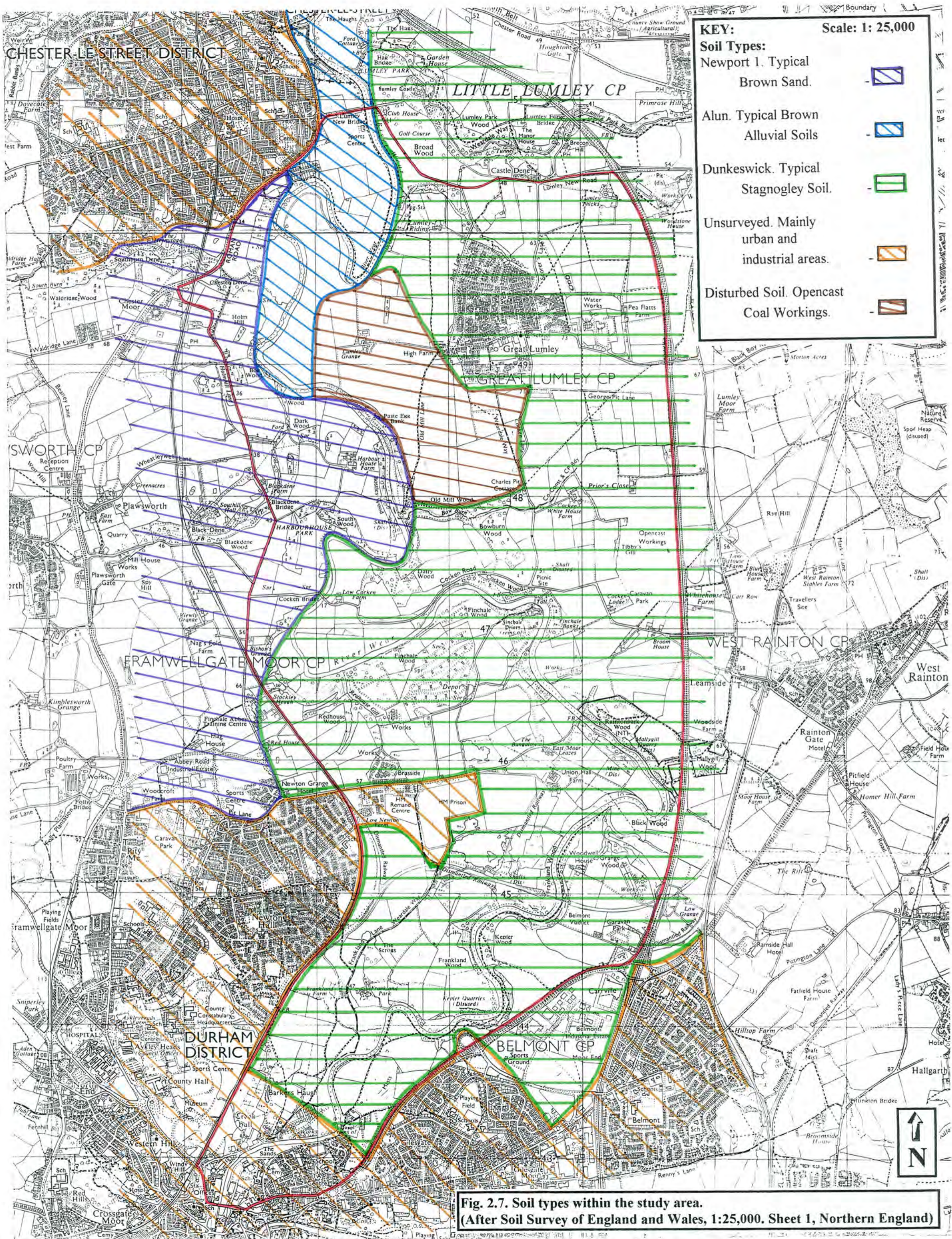
Reference to the "Soil Survey of England and Wales" 1:250,000 scale soil map of England and Wales, 1983 (Fig. 2.7) shows the majority of the study area to be Dunkeswick with Newport 1 and Alun in the north west.

In the Durham Wildlife Audit (Durham County Council, 1995), the soils in the study area are described as good agricultural soils. The highest, and most scarce, grade of agricultural land quality is grade 1 (Appendix 1). No grade 1 land is found in the study area but the majority is classified as grade 3 with some isolated pockets of grade 2.

2.5 Landscape and Topography.

The landscape and topography of the study area was appraised by considering;

- Classification.
- Description.
- Designated Sites.



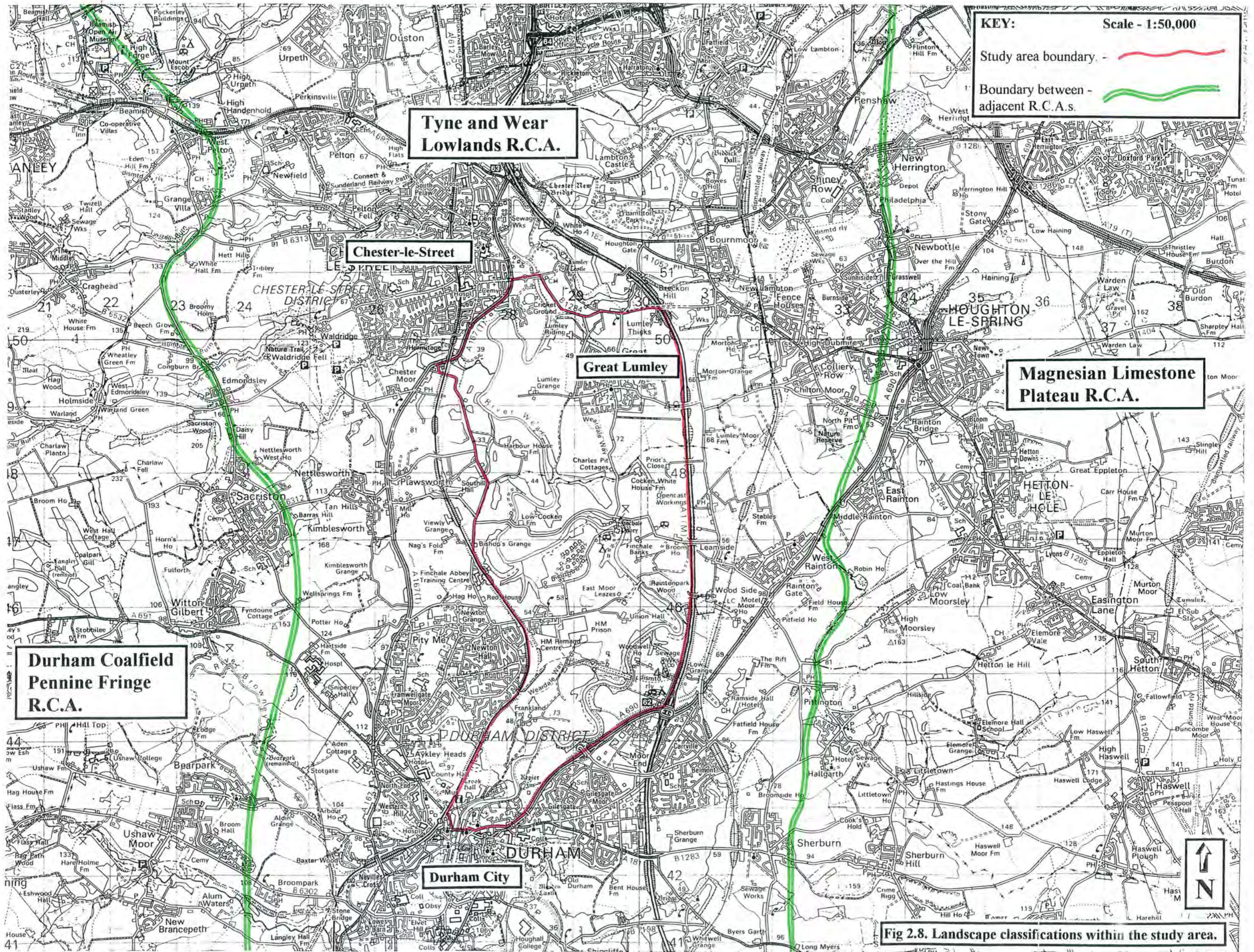
2.5.1 Classification.

The landscape of the study area, and indeed all of the County of Durham, has recently been subject to study by Lawson (1997) to produce part of *The Character of England: Landscape, Wildlife, and Natural Features* (Countryside Commission, 1997) This is a joint project between the Countryside Commission and English Nature to produce a definitive identification and classification of the different landscape types and characters in the country as an aid to effective landscape conservation.

In the landscape character map of this region, the study area of this project falls within an area for which the Regional Landscape Type (R.L.T.) has been identified as Lowland Valley and within a Regional Character Area (R.C.A.) that has been named Tyne and Wear Lowlands (Fig 2.8). The boundary of the Tyne and Wear Lowlands to the west follows the terminal spurs at the end of the major ridges of the Pennine fringe valleys, following approximately the 120m contour. To the west of this approximate boundary lies the Durham Coalfield Pennine Fringe R.C.A.. The eastern boundary is with the Magnesian Limestone Plateau R.C.A. and occurs at the base of the slope of the Magnesian limestone escarpment at approximately the 100m contour in the north and the 150m contour in the south.

The Tyne and Wear Lowlands R.C.A. is further sub-divided into Transitional Valley landscapes to the west, which comprise the lower reaches of the Pennine fringe valleys where they enter the Wear, Valley Terrace landscapes to the east, below the limestone escarpment, and Incised Valley landscapes of the river Wear itself, characterised by narrow ravines and broader flood plains bounded by steep wooded bluffs.

The majority of the study area is Incised Valley landscape. Examples of Valley Terrace landscape can be seen around Great Lumley in the north east of the study area (Fig. 2.8). Examples of Transitional Valley landscape impinge on the study area very slightly in the west.



2.5.2 Description

The River Wear flows from south to north within a broad valley, bounded to the east by a magnesian limestone escarpment and to the west by the hills of the Pennine fringe. As would be expected of a lower section river valley the whole of the study area is low lying with no point above the 100m contour. The highest areas lies in the south where the land rises steadily from the river, south east to the A690 road, which is some 75m above sea level at this point and to the north of the Carrville interchange (Fig. 2.2).

An initial appraisal of the study area from the existing rights of way within it show that in the south the river has carved a meandering course between steep wooded bluffs which occasionally give way to areas of open flood plain. In the northern section, the valley landform becomes more open with wider expanses of river terraces. Agricultural land use is a mixture of arable and pasture.

Lawson (1997) states that the majority of the field boundaries in the study area appear to be enclosure period hedges from the 16th and 17th centuries, his argument being founded on the straight sides (but irregular shapes) and the size of the land parcels they enclose. There is some evidence of pre-enclosure hedgerows in places. Long non-linear hedgelines incorporated into enclosure field patterns just south of Finchale Priory (Fig. 2.9) may be indications of such (Lawson, 1997). More detailed investigation may be required in the immediate vicinity of any works detailed in the proposal. In the northern section of the study area, on the wider river terraces, greatly increased field sizes are evidence of hedgerow removal during post war agricultural intensification.

Lawson (1997) notes that the hedgerows are generally managed by mechanical cutter and are species poor with Hawthorn (*Crataegus monogyna*) predominant. Again more detailed investigation may be required in the vicinity of any works specified by the proposal.

The location of the urban areas on the 1:25000 scale Ordnance Survey map would appear to indicate that the landscape has been affected by urban spread at Chester-le-Street in the north west and around Durham in the south, most notably at Newton Hall, Gilesgate, Gilesgate Moor and Belmont (Fig 2.9). The only other major settlement in the study area is Great Lumley which remains fairly compact and contained by the road layout which surrounds it though there is some post-war residential spread to the south (Fig. 2.9).

The Tyne and Wear Lowlands have historically been a major north-south communication route for the region and the landscape of the study area has therefore, not surprisingly been affected by major communication links. The major north-south rail link; the East Coast Main Line, and the major north-south road link; the A1(M), as well as the A690 trunk road linking the A1(M) to the City of Durham in the south-eastern sector of the study area, and the more local north-south road link in the west, the A167(T), have all tended to compartmentalize the landscape (Fig. 2.9).

2.5.3 Designated Sites.

Areas beyond the boundaries of the study area are included where they are thought to be significant.

2.5.3.1 National and Local designations - A large proportion of the river valley landscape in the study area is currently identified as areas of value and importance. Previously, these areas were designated as Areas of Great Landscape Value (AGLV) or Areas of Special Landscape Value (ASLV). In the new Structure Plan, (Durham County Council, 1998) these two categories are replaced with one: Area of High Landscape Value (AHLV), the boundaries of which (Fig. 2.9) correspond roughly to the former AGLVs and ASLVs.

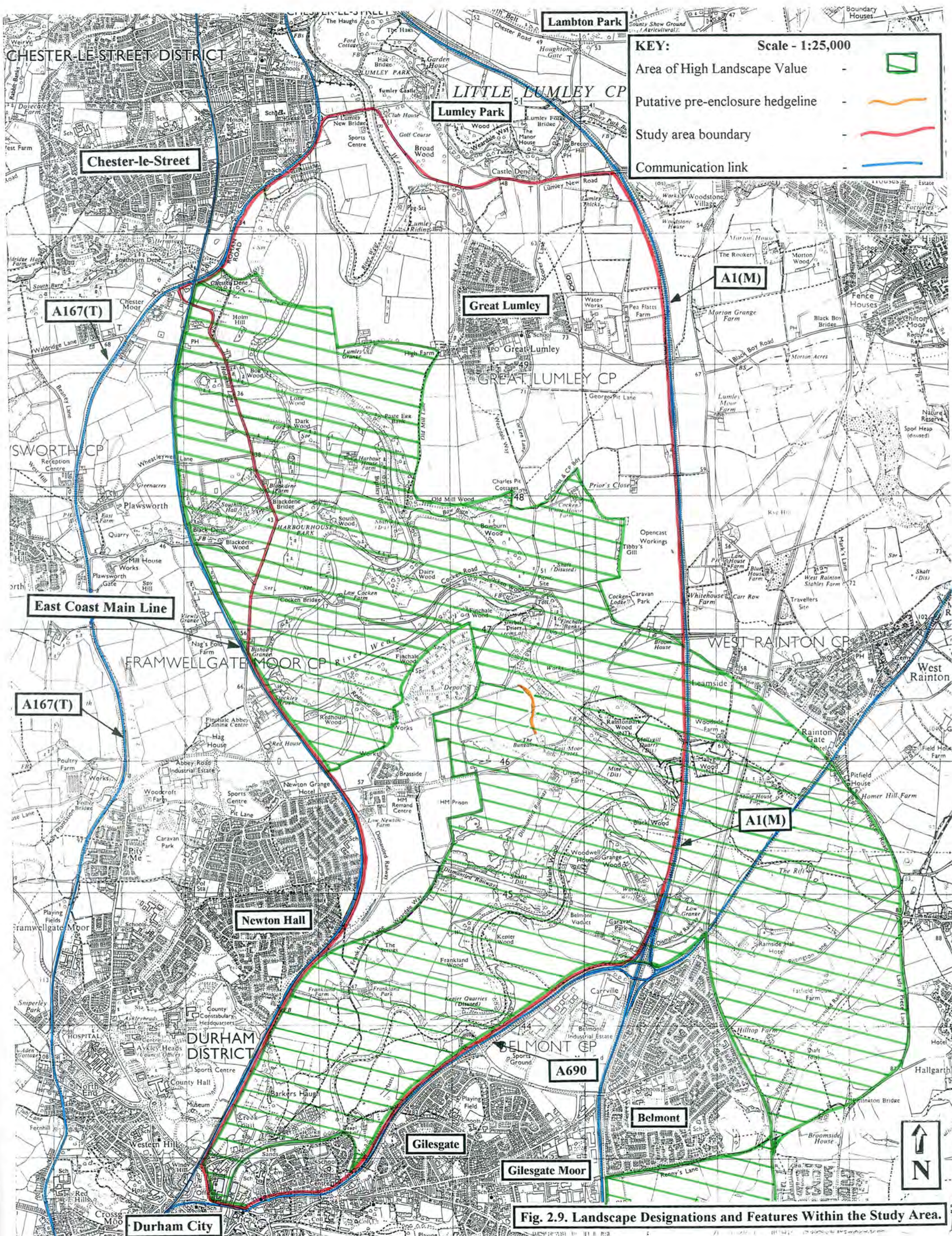


Fig. 2.9. Landscape Designations and Features Within the Study Area.

This new AHLV is defined as an area:

"where the landscape characteristics and overall appearance are considered to be of sufficient importance to the character of the County to require special recognition" .

(Durham County Council, 1998).

In addition, it seems likely that the whole of the study area will be included in the proposed North Durham Green Belt (Durham County Council, 1998), under proposed modification to Policy 5 of the Structure Plan. As Policy 5 and the precise boundaries of the Green Belt have yet to be formalised, the proposed Green Belt cannot be shown (Fig. 2.9). Under Policy 6 of the Structure Plan there would be a presumption against building within the Green Belt. Policy 5 and 6 are discussed in more detail elsewhere.

2.5.3.2 Other Designations. - English Heritage has compiled a register of parks and gardens deemed to be of national importance. There are currently no parks or gardens within the study area or its immediate vicinity that are included in this register (Durham County Council, 1998), though the register is due for review. However, the parklands at Lambton and Lumley (Fig. 2.9) which lie just to the north of the study area, are considered to be of significant local interest.
(Lawson, 1997)

2.6 Archaeological and Historic Heritage.

2.6.1 Historical Over-view.

County Durham has a long and rich history and the county as a whole contains signs of human habitation from the end of the last ice age to the present day.

The history and archaeological heritage of the city of Durham is well documented as is, to a lesser extent, the surrounding area including the study area. Detailed

accounts can be found in Adey et al, 1990; Dewdney *et al*, 1970; Marcombe,1987; Bonney, 1990; etc. Durham Castle and Cathedral, within Durham City, are designated as a World Heritage Site i.e. recorded on the "World Cultural and Natural Heritage List": a list of sites and monuments, drawn up by the "Convention Concerning the Protection of the World Cultural and Natural Heritage", considered to be of such exceptional interest and such universal value that their protection is "the responsibility of all mankind". Signatory countries to the Convention pledge to conserve sites on this list which lie within their borders.

In addition to these a substantial quantity of evidence specific to the archaeological and historic heritage of the study area is also on record.

2.6.2 Sites and Monuments Record Entries.

The Durham County Sites and Monuments Record (SMR), held at the Bowes Museum, records details of sites of archaeological and historical importance within the county. The SMR groups entries into the following general historical periods:

<i>Prehistoric</i>	pre AD70
<i>Roman</i>	AD70 to Fifth century
<i>Early Mediaeval</i>	Fifth century to 1066 AD
<i>Mediaeval</i>	1066 AD to 1540 AD
<i>Post Mediaeval</i>	1541 AD to 1899 AD
<i>Modern</i>	1900 AD to present
<i>Undetermined</i>	Date not known from available information.
<i>Unknown</i>	Recognised that date cannot be established.

It lists the following sites located within or immediately adjacent to the study area (Fig. 2.10). Full descriptions are given in Appendix 2.

2.6.2.1 Prehistoric Entries -

SITE NAME: Great Lumley

SITE TYPE: Flints

SMR No.:1044

O.S.GRID REF: NZ 295495

SITE NAME: Kepier

SITE TYPE: Enclosure

SMR No.: 372

O.S.GRID REF: NZ 282483

SITE NAME: Harbour House

SITE TYPE: Ring ditch

SMR No.:1287

O.S.GRID REF: NZ 27894799

SITE NAME: None

SITE TYPE: Flints

SMR No.: 952

O.S.GRID REF: NZ 299479

SITE NAME: None

SITE TYPE: Flints

SMR No.: 953

O.S.GRID REF: NZ 298479

SITE NAME: Priory Farm

SITE TYPE: Cist burial

SMR No.: 3207

O.S.GRID REF: NZ 296472

SITE NAME: North Finchale

SITE TYPE: Enclosure

SMR No.: 378

O.S.GRID REF: NZ 297475

SITE NAME: Finchale Banks

SITE TYPE: Find spot

SMR No.: 150

O.S.GRID REF: NZ 298470

SITE NAME: North Finchale

SITE TYPE: Enclosure

SMR No.:1294

O.S.GRID REF: NZ 297475

SITE NAME: Finchale Priory Farm	SITE TYPE: Find spot
SMR No.: 102	O.S.GRID REF: NZ 296470
SITE NAME: Finchale Nab	SITE TYPE: Find spot
SMR No.: 97	O.S.GRID REF: NZ 297473
SITE NAME: Finchale Banks	SITE TYPE: Find spot
SMR No.: 98	O.S.GRID REF: NZ 298470
SITE NAME: Harbour House	SITE TYPE: Find spot
SMR No.: 99	O.S.GRID REF: NZ 294468
SITE NAME: Frankland Wood	SITE TYPE: Chipping Floor
SMR No.: 1043	O.S.GRID REF: NZ 296454
SITE NAME: Union Hall	SITE TYPE: Find spot
SMR No.: 103	O.S.GRID REF: NZ 298458
SITE NAME: Woodwell House	SITE TYPE: Ring ditch
SMR No.: 2417	O.S.GRID REF: NZ 300452
SITE NAME: KEPHIR quarry	SITE TYPE: Core
SMR No.: 261	O.S.GRID REF: NZ 293440
SITE NAME: North Lodge	SITE TYPE: Enclosure
SMR No.: 407	O.S.GRID REF: NZ 280533
SITE NAME: Chester-le-Street	SITE TYPE: Axe
SMR No.: 2147	O.S.GRID REF: NZ 2751

2.6.2.2 Roman Entries. -

SITE NAME: Chester-le-Street	SITE TYPE: Bridge
SMR No.: 2166	O.S.GRID REF: NZ 27535157
SITE NAME: Chester-le-Street	SITE TYPE: Cremation cemetery
SMR No.: 2167	O.S.GRID REF: NZ 27995117
SITE NAME: Chester-le-Street	SITE TYPE: Cemetery
SMR No.: 2170	O.S.GRID REF: NZ 27005111
SITE NAME: Congcangium	SITE TYPE: Fort
SMR No.: 2153	O.S.GRID REF: NZ 275513
SITE NAME: Chester-le-Street	SITE TYPE: Bath house
SMR No.: 2168	O.S.GRID REF: NZ 27635118
SITE NAME: Chester-le-Street	SITE TYPE: Drain
SMR No.: 2171	O.S.GRID REF: NZ 276513

In addition to the above, the SMR entries 2619 through to 2626 record numerous altar and other inscribed stones from the Roman period found in and around the site of the fort at Chester-le-Street, between 1849 and 1886.

2.6.2.3 Early Medieval Entries. -

SITE NAME: Chester-le-Street	SITE TYPE: Sculpture
SMR No.: 700	O.S.GRID REF: NZ 276514

SITE NAME: Chester-le-Street SMR No.: 701	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 702	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 703	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 704	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 705	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 706	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 707	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 708	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 709	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514
SITE NAME: Chester-le-Street SMR No.: 710	SITE TYPE: Sculpture O.S.GRID REF: NZ 276514

SITE NAME: Chester-le-Street SITE TYPE: Sculpture
SMR No.: 711 O.S.GRID REF: NZ 276514

SITE NAME: Chester-le-Street SITE TYPE: Sculpture
SMR No.: 712 O.S.GRID REF: NZ 276514

SITE NAME: SS Mary and Cuthbert SITE TYPE: Cathedral
SMR No.: 2150 O.S.GRID REF: NZ 27605132

2.6.2.4 Medieval Entries. -

SITE NAME: Harbour House SITE TYPE: Manor House
SMR No.: 1289 O.S.GRID REF: NZ 28214829

SITE NAME: Harbour House SITE TYPE: Chapel
SMR No.: 1290 O.S.GRID REF: NZ 282483

SITE NAME: Finchale SITE TYPE: Wall
SMR No.: 1301 O.S.GRID REF: NZ 29664709

SITE NAME: Priory Mill SITE TYPE: Mill
SMR No.: 1297 O.S.GRID REF: NZ 29624718

SITE NAME: Finchale Priory SITE TYPE: Priory
SMR No.: 1295 O.S.GRID REF: NZ 296471

SITE NAME: Finchale SITE TYPE: Building (unclassified)
SMR No.: 1299 O.S.GRID REF: NZ 295471

SITE NAME: Finchale	SITE TYPE: Wall
SMR No.: 1300	O.S.GRID REF: NZ 29594686
SITE NAME: Crook Hall	SITE TYPE: Chapel
SMR No.: 1250	O.S.GRID REF: NZ 27454315
SITE NAME: Crook Hall	SITE TYPE: Moat
SMR No.: 1251	O.S.GRID REF: NZ 27454315
SITE NAME: Crook Hall	SITE TYPE: Manor House
SMR No.: 1252	O.S.GRID REF: NZ 27454315
SITE NAME: Kepier Hospital	SITE TYPE: Hospital
SMR No.: 1264	O.S.GRID REF: NZ 28214327
SITE NAME: Chester-le-Street	SITE TYPE: Village
SMR No.: 2159	O.S.GRID REF: NZ 2752
SITE NAME: St. Stephen's Hospital	SITE TYPE: Hospital
SMR No.: 2164	O.S.GRID REF: NZ 2752
SITE NAME: Chester New Bridge	SITE TYPE: Bridge
SMR No.: 2162	O.S.GRID REF: NZ 28455228
SITE NAME: The Anker's House	SITE TYPE: Church
SMR No.: 2151	O.S.GRID REF: NZ 27605132
SITE NAME: SS Mary and Cuthbert	SITE TYPE: College
SMR No.: 2152	O.S.GRID REF: NZ 27605132

SITE NAME: Chester-le-Street SITE TYPE: Memorial Effigy
SMR No.: 2533 O.S.GRID REF: NZ 276513

SITE NAME: Chester-le-Street SITE TYPE: Memorial Effigy
SMR No.: 2534 O.S.GRID REF: NZ 276513

SITE NAME: Chester-le-Street SITE TYPE: Memorial Effigy
SMR No.: 2536 O.S.GRID REF: NZ 276513

SITE NAME: Ankers House SITE TYPE: Anchorite Cell
SMR No.: 239 O.S.GRID REF: NZ 276513

SITE NAME: SS Mary and Cuthbert SITE TYPE: Church
SMR No.: 2149 O.S.GRID REF: NZ 27605132

SITE NAME: Lumley Castle SITE TYPE: Castle
SMR No.: 2154 O.S.GRID REF: NZ 28785105

SITE NAME: Lumley Castle SITE TYPE: Manor House
SMR No.: 2155 O.S.GRID REF: NZ 28785105

SITE NAME: Lumley Castle SITE TYPE: Chapel
SMR No.: 2156 O.S.GRID REF: NZ 28785105

2.6.2.5 Post Mediaeval Entries. -

SITE NAME: John Duck's Hospital SITE TYPE: Hospital
SMR No.: 1291 O.S.GRID REF: NZ 28964916

SITE NAME: Godric's Garth SITE TYPE: Building unclassified
SMR No.: 1292 O.S.GRID REF: NZ 29914633

SITE NAME: Kepier SITE TYPE: Kiln
SMR No.: 3227 O.S.GRID REF: NZ 28334341

SITE NAME: Lambton Hall SITE TYPE: Mansion
SMR No.: 2157 O.S.GRID REF: NZ 29575238

SITE NAME: Lambton Castle SITE TYPE: Mansion
SMR No.: 2160 O.S.GRID REF: NZ 29835258

SITE NAME: Harraton Hall SITE TYPE: Mansion
SMR No.: 2161 O.S.GRID REF: NZ 29835258

SITE NAME: Chester-le-Street SITE TYPE: Non-antiquity
SMR No.: 2653 O.S.GRID REF: NZ 275513

SITE NAME: Lumley Park SITE TYPE: Deer Park
SMR No.: 2174 O.S.GRID REF: NZ 286512

2.6.2.6 Modern Entries. -

There are no entries in the County SMR for sites of this period within the study area.

2.6.2.7 Undetermined Entries. -

N.B.: The recording of "Undetermined" entries is frequently the result of observation of aerial photographs where the Site Type is therefore recorded as "AP site".

SITE NAME: Chester-le-Street SMR No.: 2719	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 283503
SITE NAME: None SMR No.: 2783	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 279480
SITE NAME: Harbour House SMR No.: 1288	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 279480
SITE NAME: Ford Cottage SMR No.: 2442	SITE TYPE: Enclosure (rectilinear) O.S.GRID REF: NZ 279475
SITE NAME: None SMR No.: 2779	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 297475
SITE NAME: Bowburn Wood SMR No.: 1293	SITE TYPE: Field System O.S.GRID REF: NZ 291475
SITE NAME: None SMR No.: 2780	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 271469
SITE NAME: None SMR No.: 3232	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 271469
SITE NAME: None SMR No.: 2782	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 29004630
SITE NAME: None SMR No.: 3234	SITE TYPE: AP Site (Unclassified) O.S.GRID REF: NZ 29004630

SITE NAME: None	SITE TYPE: AP Site (Unclassified)
SMR No.: 2781	O.S.GRID REF: NZ 295456
SITE NAME: None	SITE TYPE: AP Site (Unclassified)
SMR No.: 3233	O.S.GRID REF: NZ 295456
SITE NAME: Low Grange	SITE TYPE: Enclosure
SMR No.: 1277	O.S.GRID REF: NZ 298448
SITE NAME: St. Giles	SITE TYPE: AP Site (Unclassified)
SMR No.: 1262	O.S.GRID REF: NZ 284438
SITE NAME: St. Giles Hospital	SITE TYPE: AP Site (Unclassified)
SMR No.: 1263	O.S.GRID REF: NZ 284434
SITE NAME: Kepier	SITE TYPE: Enclosure (rectilinear)
SMR No.: 1272	O.S.GRID REF: NZ 28244352
SITE NAME: North Lodge	SITE TYPE: AP Site (Unclassified)
SMR No.: 2825	O.S.GRID REF: NZ 27535362
SITE NAME: North Lodge 2	SITE TYPE: Trackway
SMR No.: 3472	O.S.GRID REF: NZ 280533
SITE NAME: Swinburn's Leap	SITE TYPE:
SMR No.: 2169	O.S.GRID REF: NZ 284522
SITE NAME: Lambton Park	SITE TYPE: Artefact
SMR No.: 2175	O.S.GRID REF: NZ 2952

SITE NAME: Chester-le-Street SITE TYPE: AP Site (Unclassified)
 SMR No.: 2720 O.S.GRID REF: NZ 281510

SITE NAME: None SITE TYPE: AP Site (Unclassified)
 SMR No.: 2172 O.S.GRID REF: NZ 28125105

2.6.3 Aerial Photographic Survey.

A study was also made of aerial photographs of the study area taken by Aerofilms of Boreham Wood as part of an aerial photographic survey of the County as a whole undertaken for Durham County Council. No unusual field or crop marks or other evidence of archaeological remains was found that did not correspond to an existing record in the SMR.

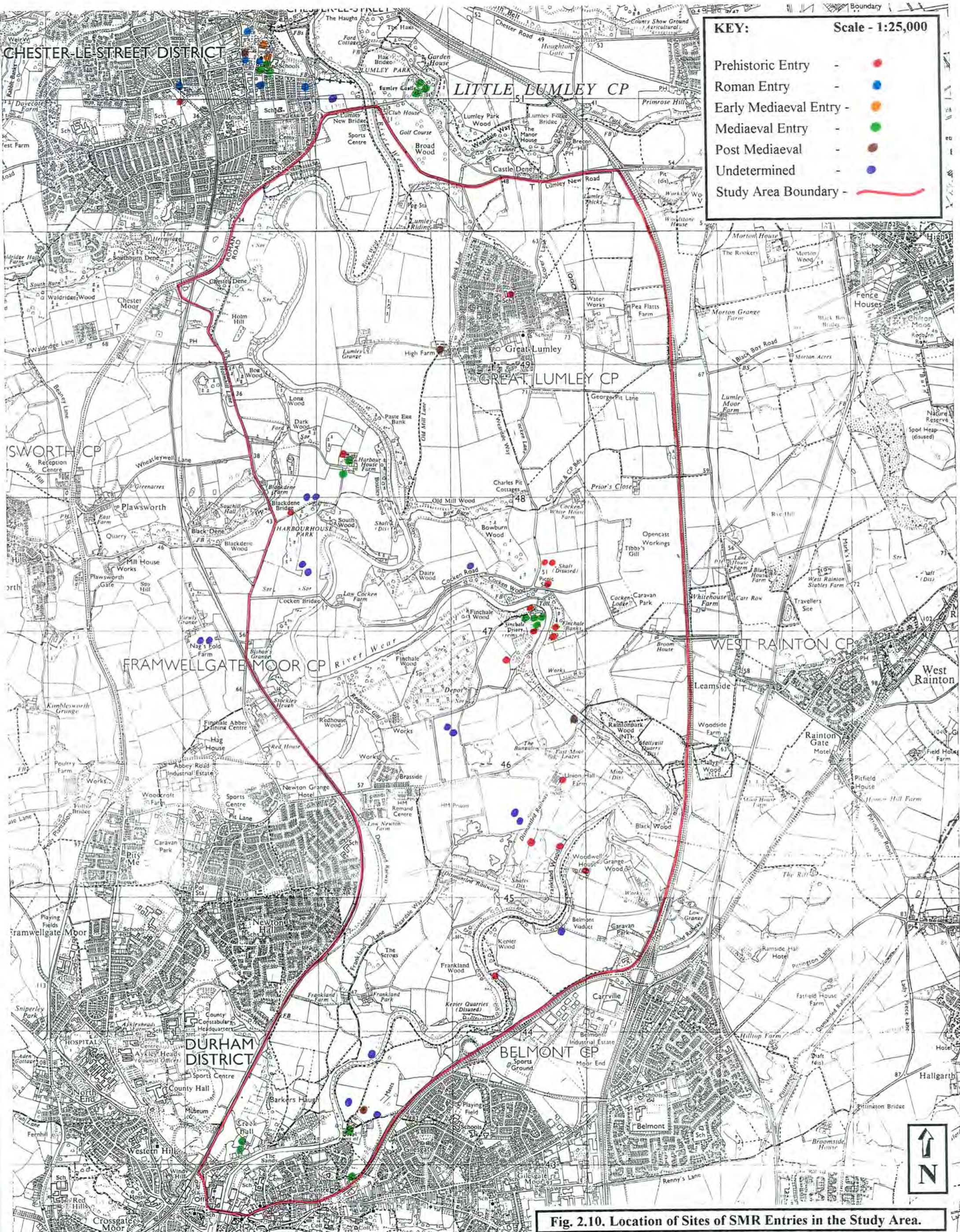
2.6.4 The List of Historic Buildings.

The Durham and Chester-le-Street volumes of the List of Historic Buildings held by Durham City Council lists the following buildings within or near to the study area as being of significance for their historical or architectural importance.

Grade I buildings are deemed to be more important than Grade II with Grade II* being "a particularly important building of Grade II". Their locations are shown on Fig. 2.11.

BUILDING	GRADE	SERIAL No. OF LIST ENTRY
Chapel of St Mary Magdalene	I	11/40
Framwelgate Bridge	I	14/386
Crook Hall	I	4/151
Barn, west of Crook Hall	II	4/152
Barn, north end of Crook Hall	II	4/153
Fram Well Head	II	9/150
Great Gateway to Kepier Hospital	I	6/15

Building attached to Kepier Hospital gateway	II	6/16
Kepier Farmhouse	II	6/7
Belmont Viaduct	II	6/18
Finchale Priory	I	2/19
Finchale Abbey Farmhouse	II	2/20
Barn and gin-gang 100m SW of Finchale		
Abbey Farmhouse	II	2/21
Union Hall Farmhouse	II	2/22
Chester New Bridge	II*	4/1
Gateway to NW of Chester Lodge	II	4/2
Chester Lodge	II	4/3
Brewery Cottages, Nos 1 and 2	II	5/22
Lamb Bridge	II*	4/23
Piers, walls, gates and railings at East Lodge,		
The Hermitage	II	4/24
The Hermitage	II	7/25
Railway viaduct E of The Hermitage	II	7/26
Church of St Mary and St Cuthbert	I	4/27
Brewery House	II	4/31
Railway viaduct over Chester Burn	II	4/32
Lumley Park House	II	4/38
Harbour House	II	7/39
Former chapel N of Harbour House	II	7/40
Former threshing barn and two gingangs, 40m E		
of Harbour House	II	7/41
Southill Hall	II	7/42
Gates, piers and walls, NW of Lumley Lodge	II	4/43
Lumley Castle	I	4/44
Sundial, 20m W of Lumley Castle	II	4/45
Walldridge Hall Farmhouse	II	7/68



KEY: Scale - 1:25,000

- Prehistoric Entry - ● (red)
- Roman Entry - ● (blue)
- Early Mediaeval Entry - ● (orange)
- Mediaeval Entry - ● (green)
- Post Mediaeval - ● (brown)
- Undetermined - ● (purple)
- Study Area Boundary - — (red line)

Fig. 2.10. Location of Sites of SMR Entries in the Study Area.

2.6.5 First Edition Ordnance Survey Map.

Reference to the 6 inch to 1 mile, 1861 edition of the Ordnance Survey Map of the area reveals the text entries listed below, many of which testify to the industrial past of the area. Their positions are recorded on a modern map based on the 1994 edition of the 1:25,000 scale Ordnance Survey Map (Fig. 2.11).

- | | |
|---|------------------------|
| 1 - Shaft | 2 - Kepier Quarries |
| 3 - Old Walls | 4 - Old Shaft |
| 5 - Old Quarry | 6 - Old Walls |
| 7 - Old Shaft (Coal) | 8 - Old Quarries |
| 9 - Old Coal Pit | 10 - Grange Colliery |
| 11 - Quarry | 12 - Quarry |
| 13 - Shaft | 14 - Quarry |
| 15 - Brickfield Ovens | 16 - Brickfield |
| 17 - Brasside Pit | 18 - Waggonway |
| 19 - Newton Hall | 20 - Mallygill Quarry |
| 21 - Cocken Hall with "Summerhouse", "The lawn",
Terrace walk (22), Nuns Walk (23),
Cocken Boat House (24), The Dairy (25). | |
| 26 - Cocken Ford (<i>No bridge</i>) | 27 - Fish Pond |
| 28 - Beesbank Engine | 29 - Beesbank Farm |
| 30 - Old Shaft (Coal) | 31 - Cocken Pit (Coal) |
| 32 - Brick Field | 33 - Pumping Engine |
| 34 - Toad Hole Quarry | 35 - Lumley Waggonway |
| 36 - Sawmill | 37 - Fentonwell lane |
| 38 - Fenton well (<i>No buildings</i>) | 39 - Old Coal Shaft |
| 40 - George Pit | 41 - Cocken Engine |
| 42 - Sand Pit | 43 - Lady Mary's Drive |
| 44 - Old Quarry | 45 - Old Quarry |
| 46 - Floodgate | 47 - Floodgate |

- | | |
|--|---|
| 48 - Lumley Hospital | 49 - Lumley Shops (<i>Buildings marked</i>) |
| 50 - Lumley Colliery | 51 - Cherry Hall |
| 52 - <i>River bends known as Lumley Crooks</i> | |
| 53 - Rope Walk | 54 - Union Workhouse |
| 55 - Lumley Fish Locks | 56 - Red Rose Hall |
| 57 - Old Quarries | 58 - Old Quarries |
| 59 - Old Quarries | 60 - Lumley Colliery |
| 61 - Lumley Ferry | 62 - Lumley Ford |
| 63 - Old Engine. | |

2.6.6 Tithe Maps of the Area.

Preliminary reference to Tithe Maps held in the County Record Office revealed that many current field boundaries in the area were in existence prior to 1841. A detailed consideration will be required of the immediate surroundings of any specific proposal resulting from this research, utilising the available Tithe plans.

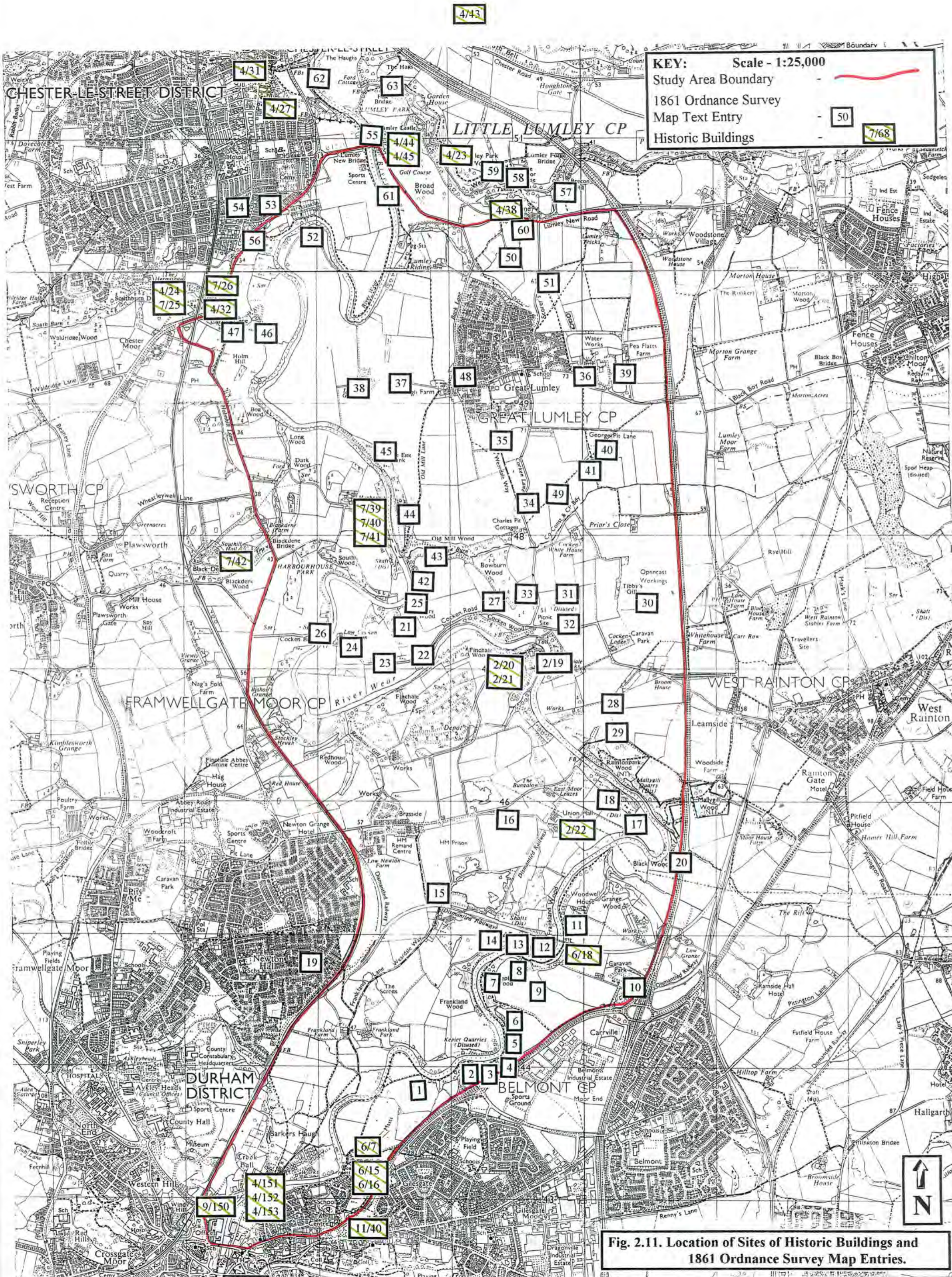


Fig. 2.11. Location of Sites of Historic Buildings and 1861 Ordnance Survey Map Entries.

2.7 Flora and Fauna.

The whole of the study area is predominantly rural in character with many areas of semi-natural habitat. As a result it has a rich and diverse ecology.

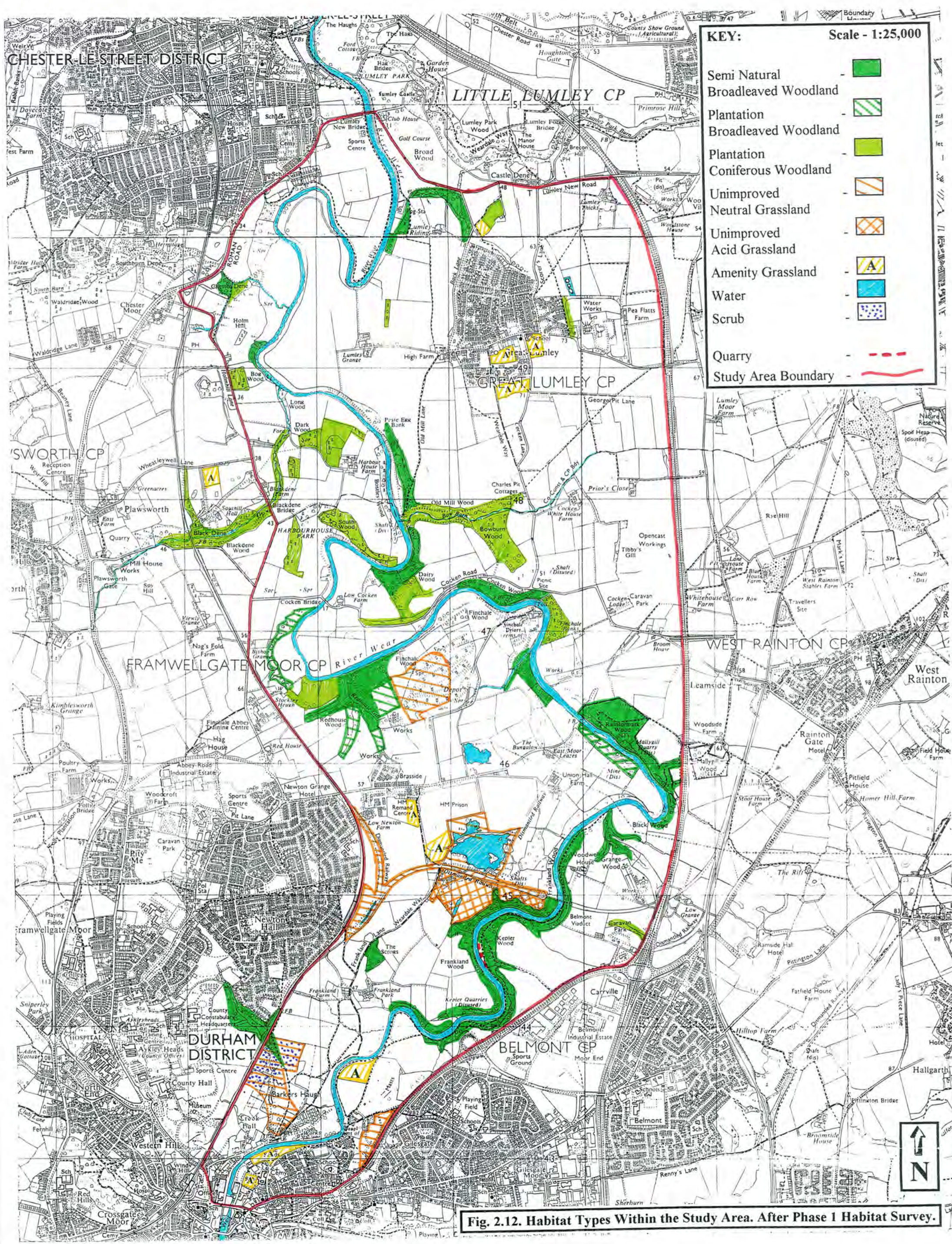
2.7.1 Species.

A list of flora and vertebrate fauna species already recorded in the study area (Appendix 3) was compiled from existing reports on designated wildlife sites. In addition to this list, the biological survey carried out by the National Trust (1987) in the fifty nine acres of Rainton Park Woods, Mallygill Woods and Moor House Woods identified 147 species of invertebrates present. Other invertebrate records for other sites in the study area are not so complete though this is probably due to a shortage of survey expertise in this field rather than dearth of invertebrate species.

2.7.2 Habitats.

A Phase 1 survey of habitat types has been completed for the county and is held by English Nature (Fig. 2.12). The main habitat types identified in the study area, and their locations, are recorded. Only large areas of vegetation are shown, i.e. no attempt has been made to show hedgelines or scattered trees. All agricultural fields within the study area that are not coded otherwise were designated as either "arable" or "improved pasture" but have not been colour coded for the sake of clarity.

The survey showed that much of the agricultural land is improved and therefore has limited ecological diversity. There are some areas of unimproved neutral grassland, most notably at Brasside Ponds and the depot near to Finchale Woods, and of unimproved acid grassland to the south of Brasside Ponds. However, the most significant habitats within the study area in ecological terms are the Site of Special Scientific Interest (S.S.S.I.) at Brasside Ponds, the woodlands along the course of the River Wear and its tributaries, and the River Wear itself.



KEY: Scale - 1:25,000

- Semi Natural Broadleaved Woodland - [Green box]
- Plantation Broadleaved Woodland - [Green with diagonal lines box]
- Plantation Coniferous Woodland - [Light green box]
- Unimproved Neutral Grassland - [Orange with diagonal lines box]
- Unimproved Acid Grassland - [Orange with cross-hatch box]
- Amenity Grassland - [Yellow with diagonal lines box]
- Water - [Blue box]
- Scrub - [Blue with dots box]
- Quarry - [Red dashed line]
- Study Area Boundary - [Red solid line]

Fig. 2.12. Habitat Types Within the Study Area. After Phase 1 Habitat Survey.

The whole of the study area has also been identified as a strategic north - south wildlife corridor by English Nature (Durham County Council, 1995).

2.7.2.1 The SSSI at Brasside Ponds. - This is an important wetland site containing two large ponds in abandoned clay workings, with smaller ponds and fen areas nearby, the whole being surrounded by acid grassland, scrub and developing woodland (Fig. 2.13). The large ponds are an important breeding and wintering site for wildfowl as well as for migrants on passage. Several species of winter visitors are listed as endangered on a world scale in the International Union for Conservation of Nature and Natural Resources (IUCN) Red Data Books (Batten et al., 1990) These include Wigeon (*Anas penelope*), Teal (*Anas crecca*), Pochard (*Aythya ferina*) and Goldeneye (*Bucephala clangula*) which are all listed as being at risk because of the vulnerability and limited nature of their required habitat. The increasingly rare Water Vole (*Arvicola terrestris*) and the rare and protected Great Crested Newt (*Triturus cristatus*) are also reported here. A more detailed description of the site is contained in Appendix 4.

2.7.2.2 Riverside Woodlands. - A significant proportion of the county's ancient woodland exists within the study area on the steep river valley sides and bluffs (Durham County Council, 1995).

The Nature Conservancy Council (1987) describe Ancient Woodland as that which has had:

"continuous woodland cover since at least 1600AD to the present day and has only been cleared for underwood or timber production."

Where the present woodland does not obviously originate from planting it is classified as Ancient Semi-natural Woodland. Where the present wood obviously originates from planting it is classified as Ancient Replanted Woodland. An example of Ancient Replanted Woodland would be where the trees are planted so

densely that the semi-natural underwood is suppressed. Those areas of ancient woodland listed in the "Durham Inventory of Ancient Woodland " (Nature Conservancy Council, 1987) and found within the study area are shown (Fig. 2.13).

Ancient woodlands are of great conservation significance as they have a rich diversity of plant and animal species and support species that have special habitat requirements and poor powers of dispersal. The Durham Wildlife Audit (1995) describes ancient woodlands as:

"the most precious of all our woods"

now occupying only 1.3% of the county. The audit notes that most ancient woodland sites in the county are confined to the steep sided river valleys like the Wear valley immediately to the north of Durham City, i.e. the study area, with some in coastal dunes. The value of the sites within the study area becomes even more apparent when it is considered that the county as a whole has only 6% woodland cover (compared to the national average of 9%) and that only 19.5% of this woodland resource is broad-leaved semi-natural (Durham County Council, 1995). The low level of tree cover in the county compared with the national average was highlighted as a "main issue" in the Durham County Councils State of the Environment Report, (1993).

2.7.2.3 The River Wear. - According to the National Rivers Authority (1994), the Wear, in the study area, supports "a reasonably diverse lowland aquatic macroinvertebrate community." However, the report notes that the flora associated with this stretch of the river reflects the steady organic enrichment of the water as the river approaches Sunderland and that the input of sewage effluent and minewater into several water courses in the area, including Lumley Park Burn, has resulted in them having "extremely poor" faunas dominated by pollution tolerant species. The report also notes that the non-native, invasive

species Giant Hogweed (*Heracleum mantegazzianum*), Japanese Knotweed (*Reynoutria japonica*), and Himalayan Balsam (*Impatiens glandulifera*) are beginning to dominate the bankside flora in some areas.

The River Wear supports important stocks of coarse fish, migratory and non-migratory salmonids and eels (N.R.A., 1994). The river in the study area supports good numbers of coarse fish, particularly Eels (*Anguilla anguilla*), Dace (*Leuciscus leuciscus*) and Chub (*Squalius cephalus*) with lesser numbers of Grayling (*Thymallus thymallus*) and other species. At a survey site at Harbour House Farm in the study area, Eels (*Anguilla anguilla*) were the most abundant species recorded with 54% of the sample, followed by Dace (*Leuciscus leuciscus*) at 31%, Gudgeon (*Gobio gobio*), 6%, Brown /Sea Trout (*Salar trutta*), 5%, and Chub (*Squalius cephalus*), 3%. Brown trout (*Salar trutta*) is noted to be widely distributed with the natural population being supplemented by stocking from angling clubs. After restocking in the early 1990's, populations of Salmon (*Salar salar*) and Sea Trout (*Salar trutta*) are considered to be sufficiently recovered that further restocking will only be undertaken to restore current levels if ongoing monitoring highlights a population decline (NRA, 1994).

2.7.2.4 *Designated Wildlife Sites.* - As well as the S.S.S.I. at Brasside Ponds, the study area also contains two Local Nature Reserves (LNR) at Newton Hall Junction, comprising marsh, scrub, and acid and neutral grassland, and Moorhouse Wood, an Ancient Semi-natural Oak-Ash woodland site (Durham Wildlife Trust, 1997). Elsewhere the ecological importance of the following sites has been recognised by designating them as County Wildlife Sites (Durham County Council, 1997):

- Frankland Pond - A flooded brick works pond with a varied flora and invertebrate fauna.
- Hopper's Wood - Mature woodland on an ancient woodland site.

- The Scroggs - Mature Sessile Oak (*Quercus petraea*) woodland on an ancient woodland site with a well developed understorey.
- Frankland and Kepier Woods - Semi natural, Sessile Oak (*Quercus petraea*) dominated woodland.
- Moorhouse Wood - Oak-Ash woodland.
- North Brasside Claypit - Two ponds.
- Rainton Park Wood - Mature Sessile Oak (*Quercus petraea*) dominated woodland with Small-leaved Lime (*Tilia cordata*) present.
- Redhouse Wood and former munitions store - Deciduous woodland and rough grassland with very high ornithological interest.
- Finchale Priory Woods - Mixed deciduous woodland with varied ground flora.
- Chester Dene - Broadleaved woodland on an ancient woodland site
- Brough's Gill Wood - Broadleaved woodland on an ancient woodland site.

Again the location of these sites is shown (Fig. 2.13) and fuller descriptions of each, from the Register of County Wildlife Site (Durham County Council, 1997) reproduced in Appendix 4.

Rainton Park Wood is a National Trust property and a more detailed biological survey of it, along with the adjoining Mally Gill Wood and the adjacent Moor House Wood reserve managed by Durham Wildlife Trust, was carried out by the National Trust in 1986/7. Of particular note in this survey are the presence of coppiced stools of Beech (*Fagus sylvatica*) and Hornbeam (*Carpinus betulus*) reported to be over 300 years old. This would suggest that they are native to the area despite the generally accepted northern limit of their native range being far to the south. Elsewhere, coppiced stools of Small-leaved Lime (*Tilia cordata*) of similar, or greater age, are found making this one of very few sites in the north east where this tree is thought to be native (National Trust, 1987). Field Rose

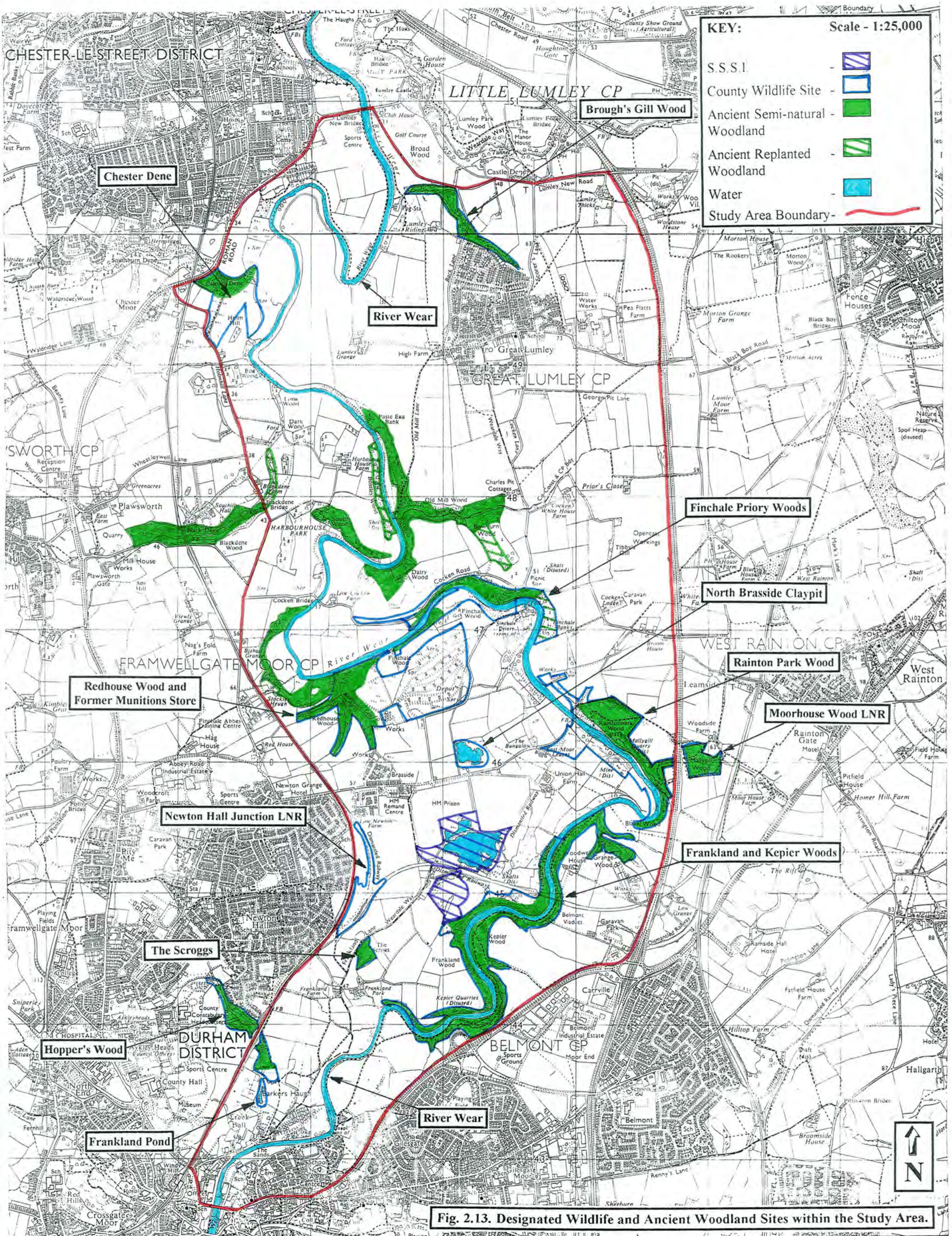


Fig. 2.13. Designated Wildlife and Ancient Woodland Sites within the Study Area.

(Rosa arvensis) is reported in the woods at one of its most northerly locations in Britain.

The biological importance of these woods is confirmed by its recognition by the National Trust in their survey report (1987) which noted that the Nature Conservancy Council:

"... consider Moor House Woods to be an important site, but not quite up to SSSI status. However, it is the opinion of the Estates Advisory Office" (of the National Trust) "in Cirencester that the woods are well worth SSSI status."

2.8 Climate.

Lawson (1997) notes that the Tyne and Wear Lowlands lie in the rain shadow of the Pennine Uplands to the west. Annual rainfall averages less than 700mm with the highest precipitation in the winter months. Mean annual temperatures are around 8°C. Maximum temperatures usually occur in July but can be in any month from May to September. Average temperatures of around 15°C occur in July and August (2°C below UK average) and between 3°C and 4°C in January and February (UK average). Air frosts can occur from October to mid-May with ground frosts in any month except July. Snowfall can be above the national average due to the influence of easterly and north easterly winds. Prevailing winds are from the south west though local direction can be heavily influenced by the valley topography.

More detailed recording of climatic conditions is undertaken at Durham University Observatory (DUO) (Goldie, 1997) which lies 1.2km to the southwest of the southern limit of the study area. Figures from there confirm that the months of May to October are the warmest with mean daily maximum temperatures in 1997 consistently above 13°C (Fig. 2.14).

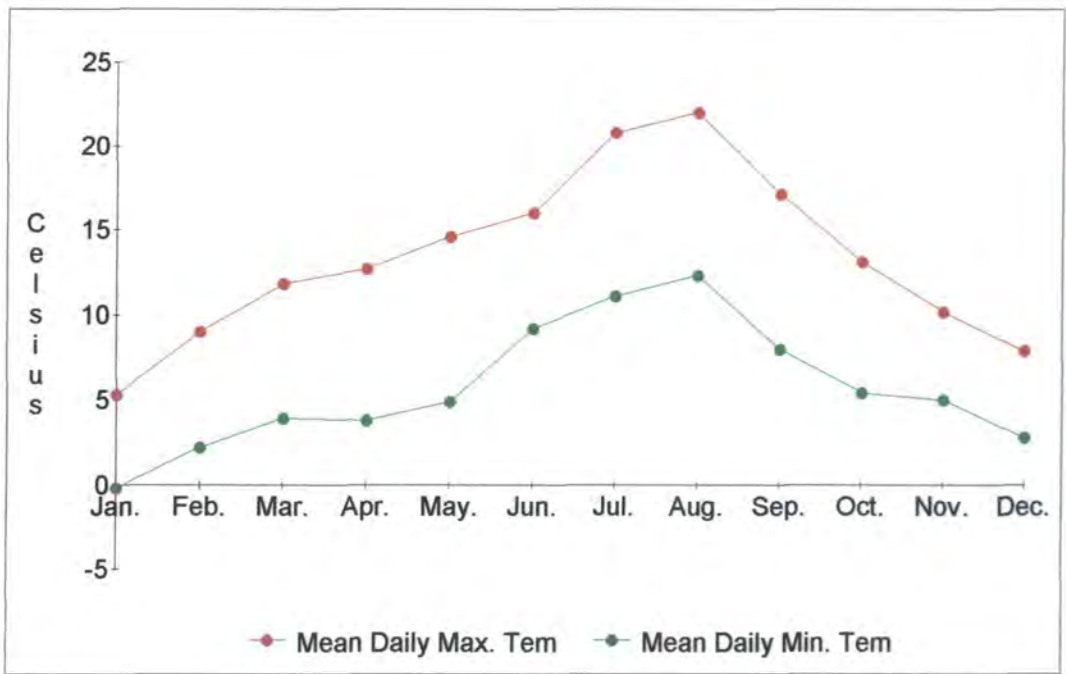


Fig. 2.14 Mean Daily Temperatures, 1997 (DUO)

Rainfall averages for the period 1961 - 1990 are consistently in the region of 50mm per month (Fig. 2.15) throughout the year though there can be significant variation year on year. June 1997 rainfall was well above the 1961 - 1990 average.

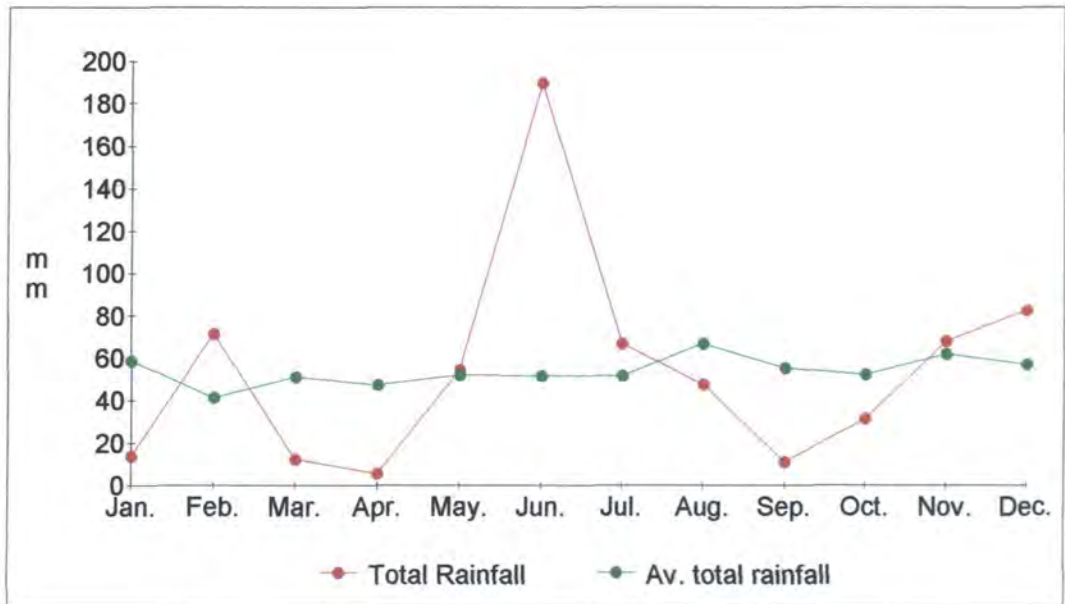


Fig. 2.15 Monthly Rainfall Totals for 1997 and Averages for 1961 - 1990. (DUO).

Records for total hours of sunshine (Fig. 2.16) averaged over 1961 - 90 confirm April to September as the months with most sunshine hours and also with the least days with no sunshine at all (Fig. 2.17). The below average figure for sunshine hours in June 1997 (Fig. 2.16) correlates with the above average rainfall for that month (Fig. 2.15) and the high number of days on which rain occurred (Fig. 2.17).

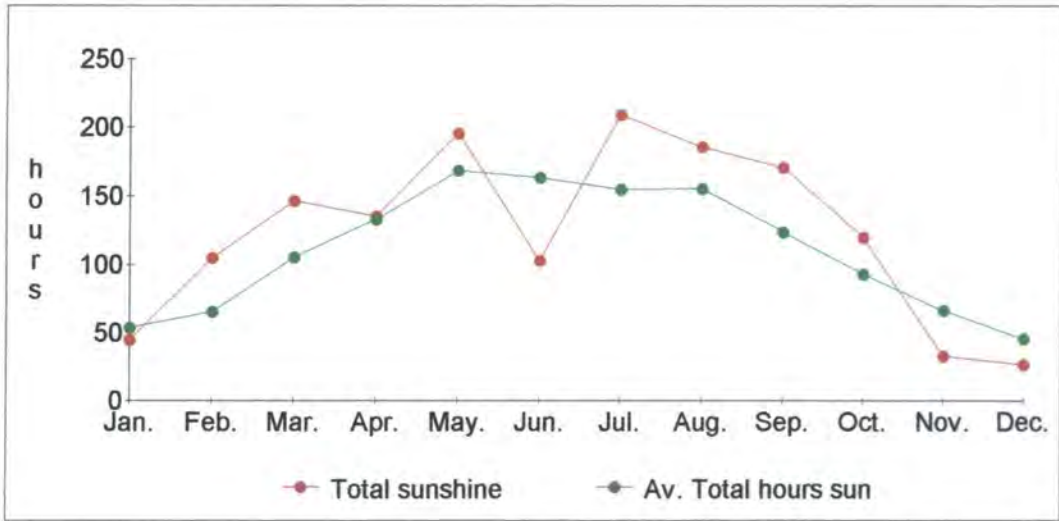


Fig. 2.16 Monthly Sunshine Totals for 1997 and Averages for 1961 - 1990. (DUO).

Records from 1997 confirm the possibility of ground frosts as late in the year as May (Fig. 2.17).

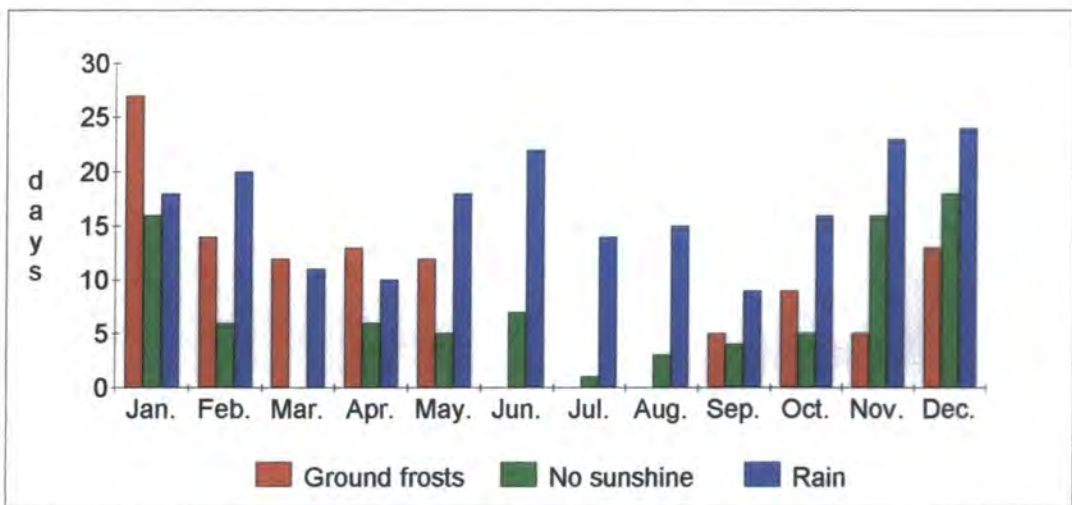


Fig. 2.17 Number of days in 1997 when Ground Frost, Rain or No Sunshine was recorded. (DUO).

Such a climate is conducive to outdoor recreational activity, especially during the months of May to September but the potential for above average snowfall and late ground frosts may affect the potential of some outdoor leisure activities.

2.9 Air Quality.

The major contributors to a reduction in air quality are the presence of ozone (at ground level), nitrogen dioxide and nitrogen oxide, volatile organic compounds, lead, and sulphur dioxide (Durham County Council, 1993). Air quality is not monitored systematically at a county level in County Durham although it is covered by the UK National Monitoring Programme. The most recent figures available from Durham County Council are those contained in the State of the Environment Report (1993). Current levels of Sulphur dioxide are monitored by the Department of Geography, University of Durham at the Durham University Observatory (Goldie, 1997).

2.9.1 Ozone.

Ozone, when found at ground level, is a poisonous gas and a photochemical pollutant detrimental to the health of humans and damaging to plants. As the commonest photochemical oxidant is taken as a good indicator of photochemical pollution in general.

World Health Organisation (WHO) air quality guide-lines recommend that hourly concentrations should not exceed 76 parts per billion (ppb) and that 8 hourly concentrations should be below 50ppb. Guide-lines to protect crops should not exceed 100 ppb for hourly concentrations, 33 ppb for daily averages and 30 ppb for annual averages. (Durham County Council, 1993)

The nearest sites to the study area which monitor ground level ozone are on high ground at Great Dun Fell and Wharley Croft in the North Pennines to the west and at High Muffles in North Yorkshire to the south. Between 1987 and 1989 summer levels were consistently above WHO guide-lines with the number of

times the guide-lines were breached increasing year on year. Though none of these sites is within the county it is believed that the ozone levels recorded at them give an accurate indication of ozone levels in the rural areas of the county. (Durham County Council, 1993)

2.9.2 Nitrogen Dioxide (NO₂) and Nitrogen Oxides (NO_x).

Oxides of nitrogen (NO_x) are formed during combustion and are found in emissions from vehicle and industrial processes. The presence of sunlight can result in conversion to the more toxic NO₂ and a photochemical smog may result. The gas is an irritant and oxides of nitrogen can affect plant growth, exacerbate low level ozone levels, and contribute to acid rain.

The nearest site to the study area where Nitrogen dioxide levels are monitored is at Billingham in Cleveland. Annual mean levels recorded at Billingham in 1987 to 1989 were consistently below the EC guide, and though this guide was exceeded in 1990 the recommended 1 hour level of 100 ppb was only exceeded for 15 hours; less than 1% of all the hours measured in 1990. The Billingham site is not felt to be representative of rural areas of County Durham, such as the majority of the study area, where levels will be much lower (Durham County Council, 1993). In general the North east has low levels of nitrogen dioxide compared to other areas of the country (Durham County Council, 1993) and this, coupled with the rural character of the study area and the fact that the most significant potential source, the A1(M), lies down-wind of the prevailing wind direction, mean that it is not likely that levels within the study area are problematical despite there having been no monitoring carried out there.

2.9.3 Volatile Organic Compounds (VOC)

These gases, which include hydrocarbons, halogenated organics and benzene, come from oil, petrol, solvents, and some industrial processes. The gases form low level ozone and photochemical smogs in the presence of sunlight and can

cause eye, throat and chest irritations and some are carcinogenic. There is no monitoring of VOCs in County Durham but Durham County Council believe that the UK trend of a slow rise in emissions with an increasing proportion coming from vehicle emissions, is applicable to the county (Durham County Council, 1993).

2.9.4 Lead.

Lead has major health effects, especially on children. The main sources of lead in the atmosphere are petrol combustion, coal combustion and metal work. There are no survey sites within the study area but yearly surveys in Durham City to the south showed levels to be well within EC guide-line levels between 1985 and 1990 (Durham County Council, 1993). Increasing use of unleaded petrol and the lower traffic levels observed on appraisal site visits within the largely rural study area make it unlikely that lead levels within the study area will be greater than those within the city.

2.9.5 Sulphur Dioxide.

Sulphur dioxide is acidic and an irritant to eyes and throat. The gas also reacts with atmospheric water to form Sulphuric acid - acid rain, which along with dry particle deposition of sulphur dioxide causes damage to plants and buildings.

Sulphur dioxide levels measured at the Durham University Observatory (Goldie, 1996 and 1997), south of the study area show that mean daily concentrations are consistently below the EC guide-line level (Fig. 2.18). Measurements taken at another monitoring site in Chester-le-Street show the average mean of daily values for the years 1985 to 1990 to also be consistently below the EC guide-line (Durham County Council, 1993).

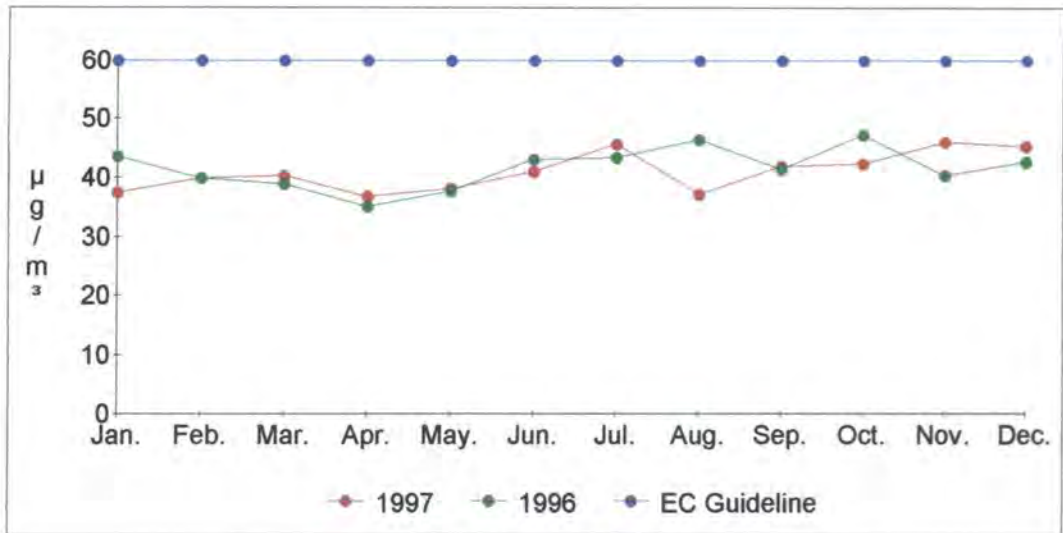


Fig. 2.18 Mean daily concentrations of Sulphur Dioxide

2.9.6 Air Quality Effects.

From the available data there is no evidence that present air quality within the study area would be a restricting factor on increasing visitor use. However, the means by which that increase in use is produced should not result in an increase in levels of air pollutants to greater than the recommended guide-lines.

2.10 Water.

The water resource in the study area is considered in terms of its quality and quantity.

2.10.1 Water Quality.

The quality of the water in the River Wear catchment area was evaluated against a range of statutory and non-statutory standards (NRA, 1994).

2.10.1.1 River Ecosystems (RE) Classification and National Water

Council (NWC) Estuary Classification Systems. - Under the RE

Classification, river waters are classified into one of five bands specifically linked to the ecological "use" of freshwaters. RE class 1 being the highest quality and Re class 5 being the lowest. The water quality criteria

measured and used in the classification and their relative values are shown in Fig. 2.19.

CLASS	DISSOLVED OXYGEN (% sat.)	BIO-CHEMICAL OXYGEN DEMAND (mg/l)	TOTAL AMMONIA (mg N/l)	UN-IONISED AMMONIA (mg N/l)	pH	HARDNESS (mg/l CaCO ₃)	DISSOLVED COPPER (µg/l)	TOTAL ZINC (µg/L)
RE1	80	2.5	0.25	0.021	6 - 9	<10 >10and<50 >50and<100 >100	5 22 40 112	30 200 300 500
RE2	70	4	0.6	0.021	6 - 9	<10 >10and<50 >50and<100 >100	5 22 40 112	30 200 300 500
RE3	60	6	1.3	0.021	6 - 9	<10 >10and<50 >50and<100 >100	5 22 40 112	30 200 300 500
RE4	50	8	2.5	-	6 - 9	<10 >10and<50 >50and<100 >100	5 22 40 112	30 200 300 500
RE5	20	15	9	-	-	-	-	-

Fig. 2.19 River Ecosystems Classification : Water Quality Criteria.
(After NRA, 1994)

Target RE classes were set for all water courses in the Wear catchment area. (Fig. 2.20).

Within the study area:

- Cong Burn failed to meet its RE target due to discharge from sewage treatment works.
- South Burn failed to meet its RE target due to discharge from sewage treatment works and pumped mine water at South Moor.
- Lumley Park Burn failed to meet its RE target due to discharge from sewage treatment works and discharge of metals from the former Lambton Cokeworks site.

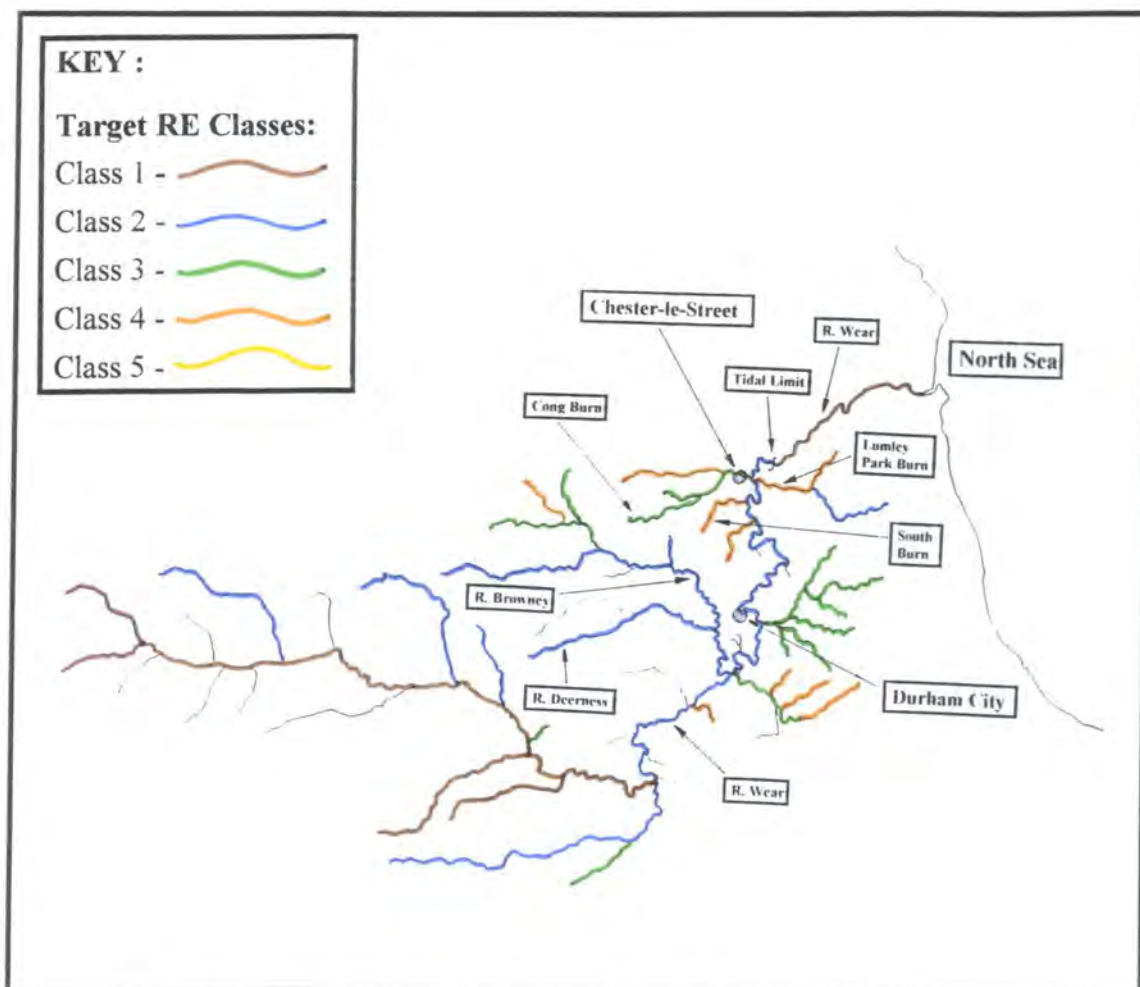


Fig. 2.20 Target RE classes for the Wear Catchment. (After NRA, 1994).

In addition, the NRA noted that any reduction in minewater pumping resulting from coal-mine closures would be likely to cause pollution of the River Wear, seriously affecting amenity, ecology and abstractions including public water supply abstraction at Lumley. To date there has been no such reduction in pumping (Pers. comm. Roger Inveraraty). Elevated levels of lead are also occasionally recorded in the Wear and are attributed to historic lead and zinc mining in the upper catchment area.

While the tidal limit of the River Wear falls outside of the study area boundary, estuarine water quality will have a direct effect on migratory salmonid fish within the study area. The Wear estuary was classified as Class A, Good Quality, the highest class, under the NWC Estuary Classification Systems. (NRA, 1994)

2.10.1.2 *EC Directives* - Failures to comply with EC Directives listed in the catchment management plan (NRA, 1994) which are currently pertinent to the study area (Pers. comm. Roger Inveraraty) are as follows:

"The lower Estuary fails to achieve the Environmental Quality Standard (EQS) for the EC Dangerous Substances Directive due to elevated concentrations of tributyl tin (TBT)."

"The River Wear and some tributaries require assessment as 'potentially sensitive waters' under the EC Urban Waste Water Treatment Directive"

2.10.1.3 *Biological Quality of River and Estuary Water* - This is assessed by sampling the invertebrate fauna that lives amongst the sediments on the river bed three times a year and comparing the results to the fauna that would be expected to be present in the absence of pollution using the Yorkshire Interpretative Index (Fig. 2.21). The degree of effect on the invertebrate fauna as a result of the pollution present is described by five categories.

CLASS	EFFECT FROM POLLUTION	BIOLOGICAL WATER QUALITY
B1A	no effect	Very Good
B1B	slight effect	Good
B2	mild effect	Fair
B3	moderate effect	Poor
B4	gross effect	Bad

Fig. 2.21 Yorkshire Interpretative Index.

The River Wear itself was classed as only "Fair" (Fig. 2.22) while the tributaries monitored that enter the Wear within the study area were classed as "Poor" or

"Bad". Particular areas of concern pertinent to the study area were listed in the catchment management plan (NRA, 1994) as follows:

" Many tributaries of the lower Wear suffer from organic and other types of pollution that have gross effects on the biota."

"Reduction in minewater pumping resulting from coal-mine closures is likely to have serious effects on the water quality of the River Wear, affecting river ecology."

"There are many abandoned minewater discharges entering water courses within the Wear catchment. The impact of all these discharges has not been fully assessed."

There has been no reduction in minewater pumping to date (Pers. comm. Roger Inverarity).

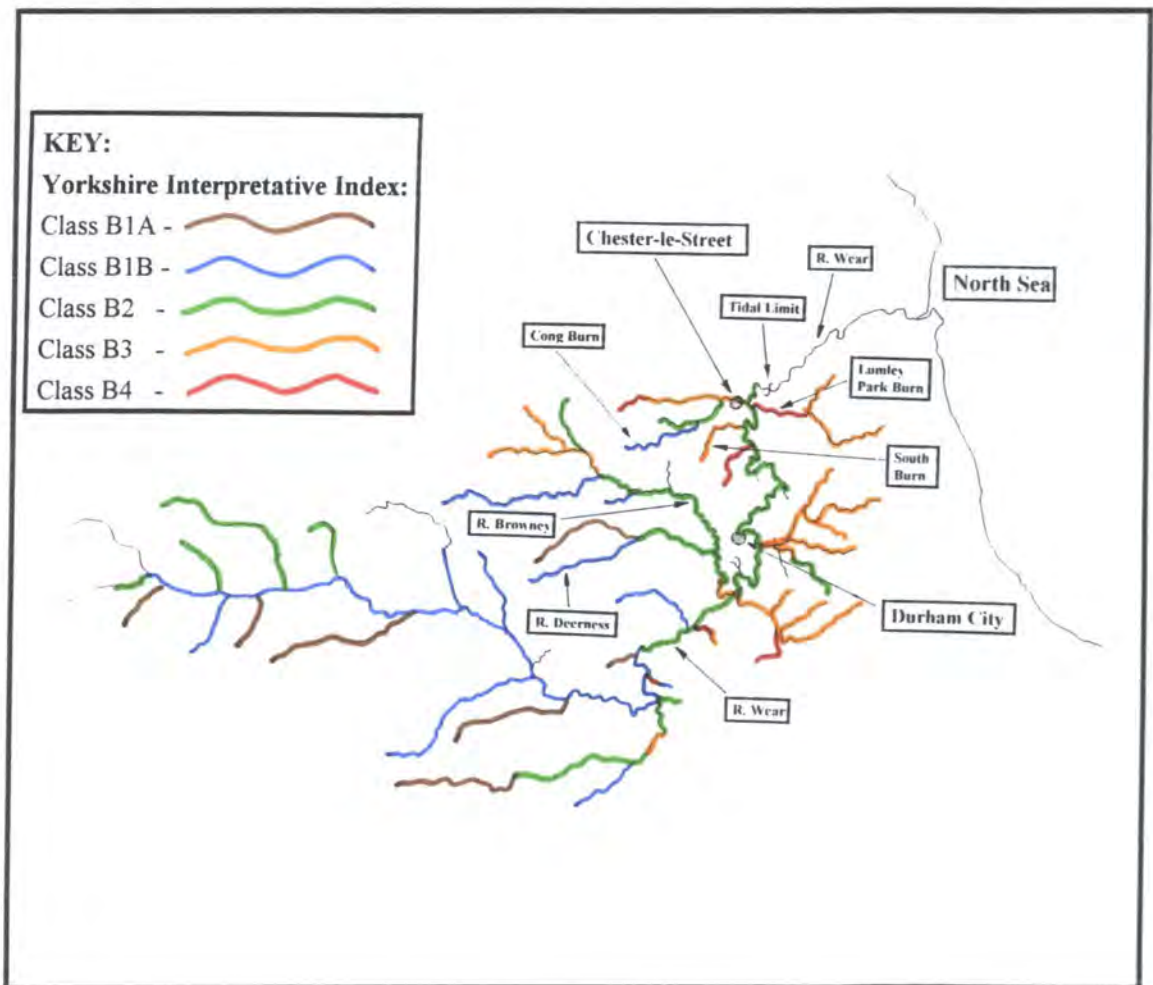


Fig. 2.22 Biological Water Quality in the River Wear. (After NRA, 1994)

2.10.2 Water Quantity.

The Environment Agency has a duty to manage the water resources of the River Wear to:

"meet the demands of abstracters as well as ensuring that the quantity of water in rivers, streams and associated wetlands is sufficient to sustain the diversity of these habitats and their associated flora and fauna."

(NRA, 1994)

No difficulty in fulfilling these duties was anticipated (Pers comm., Roger Inveraraty). Though the Wear is not regulated by a catchment reservoir, river levels can be supported if necessary by transfer of water from the river Tyne via the Kielder reservoir, discharging into the River Wear at Frosterley, upstream of the study area. However, it is noted that such Kielder Scheme transfers have the potential to affect the water quality of the Wear and have unknown effects on the local river ecology.

The River Wear has also traditionally been subject to a strong, daily cyclic pattern of river flow as a result of the discharge into it of pumped mine water, predominantly at night and weekends, as a result of measures to artificially lower the water table in the surrounding coal field. The end of the local coal industry raises the possibility of minewater pumps eventually being switched off eliminating this cyclical variation in flow. Though the surrounding water table would ultimately rise to allow ground water to discharge into the River Wear, the quality of this groundwater is likely to be poor and in the interim, to maintain flow rates, more frequent transfers from the Tyne via the Kielder Scheme would be necessary with their attendant potential ecological problems. However, at present, the pattern and volume of discharge of mine water into the Wear is the same as when the coal industry was active and there are no plans to significantly alter the pumping regime in the near future (Pers. comm., Roger Inveraraty).

2.11 Noise

There appears to be little systematic monitoring and evaluation of noise within the County of Durham. The only indicator used for assessing noise available from Durham County Council was the annual number of complaints received by district council Environmental Health Officers and recorded in State of the Environment Report (Durham County Council, 1993).

In Durham City District less than one hundred complaints were received in 1991-2 (Durham County Council, 1993) and these were classified only very broadly into the following categories:

- Domestic 74%
- Industrial/Commercial 19%
- Traffic 4%
- Construction 3%

In Chester-le-Street district, the other administrative district covering the study area, again, less than one hundred complaints were received but no breakdown of these complaints was made available (Durham County Council, 1993).

These sketchy district figures cannot provide a reliable indication of noise levels in the study area. Only a small part of each district falls within the study area and the nature of the monitoring is not a suitable method for assessing noise levels within a predominantly rural area. Casual visitors to the countryside are unlikely to complain about excessive noise but simply visit elsewhere resulting in a noise pollution problem going unrecorded. Conversely, residents in a rural area, used to tranquillity, may be more likely to complain repeatedly thus skewing results in the other direction.

In a broader assessment of the whole of the North East region, the Countryside Commission has classified the study area as part of a "Semi-tranquil Area" (Countryside Commission, 1995) using the following definitions and criteria:

"Tranquil areas are places which are sufficiently far away from the visual or noise intrusion of development or traffic to be considered unspoilt by urban influences"

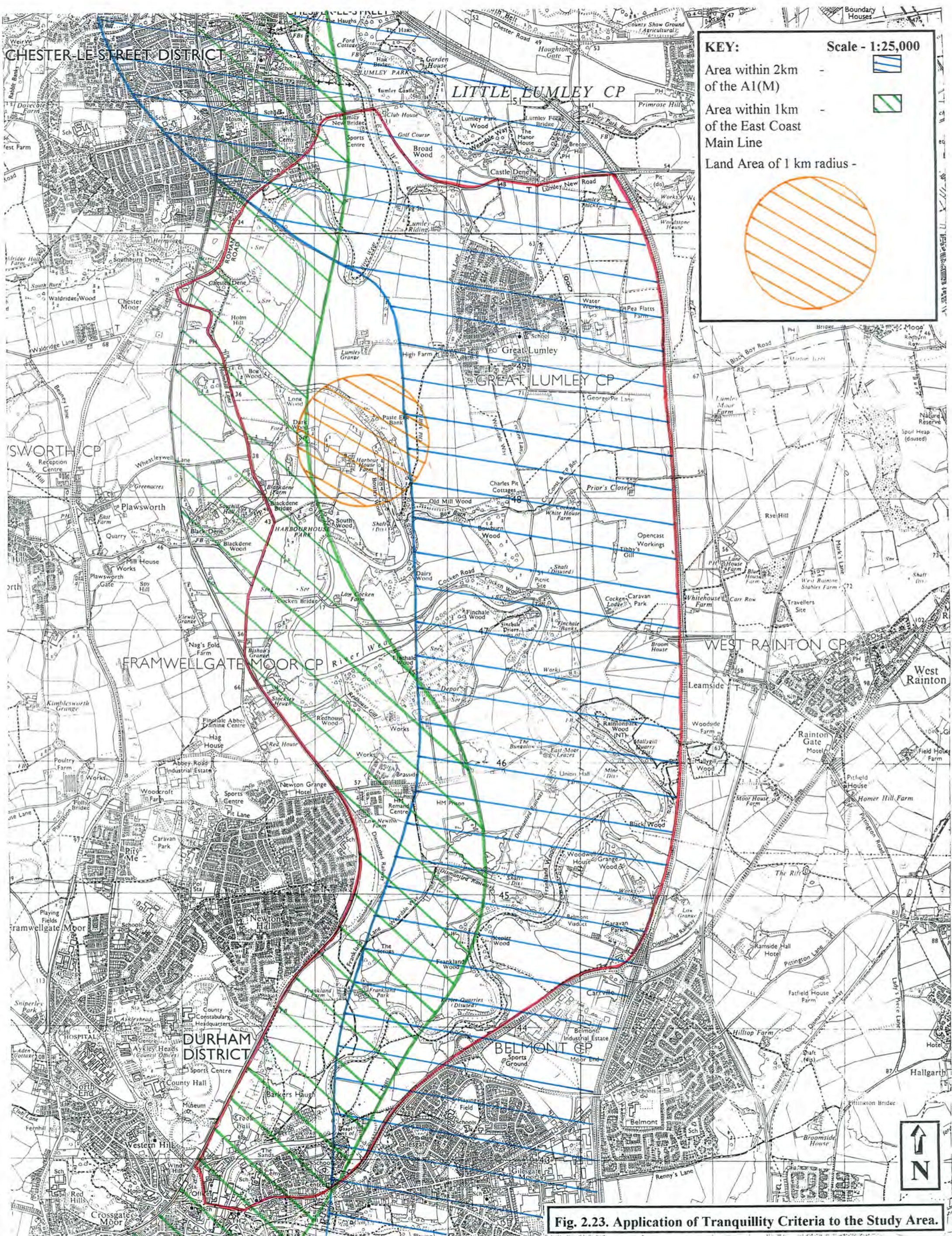
"Within Tranquil areas, lower level Semi-tranquil areas exist."

A Tranquil area is defined (Countryside Commission, 1995) as one which lies:

- 4 km from the largest power stations
- 3 km from the most trafficked roads such as the M1/M6; from large towns (e.g. towns the size of Leicester and larger; and from major industrial areas
- 2 km from most other motorways and major trunk roads such as the M4 and A1 and the edge of smaller towns.
- 1 km from medium disturbance roads i.e. roads which are difficult to cross in peak hours (taken to be roughly equivalent to greater than 10,000 vehicles per day) and some main line railways.
- A Tranquil Area also lies beyond military and civil airfield/airport noise lozenges as defined by published noise data (where available) and beyond very extensive opencast mining.

Tranquil Areas are drawn with a minimum radius of 1 km to eliminate local effects.

Application of the tranquillity criteria above to the study area (Fig. 2.23) confirms that most areas fail to meet at least one of the criteria and no area with a minimum radius of 1 km satisfies them all.



KEY: Scale - 1:25,000

- Area within 2km of the A1(M)
- Area within 1km of the East Coast Main Line
- Land Area of 1 km radius -

Fig. 2.23. Application of Tranquillity Criteria to the Study Area.

2.12 Population

2.12.1 Local Residents.

The study area itself is sparsely populated being largely rural. The area of greatest population density within it is the village of Great Lumley though large urban residential areas of the north and east of Durham City and south and east Chester-le-Street lie hard against the boundary. The town of Chester-le-Street and City of Durham are the largest population centres in their respective districts.

Accurate population statistics are, by definition, hard to come by for such ill-defined areas as "the north and east of Durham City" and for individual villages within districts. Population figures from the 1991 census and population projections (Durham County Council, 1995) are, however, available for the county as a whole, for administrative districts within it, and for nearby population centres (Fig. 2.24). These are discussed in greater detail elsewhere.

GEOGRAPHICAL AREA	1991 POPULATION	AS A %AGE OF THE COUNTY DURHAM POPULATION	2006 POPULATION (PROJECTED)	AS A %AGE OF THE COUNTY DURHAM POPULATION
COUNTY DURHAM	593,400	-	597,700	-
CHESTER-LE-STREET DISTRICT	52,600	8.90	57,000	9.6
CITY OF DURHAM DISTRICT	80,700	13.60	80,200	13.4
SUNDERLAND	284,274	N/A	N/A	N/A
NEWCASTLE/ GATESHEAD CONURBATION	448,463	N/A	N/A	N/A
NORTH AND SOUTH TYNESIDE	340,891	N/A	N/A	N/A

Fig. 2.24 Resident Population of the Geographical Area Containing and Surrounding the Study Area.

2.12.2 Tourists

The numbers of tourists visiting specific areas of the county are discussed in more detail elsewhere but Northumbria Tourist Board (1997) estimates that approximately 800,000 trips were made to County Durham in 1996.

2.12.3 Student Residents.

Details of the numbers of students registered at the University of Durham in 1997 are shown in Fig. 2.25.

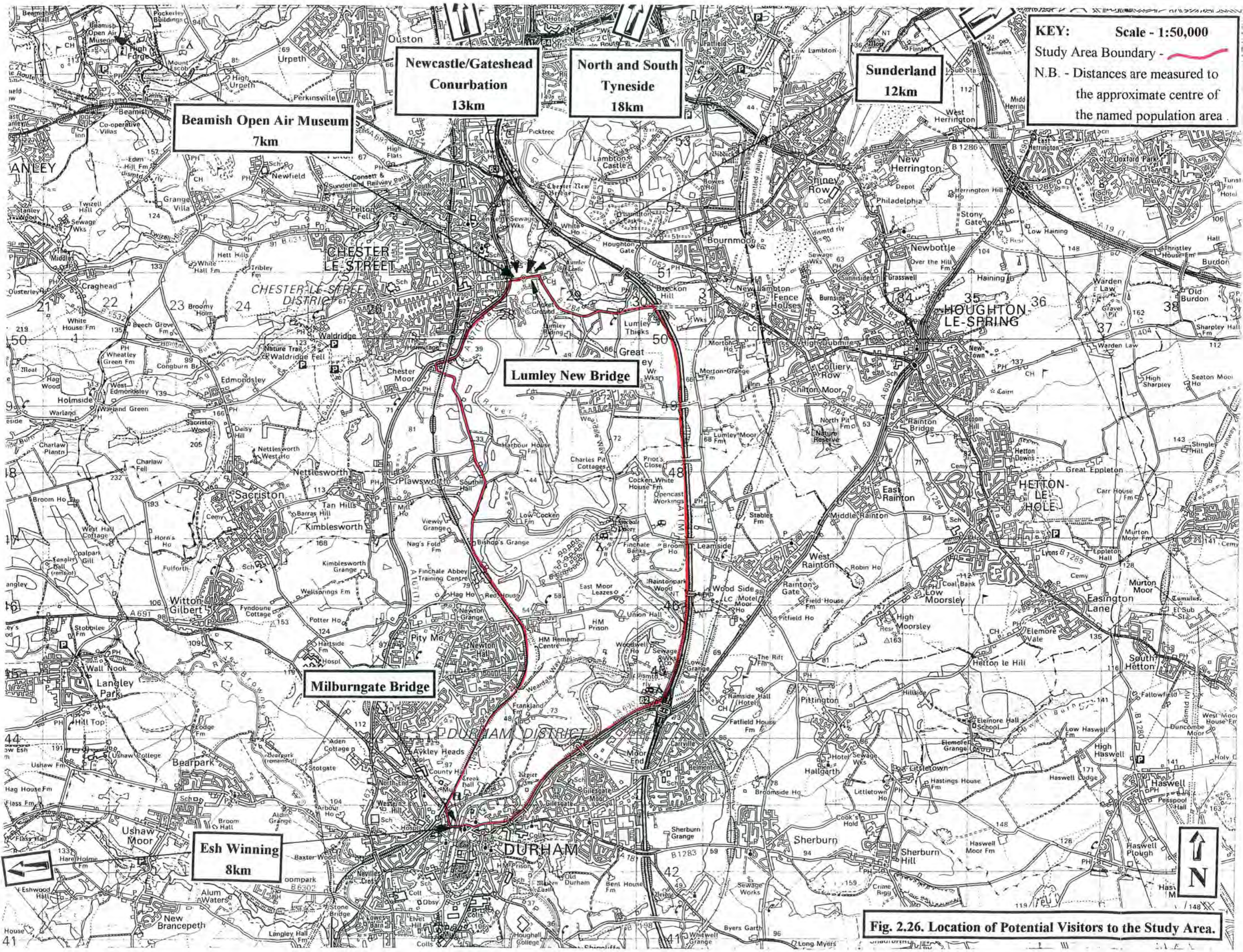
FULL TIME UNDERGRADUATES	7329
PART TIME UNDERGRADUATES	419
FULL TIME RESEARCH STUDENTS	505
FULL TIME, TAUGHT POSTGRADUATE STUDENTS	745
PART TIME, RESEARCH POSTGRADUATE STUDENTS	389

Fig. 2.25 Students Registered at the University of Durham in 1997

2.12.4 Potential Visitors.

In considering the potential for an increase in visitor numbers to the study area it is important to know that sufficient potential visitors exist before considering how or whether to attract them.

The point furthest from the study area but still within Chester-le-Street district is the sparsely populated area around the Beamish Open Air Museum, 7 km. from Lumley New Bridge (Fig. 2.26). The furthest point from the study area but still within City of Durham district with a significant population is Esh Winning 8km. to the west of Milburngate Bridge in Durham City. It is therefore reasonable to



KEY: Scale - 1:50,000
 Study Area Boundary -
 N.B. - Distances are measured to the approximate centre of the named population area.

**Newcastle/Gateshead
 Conurbation
 13km**

**North and South
 Tyneside
 18km**

**Sunderland
 12km**

**Beamish Open Air Museum
 7km**

Lumley New Bridge

Milburngate Bridge

**Esh Winning
 8km**

Fig. 2.26. Location of Potential Visitors to the Study Area.

say that, discounting any individual travel and access restrictions, the study area is within the reach of the total resident population of both districts as a day excursion destination.

The appeal of the study area as a destination for the population of the rest of the county and the nearby conurbations of Newcastle/Gateshead, North and South Tyneside and Sunderland (Fig. 2.26) is at this point still to be determined.

However, residents in these areas who are all *potential* visitors to the study area, both now and in the future.

Therefore, the following conclusions can be drawn:

- The study area is a potential recreational destination for a substantial population.
- 133,300 people (1991 figures) in the districts of Chester-le-Street and Durham City would not have to travel more than 8 km. to visit.
- A visit by the population of 1,533,728 (1991 figures) that exists in the rest of County Durham and the nearby conurbations of Newcastle/Gateshead, Sunderland, and North and South Tyneside would require the majority to travel a greater, though still acceptable, distance.
- 800,000 tourists (1996 figures) already visit the county and could potentially be encouraged to visit the area, as could 9,387 students (1997 figures) registered at the University of Durham.

It should be noted that there is potential for a degree of overlap in all the above figures. A proportion of the student population may have been registered on the 1991 census, or may already visit the area. A proportion of the 800,000 tourists may be visiting from Newcastle, Gateshead, Sunderland, and North and South Tyneside and thus being effectively counted twice. However, even allowing for such overlaps it is still reasonable to say that; in excess of 2,000,000 people are potential visitors to the area as a "local" attraction. This is an adequate potential

catchment population from which to draw visitors to the study area. Should the study area become a "national attraction", i.e. one that visitors will specifically travel long distances to see, the potential catchment population will increase further.

2.13 Communications

Lying in the lowlands between the Magnesian Limestone Plateau to the east and the Pennines to the west, the study area has historically contained major north-south communication routes (Lawson, 1997) as well as more local routes.

2.13.1 Rail.

The East Coast Main Line, which skirts the western boundary of the study area (Fig. 2.27), is a nationally important north-south link with stations in Chester-le-Street and Durham City.

2.13.2 Road.

The A1(M) lies at the eastern edge of the study area (Fig. 2.27). Again this is an important north-south link, both for traffic within the North East of England and as a connecting route to the rest of England and Scotland, carrying an average of 51,700 vehicles per day (Durham County Council, 1997). Other major roads in the area are the A690 connecting Durham City to the A1(M) at Carrville and continuing north-east to the A19 (another major north-south link) and the city of Sunderland. In the west the A167(T) links Chester-le-Street and the west of Durham City to the south of the county, carrying an average of 27,500 vehicles per day (Durham County Council, 1997). Major roads connecting to the west of the county, and the west of England, access the immediate surroundings of the study area at its northern and southern extremes: the A693 at Chester-le-Street and the A691 at Sniperley roundabout to the west of Durham City respectively (Fig. 2.27).

There are various other minor roads in the study area (Fig.2.27). Annual Average Daily Traffic Flows (AADT's) for these minor roads are shown (Fig. 2.27) where they are known (Durham County Council, 1997).

On familiarisation visits it was noted as significant that there is only one other river crossing suitable for motorised vehicles (Cocken Bridge) between Milburngate Bridge in Durham City at the south of the study area and Lumley New Bridge (later replaced by a new road crossing in the same location and re-named Lumley Bridge) at the north of the study area. It was also noted that vehicular access into the river valley immediately to the north of Durham City is only possible from the centre of the city and only for a short distance: as far as Frankland farm on the west bank and the remains of Kepier hospital on the east (Fig. 2.27). As a result these roads appear to be used only by farm traffic and for access by residents and to the river by anglers.

2.13.3 Cycleways.

There are numerous official cycleways in and around the study area (Fig. 2.27). The most significant of these is the C2C long distance cycle route which passes near to the northern end of the study area. This route starts on the west coast of England in Whitehaven/Workington and finishes on the east coast at Sunderland/Tynemouth. This is a well used and popular long distance cycle route forming part of the National Cycle Network. It is the Sunderland leg of the C2C route which passes to the north of the study area via the Consett to Sunderland Railway Path.

In the south of the study area there are also significant local recreational cycle routes on disused railway lines along the River Browney in the Lanchester valley and along the Deerness river valley (Fig. 2.27). Research is currently being carried out by Durham County Council into the possibility of linking Durham City to the C2C route at Stanley via the Lanchester Valley Railway path and into

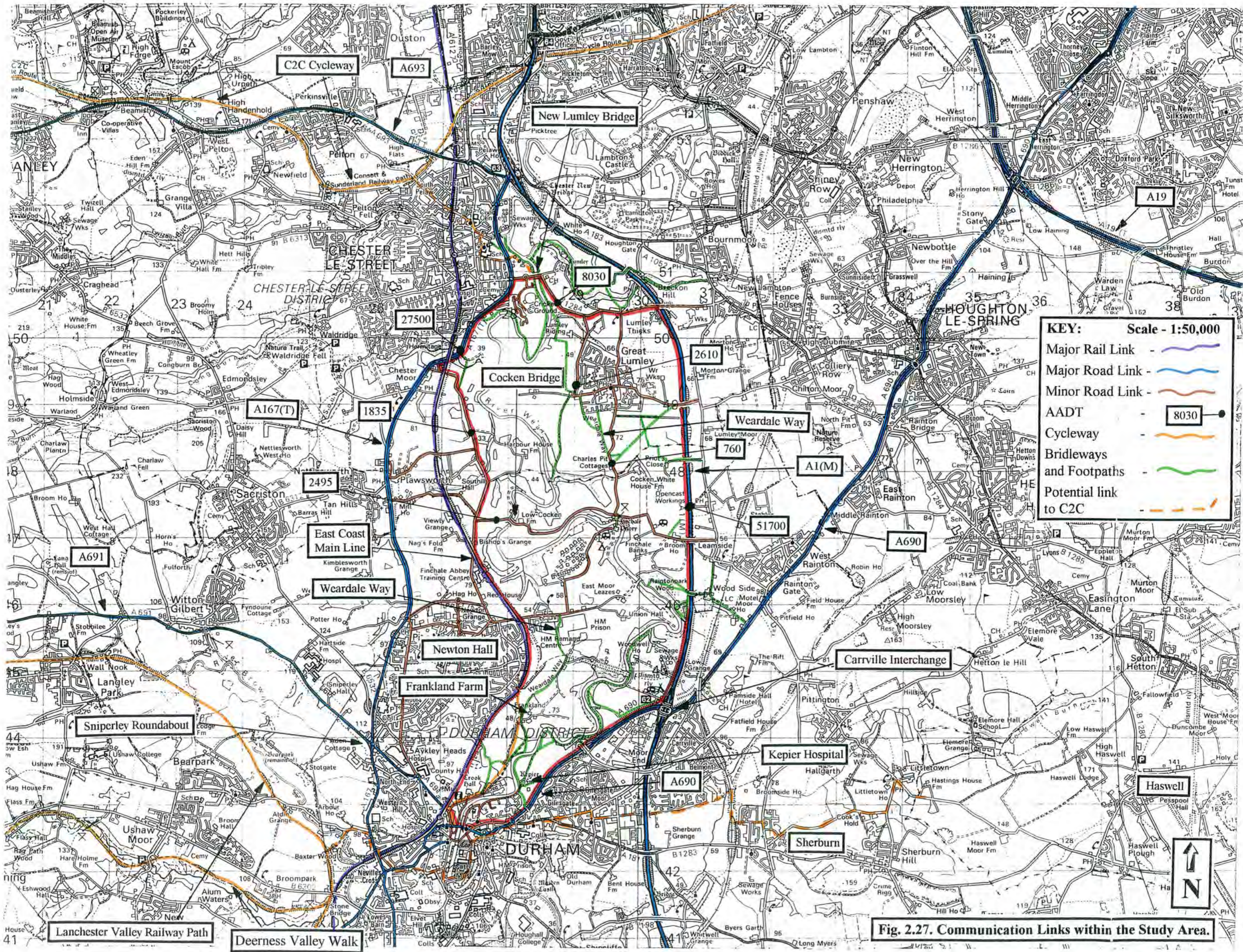
the creation of a route out of Durham City to the east towards Sherburn, Haswell, and ultimately Seaham on the coast (Pers. comm., Julian Ashworth). One possible route is shown (Fig. 2.27).

Similarly Chester-le-Street District Council is looking at the feasibility of developing a link between the C2C route and Chester-le-Street town centre and ultimately the riverside park (Pers. comm., Katherine Stross). One possible route under consideration is shown (Fig.2.27). The link has proved feasible and though the project is still "live", it is linked to other re-development work and no time scale for implementation can be given (Pers. comm., Neil Cole). The council would ultimately like to develop a pedestrian/cycle route from Chester-le-Street riverside, along the banks of the river to Durham City but it is thought that negotiation and construction of this riverside route is likely to be so problematical as to make its completion highly unlikely (Pers. comm., Katherine Stross). In the interim, kerbs have been lowered along the A167(T) between Chester-le-Street and Durham to allow the path to be used as a cycle route.

There is also a commuter cycle route in the southern part of the study area from Newton Hall into the city (Fig. 2.27) and it was observed during familiarisation visits that many public footpaths are used unofficially by cycle traffic.

2.13.4 Footpaths and Bridleways

The area is well served with public footpaths and bridleways (Fig. 2.27). A major footpath, the Weardale Way, passes through the area but observations during familiarisation visits indicate that it is not well used by long distance walkers though short sections were well used by local walkers. The fact that the official guide to this path (Piggin, 1984) is out of print supports these field observations



KEY: Scale - 1:50,000

- Major Rail Link -
- Major Road Link -
- Minor Road Link -
- AAADT - 8030
- Cycleway -
- Bridleways and Footpaths -
- Potential link to C2C -

Fig. 2.27. Communication Links within the Study Area.

2.14 Current Visitor Use.

The nature of the data available make it convenient and logical to consider tourism in the region and county in general before focussing on local recreational use specific to the study area.

2.14.1 Tourism in the Area.

Northumbria Tourist Board publishes details of tourism in the Northumbria region, which for their purposes, includes Cleveland, Durham, Northumberland, and Tyne and Wear (Northumbria Tourist Board, 1997). It should be noted that a "visit" is described as "a trip of longer than one day for leisure and business purposes" in their data which is distilled from the following surveys:

- The United Kingdom Tourism Survey
- The International Passenger Survey
- The Survey of Visits to Tourist Attractions
- The English Tourist Board, English Hotel Occupancy Survey.

Data pertinent to the study regarding visitor numbers, origins, reasons for visiting, accommodation preferences, financial contribution to the local economy and seasonal variation (Northumbria Tourist Board, 1997) has been abstracted (Fig.s 2.28 to 2.32). In only some few instances was data available broken down to a County level.

In addition to these trips, 38,000,000 "day visits" were made to Northumbria; that is "trips by British residents of three hours or more, but less than a day, for leisure and business purposes" (Northumbria Tourist Board, 1997).

	TOTAL	NIGHTS SPENT IN AREA	MONEY SPENT IN AREA
VISITS TO NORTHUMBRIA BY U.K. RESIDENTS	3,300,000	10,600,000	£260,000,000
VISITS TO NORTHUMBRIA BY OVERSEAS RESIDENTS	490,000	4,400,000	£174,000,000
TOTAL VISITS TO NORTHUMBRIA	3,790,000	15,000,000	£434,000,000
VISITS TO COUNTY DURHAM BY U.K. RESIDENTS	700,000	2,300,000	£50,000,000
VISITS TO COUNTY DURHAM BY OVERSEAS RESIDENTS	100,000	800,000	£31,000,000
TOTAL VISITS TO COUNTY DURHAM	800,000	3,100,000	£81,000,000

Fig. 2.28 Visits to the Region (1996 data).

RESIDENCE OF VISITORS	U.K.	OVERSEAS
NORTH OF ENGLAND	36%	-
LONDON AND THE SOUTH EAST	18%	-
YORKSHIRE AND HUMBERSIDE	15%	-
NORTH WEST OF ENGLAND	9%	-
SCOTLAND	9%	-
OTHER U.K. REGIONS	13%	-
SCANDINAVIA	-	18%
GERMANY	-	18%
U.S.A.	-	12%
FRANCE	-	9%
NETHERLANDS	-	6%
OTHER COUNTRIES	-	32%

Fig. 2.29 Origins of Visitors to Northumbria (1996 data).

	HOLIDAY	VISIT FRIENDS OR RELATIVES	BUSINESS	OTHER
U.K. RESIDENTS	50%	33%	11%	6%
OVERSEAS RESIDENTS	37%	24%	30%	9%

Fig. 2.30 Reasons for Visiting Northumbria (1996 data).

	HOME OF FRIEND OR RELATIVE	HOTEL OR GUEST HOUSE	RENTED HOUSE/ FLAT/ CHALET	TOWED CARAVAN	CAMPING	PAYING GUEST	OTHER
UK RESIDENTS	50%	22%	5%	2%	1%	3%	22%
OVERSEAS RESIDENTS	41%	43%	1%	1%	1%	2%	14%

Fig. 2.31 Accommodation used by visitors to Northumbria (1996 data)

	JAN. - MARCH	APRIL - JUNE	JULY - SEPT.	OCT. - DEC.
VISITS BY UK RESIDENTS	19%	32%	27%	21%
VISITS BY OVERSEAS RESIDENTS	18%	28%	36%	18%

Fig. 2.32 Seasonality of Tourism in Northumbria as a Percentage of Annual Total (1996 data).

From these figures it is possible to draw a number of conclusions:

- In the county as a whole there is the potential to accommodate an increase in over-night and day visits. In 1995, UK and overseas visitors spent 3,100,000 nights in the county. Even though there is bias towards the summer months and that there is a concentration of these visitors around the City of Durham (Pers. comm., Martin Roberts), this is a figure easily accommodated within the County population of 593,400 (Pers. comm., Martin Roberts). There is less potential for the County to accommodate an increase in daily visits. Of the 38,000,000 day visits to Northumbria, assuming the same proportional distribution as seen with over-night visitors to the region, 21% or 8,000,000 could be expected to visit County Durham. Taking account of seasonal trends this equates to 26,077 visitors per day in summer, in addition to the over-night visitors. Distributed evenly throughout the County this would still be a large number to accommodate but high concentrations around the City of Durham lead to the City, and especially the peninsula already being overcrowded with day visitors (Pers. comm., Martin Roberts).
- It is generally accepted that visitors who stay over-night in an area make a greater contribution to the local economy. They will need food and accommodation. It would therefore benefit the local economy to increase the number of visitors who stay in the region over-night. There is already a large number of day visitors to the region - 38,000,000 in 1996 - who could potentially be encouraged to increase the length of their visit.
- Of the over-night visits to Northumbria in 1996, 50% were at the home of a friend or relative. Measures to promote an increase in the numbers staying in hotels, guest houses and rented accommodation would contribute further to the local economy.

2.14.2 Local Recreational Use.

Current information on levels of visitor use specific to the study area is scarce and comes from three main sites (Fig. 2.33):

- The Chester-le-Street Riverside development
- Finchale Priory
- Finchale Banks/Cocken Wood Picnic Area

Information on levels of use of the less formally managed areas, such as footpaths, is not available and will have to be assessed by field surveys.

2.14.2.1 Chester-le-Street Riverside - Chester-le-Street District Council carried out a survey of visitor use of the Riverside development in August 1996 (Chester-le-Street District Council, 1996). From this survey they estimated that :

- The number of visitors to that part of the development lying to the north of Lumley New Bridge during the six week summer holiday period was over 110,000.
- 74% of these visitors came from within seven miles of the site.
- 77% of all users came in a family group which ties in with the fact that the most popular activity at the site, being undertaken by 85% of visitors, was "children's play".
- 49% of those surveyed planned to use the Riverside walks and 50% planned to spend more than one hour at the site making it reasonable to presume that a significant proportion of these visitors could be persuaded to explore further south into the study area given the incentive to do so.

The district councils own target for visitor use of the development is 500,000 p.a. by the year 2002, with 50,000 p.a being day or overnight visitors to the area (Chester-le-Street District Council, 1996).

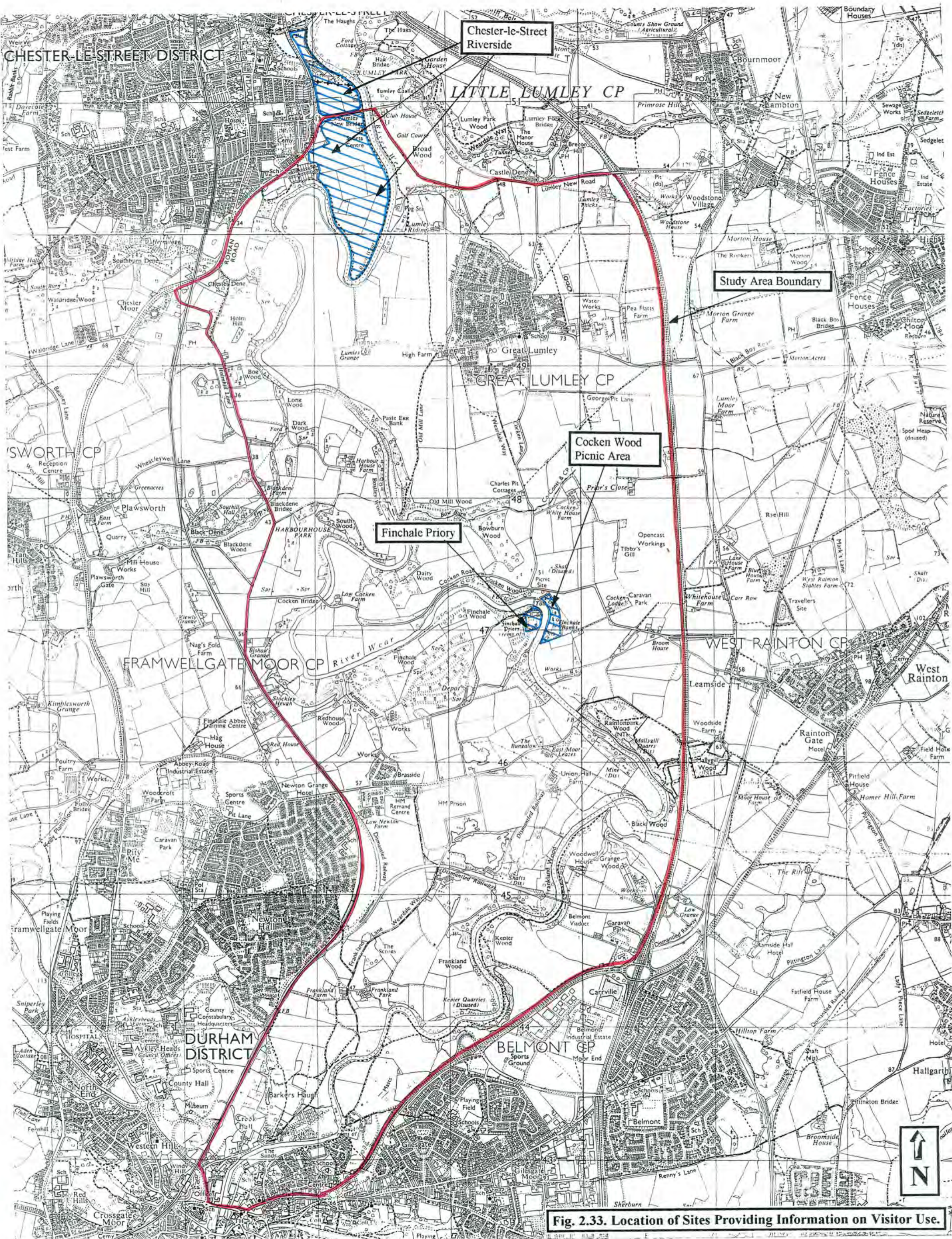


Fig. 2.33. Location of Sites Providing Information on Visitor Use.

2.14.2.2 *Finchale Priory* - The site is managed by English Heritage. Visitor totals for the site between April 1997 and October 1997 (the period when the site is staffed) were 7,037, a decrease of 3.5% on the previous year. English Heritage regard the site as "definitely not saturated" and would welcome an increase in visitor numbers (Pers. comm., Barbara Spearman.).

2.14.2.3 *Finchale Banks/Cocken Woods* - This woodland site is managed by Durham County Council. Visitor totals were recorded during warden patrols at weekends and on Bank Holidays between April and September of 1996 (Fig. 2.34 to 2.36). Figures were not available for 1997.

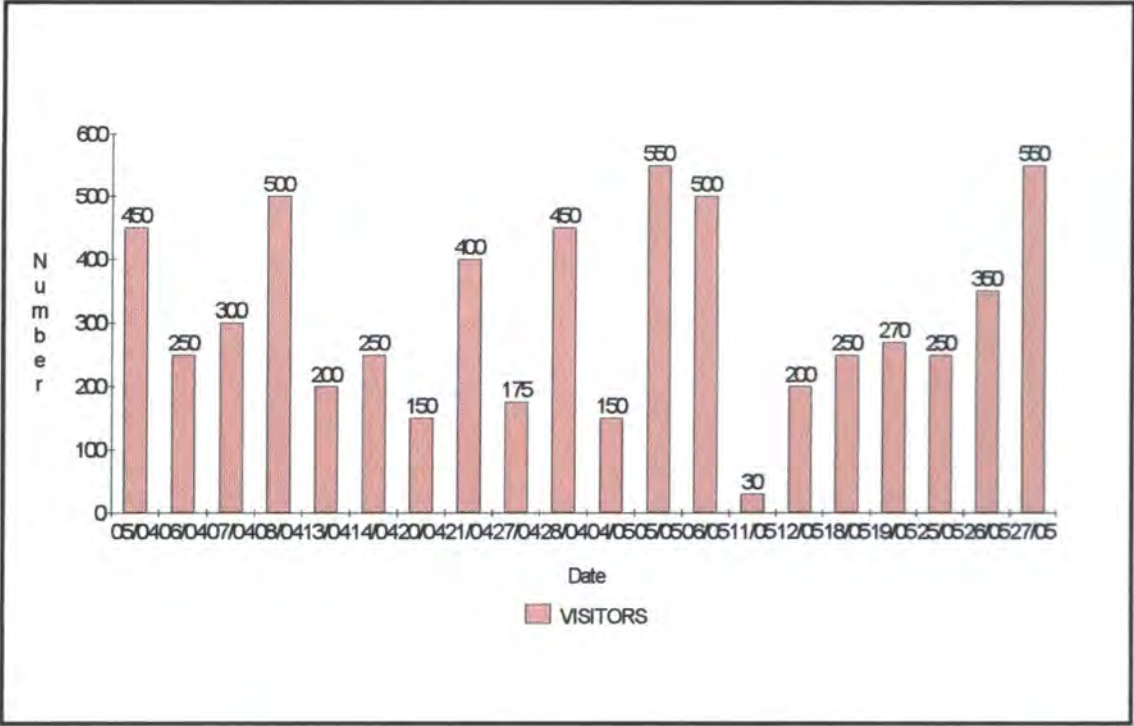


Fig. 2.34 Visitor Totals, April - May 1996. Finchale Banks/Cocken Woods.

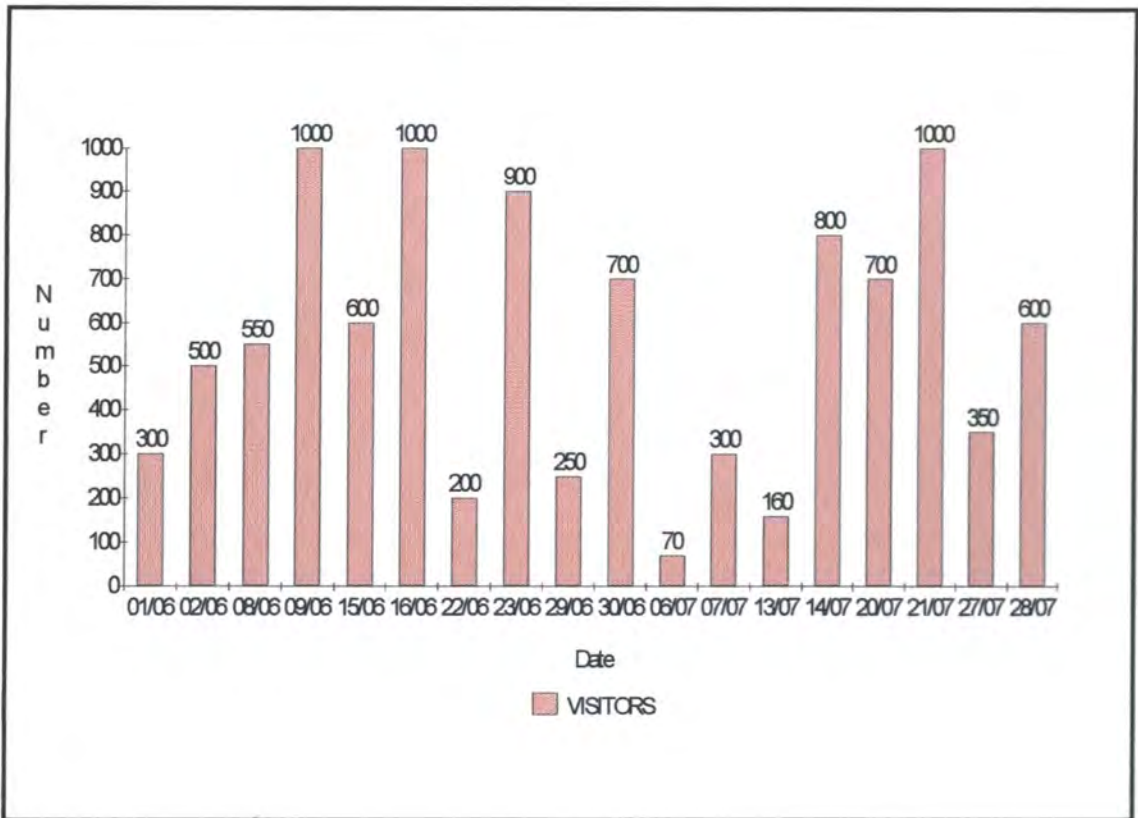


Fig. 2.35 Visitor Totals, June - July 1996. Finchale Banks/Cocken Woods.

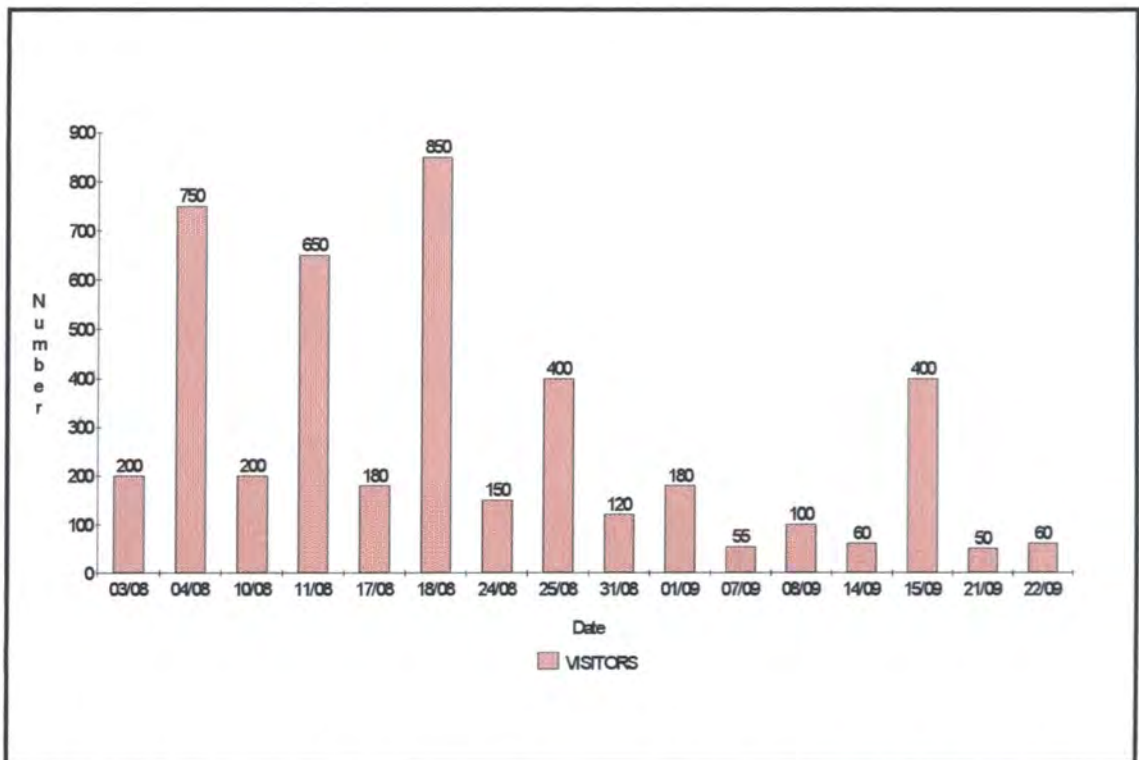


Fig. 2.36 Visitor Totals, August - September 1996, Finchale Banks/ Cocken Woods.

The number of cycles encountered and the number of cars parked in the free parking lay-by which serves the site, and elsewhere on Cocken Road, were also recorded (Fig. 2.37 to 2.39).

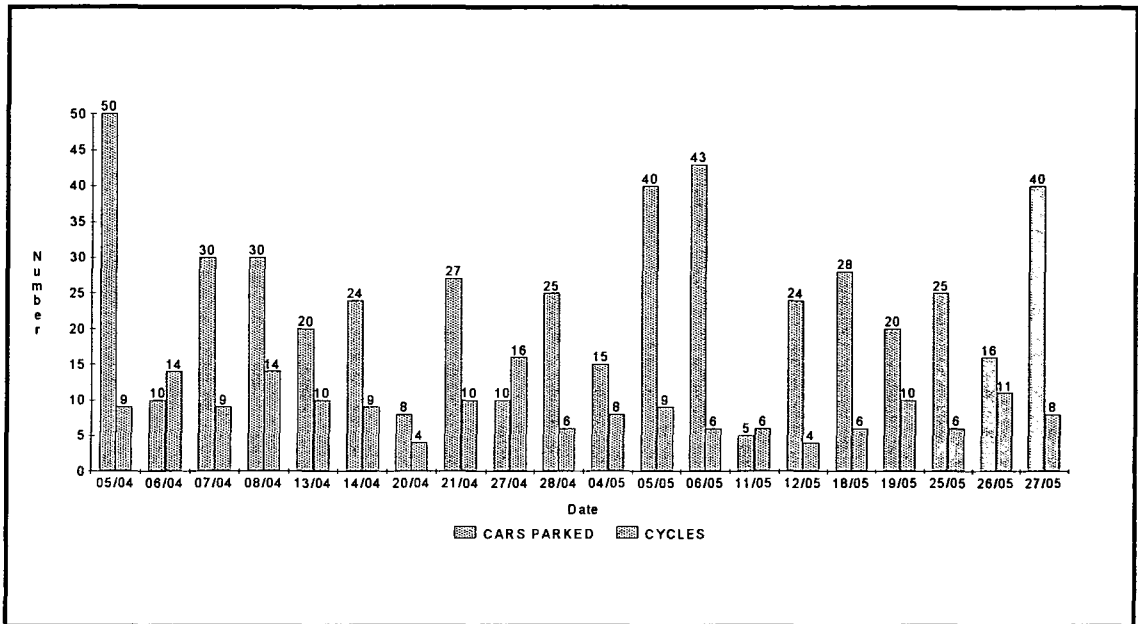


Fig. 2.37 Totals of Cars Parked and Cycles Encountered, April - May 1996, Finchale Banks/Cocken Woods

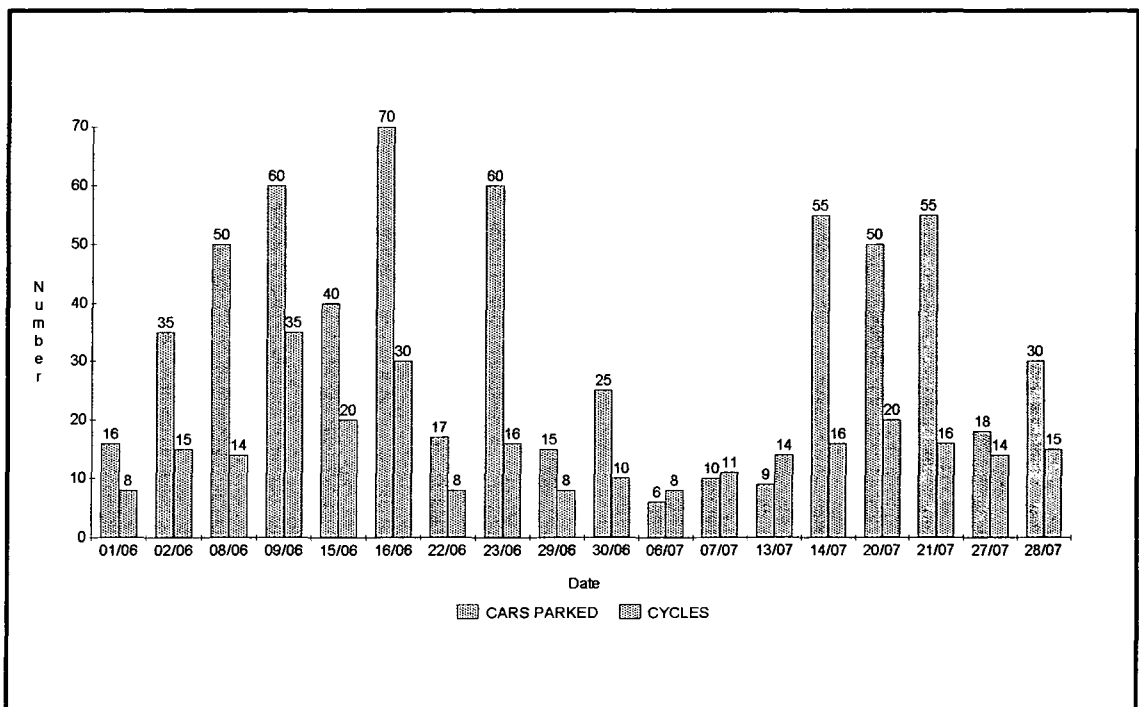


Fig. 2.38 Totals of Cars Parked and Cycles Encountered, June - July 1996, Finchale Banks/Cocken Woods

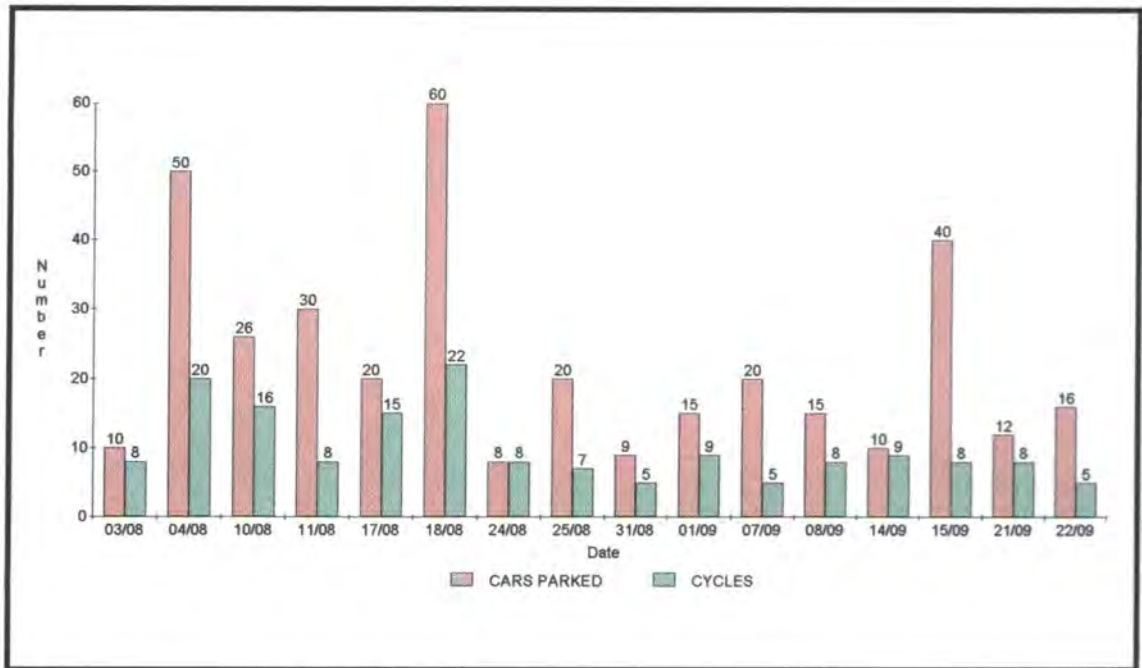


Fig. 2.39 Totals of Cars Parked and Cycles Encountered, August - September 1996, Finchale Banks/Cocken Woods

Consideration of this data, in conjunction with a knowledge of the site gained during familiarisation visits, allows the following conclusions to be drawn:

- The site is heavily overcrowded on some summer weekends, a fact confirmed by the local warden (Pers.comm., Ann Nicholson) and would benefit from a reduction in visitor density.
- The site provides a catchment of visitors that could be encouraged into other parts of the study area. A noticeably high proportion of visitors are from the Sunderland area, the site having historically been a traditional countryside destination for families from that city (Pers.comm., Ann Nicholson).
- Car parking at the site is limited and overcrowded on some summer weekends and the site would benefit from a reduction in its dependence on the private motor car.
- The site is regarded as suitable for cycles, though not heavily used at present. There is currently a degree of pedestrian/cycle conflict on the narrow paths within the woodland (Pers.comm., Ann Nicholson).

2.15 Current Accessibility.

How accessible an area is can be considered in two separate ways. How easy is it for people with varying degrees of physical mobility, and with access to different ranges of transport alternatives, to get to the area? Once there, how easy is it for them to reach various sites within the area?

No published information could be located about either aspect with respect to the study area and assessment of accessibility would have to be by field research.

3.0. ADDITIONAL ENVIRONMENTAL SITE EVALUATION.

The Environmental Assessment highlighted areas where a shortage of data existed which would prevent a balanced and reliable assessment of the potential for an increase in visitor use being made. Information was required about:

- the ecology of the study area away from designated wildlife sites
- existing levels of visitor use within the study area
- accessibility both to the study area and within it
- the landscape of the study area

This data was collected by field survey and was vital in ensuring that a sustainable and appropriate method of increasing visitor use was identified.

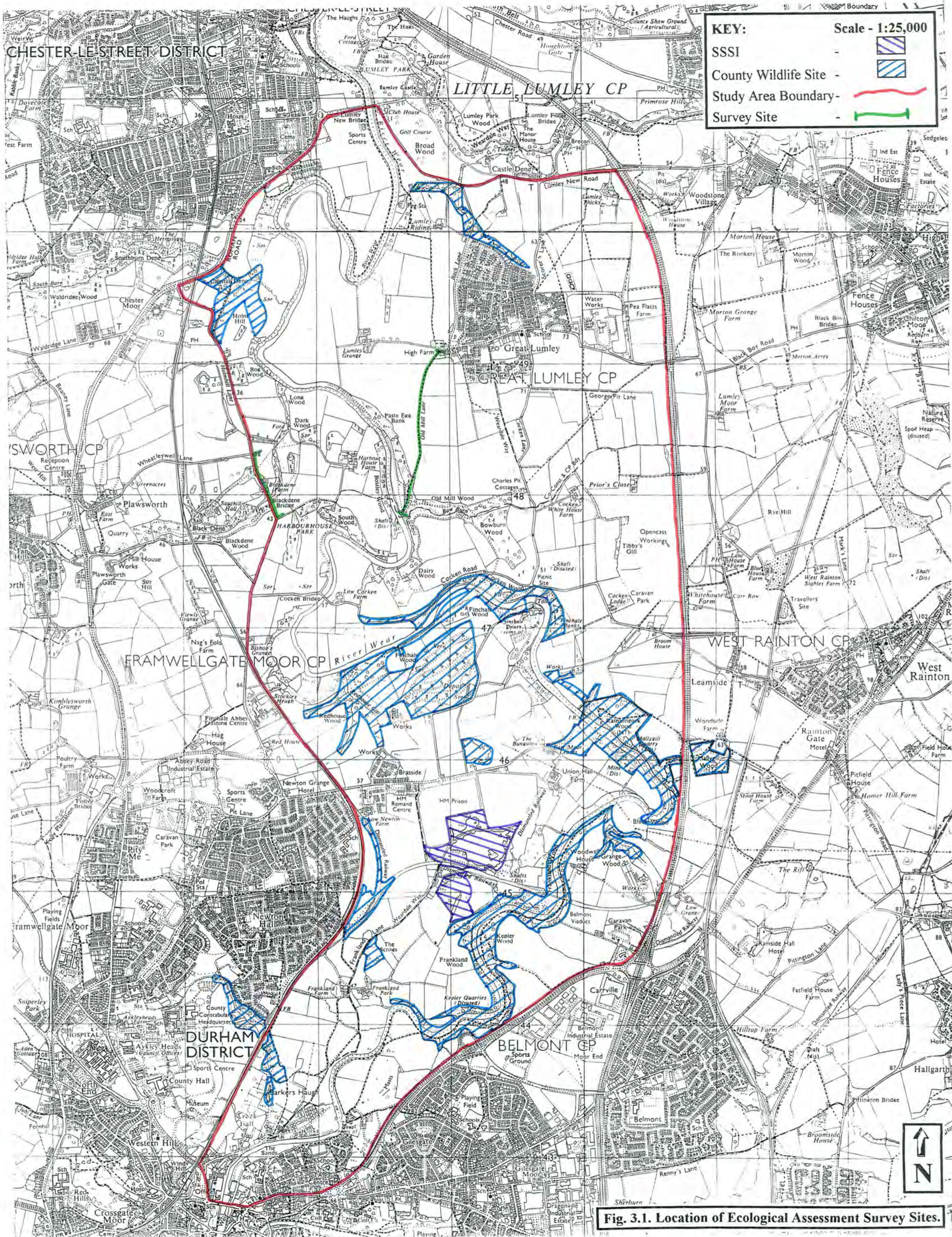
3.1 Ecological Assessment.

Having noted that existing ecological information tended to be concentrated in those areas previously identified as ecologically valuable and/or actively managed for wildlife conservation, two survey sites were selected away from such sites (Fig. 3.1). Located in the section of the study area south of Great Lumley and north of Cocken Road, these survey sites served both to provide ecological information on this central section and to provide information on sites other than those previously selected and/or managed for their ecological value. The selected sites are served by public access, cover both the west and east sides of the river valley and encompass both farmland and woodland. They are described as:

- a section of Holmhill Lane from NZ 275483 to NZ 277478,
- the public footpath known as Old Mill Lane, NZ 289491 to NZ 286479

3.1.1 Methodology

The survey methodology is one widely used to promote successful observation of mammals and birds (Sutherland, 1996). Each route was walked slowly, in sections of approximately 100m, a measured 100m having previously been walked and the required number of paces noted.



Walking pace was set by practice so as to cover 100m in five minutes. A halt of five minutes was taken after each 100m section during which observation was continued. The species identified as present were recorded.

It should be noted that identification of species concentrated mainly on mammals, birds, and vascular plants, positive identification of invertebrates and lower plants being a specialism beyond the scope of the surveyor.

The flora recorded was restricted to that within a corridor extending to a maximum of five metres either side of the transect. Where the transect was bounded by thick hedges the corridor of observation was restricted to a width dictated by the hedge.

The corridor of observation for mammals and birds was restricted only to the visible range where positive identification was possible. It should be noted that the survey methodology is not conducive to the successful observation of diurnal mammals and the lack of night-time surveys make the observation of nocturnal mammals highly unlikely. The recording of mammals is therefore largely based on tracks, spraints or other sign.

Each site was surveyed three times: in April/May, in July/August and in October/November 1996.

3.1.2 Results. - The species list compiled for each site is reproduced in Appendix 5.

None of the species of bird identified is recorded in the International Union for Conservation of Nature and National Resources (IUCN) Red Data Books of "endangered, vulnerable or rare" species (Batten, 1990). In addition, the

following flowering plants that were recorded are considered as pest species under the Weeds Act (H.M.S.O., 1959):

<i>Cirsium arvense</i>	CREEPING THISTLE
<i>Cirsium vulgare</i>	SPEAR THISTLE
<i>Senecio jacobaea</i>	RAGWORT
<i>Rumex obtusifolius</i>	BROAD-LEAVED DOCK
<i>Rumex crispus</i>	CURLED DOCK
<i>Heracleum mantegazzianum</i>	GIANT HOGWEED

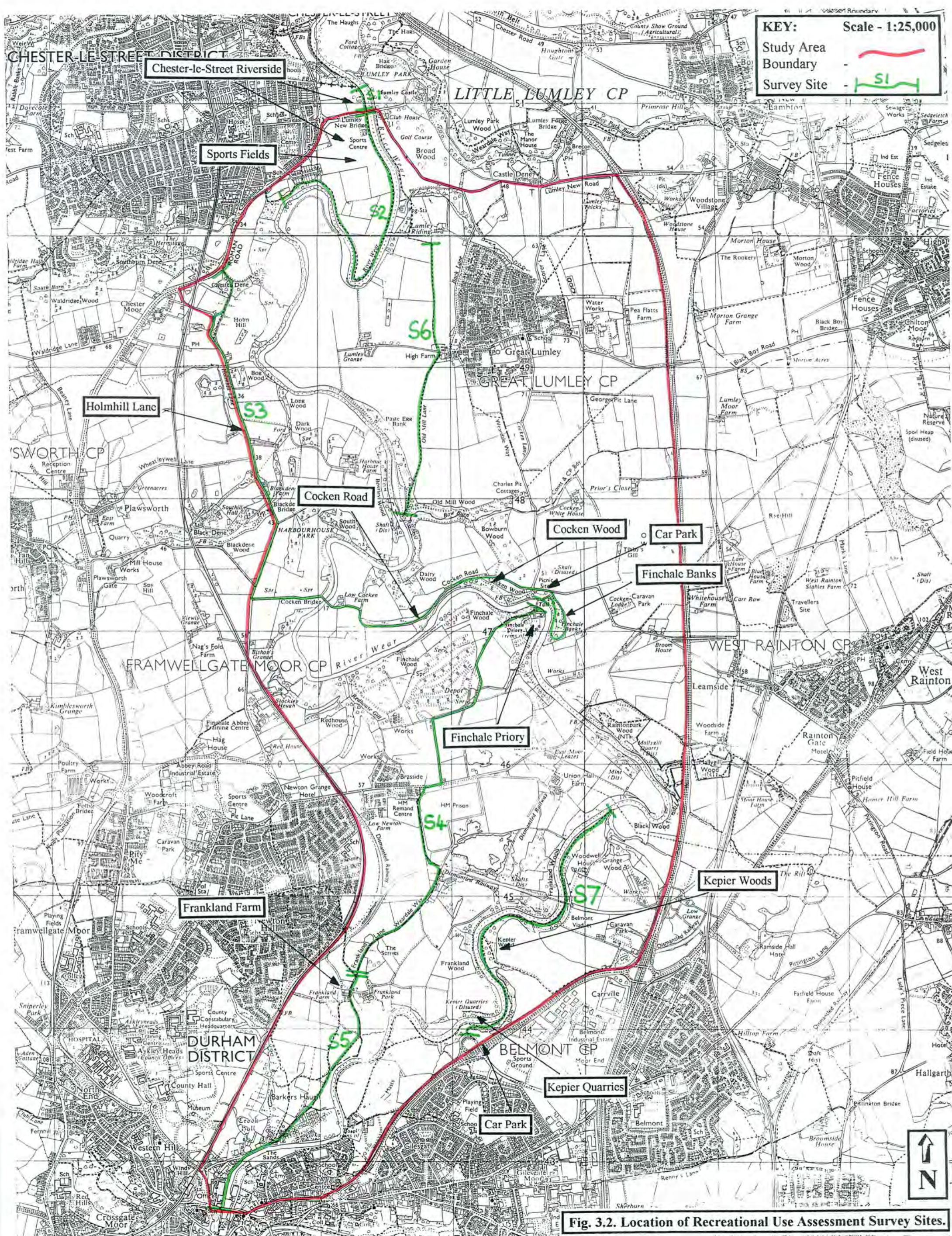
Himalayan Balsam (*Impatiens glandulifera*) and Japanese Knotweed (*Reynoutria japonica*) are also widely regarded as pest species because of their excessive vigour which allows them to out-compete native ground flora species.

Despite the lack of "endangered, vulnerable or rare" species, the species records for the two survey sites show that significant diversity of species exists within the study area outside of those areas already designated for their wildlife value.

3.2 Assessment of Current Level of Visitor Use.

3.2.1 Methodology.

Having identified that little information existed on the current level of visitor use of the study area away from the "honeypots" of Finchale Priory, Finchale Banks/Cocken Woods and Chester-le-Street Riverside, survey sites were selected away from these sites (Fig. 3.2). The survey was conducted by travelling the public footpaths and roads at different times of the week and year (Fig. 3.3) and counting the numbers of pedestrians, cyclists and "others" e.g. rowers on the river, pushchairs, fishermen, etc. on a standard proforma (Appendix 6). During the survey a note was also made of any other relevant information, such as if the visitors encountered were not evenly distributed along the survey section.



KEY: Scale - 1:25,000
 Study Area - [Red line]
 Boundary - [Dashed line]
 Survey Site - [Green line with 'S1']

Fig. 3.2. Location of Recreational Use Assessment Survey Sites.

To allow consistent comparison the visitor numbers recorded on each section of the survey route were converted to an hourly figure. While acknowledging that the length of the survey sections varies, no attempt has been made to convert this figure to one of visitors/hour/kilometre of survey section because survey notes frequently indicated that visitors were not evenly distributed along the route but concentrated in specific areas. Specific examples of this are detailed later.

Surveys were carried out on days of fine weather during the Spring and Summer of 1996. It was deemed reasonable to assume as these were the times when the greatest numbers of visitors would be using the area and thus the results would indicate the maximum numbers of people currently using the area for recreation. The survey was repeated a total of eight times varying the day and time of survey (Fig 3.3) to avoid a single survey coinciding with an abnormally busy or quiet time and producing a falsely high or low result.

DAY	Mon.	Wed.	Thur.	Tues.	Fri.	Sat.	Sun.	Sun.
DATE	01/04.	01/05.	13/06.	02/07.	12/08.	20/07.	18/08.	22/09.

Fig. 3.3 Visitor Use Survey Dates, 1996.

It is important to note the limitations of the information supplied by the survey methodology. No attempt was made to determine any detailed information about purpose or length of visit, method of transport to the area, location of home, etc. and no such inferences can be drawn from the results. Recording such information would have required the completion of a structured questionnaire by large numbers of the visitors encountered over a large geographical area. The time required to carry out such a survey and gain anything other than a "snapshot" of a limited geographical area made such an approach unfeasible for

this research. The methodology selected simply records the presence of individuals or groups along the survey route who "were not obviously working", i.e. were there for recreational purposes or as commuters, though walking or cycling for recreation and as a means of commuting should not be regarded as mutually exclusive.

3.2.2 Results - As would be expected, the numbers of visitors encountered increased greatly on weekend days when compared to weekdays. The results for weekdays and weekend days are, therefore, considered separately. Survey figures were combined to produce an average hourly figure for numbers of pedestrians and cyclists encountered on each survey section (Figs 3.4 and 3.5).

3.2.2.1 Current Level of Pedestrian Use. - The area is more heavily used by pedestrians at weekends than on weekdays (Fig. 3.4). Concentrations of pedestrians increase in the vicinity of car parks at Chester-le-Street Riverside, Finchale Banks/Cocken Woods, Finchale Priory and at Kepier Woods near Kepier Quarries (Fig. 3.2.), indicating that many travel to the area by car.

The section most heavily used was section S2 with visitor numbers being concentrated near the sports fields near Lumley New Bridge. In sections S3 and S4, visitor numbers were concentrated in Finchale Banks/Cocken Woods and the Finchale Priory site respectively. As an example; on Sunday 22/9/96, a survey of section S3 which took one hour and five minutes recorded 21 pedestrians. All were in Finchale Banks/Cocken Woods which will have taken less than ten minutes of the total time to survey.

In section S5 most of the pedestrians encountered were within the City of Durham. In section S7, the survey notes recorded that pedestrian numbers

decreased with distance away from the car park near Kepier Quarries at the south of the section.

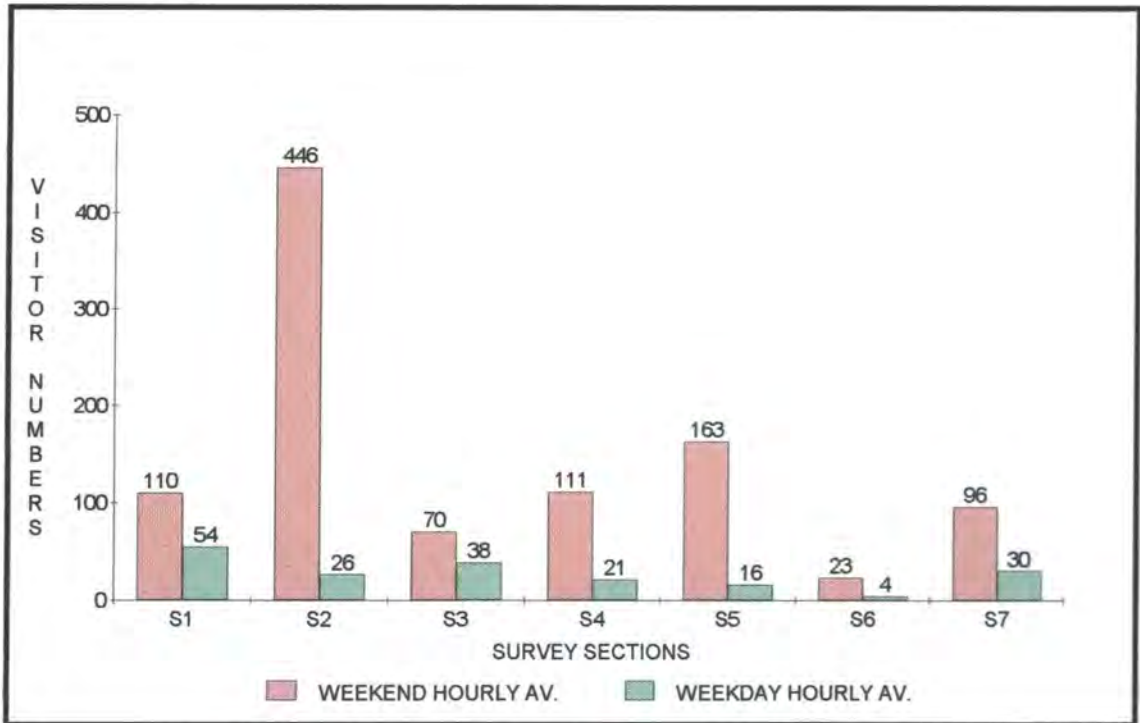


Fig. 3.4 Current Level of Pedestrian Use.

Bearing in mind the limitations of the survey method as described above and assuming that the survey sites selected are accurately representative of the public rights of way in the study area as a whole; the following conclusions can be drawn from the survey of pedestrian visitor numbers:

- Away from the well used sites of Chester- le-Street Riverside, Cocken woods, Finchale Priory and to a lesser extent Kepier Woods, the study area has the capacity to accommodate more pedestrian traffic.
- The ecologically important ancient woodland sites of Finchale Banks/Cocken Woods and Kepier Woods would benefit from measures to reduce the numbers of visitors currently using them. Such measures could either encourage visitors to spread further into the surrounding area, thus diluting detrimental effects, or to visit other less sensitive sites in the study area.

- The archaeological site of Finchale Priory may also benefit aesthetically from a reduction in visitor numbers but as a charge is levied for admission to this site any such measures would have serious financial implications for English Heritage and ultimately for the upkeep of the site. Any such measures are, therefore, not likely to be welcomed.
- Measures to reduce the dependence on private motor cars as a dominant method of transport to the area would help to prevent visitor numbers concentrating in sites served by car parks. Such measures would also benefit the environment of the study area and promote more sustainable use of energy resources.
- Measures are needed to encourage visitors to explore beyond the confines of Chester-le-Street Riverside so that it can fulfil its perceived role as a "gateway" to the countryside.

3.2.2.2 *Current Level of Use by Cyclists.* - As with pedestrians, the area is used by cyclists more frequently at weekends than during the week (Fig. 3.5)

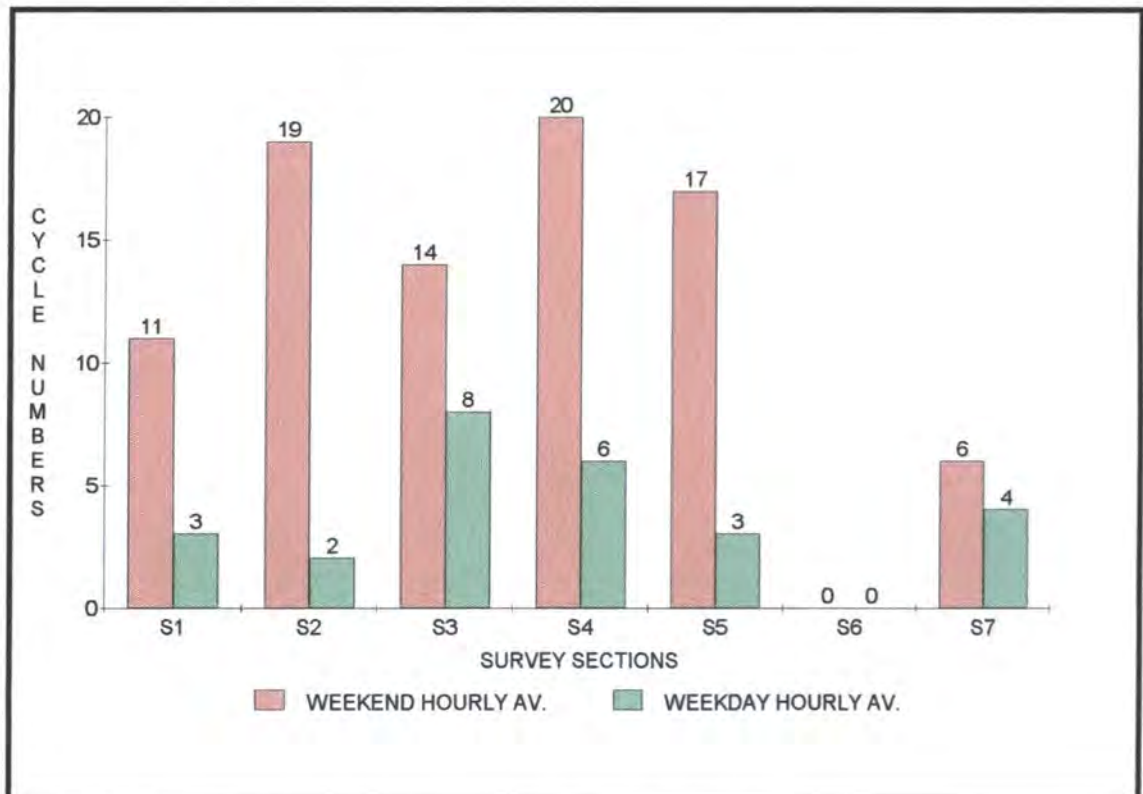


Fig. 3.5 Current Level of Use by Cyclists

The major conclusions that can be drawn from the results of the survey are as follows:

- Nowhere was the surveyed area heavily used by cyclists and, assuming that the survey sites selected are accurately representative of the public rights of way in the study area as a whole, the study area has the capacity to accommodate more cycle traffic.
- In survey section S3, survey notes show that the majority of cycles recorded on this section were using the road sections of Cocken Road and Holmhill Lane and not the ecologically sensitive area of Finchale Banks/Cocken Woods. This is exactly the opposite of survey findings of the use made of this section by pedestrians.

3.2.2.3 Current Level of "Other" Visitor Use. - The recording of "other" categories of visitor use during the survey was confined to: twelve observations of "pushchairs" in survey sections S1 and S2; nine separate observations of "rowing boats" in section S2; and seven observations of "anglers" in section S2 and thirteen in section S5. There was no discernible variation in observations of "pushchairs" and "rowing boats" at different times of the week. However, all but one observation of "anglers" occurred at the weekend.

While recognising that the sample size of these observations is too small to extrapolate to definitive statements it is reasonable to draw the following two conclusions:

- Use of the area by visiting groups/individuals with pushchairs is largely confined to Chester-le-Street Riverside park and the area immediately around it.

- Visitor use of the area by anglers is largely confined to those river areas immediately adjacent to Chester-le-Street Riverside and north of Durham City as far as Frankland Farm and takes place mainly at weekends.

3.3 Assessment of Current Level of Accessibility.

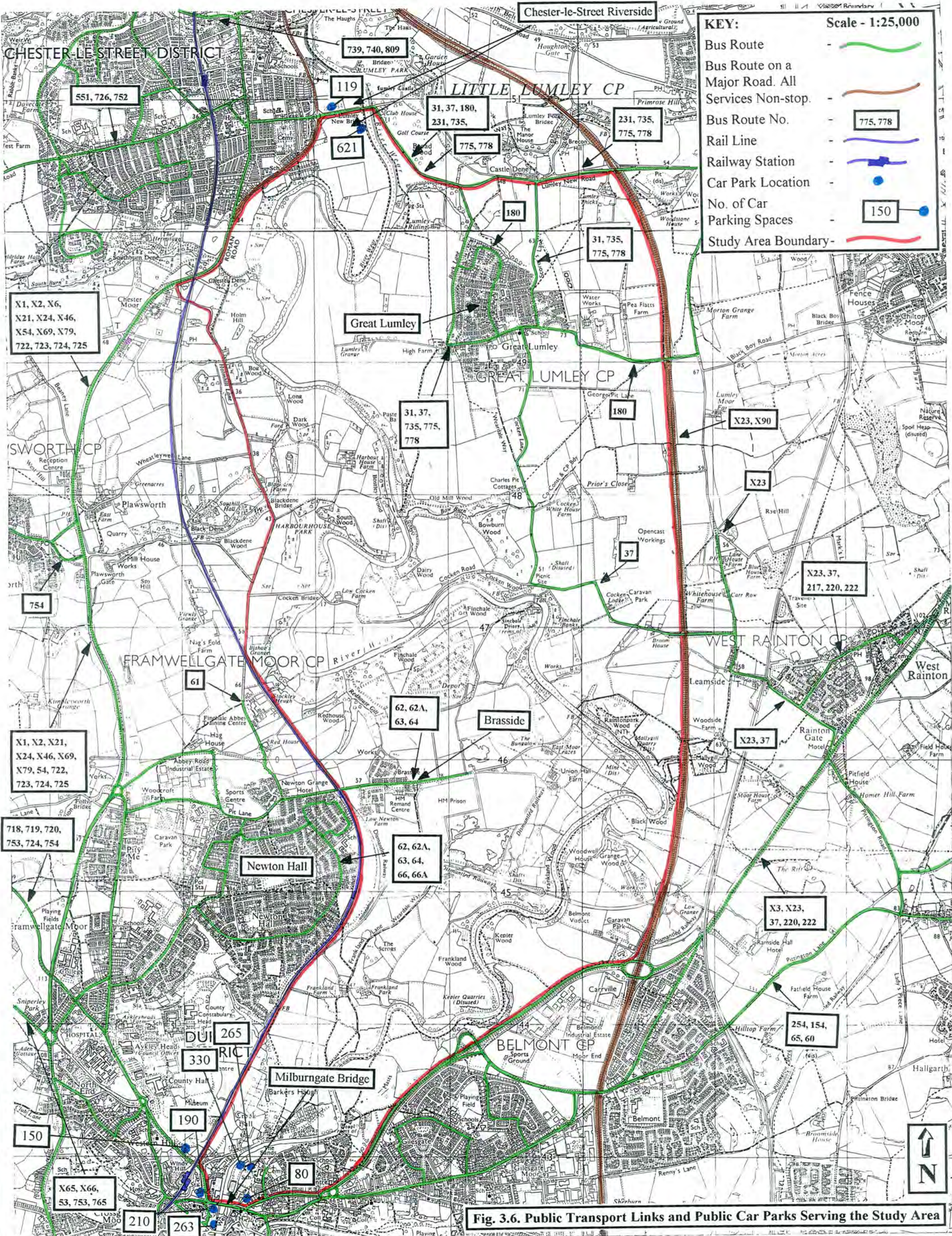
3.3.1 Methodology.

Access within the study area other than by motorised transport was assessed during surveys carried out to ascertain current levels of visitor use which are described earlier. During these surveys a note was made of any areas with access constraints that would be a barrier to some sections of the population e.g. stiles or uneven path surfaces which would deny access to wheelchairs and pushchairs. Levels of this internal accessibility were found to vary greatly and, as would be expected, to be largely dependent on local conditions. As a result it is impossible to generalise as to how internally accessible the study area is to the less physically able and users of wheelchairs and pushchairs. However, the information gathered was used in formalising the proposal detailed later.

To assess how easy it is to gain access to the general locale of "the Wear valley between Chester-le-Street and Durham" and to specific sites within the study area, all major local and national public transport providers were consulted, either directly or via their published timetables or via the County Durham Public Transport Map (Durham County Council, 1997).

3.3.2 Results.

The routes of bus services (excluding works services) stopping within the study area, or within a reasonable walking distance of a suitable access point, such as a road or public right of way, were noted (Fig.3.6). Service frequency of these and other buses providing access to Chester-le-Street and Durham City centre was noted (Appendix 7), as were train services stopping at Chester-le-Street and



KEY: Scale - 1:25,000

- Bus Route - —
- Bus Route on a Major Road. All Services Non-stop. - —
- Bus Route No. - 775, 778
- Rail Line - —
- Railway Station - ■
- Car Park Location - ●
- No. of Car Parking Spaces - 150
- Study Area Boundary - —

Fig. 3.6. Public Transport Links and Public Car Parks Serving the Study Area

Durham (Appendix 8). The location and capacity of district council serviced car parks was also noted (Fig. 3.6). Informal car parking for 22 cars exists in lay-bys on Cocken Road at Finchale Banks.

From the available information it is possible to draw the following conclusions:

- The study area is accessible to the population of potential visitors identified elsewhere, but accessibility would be enhanced by an increase in the frequency of public transport services, especially evening and Sunday services.
- The majority of available public transport routes skirt the boundaries of the study area rather than entering it.
- The access points to the study area best serviced by public transport are the Milburngate Bridge area, due to its proximity to Durham City Centre, and Chester-le-Street Riverside.
- Newton Hall/ Brasside, Great Lumley and other points on the route of the 37 bus service could potentially provide good public transport access points if Sunday/evening services and/or more frequent service was provided.
- Access points to the study area best serviced by car parks are again the Milburngate Bridge area, due to its proximity to Durham City Centre, and Chester-le-Street Riverside. However, existing car parking in Durham City is already very heavily used (Pers. comm., Martin Roberts).

3.4 Landscape Assessment.

While acknowledging that the landscape of any area should never be considered in isolation from its surroundings, an appreciation gained from a detailed field assessment of the landscape at a "local" rather than "county" level was considered to be essential in understanding the study area fully.

3.4.1 Methodology.

The landscape assessment was carried out in accordance with Countryside Commission recommended methodology (Countryside Commission, 1993), in which the main steps advocated are:

- Planning the assessment.
- Desk study
- Field survey.
- Analysis and presentation of results.

3.4.1.1 Planning the Assessment. - In accordance with the guide-lines, the reasons for this field assessment were formally identified as follows:

- to gain an appreciation and "feel" for the landscape of the study area.
- to ensure that any recreational development that might be proposed as a result of the study could be successfully accommodated within the landscape
- to allow the identification of areas within the study area where any such recreational development would be detrimental, acceptable or beneficial.

3.4.1.2 Desk Study. - A desk study of existing sources of information, as advocated by the Countryside Commission, had effectively already been carried out, the results being recorded in Section 2. of this thesis.

3.4.1.3 Field Survey. - The methodology for the field survey itself was devised according to the principles laid-down (Countryside Commission, 1993) with one major deviation that must be noted. The Countryside Commission state that:

"Experience has shown that the survey is best carried out by a team of two, not only for practical reasons but also because the use of two surveyors permits discussion and consensus."

The use of a second surveyor was not, however, a practical option in this research. It, therefore, had to be recognised at the outset that assessment by one surveyor was likely to be prone to be more subjective. However, being aware of this fact allowed me to question the objectivity of my assessment throughout the survey. As a result, I do not believe that the objectivity of the survey was compromised to any significant degree.

Potential survey points were identified by reference to the O.S. 1:25,000 scale maps of the area coupled with local knowledge gained during initial familiarisation visits to the area. Survey points were selected that had public access, as it is from public access that landscape is most frequently viewed. They were also selected to be fairly evenly distributed throughout the study area and to give views both from the edge, looking in and from within, looking out. No attempt was made to select "attractive" or "unattractive" views, but merely to give coverage of as much of the study area as possible. The higher points within the study area, which appeared, on the map, to be away from dense tree cover were selected as likely to give the most open views and therefore the most information. However, once in the field, it was found that the steeply incised river valley, especially in the southern part of the study area, and the densely wooded nature of some valley sides, frequently meant that finding informative viewpoints was problematical. As a result a high degree of flexibility in selection was required and the pre-planned viewpoints were frequently not the ones that were finally used (Fig. 3.7).

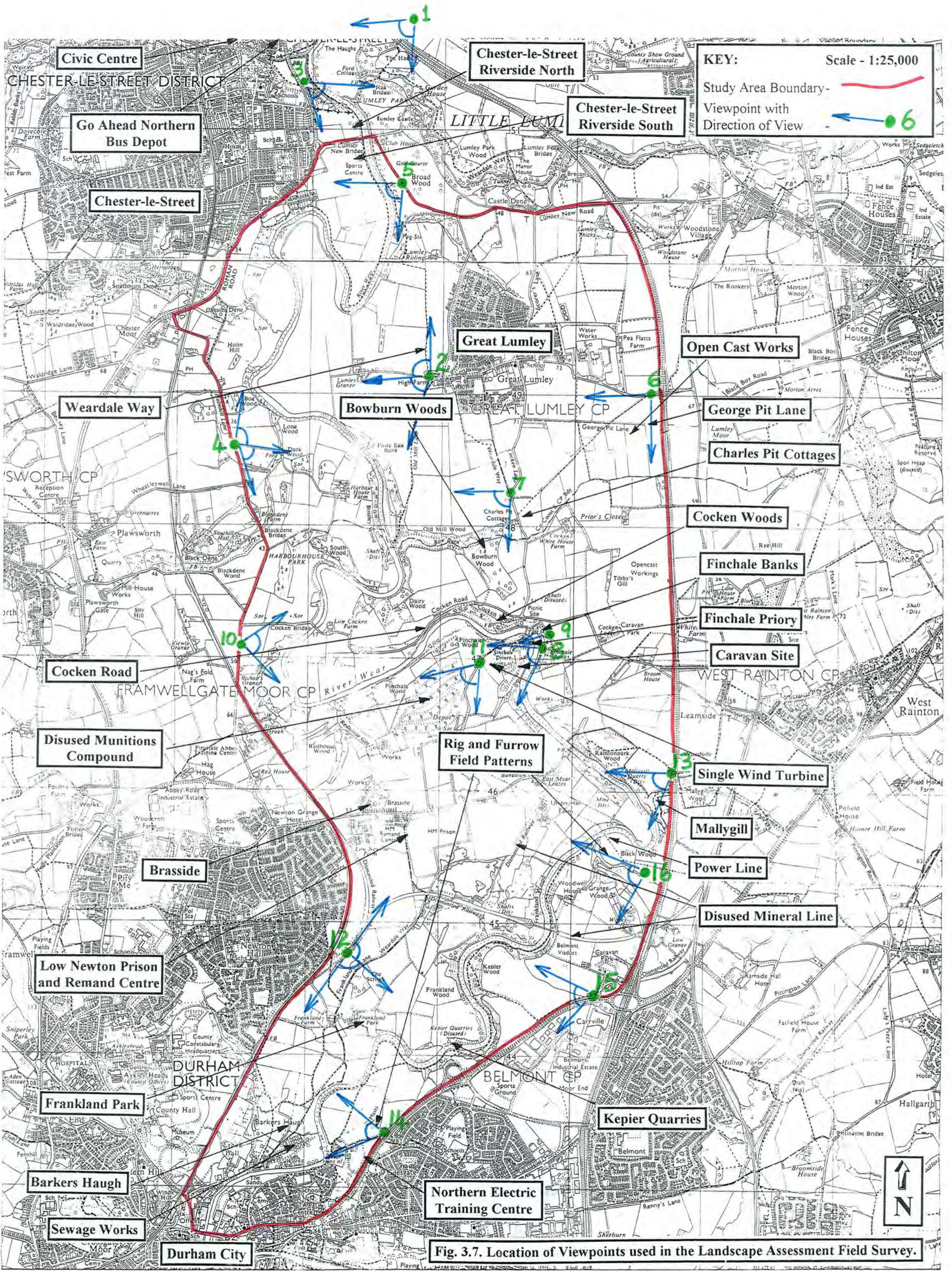


Fig. 3.7. Location of Viewpoints used in the Landscape Assessment Field Survey.

A panoramic series of photographs was taken at each viewpoint and a survey form, designed to ensure analysis at each viewpoint was carried out in a structured manner, completed. The form closely followed the example produced by the Countryside Commission and was designed as a double sided A4 sheet for ease of use. Each side of a completed proforma is reproduced separately in Appendix 9.

The first side recorded factual information about the date, location, direction of view, etc. followed by a written description of the landscape and record of the dominant landscape elements present; the latter being recorded on a check list.

Initial intentions to make an annotated sketch at each viewpoint were quickly abandoned as impractical due to the time required and the limited artistic skills of the surveyor! Instead, a line sketch was produced at a later date from the panoramic photographs and used to illustrate landscape elements or pertinent points from the written description. The photographs were developed and the sketch produced within a week of the field visit to ensure that memory, coupled with the written description, was sufficient to ensure that any features indistinctly recorded on the prints, due to atmospheric conditions, such as haze or drizzle, were correctly recorded in the sketch. It should be noted that a further loss of clarity resulted when the photographs and sketch were colour photocopied for submission in this thesis.

In completing the check-lists care was taken to ensure that the immediate first impression was recorded. In the case of the check-list for Landscape Elements this meant recording the elements that immediately commanded the attention. The absence of a record for a particular element at a viewpoint therefore does not necessarily mean that element was absent, simply that others were more dominant.

The written description attempted to convey the overall impression of the landscape, whilst avoiding being subjective or making judgements on "quality". The general approach adopted was to describe the landform, landscape elements and eye-catching features, and their contribution to the overall impression, in a structured manner. This was most easily done by either describing the view from left to right considering the foreground, middle distance, far distance and horizon separately; or by progressing from foreground, to middle distance, to far distance, to horizon. Though these methods were applicable to many views, in some a dominant element, such as a large urban area in the foreground of a predominantly rural landscape, would make this the most logical place to start the description. In others the presence of related elements scattered throughout the landscape, such as patches of woodland inter-connected by wooded stream courses, would make it logical to describe these together. In general the view itself would dictate the most logical method of description. In writing the description, the most useful advice to bear in mind to ensure a detailed non-emotive account resulted was to "imagine that you are telling a blind person how the landscape looks" (Countryside Commission, 1993).

The second side of the survey form was designed to record aesthetic considerations, firstly using a graded check-list to consider Balance, Scale, Enclosure, Texture, Colour, Diversity, Unity, and Form. Special note should be made of the guidance notes on descriptive vocabulary for recording aesthetic factors (Appendix 10). Secondly, a record was made of anything that especially affected one of the aesthetic factors above, either as an attractor or detractor, and of any visual evidence of ecological or historical significance that could not be recalled from researching Section 2 of this thesis. A note was also made of any obvious potential for discernible seasonal or temporal variation. Finally, a note was made of any obvious conservation or enhancement measures that might be appropriate to strengthen or improve the landscape character of the area seen from that viewpoint.

3.4.1.4 Analysis and Presentation of the Results. - The photographs taken from each viewpoint, and the line sketch produced from them (Figs 3.8 to 3.26) were used extensively in the analysis set out below and serve as reference illustrations for the landscape of the study area.

The assessment survey sheets were used to analyse the landscape in three ways. Firstly the check-lists of "Landscape Elements" and "Aesthetic Factors" were analysed graphically to identify commonly recurring elements and themes and to identify any significant geographical variations within the study area. A written summary of these trends was then produced.

Secondly an appraisal was made of the notes on "special aesthetic factors", i.e. attractors and detractors, visual evidence of ecological or historical significance, any seasonal variation, and "appropriate conservation or enhancement measures". Again any geographical variation was noted.

Finally, a written description for the landscape of the study area as a whole was produced by reference to the written descriptions for each viewpoint, the trends highlighted in the graphical analysis and note appraisal described above.

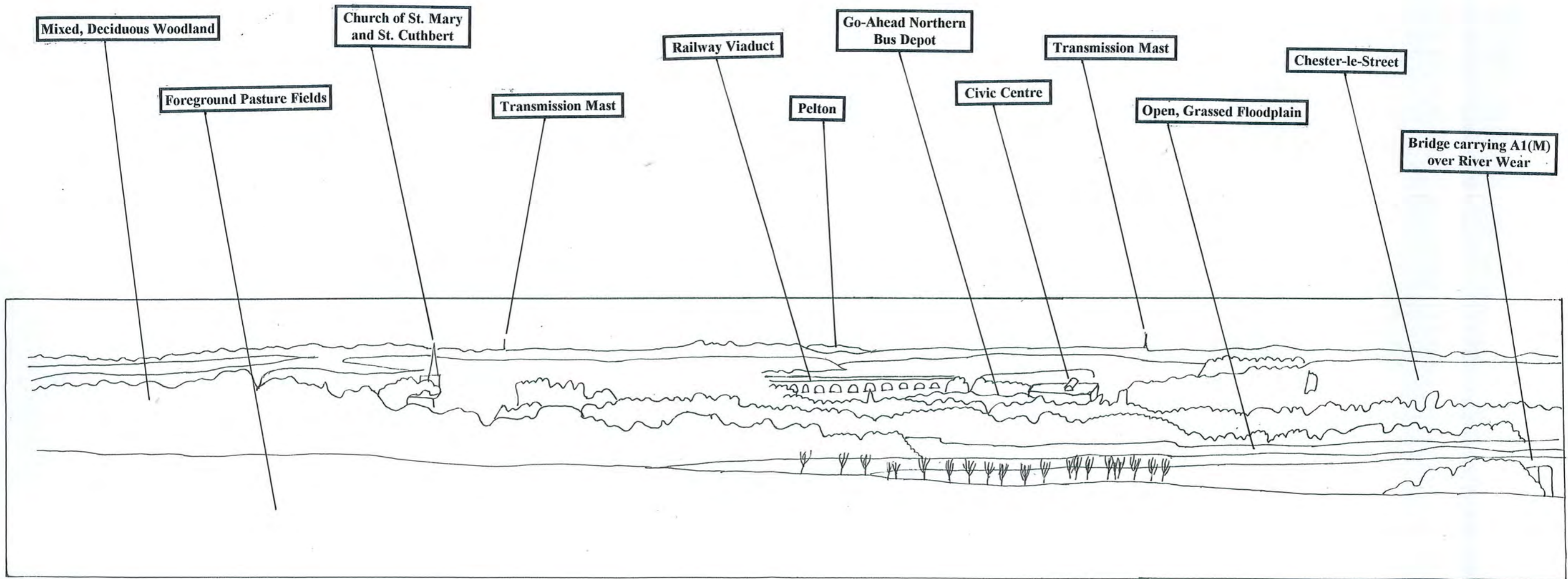
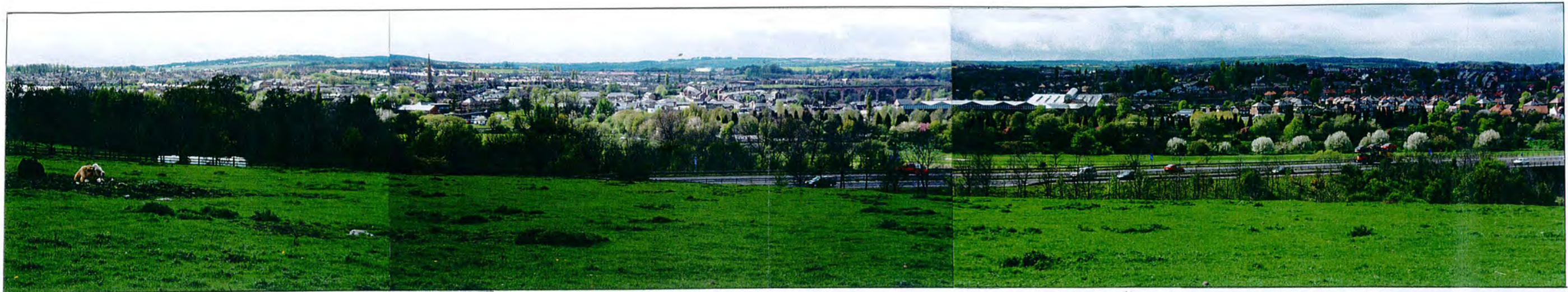


Fig. 3.8. Landscape Assessment. Viewpoint 1. Looking South West.

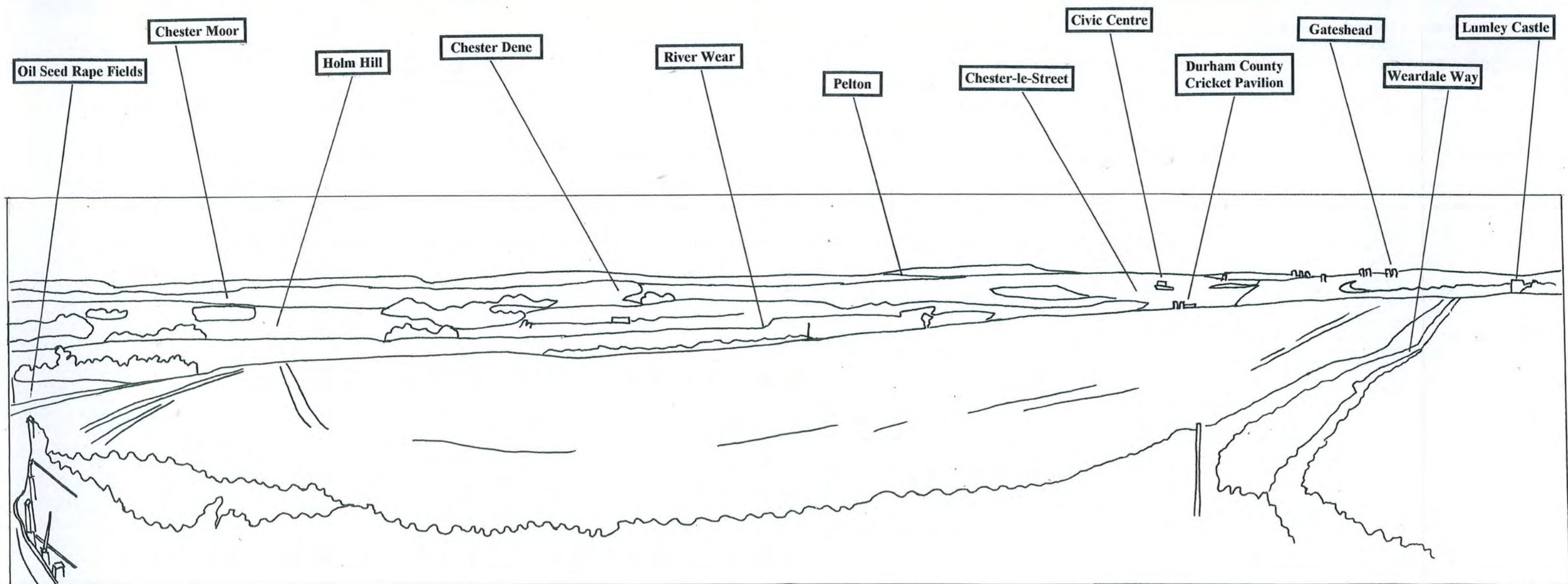


Fig. 3.9. Landscape Assessment. Viewpoint 2a. Looking North West.

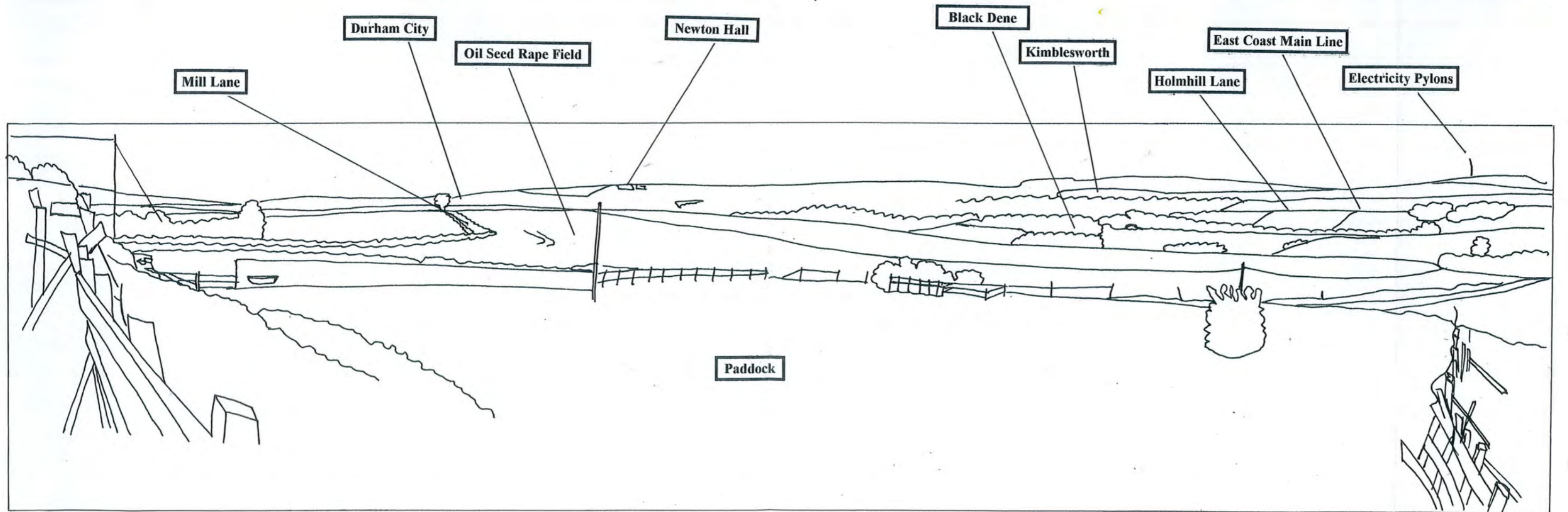


Fig. 3.10. Landscape Assessment. Viewpoint 2b. Looking South West.

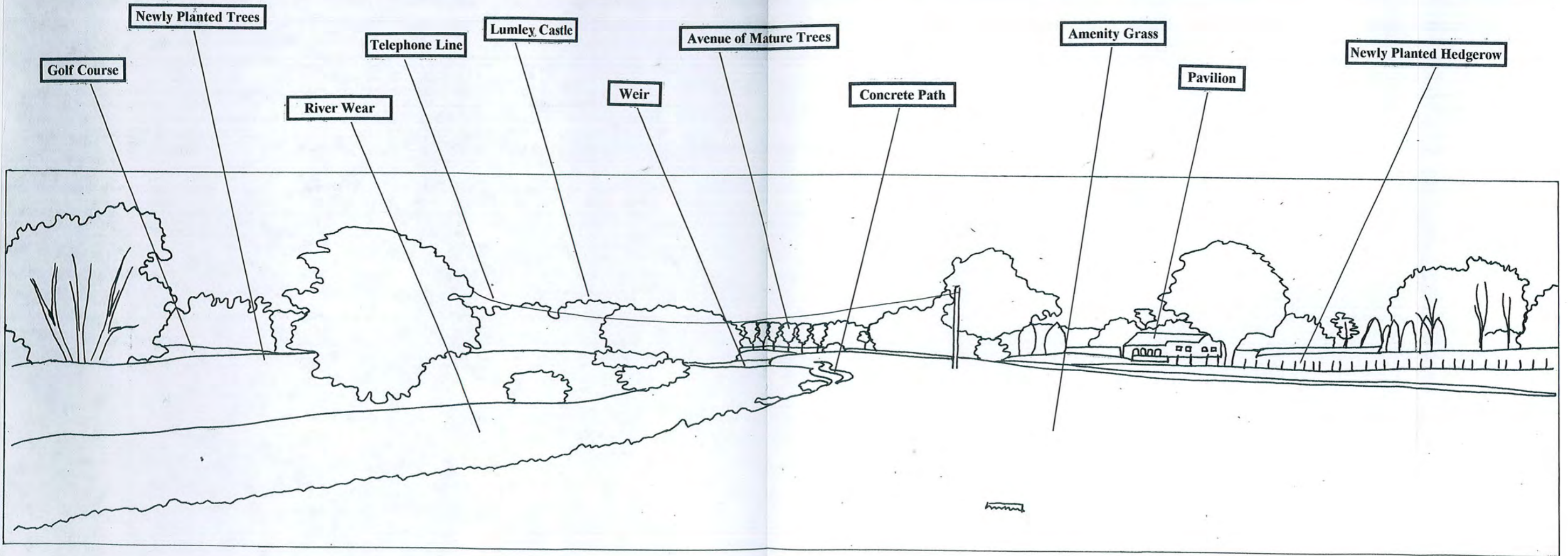


Fig. 3.11. Landscape Assessment. Viewpoint 3. Looking South East.

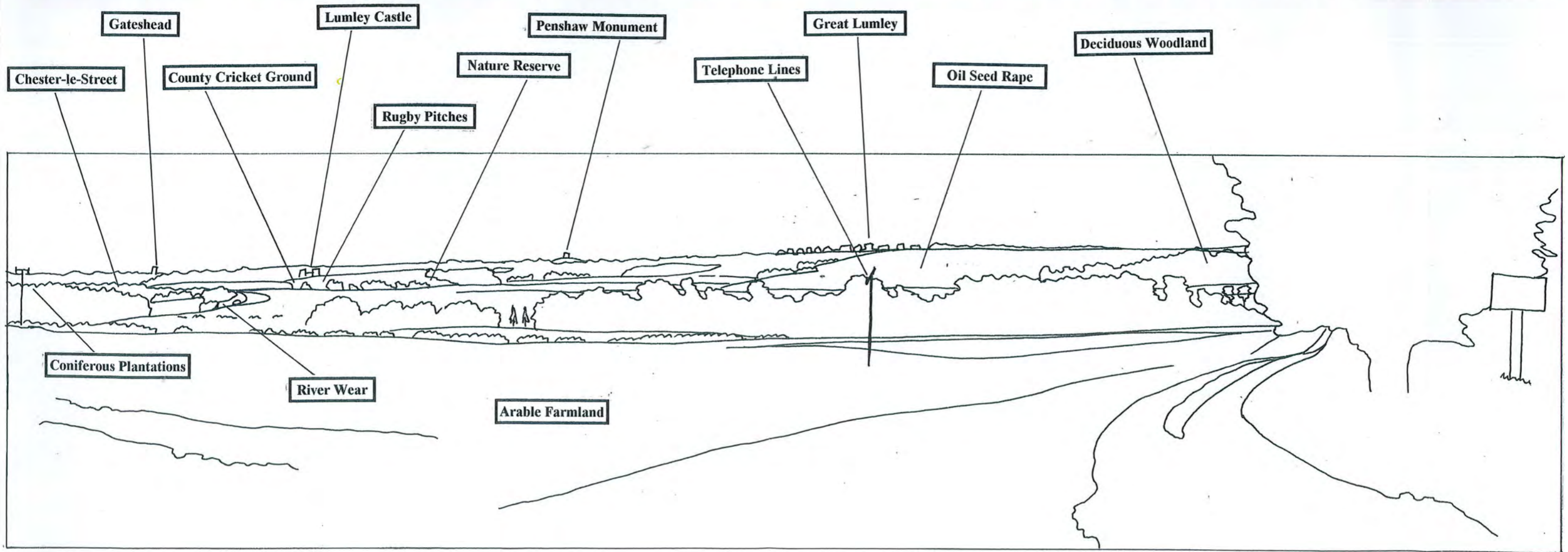


Fig. 3.12. Landscape Assessment. Viewpoint 4a. Looking North East.

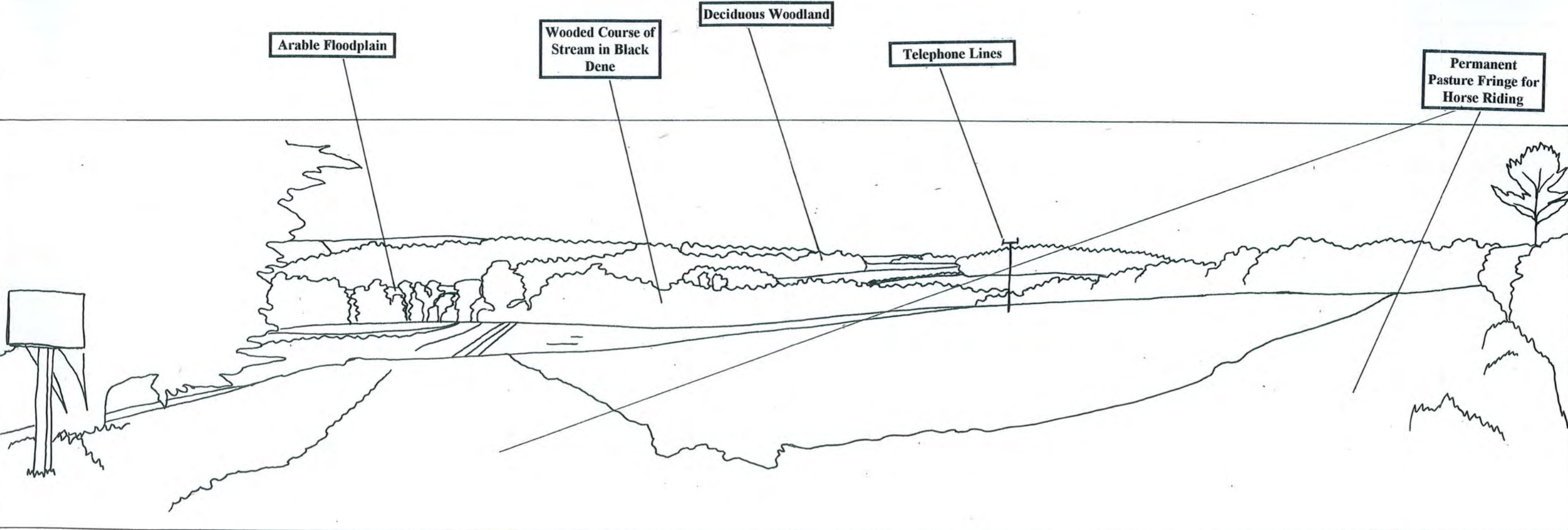


Fig. 3.13. Landscape Assessment. Viewpoint 4b. Looking South East.

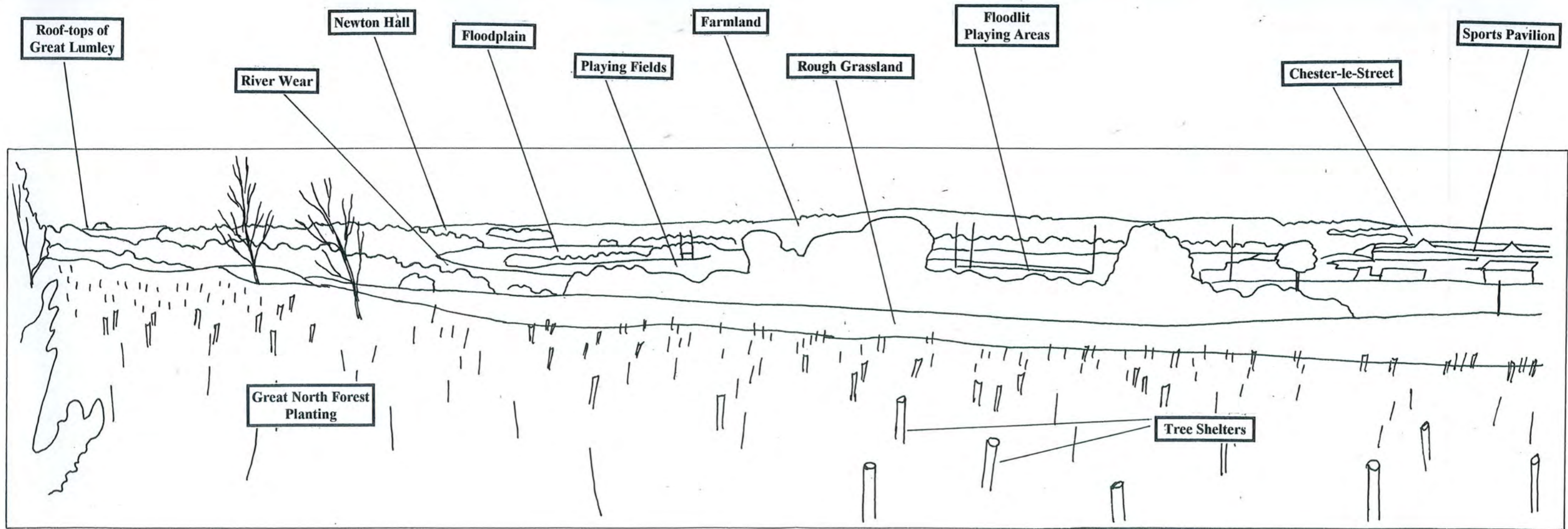


Fig. 3.14. Landscape Assessment. Viewpoint 5. Looking South West.

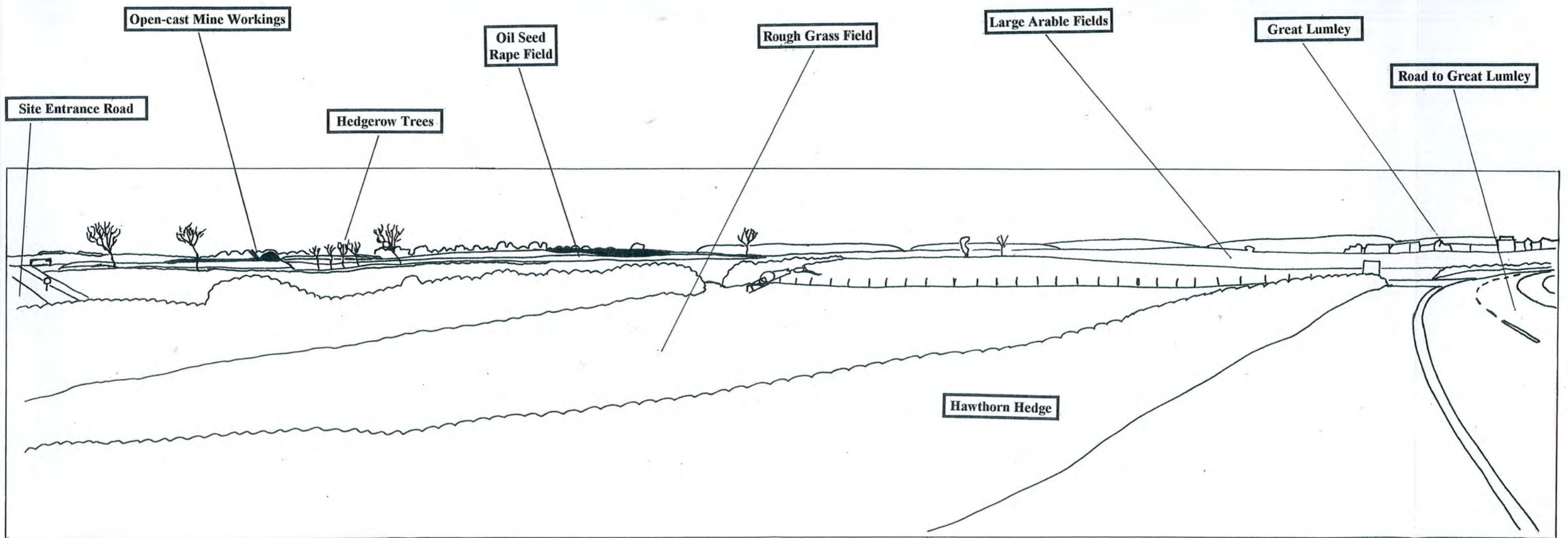


Fig. 3.15. Landscape Assessment: Viewpoint 6. Looking South West.

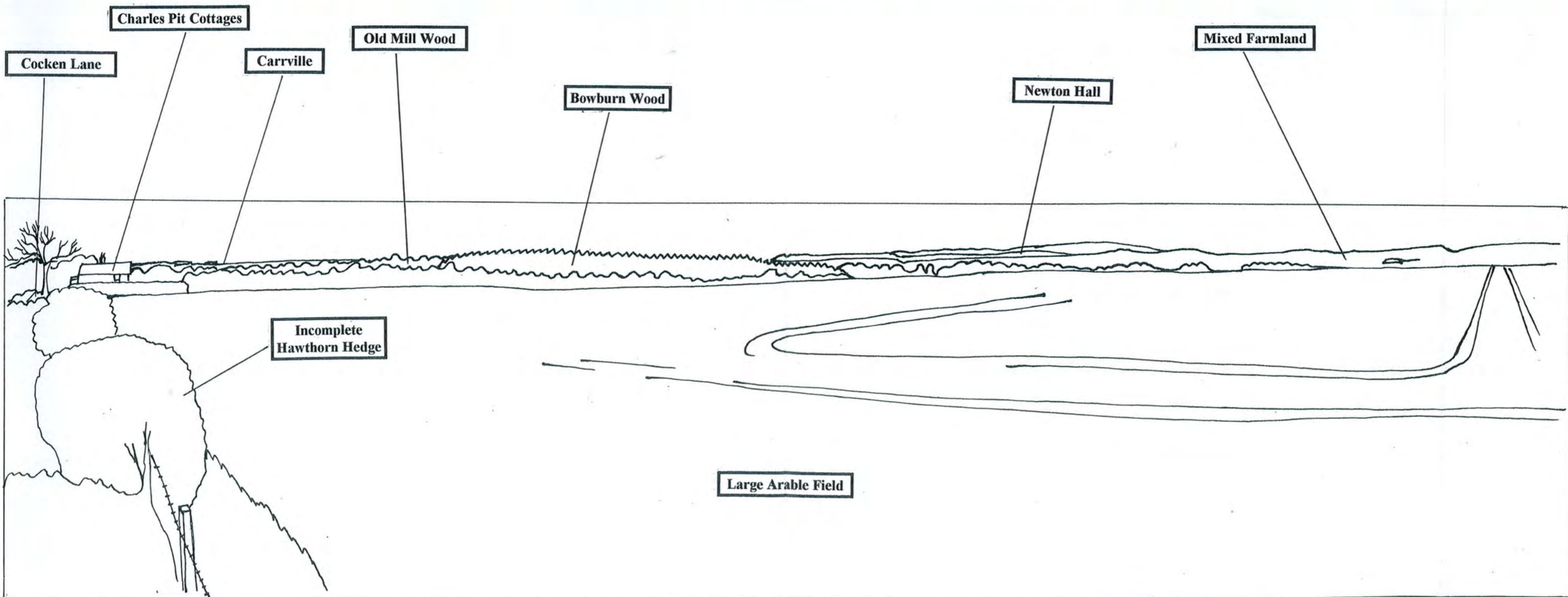


Fig. 3.16. Landscape Assessment. Viewpoint 7. Looking South West.

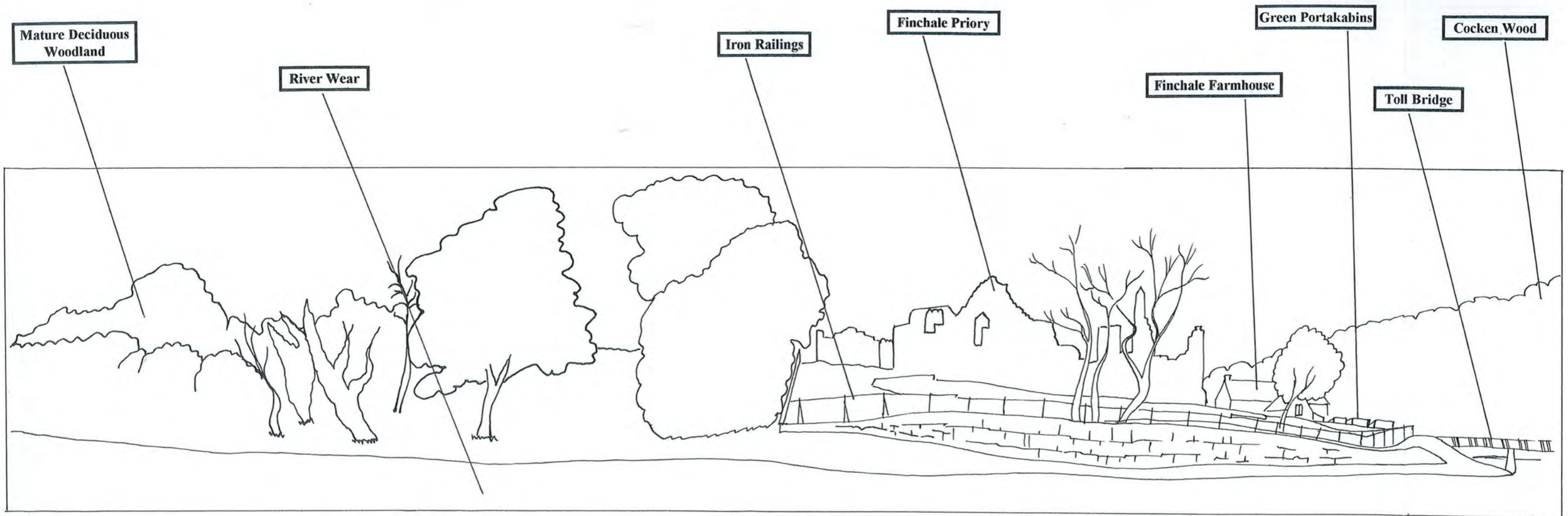


Fig. 3.17. Landscape Assessment. Viewpoint 8. Looking South West.

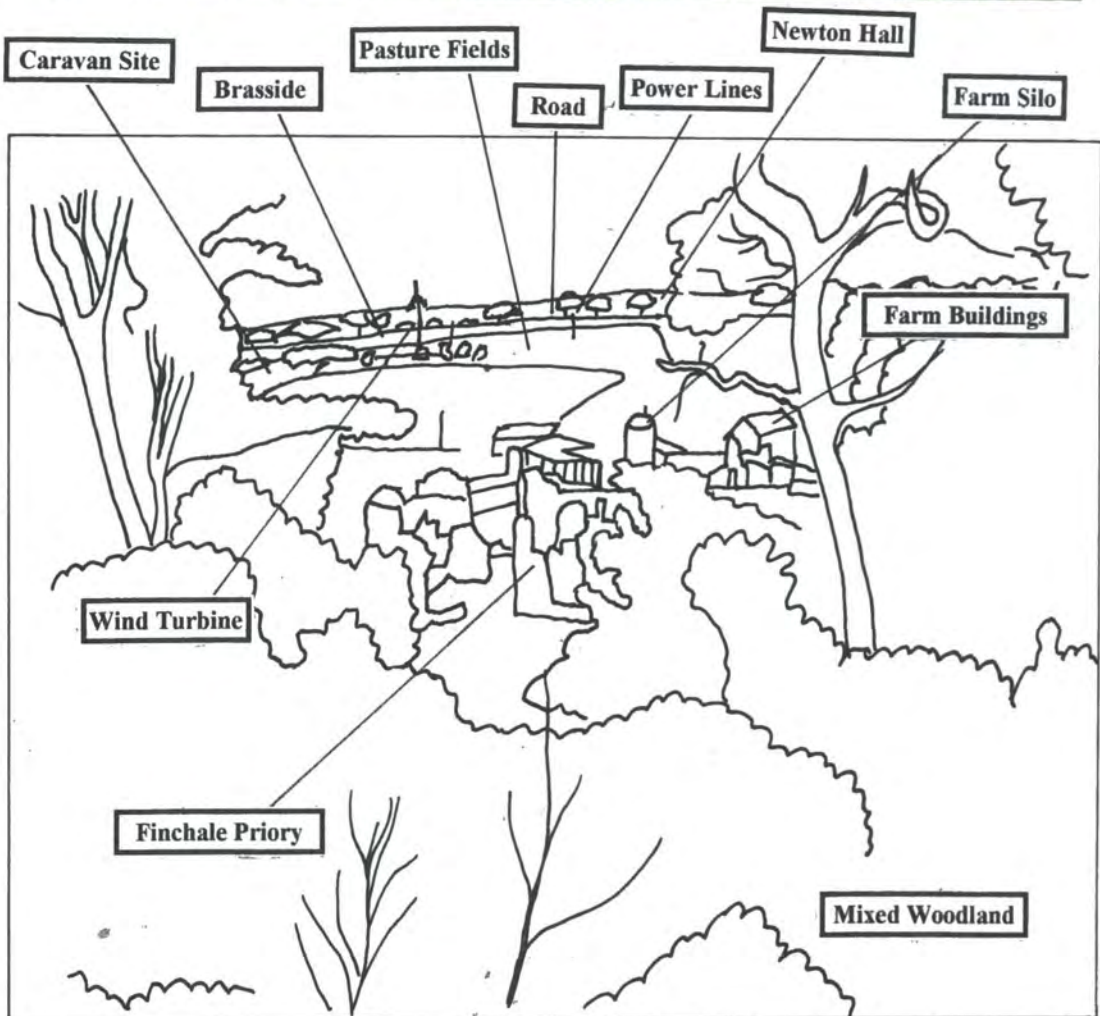


Fig. 3.18. Landscape Assessment. Viewpoint 9. Looking South West.

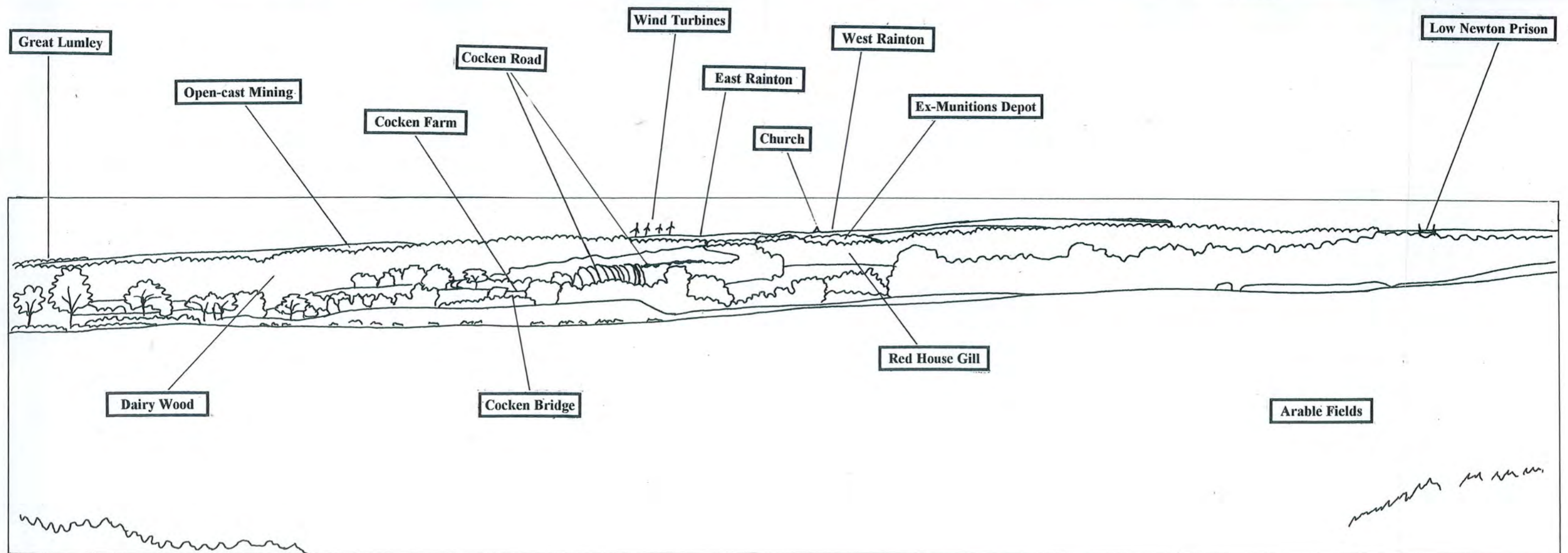


Fig. 3.19. Landscape Assessment. Viewpoint 10. Looking East.

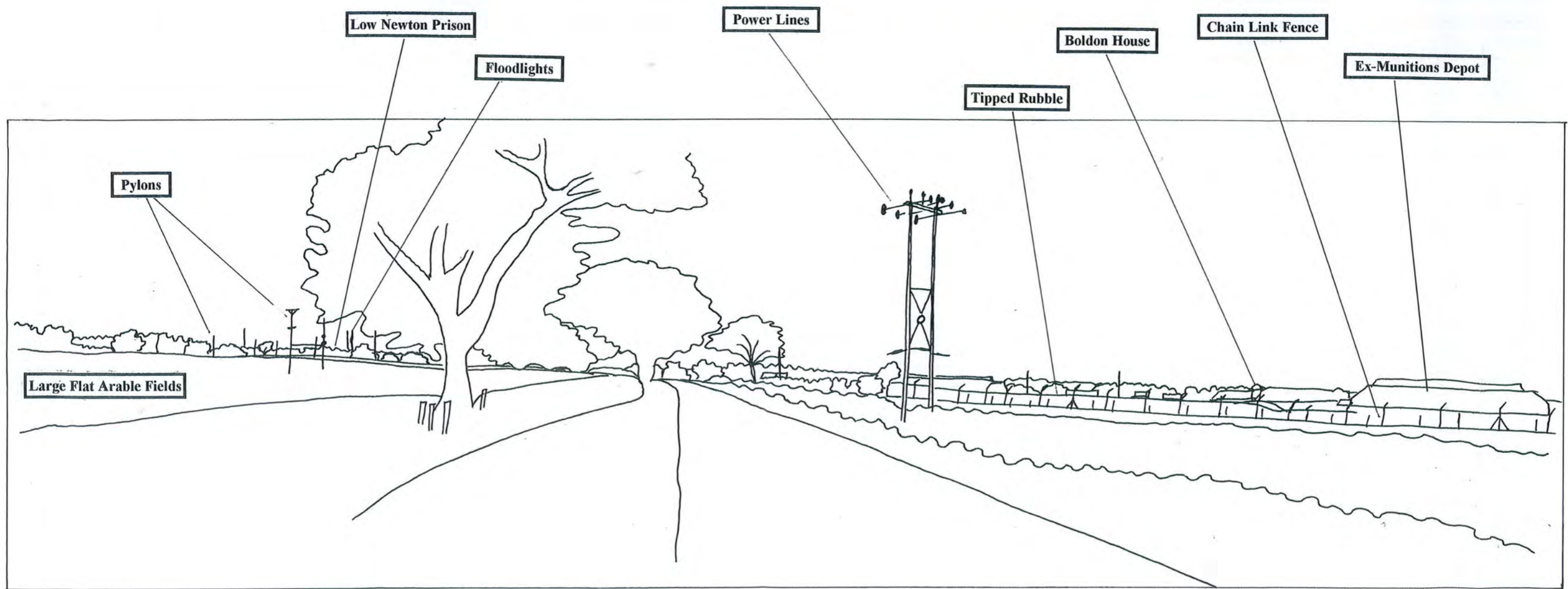


Fig. 3.20. Landscape Assessment. Viewpoint 11. Looking South West.

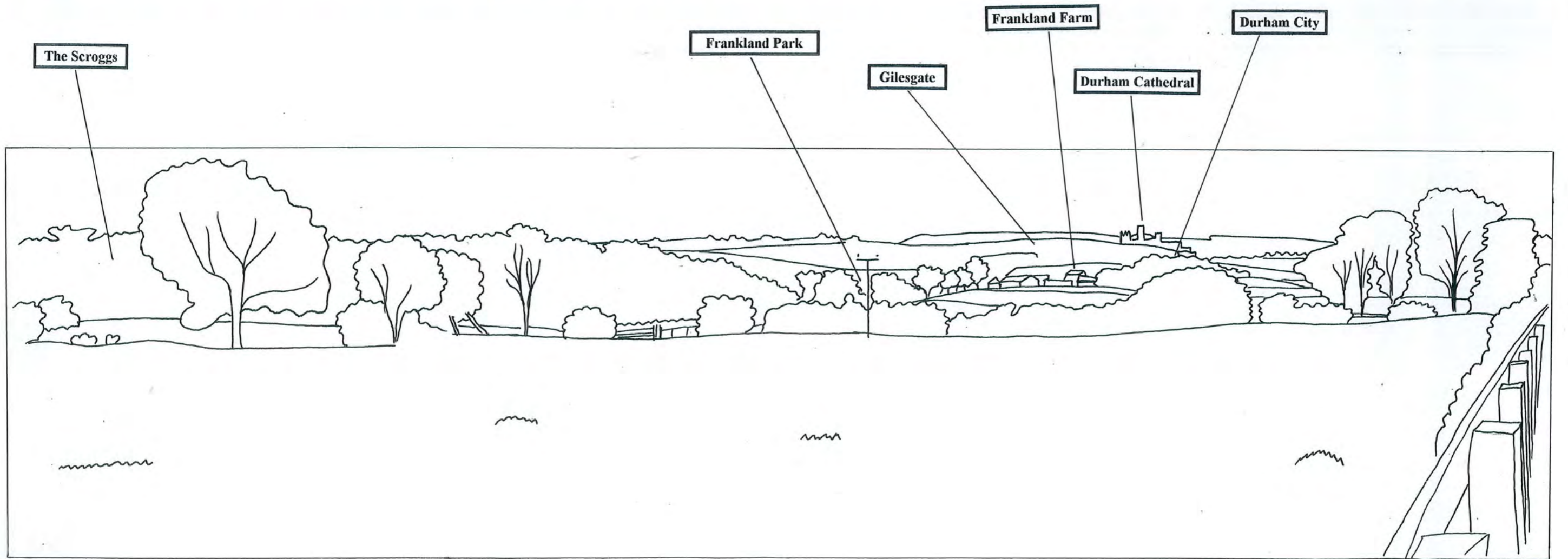


Fig. 3.21. Landscape Assessment. Viewpoint 12a. Looking South.



Low Newton Prison

Course of Frankland Lane

The Scroggs

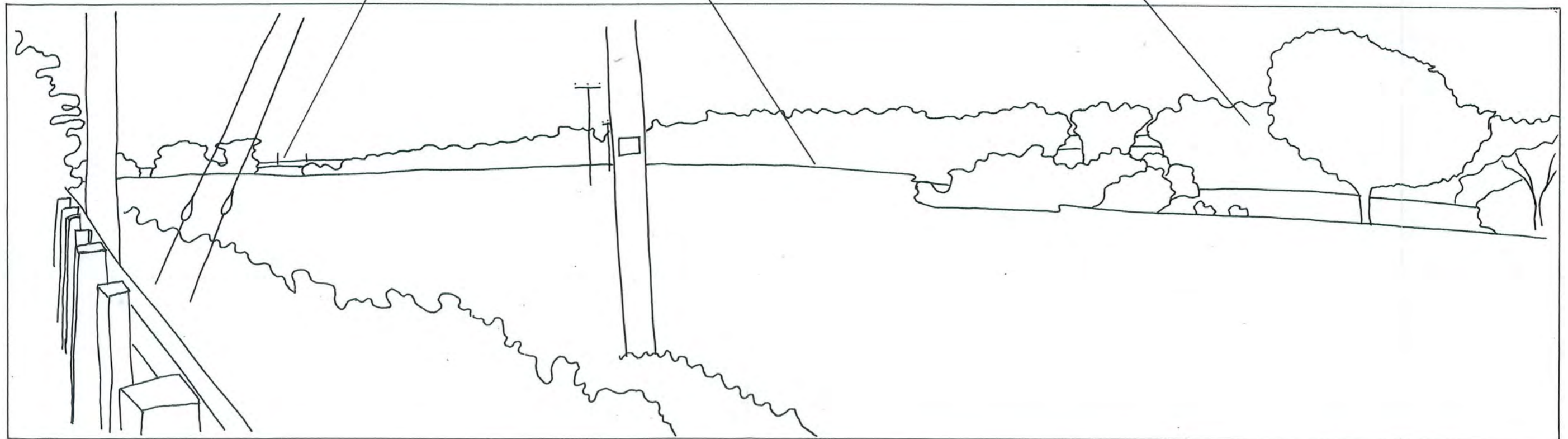


Fig. 3.22. Landscape Assessment. Viewpoint 12b. Looking East.

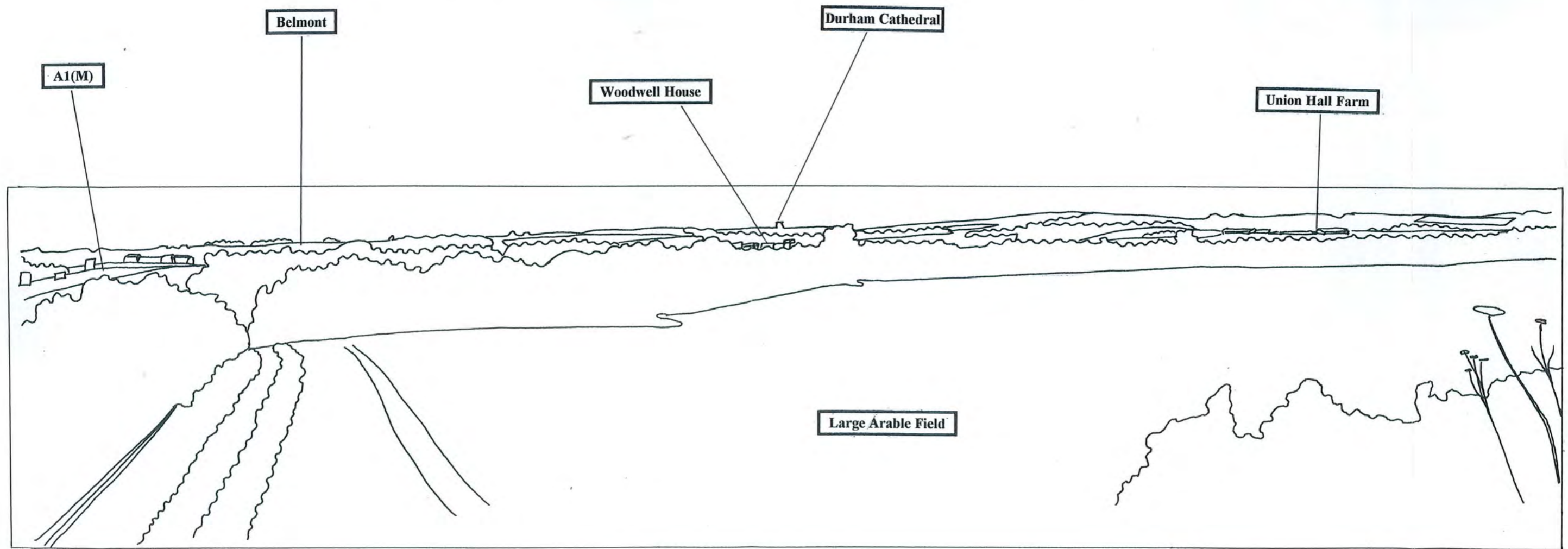


Fig. 3.23. Landscape Assessment. Viewpoint 13. Looking South West.

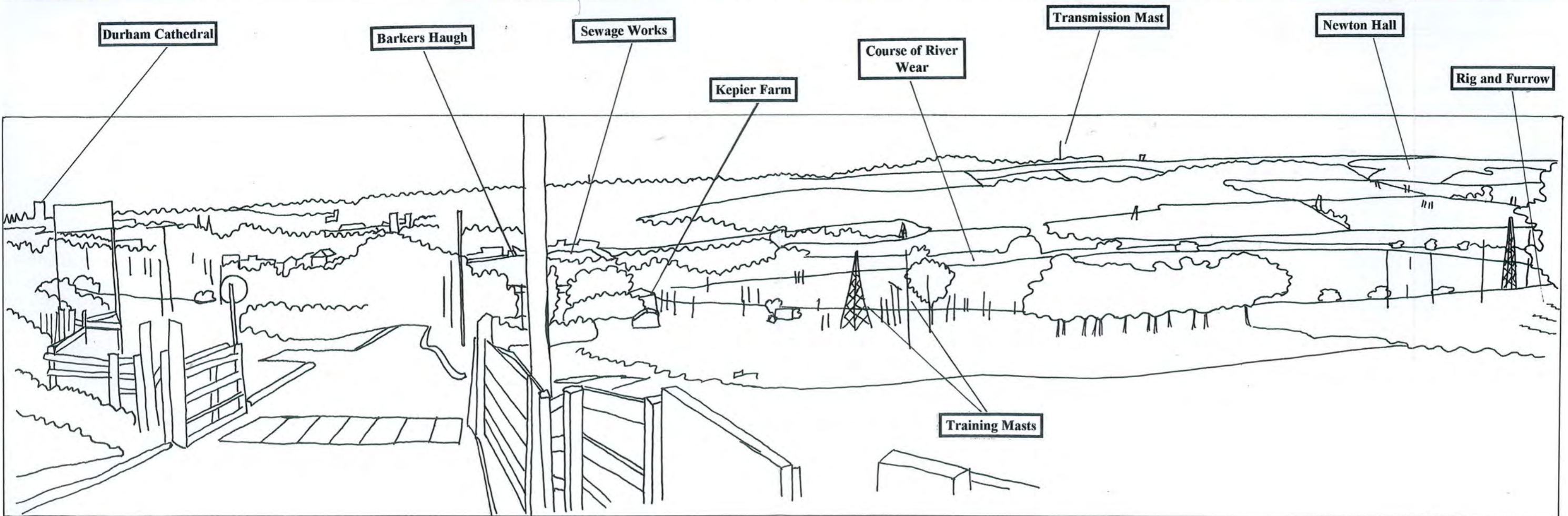


Fig. 3.24. Landscape Assessment. Viewpoint 14. Looking West.

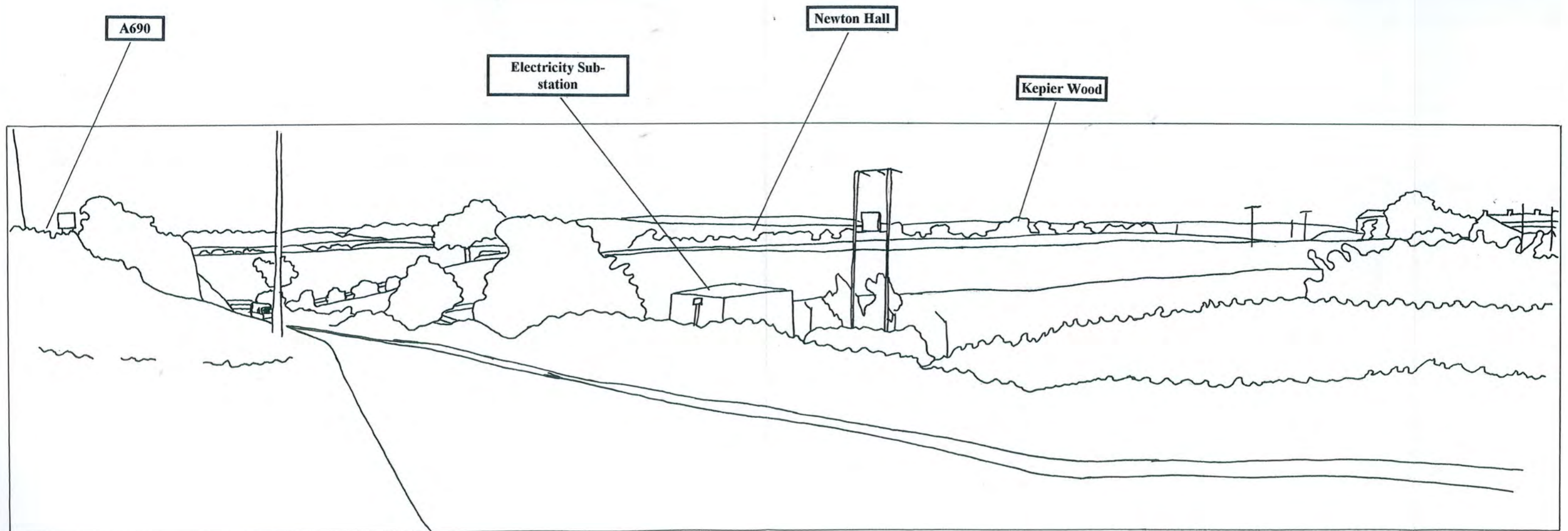


Fig. 3.25. Landscape Assessment. Viewpoint 15. Looking North West.

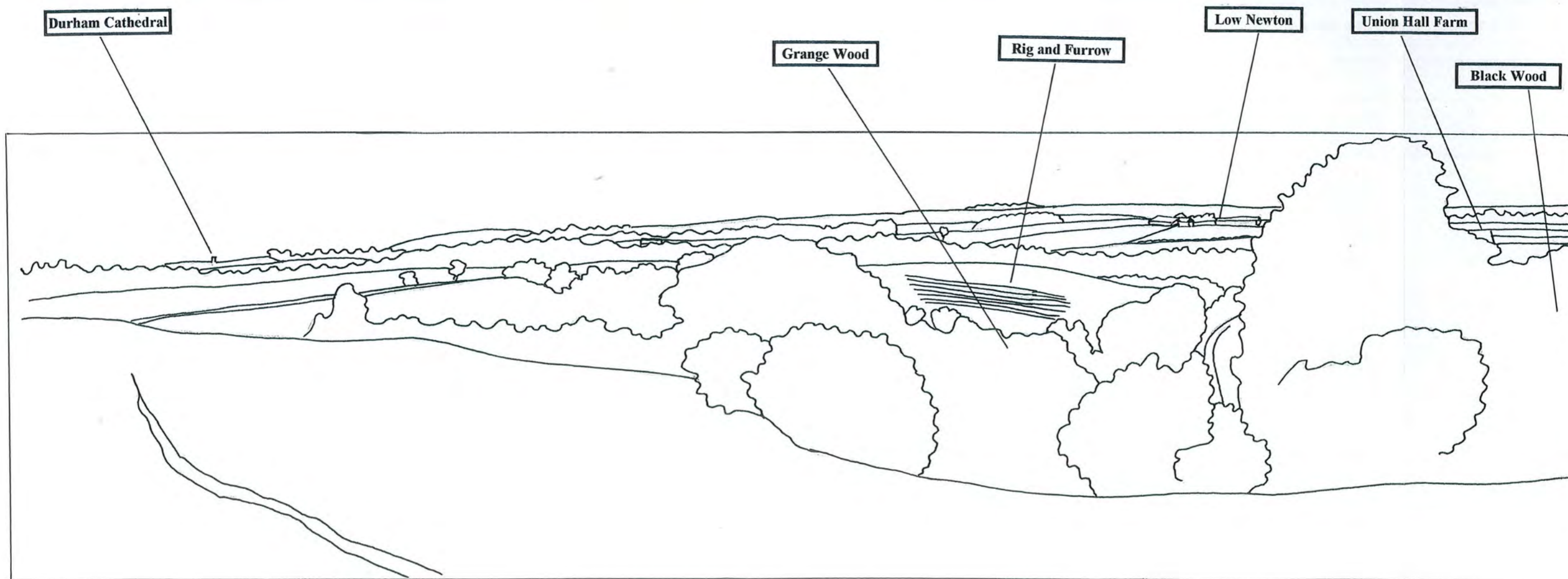


Fig. 3.26. Landscape Assessment. Viewpoint 16. Looking South West.

3.4.1.5 Results of the Landscape Assessment.

3.4.1.5.1 Analysis of "Dominant Landscape Elements". - Firstly, the overall dominance of the various landscape elements was analysed graphically by plotting the number of times each occurred (Fig. 3.27).

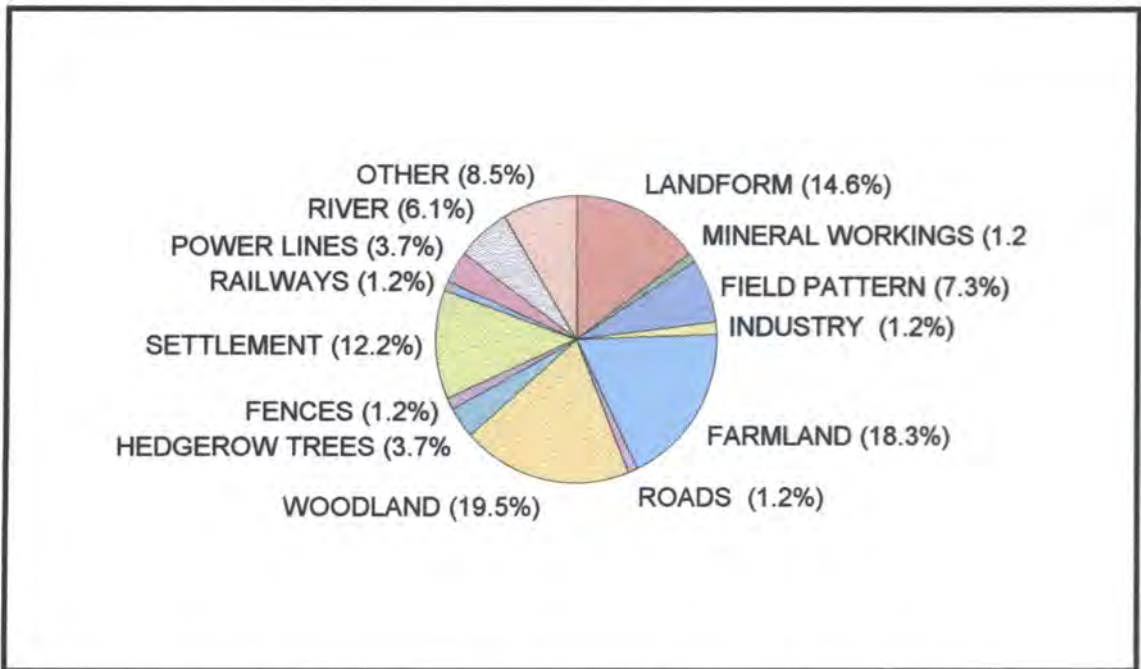


Fig. 3.27 Analysis of "Dominant Landscape Elements".

Woodland, farmland, landform and settlement, in descending order, are the major dominant elements of the study area landscape. This concurs with the impression gained during surveying.

The low incidence of "River" as a dominant element may at first seem surprising. However, its meandering course within a steep sided valley, especially at the southern end, mean that it is frequently not visible. In such cases it was not recorded but its obvious effect on the landscape would be recorded as "landform".

The low incidence of recording of "road", and "railway" is testament to how well these are absorbed into the landscape. The East Coast Main Rail

Line, which runs generally north-south along the western side of the valley, is not visually intrusive because it follows the contours of the valley side. As a result, an observer generally only becomes aware of its presence when a train is actually passing along it. The minor roads within the valley again frequently follow the valley contours or are generally well screened by tree cover, thus reducing visual intrusion, while their relatively low traffic levels stop them being audibly intrusive. It should be noted, however, that the A1(M), A690 and, to a lesser extent, the A167(T) are visually and audibly intrusive to a significant degree but they generally lay outside of the visual envelope being considered. Traffic noise was recorded as a detracting factor at seven of the viewpoints.

Of the eleven recordings of "other" dominant landscape elements, two were of Architectural Ruins, at Finchale Priory, while the other nine were single recordings of Sports Field, Amenity Grassland, Caravan Site, Wind Turbine, Disused Munitions Compound, Durham Cathedral, Pylons, Radio Mast, and Prison Light Pylons.

Each element, with the exception of "Other", was then analysed individually to look for any significant geographical variation in the presence of that element as dominant by plotting the recording (1) or absence (0) of it at each viewpoint, with the viewpoints arranged geographically from north to south. The trends highlighted can be summarised as follows:

- Landform (Fig. 3.28) has a significant effect on the landscape throughout the study area. Its absence as a dominant element at viewpoints 9, 8 and 11 appears to suggest that it is less significant in the central portion of the study area but the restricted visual envelope at viewpoints 9 and 8, and the dominance of the disused munitions compound at viewpoint 11 partially account for this. The fact that these three viewpoints are in such close proximity to each other, and the direction of view is largely the same, means

that there will be a significant overlap in the elements being considered from each. Therefore, any possible trend highlighted here should be regarded as less significant than one highlighted at other adjacent, but more widely spaced viewpoints such as, say, 1,3 and 5.

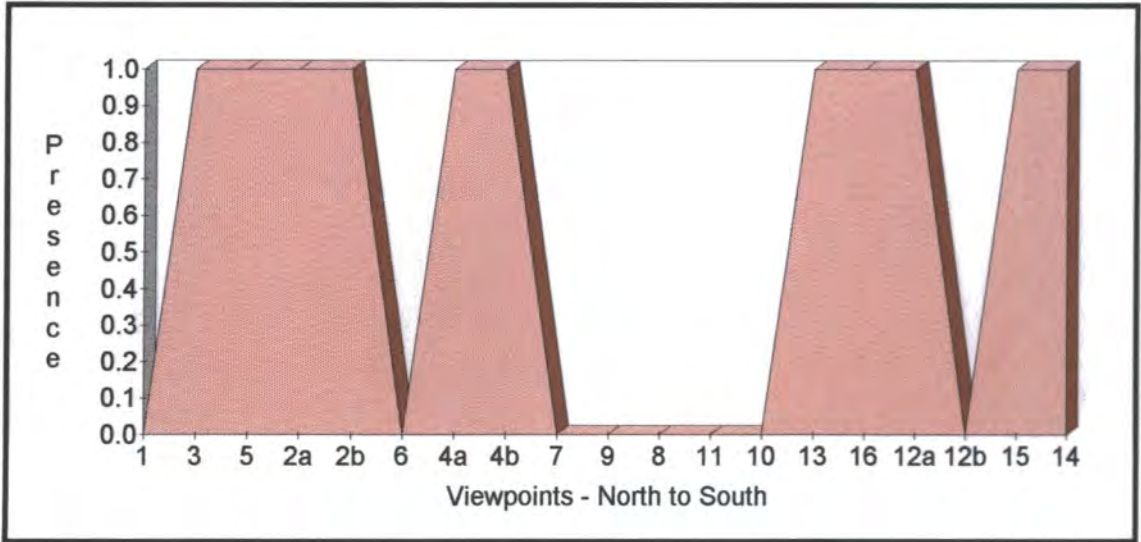


Fig. 3.28 Geographical Variation of Landform as a Dominant Landscape Element.

- Farmland (Fig 3.29) is uniformly dominant throughout the study area except at the extreme north around Chester-le-Street and the Riverside. Its absence at viewpoints 8 and 11 can be accounted for by the restricted visual envelope at viewpoint 8 and the dominance of the disused munitions compound at viewpoint 11 as above.

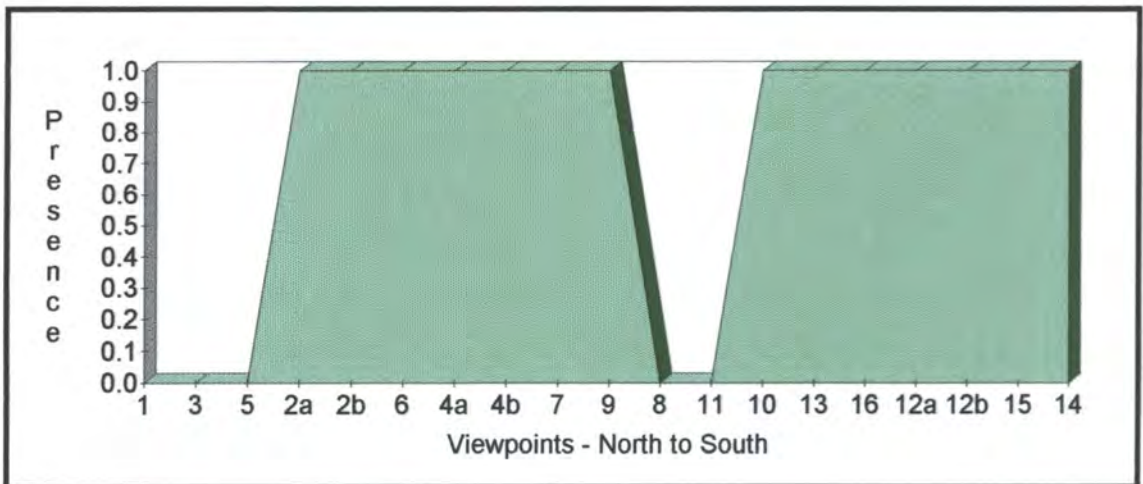


Fig. 3.29 Geographical Variation of Farmland as a Dominant Landscape Element.

- Field Pattern (Fig 3.30) has a variable degree of significant effect on the landscape throughout the study area. Like "Farmland", it is again notably absent at the extreme north of the study area around the town of Chester-le-Street and the amenity areas of the Riverside. It was also absent as a dominant element in the central section of the study area at viewpoints 9, 8, 11, 10, and 13.

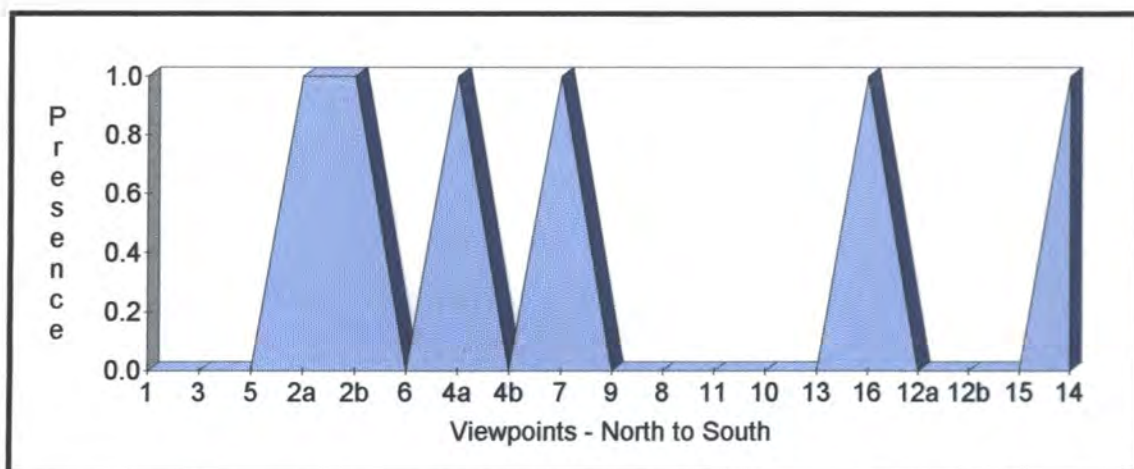


Fig. 3.30 Geographical Variation of Field Pattern as a Dominant Landscape Element.

- Woodland (Fig. 3.31) has a significant effect on the landscape and is uniformly dominant throughout the study area.

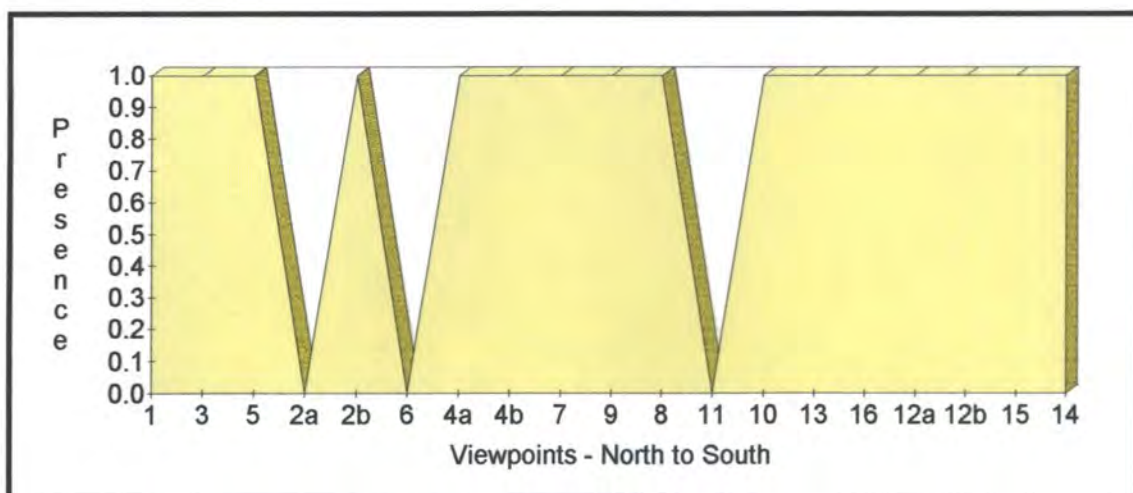


Fig. 3.31 Geographical Variation of Woodland as a Dominant Landscape Element.

- Hedgerow Trees (Fig 3.32) do not have a significant effect on the landscape of the study area. When present their impact is masked by the extensive woodland cover, a notable exception being at viewpoint 6 where their recording as a dominant element corresponds with the absence of "Woodland" as a dominant element.

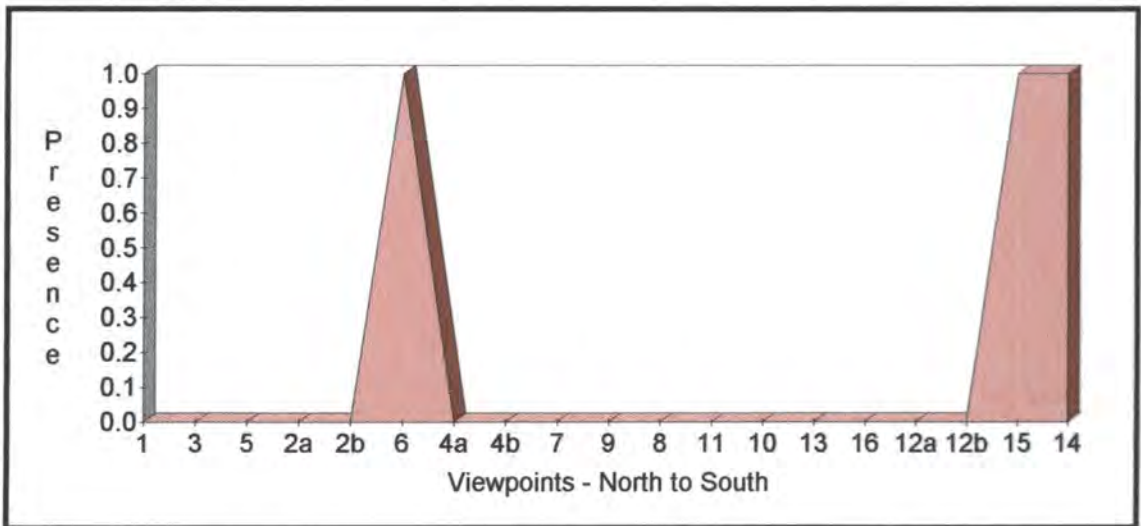


Fig. 3.32 Geographical Variation of Hedgerow Trees as a Dominant Landscape Element.

- Mineral Workings (Fig. 3.33) do not have a significant effect on the landscape of the study area except in the immediate vicinity of viewpoint 6.

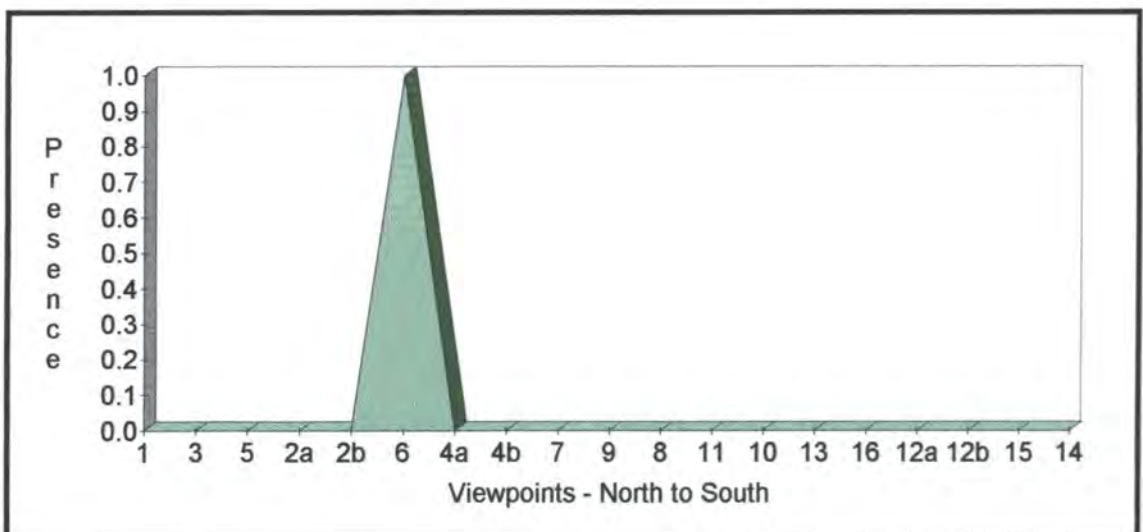


Fig. 3.33 Geographical Variation of Mineral Workings as a Dominant Landscape Element.

- Fences (Fig 3.34) do not have a significant effect on the landscape of the study area except at viewpoint 11, where the record refers to the fences surrounding the disused munitions compound there.

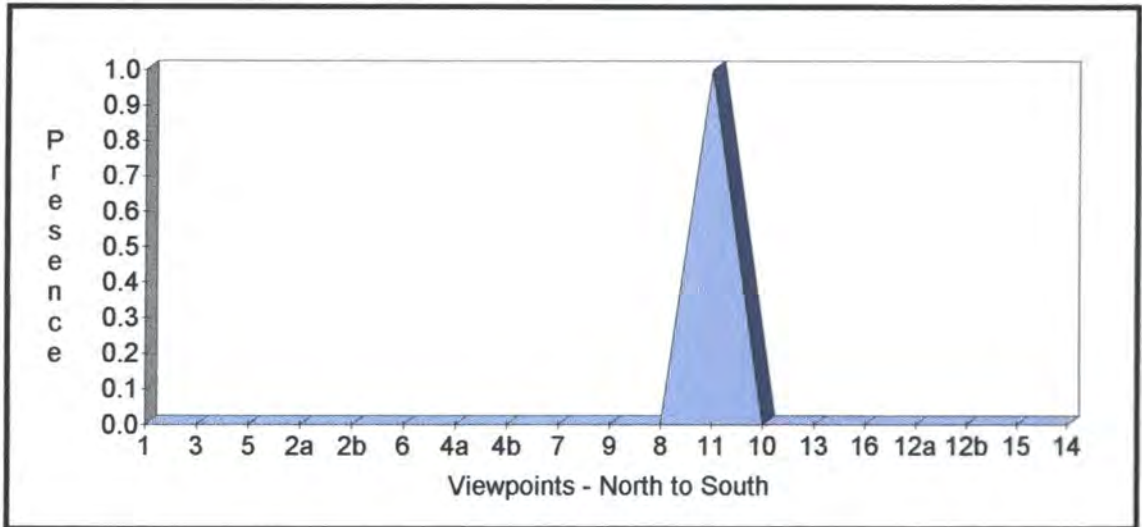


Fig. 3.34 Geographical Variation of Fences as a Dominant Landscape Element.

- Settlement (Fig. 3.35) has a significant effect on the landscape, though less so than "Woodland", and shows no geographical variation within the study area. In the northern section Chester-le-Street and Great Lumley are the cause. Progressing south in the study area, the influence of Durham increases; initially with the northern suburb of Newton Hall and later with the eastern area of Gilesgate and the central area of the City itself.

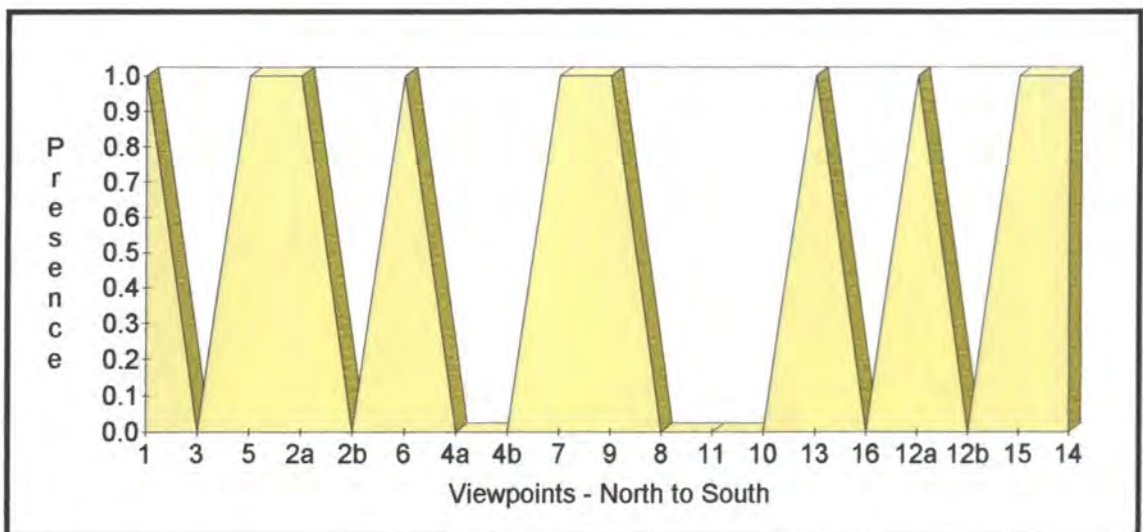


Fig. 3.35 Geographical Variation of Settlement as a Dominant Landscape Element.

- Industry (Fig. 3.36) does not have a significant effect on the landscape anywhere in the study area. The industry within Chester-le-Street in the north is masked within the settlement. Only at Belmont in the south does a discrete industrial area stand on the edge of the study area, its presence being recorded at viewpoint 14.

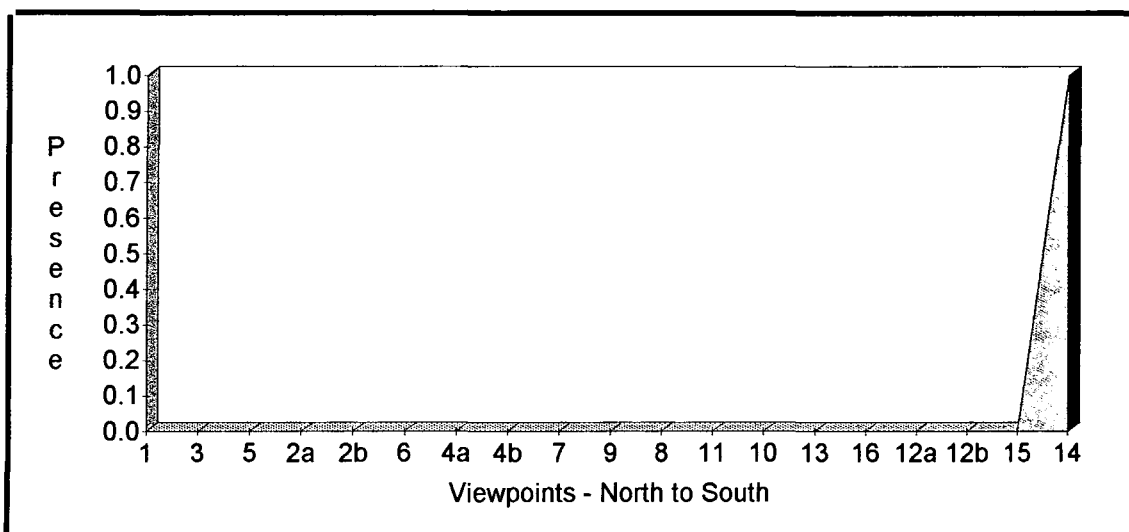


Fig. 3.36 Geographical Variation of Industry as a Dominant Landscape Element.

- Roads (Fig 3.37) do not have a significant effect on the landscape anywhere in the study area. However, reference should be made to the comments made about the A1(M), A690 and A167(T) in the initial analysis of the overall dominance of the various "dominant landscape elements".

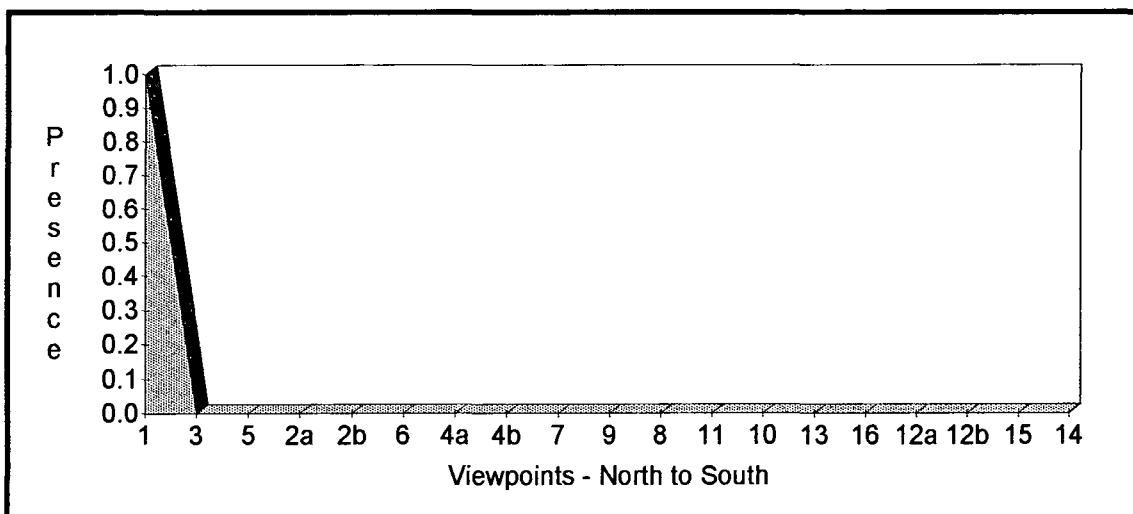


Fig. 3.37 Geographical Variation of Roads as a Dominant Landscape Element.

- Railways (Fig. 3.38) do not have a significant effect on the landscape anywhere in the study area except at the extreme south where the railway viaduct within Durham City is noticeable. Again reference should be made to the earlier comments in the initial analysis of the overall dominance of the various "dominant landscape elements".

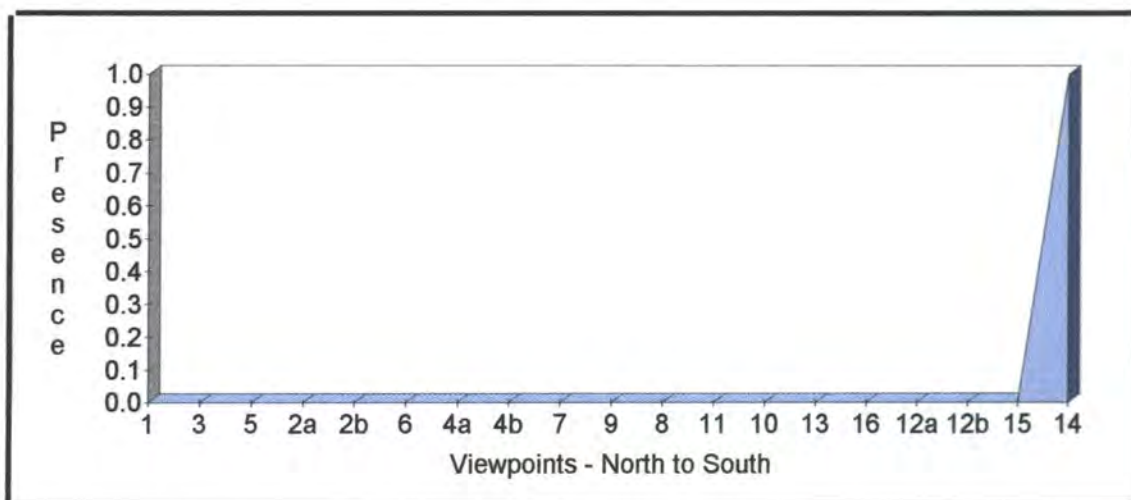


Fig. 3.38 Geographical Variation of Railways as a Dominant Landscape Element.

- Power Lines (Fig. 3.39) have a significant effect on the landscape of the study area in the central section, around the disused munitions storage compound, and in the south where the presence of the Electricity Board Training Centre is the cause.

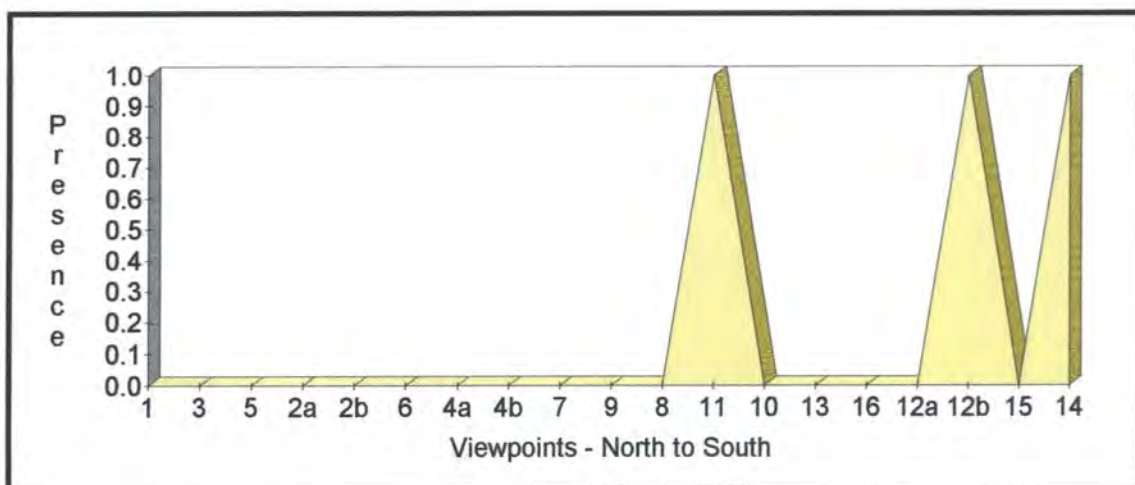


Fig. 3.39 Geographical Variation of Power Lines as a Dominant Landscape Element.

- River (Fig. 3.40) has a moderately significant effect on the landscape, though less so than "Woodland" or "Settlement". The relatively low incidence of recording was explained in the initial analysis of the overall dominance of the various "dominant landscape elements" above. As would be expected with the river flowing through the length of the study area, there is no geographical variation in its effect.

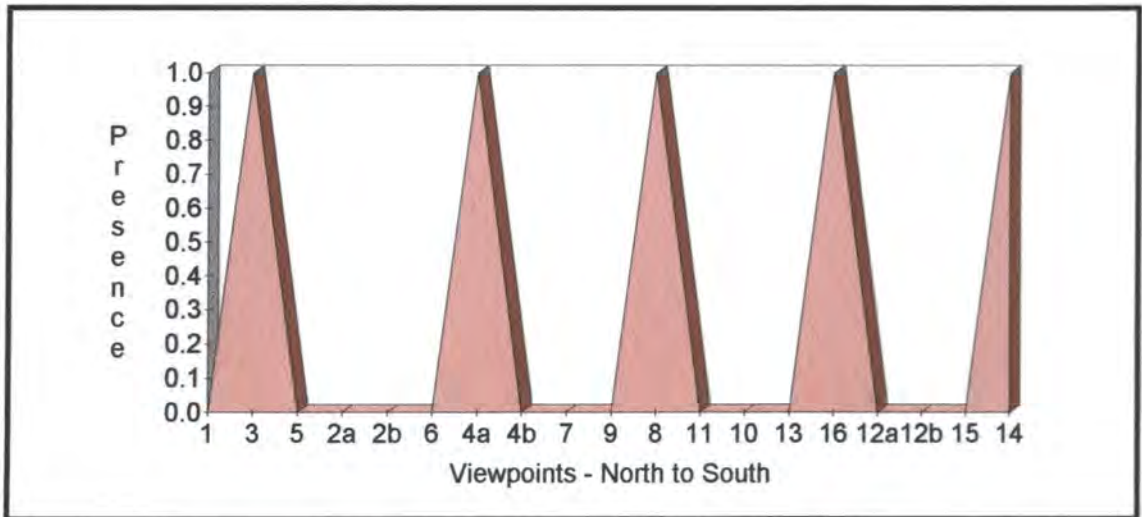


Fig. 3.40 Geographical Variation of River as a Dominant Landscape Element.

3.4.1.5.2 Analysis of Aesthetic Factors. - The aesthetic factors considered in the survey were first analysed graphically by considering each factor in turn and plotting the number of times each key word in the graded check-list occurred as a percentage of the whole. The results were then used in drafting the summaries below which should be read in conjunction with the relevant figures.

- Balance: (Fig. 3.41) The landscape of the study area is predominantly Harmonious and Balanced with Chaotic or Discordant being recorded at only 26.3% of viewpoints.

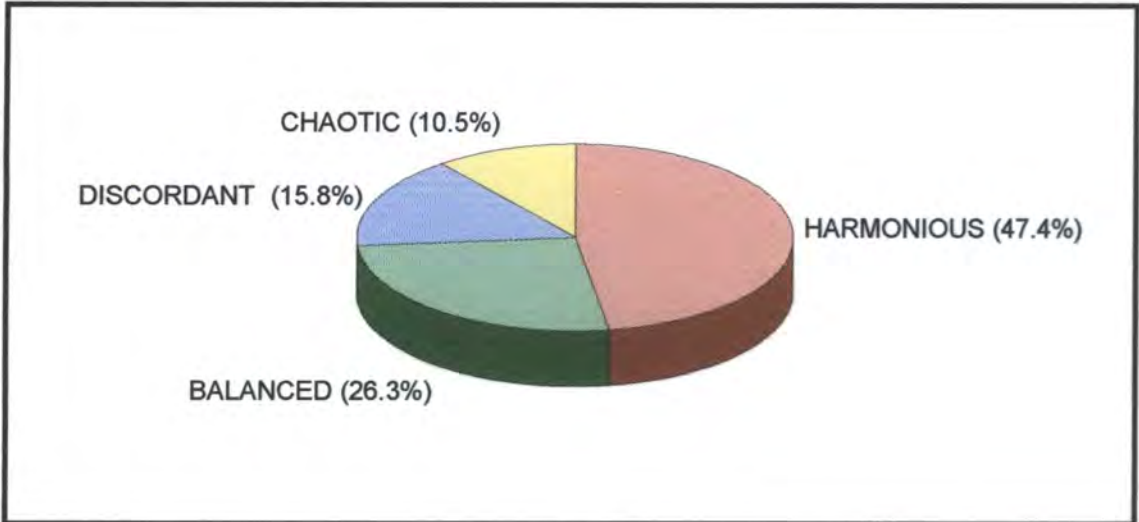


Fig. 3.41 Assessment of the Landscape by Considering the Aesthetic Factor of Balance.

- Scale: (Fig. 3.42) The scale of the landscape is predominantly Large or Medium scale. This result will have been influenced by the selection of elevated viewpoints.

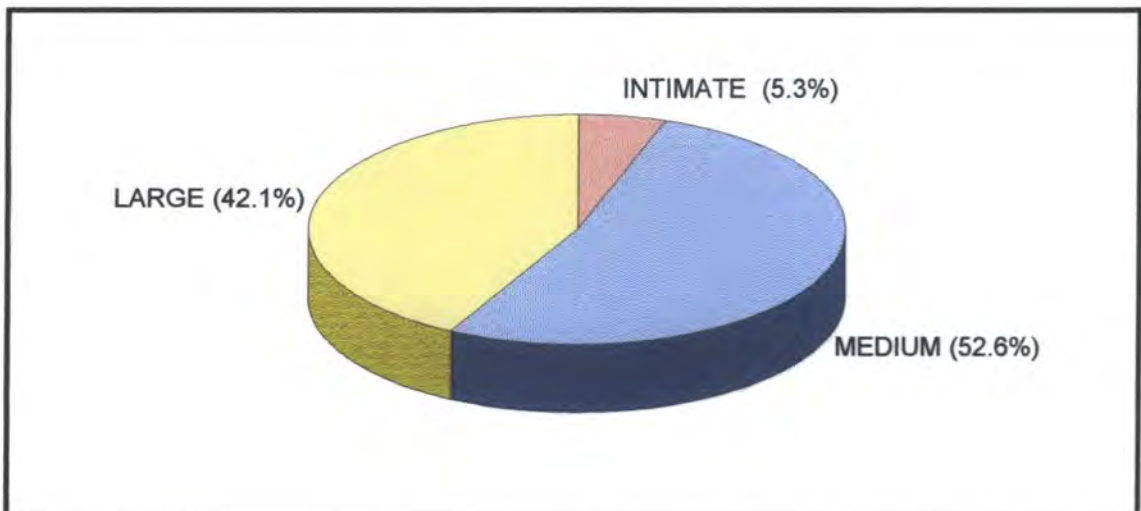


Fig. 3.42. Assessment of the Landscape by Considering the Aesthetic Factor of Scale.

- Enclosure: (Fig. 3.43) The landscape is predominantly Open. Nowhere was it considered to be Confined and Enclosed was recorded as a response at only 15.8% of viewpoints.

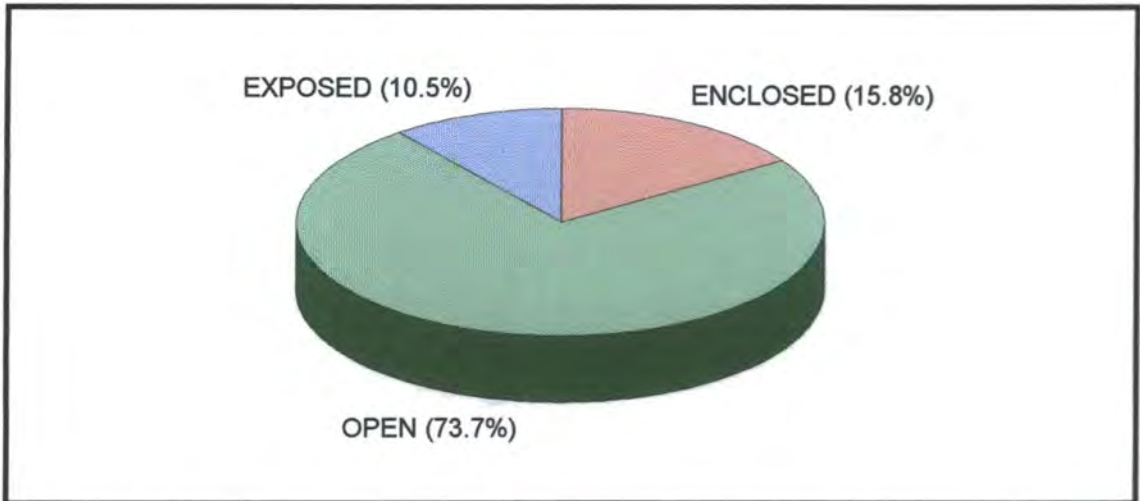


Fig. 3.43 Assessment of the Landscape by Considering the Aesthetic Factor of Enclosure.

- Texture: (Fig. 3.44) The landscape is predominantly Rough or Very Rough. Nowhere was it considered to be Smooth, and Textured was recorded as a response at only 5.3% of viewpoints.

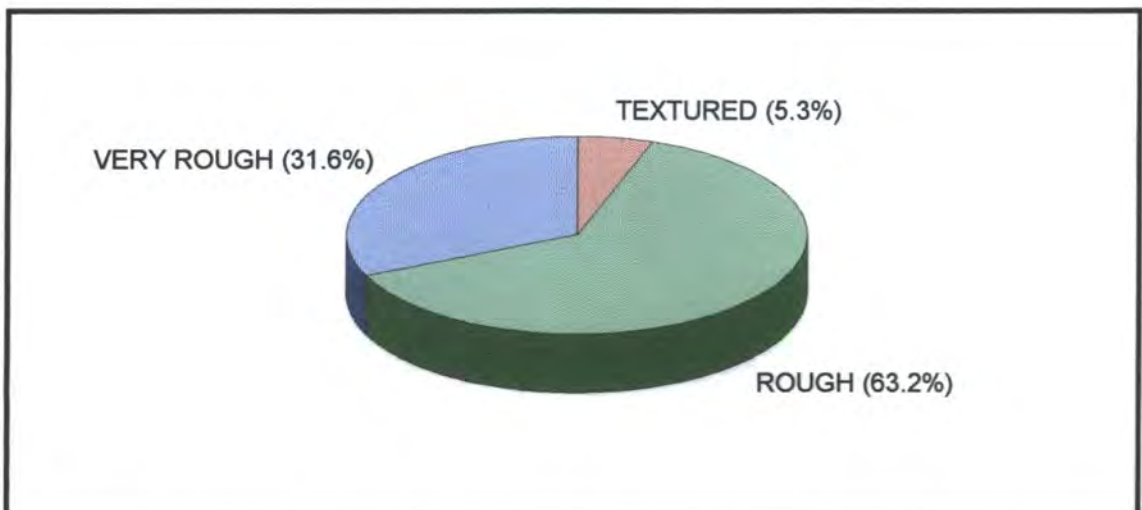


Fig. 3.44 Assessment of the Landscape by Considering the Aesthetic Factor of Texture.

- Colour: (Fig. 3.45) The landscape throughout the study area was recorded as Colourful or Muted. A single recording of Garish at one viewpoint can be attributed to a large oilseed rape field. Nowhere was it considered Monochrome.

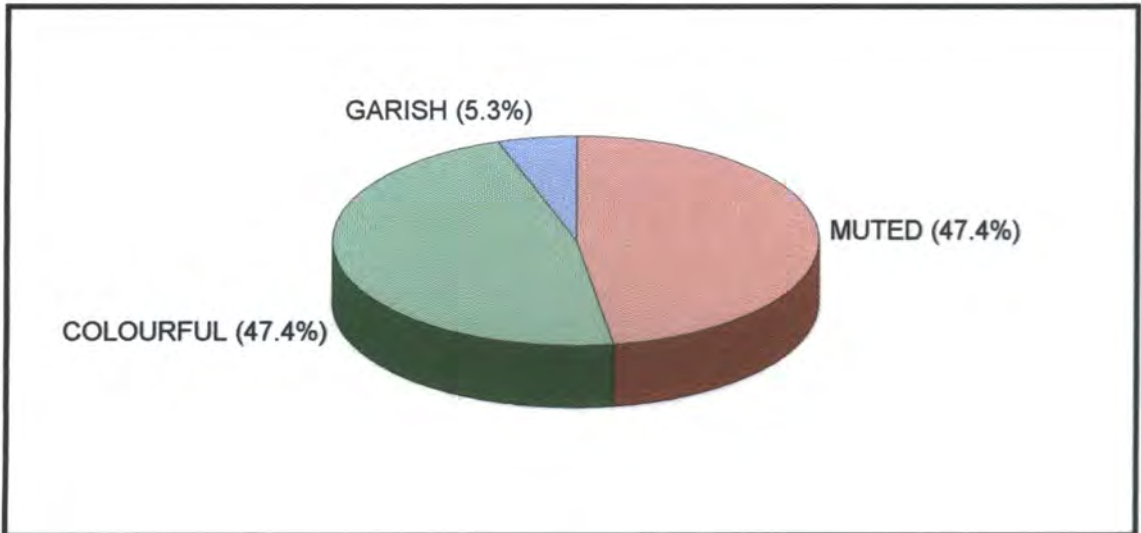


Fig. 3.45 Assessment of the Landscape by Considering the Aesthetic Factor of Colour.

- Diversity: (Fig. 3.46) Nowhere was the landscape Uniform. The recordings of Simple, Diverse and Complex were in almost exactly equal proportions.

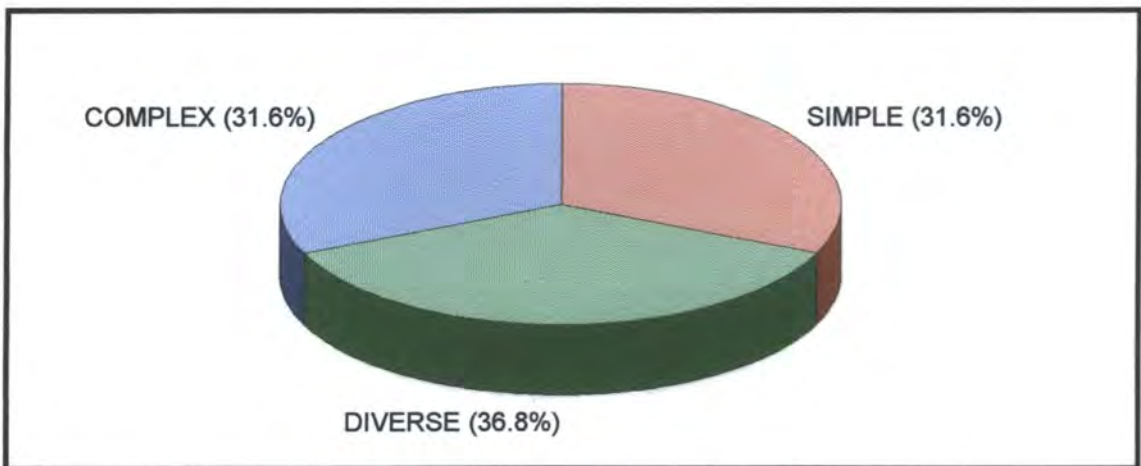


Fig. 3.46 Assessment of the Landscape by Considering the Aesthetic Factor of Diversity.

- Unity: (Fig. 3.47) The majority of recordings in this category described the landscape as Interrupted with this description occurring at 57.9% of viewpoints.

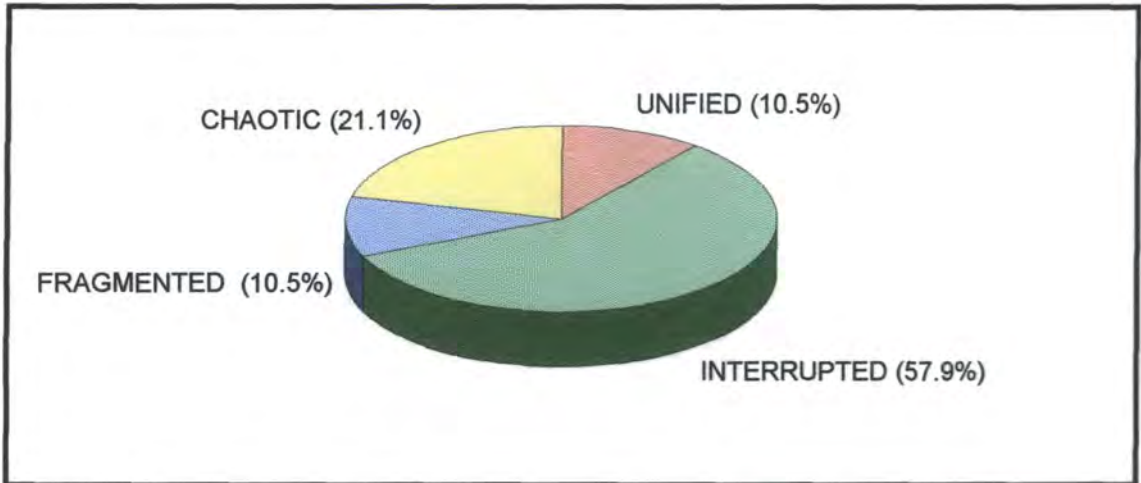


Fig. 3.47 Assessment of the Landscape by Considering the Aesthetic Factor of Unity.

- Form: (Fig. 3.48) The form of the landscape is predominantly Curved (at 42.2% of viewpoints) or Sinuous (at 31.6% of viewpoints).

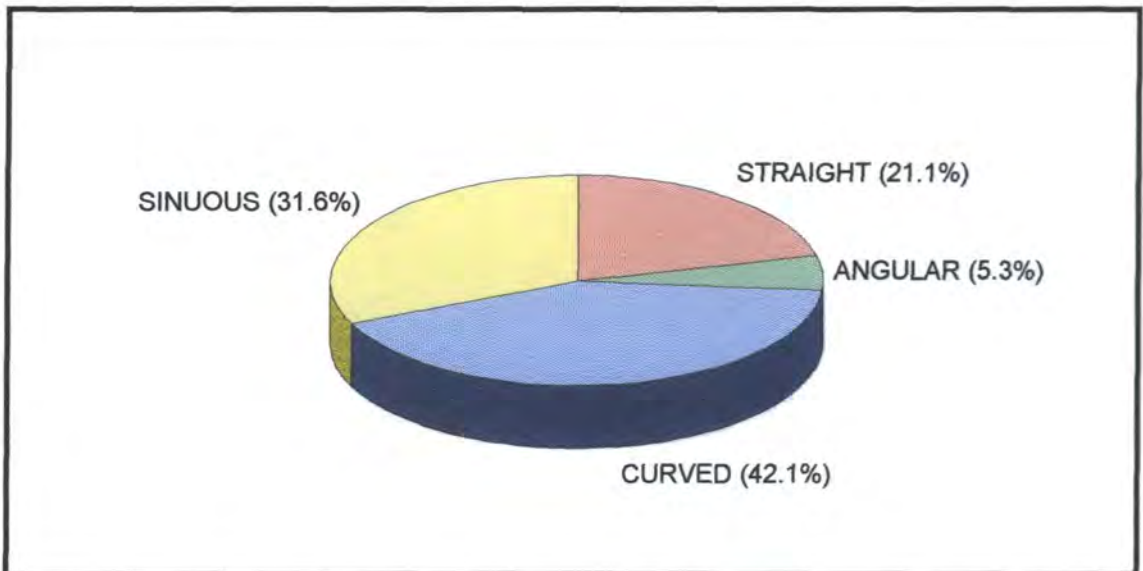


Fig. 3.47 Assessment of the Landscape by Considering the Aesthetic Factor of Form.

Each aesthetic factor was then analysed individually to look for any significant geographical variation by assigning a number between 0 and 3 to each of the four keywords used to grade each aesthetic factor. For example, in the case of the aesthetic factor Balance, 0 was assigned to the keyword describing the lowest degree of balance, Chaotic, and 3 to that describing the highest degree, Harmonious. Numbers were assigned to the other categories in a similar manner (Fig. 3.48)

	ASSIGNED 3	ASSIGNED 2	ASSIGNED 1	ASSIGNED 0
BALANCE	HARMONIOUS	BALANCED	DISCORDANT	CHAOTIC
SCALE	LARGE	MEDIUM	SMALL	INTIMATE
ENCLOSURE	EXPOSED	OPEN	ENCLOSED	CONFINED
TEXTURE	VERY ROUGH	ROUGH	TEXTURED	SMOOTH
COLOUR	GARISH	COLOURFUL	MUTED	MONOCHROME
DIVERSITY	COMPLEX	DIVERSE	SIMPLE	UNIFORM
UNITY	UNIFIED	INTERRUPTED	FRAGMENTED	CHAOTIC
FORM	SINUOUS	CURVED	ANGULAR	STRAIGHT

Fig. 3.48 Code Numbers Assigned to Aesthetic Factor Keywords.

The assigned numbers were then plotted against the viewpoints, arranged geographically from north to south, for each aesthetic factor to quickly identify any possible geographical trends. The greater the area beneath the graph at each viewpoint, the more that landscape was Balanced, Diverse or Unified; the larger the Scale; the more Colourful or Textured it was; the less Enclosed it was; or the more sinuous was its Form. The trends thus highlighted can be summarised as follows:

- Taking into account the restricted visual envelope from viewpoints 9 and 8, there is no significant geographical variation in Balance (Fig. 3.49), Scale (Fig. 3.50), Texture (Fig. 3.51), Colour (Fig. 3.52), Diversity (Fig. 3.53) and Form (Fig. 3.54) within the study area.

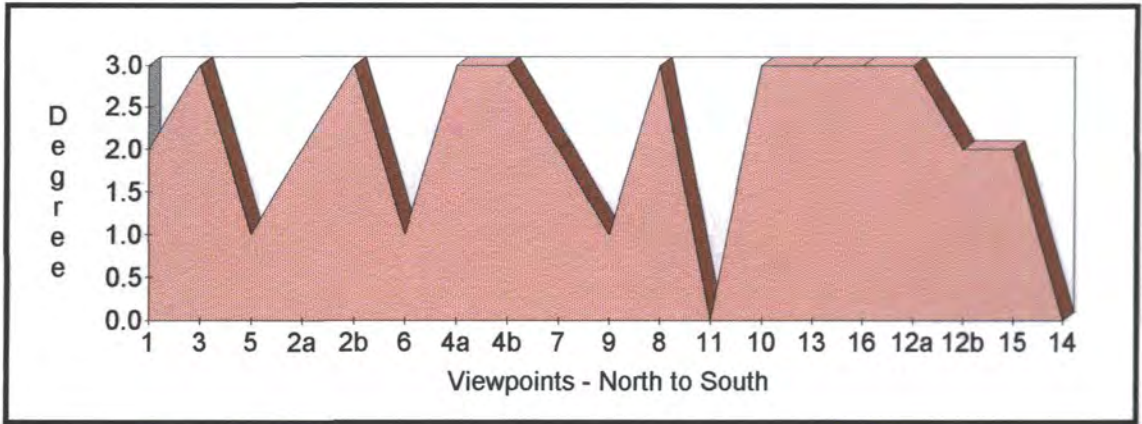


Fig. 3.49 Geographical Variation of the Aesthetic Factor of Balance.

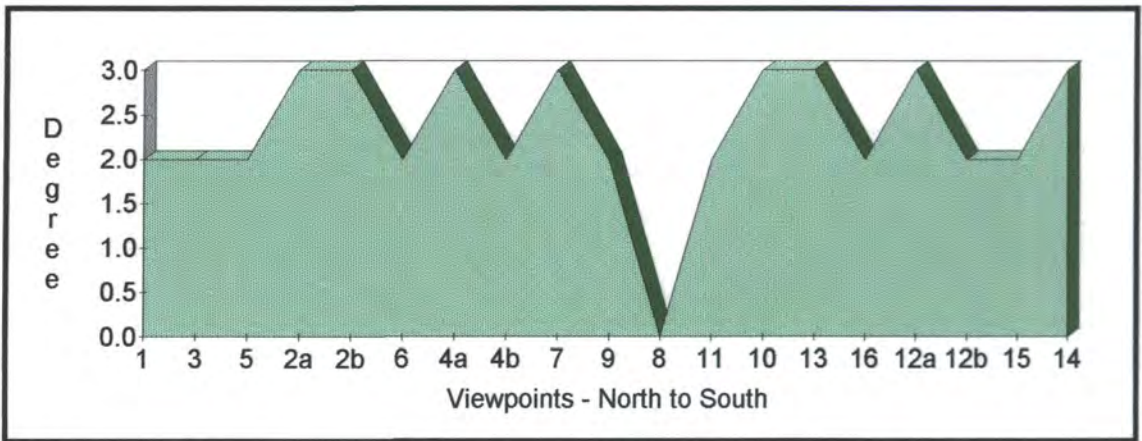


Fig. 3.50 Geographical Variation of the Aesthetic Factor of Scale.

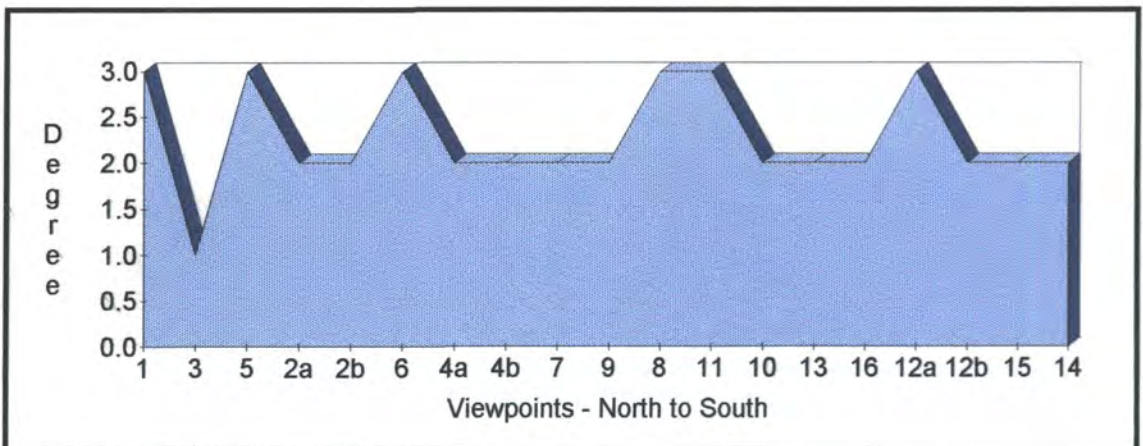


Fig. 3.51 Geographical Variation of the Aesthetic Factor of Texture.

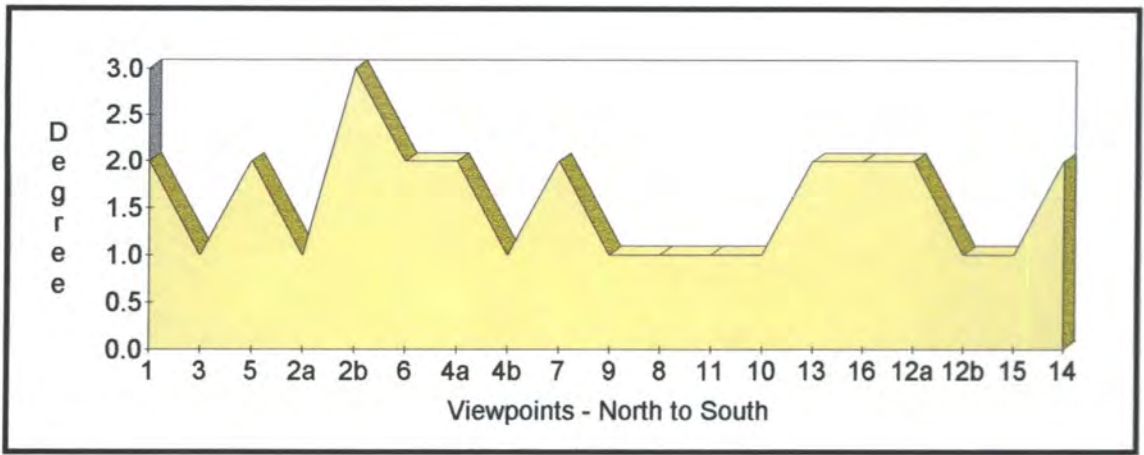


Fig. 3.52 Geographical Variation of the Aesthetic Factor of Colour.

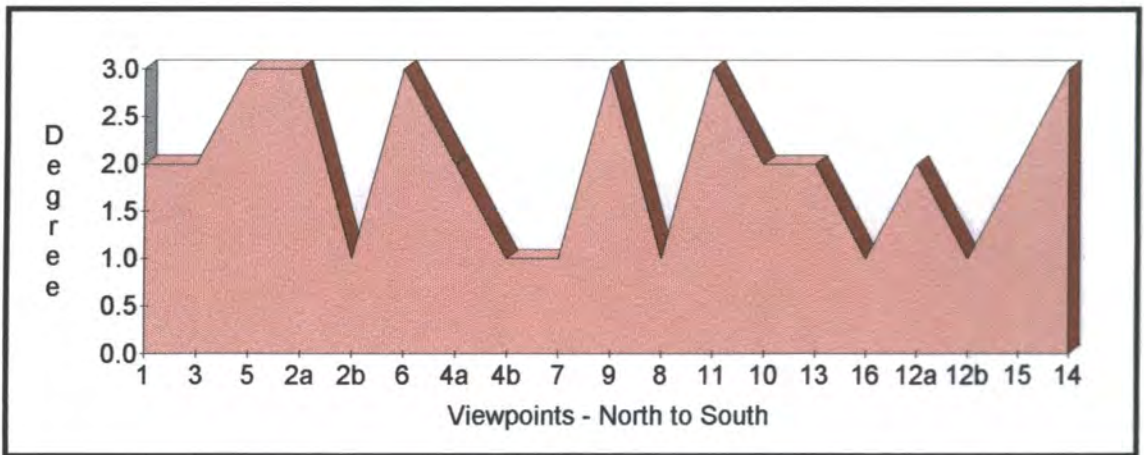


Fig. 3.53 Geographical Variation of the Aesthetic Factor of Diversity.

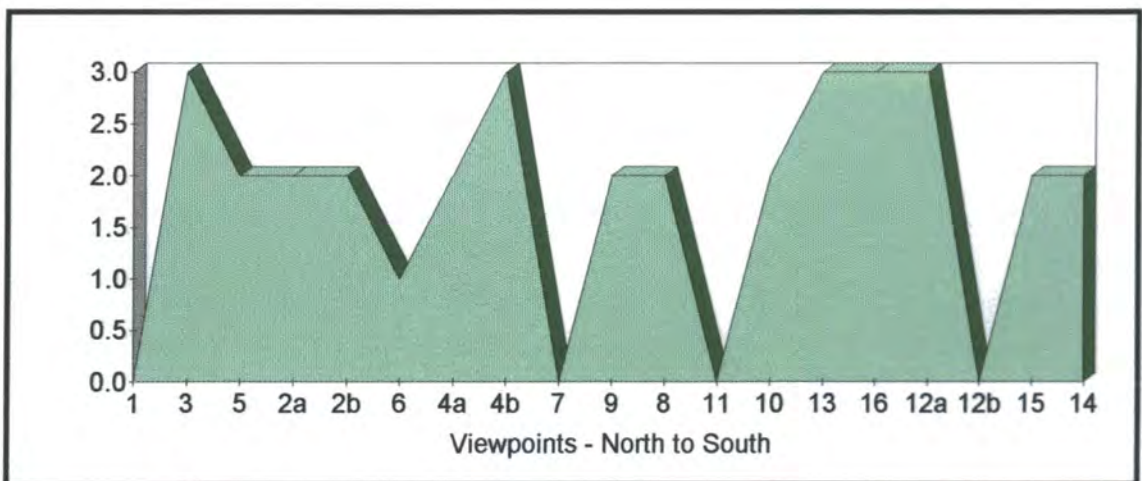


Fig. 3.54 Geographical Variation of the Aesthetic Factor of Form.

- The recording of "Exposed" as descriptive of the Enclosure of the landscape is confined to the northern part of the central section of the study area (Fig 3.55). In the southern part the landscape was consistently described as "Open".

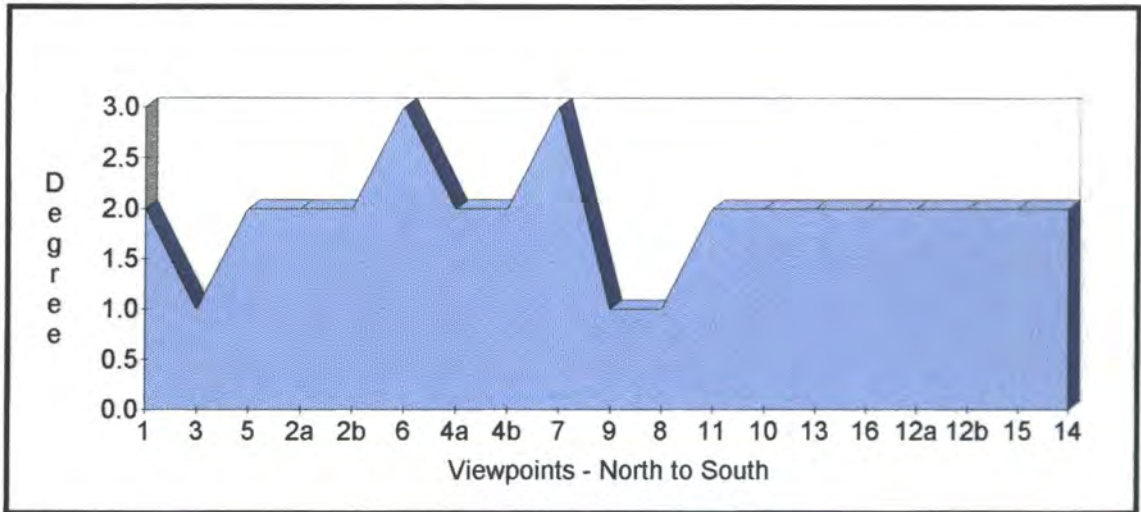


Fig. 3.55 Geographical Variation of the Aesthetic Factor of Enclosure.

- Recording of the greatest degree of Unity; "Unified" is confined to the central section of the study area.(Fig. 3.56).

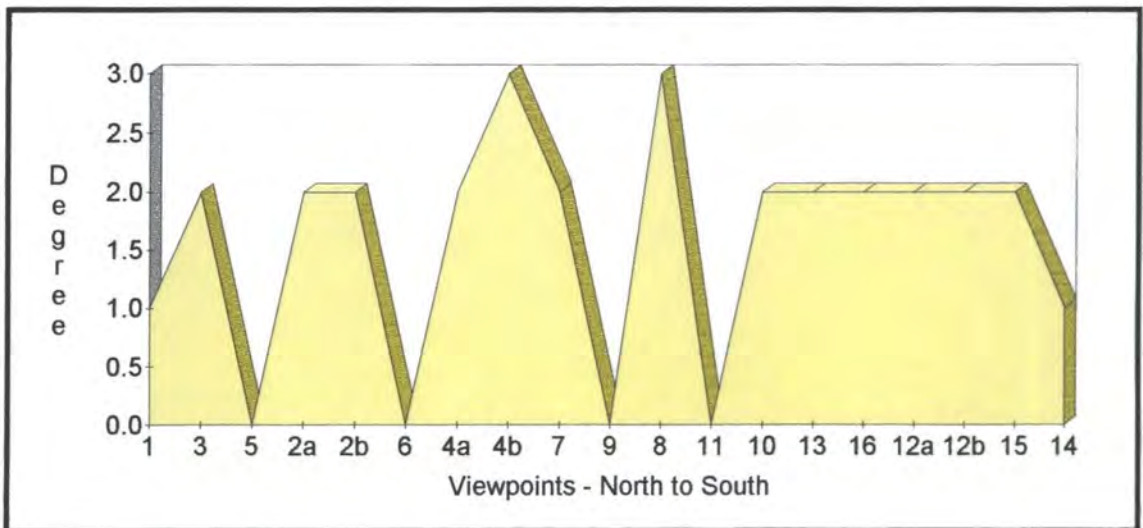


Fig. 3.56 Geographical Variation of the Aesthetic Factor of Unity.

3.4.1.5.3 Analysis of Special Aesthetic Factors and Landscape Enhancement and Conservation Measures. - Appraisal of field survey notes results in the following summary:

- The undulating landform and rural nature of the valley landscape, and the presence of large areas of deciduous woodland, sympathetically positioned within it, were frequently recorded as attractive features. It was also noted that the mix of farmland and woodland in the rural areas was generally well balanced and provided visual variety.
- The meandering river and the open grassed areas and riparian treecover around Chester-le-Street Riverside were considered attractive.
- The remains of Finchale Priory in its riverside setting was noted as a particularly attractive feature of the landscape as was the densely-wooded, steep-sided meandering river valley in the surrounding area.
- In the south of the study area the tree-dotted parkland at Frankland Park is an attractive feature and the historic buildings of the City of Durham, most especially the cathedral, provide a visual focus.
- Traffic noise from the major roads around the periphery of the study area was the feature most consistently recorded as detracting from the landscape.
- The open cast mineral workings near Great Lumley also detract from the landscape. They are ineffectively screened from the area immediately around them and, being on the skyline, they are also visible from the far side of the valley.
- Some incongruous buildings within the settlements of Chester-le-Street and Durham detracted from the landscape as did some newly built properties in rural areas, and portakabins within the site of Finchale Priory.
- Overhead telephone lines, where these were routed in straight lines across country, were visually unappealing.

- The disused munitions compound to the west of Finchale Priory was considered to be a major detractor; chiefly because of the regimented layout of the buildings, semi-derelict chain-link fencing around the compound, fly-tipping within the compound, and the general appearance of neglect.
- The wind turbine, over-head power lines, caravan site and modern farm buildings around Finchale Priory were considered to detract from the landscape because of the close proximity of such modern structures to the architectural remains.
- The power masts and pylons at the Northern Electric Training Centre and the sewage works at Barkers Haugh detract from the landscape of the south of the study area as do over-head power lines that run through this area.
- Large field sizes were sometimes recorded as a detracting feature in the rural areas but generally, surrounding woodland cover or the undulating land form served to offset this effect.
- A block of conifers within the predominantly deciduous Bowburn Woods was felt to be visually incongruous.

3.4.1.5.4 Analysis of Seasonal and Temporal Effects. - The most frequently mentioned potential variation in the landscape due to seasonal or temporal effects was visual changes due to the large areas of deciduous woodland cover, changes in leaf colour in autumn will have a significant effect on the colour of the landscape. Leaf fall over winter will lessen the visual impact of the deciduous stands significantly affecting the landscape; especially in the areas of Balance and Texture. The presence of coniferous blocks within the areas of mixed woodland will also be more noticeable in autumn and winter affecting Balance and Unity. Growth of the trees in the newly planted areas in the north of the study area will also have an effect on the landscape over the longer term.

The growth and harvest of crops, and year-by-year changes in the crops grown, in the arable areas will have a significant effect on the Colour and, to a lesser extent, the Texture of the landscape. The effect of the yellow flowers of oil-seed rape on the Colour of the landscape was especially noted.

3.4.1.5.5 Analysis of Landscape Enhancement And Conservation

Measures. - Appraisal of the survey notes recording measures that could potentially conserve or enhance the character of the landscape resulted in the following conclusions:

- Great importance was attached to preventing urban spread; both of Chester-le-Street east of the A167(T) into the valley flood plain or southwards beyond its present limits, and of Newton Hall any further to the north or to the east beyond the East Coast Main Rail Line (Fig.3.7).
- In the urban fringe areas it would be beneficial to screen the incongruous buildings of the Go Ahead Northern Bus Depot and the Civic Centre in Chester le Street with taller tree species, as would management of the riverside trees to allow larger specimens to obscure the sports centre buildings when viewed from the B1284. Maintaining tree cover at existing levels within the managed areas of Chester-le-Street Riverside North by progressive planting was also identified as a potential landscape conservation measure, though it was also noted that there were indications that this is being undertaken.
- In the rural areas it was frequently noted that preserving levels of woodland cover and diversity of tree species was important in conserving the landscape character. Noted enhancement measures concerning woodland included breaking up the coniferous block in Bowburn Woods by progressively replanting with deciduous species, increasing the level of deciduous tree cover within the grounds of the treatment works at Barkers Haugh and around the caravan site at Finchale Priory to reduce their visual impact, and

managing the woodland in Finchale Banks/Cocken Woods to obscure the summer view of Finchale Priory from the upper path where the caravan site and farm buildings beside it are most visible and therefore detracting.

Management of this latter area to allow the first view of the Priory to be from the lower path means that the farm buildings and the caravan site are mostly obscured and reduces the discordant juxtaposition of ancient and modern.

- Promoting scrub and woodland growth within selected areas of the disused munitions compound at Finchale to break up the regimented pattern of the buildings, selectively screen areas, and introduce visual diversity would enhance the landscape in this area.
- Reducing large field sizes in the northern end of the study area was identified as a potential enhancement measure as was restoring the hedgeline along the route of the Weardale Way to the west of Great Lumley. The two fields divided by the Weardale Way at this point are separated by a six foot ridge which makes it impossible for them to be worked as one unit. Planting a mixed hedge of locally abundant species along the bottom of the ridge would not take up any farmable land, whilst increasing the deciduous cover of the east side of the valley to be more in balance with the west. The presence of such a hedge would have ecological benefits and its height could be maintained at a level that did not obscure the view to the west from the path above it. A more detailed ecological investigation would, however, be advisable before such a course of action as the area has good potential as a rich invertebrate habitat.
- The area around the open-cast site at Great Lumley could be enhanced by managing existing hedgerows to restore them to a stockproof condition and increasing the numbers of hedgerow trees in them.
- Throughout the study area the removal of cross-country overhead telephone lines by re-routing along roads or underground and the re-routeing of power

lines sub-surface were identified as potentially highly beneficial to the landscape character.

3.4.1.5.6 Summary of Landscape Assessment Results. - By using the results of the graphical analyses and summarised appraisals above, in combination with the field description written at each viewpoint, a description of the landscape of the whole of the study area could be written:

" The Wear Valley within the study area follows a meandering north-south course between the settlements of Chester-le-Street and Durham City (Fig. 3.7). The only significantly sized areas of settlement within the study area are at Great Lumley and, to a lesser degree, Brasside. Elsewhere settlement is confined to individual or small groups of houses and individual farms. Other significant, non-agricultural, modern human influences on the landscape within the study area are the Riverside development at Chester-le-Street, the disused munitions compound to the west of Finchale Priory, open-cast coal mining to the north-east of it, Low Newton Prison and Remand Centre at Brasside, and industry and water treatment works at Barkers Haugh in the south.

The river valley cross-profile varies throughout the study area. In the southern and central section the valley sides are frequently steep and the river enclosed by the exposed sandstones of the Middle Coal Measures. In the north and extreme south the valley profile opens out with a discernible floodplain present.

The meandering nature of the river has restricted the development of major modern north-south communications links to the edges of the study area where frequent bridging was not required. Traffic levels within the area are therefore low with the only significant east-west link being

Cocken Road. A major north-south recreational pedestrian route passes through the length of the study area; the Weardale Way. The current popularity of this route is however questionable.

It is a predominantly rural landscape with farmland and woodland in well balanced proportions. The good agricultural soils, supplemented in the floodplain by river-borne alluvial deposits, have promoted the development of a mixture of arable crops and pasture agriculture. The undulating terrain and numerous streams have helped to prevent the development of large field sizes except on the flood plain in the extreme north and south of the area. Field boundaries are generally rectilinear indicating that they are as a result of formal enclosure; the majority of which is believed to have occurred in the seventeenth century (Lawson, 1997). Evidence of earlier agricultural practices can be found in the non-linear field boundaries to the south of Finchale Priory and "rig and furrow" field patterns in the south of the study area. Field boundaries are predominantly hedges of mixed species, though with hawthorn (*Crataegus monogyna*) dominant. These are supplemented, where not stock-proof with post and wire or post and rail fences. The woodland stands are predominantly deciduous and of mixed species and are generally harmoniously incorporated into the landscape, generally following valley side contours and stream courses. There are significant amounts of ancient semi natural woodland in the area, especially on the steeper valley sides in the south where the terrain has prevented the land being brought into agricultural use.

Evidence of earlier industrial activity exists within the study area. Disused stone quarries can be found at Keping and at Mallygill. Dismantled mineral railway lines to the south of Finchale Priory and place names such

as Charles Pit Cottages and George Pit Lane to the south of Great Lumley are evidence of the coal industry that once existed here.

Overall the study area has a landscape of high value. It is well balanced and aesthetically pleasing in its form and variety. It contains areas that are of high ecological value in its ancient woodlands and ones that should be prized for their recreational value. Away from the settlements of Chester-le-Street and Durham City there are few areas where the rural landscape is significantly degraded. The only area where degradation is significant is the central area around the detention facilities at Brasside and the disused munitions compound at Finchale."

4.0 RESTRICTIONS ON THE DESIGN OF THE PROPOSAL.

Several factors which would constrain and limit the scale and design of the proposal were identified.

4.1 Sustainability.

Any proposal must promote "sustainable development" of recreation and tourism in the area. It is important, therefore, to define the term "sustainable".

The definition of sustainable development as:

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

(Bruntland Report, 1987) is, when applied to recreation and tourism, so vague as to be unusable, as well as potentially damaging. Similarly, a definition put forward by the UK government (Department of Employment, 1992) which defines sustainable tourism as that:

"where harmony exists between tourism, the environment and host populations"

is also true, but dangerously vague.

A less accessible but more tightly defined, and therefore more usable definition is that given by the Federation of Nature and National Parks in Europe (1993) who defined "sustainable tourism" as:

"all forms of tourism development, management and activity which maintain the environment, social and economic integrity and well-being of natural, built and cultural resources in perpetuity."

This applies equally well to "sustainable recreation" and it is this definition which will be used as the bench mark against which the sustainability of the proposal will be judged.

In addition, it must heed the seven principles for sustainable tourism set out in the UK government's 1991 report (English Tourist Board/ Department of Environment, 1991):

- The environment has an intrinsic value which outweighs its value as a tourism asset. Its enjoyment by future generations and its long-term survival must not be prejudiced by short-term considerations.
- Tourism should be recognised as a positive activity, with the potential to benefit the community and the place as well as the visitor.
- The relationship between tourism and the environment must be managed so that it is stable in the long term. Tourism must not be allowed to damage the resource, prejudice its future enjoyment, or bring unacceptable impacts.
- Tourism activities and developments should respect the scale, nature and character of the place in which they are sited.
- In any location, harmony must be sought between the needs of the visitor, the place and the host community.
- In a dynamic world some change is inevitable, and change can often be beneficial. Adapting to change, however, should not be at the expense of any of these principles.
- The tourism industry, local authorities, and environmental agencies all have a duty to respect the above principles, and to work together to achieve their practical realisation.

Again these principles apply equally as well to "sustainable recreation" as to tourism.

4.1.1 Achieving Sustainability.

Having defined sustainable tourism it is also important to have an objective understanding of the impacts of tourism and thus the best way to achieve sustainability.

According to Croall (1995), concern over the effect increasing visitor numbers were having on certain historic towns, heritage sites and parts of the countryside in the UK in the 1980's led to the Department of Employment, in 1990, setting out to

"examine the scale and nature of the problems caused by visitor numbers at tourist sites and areas, and to examine the environmental and other benefits which tourism brings to such areas"

The resulting report (English Tourist Board/ Department of Environment, 1991) highlighted five major problems that were currently responsible for making much UK tourism unsustainable at that time:

- Overcrowding.
- Traffic congestion.
- Wear and tear.
- Inappropriate development.
- Conflicts with the local community.

To ensure that any increase in visitor use of the study area is sustainable, any proposal designed to bring about such an increase must neither be the cause of any of these five major problems or add to them where they already exist.

Ideally it should also help to alleviate these problems where they currently exist. For example, the proposal must not contribute to the overcrowding observed on summer weekends in Finchale Banks/ Cocken Woods and should ideally promote a reduction in visitor numbers at peak times by encouraging

them to visit at different times of the week or year, or to visit other sites in the study area on summer weekends.

4.1.2 Specific Impacts of Tourism and Recreation.

Having identified the major problems associated with unsustainable visitor use it is also important to understand in more detail the specific environmental impacts of tourism and recreation most relevant to the study area, i.e. impacts on the rural environment.

4.1.2.1 Landscape - Tourist developments and transport links associated with them can significantly affect landscape and its quality. Inappropriate development can be visually intrusive, detract from historic landscapes and compartmentalize landscape.

4.1.2.2 Air Quality - According to Mieczowski (1995), the major negative impact on air quality by tourism is the movement of tourists by private motor car which he describes as the "least energy efficient and most polluting agent in the tourist system".

4.1.2.3 Noise - Noise pollution can be caused by construction work associated with tourist development, from the resultant increase in traffic associated with increased tourism and from the tourists themselves.

4.1.2.4 Soil - Recreational activities can change the structure, aeration, temperature, moisture and organic content of soils (Mieczowski, 1990). Compaction by feet and vehicles reduces pore spaces within the soil. The resultant lack of aeration has negative impacts on plant growth. Water infiltration is also reduced leading to desiccation of the

soil, which again has a negative impact on plants, and increased water run-off can lead to soil erosion.

4.1.2.5 Water Quantity - Increase in numbers of tourists spending any length of time in an area automatically results in an increase in water consumption.

4.1.2.6 Water Quality - According to Mieczowski, 1994, tourism can negatively affect water quality in four ways:

- By increased pathogen contamination by improper disposal of human waste.
- Input of fertilisers, acting as nutrients, and pesticides, acting as toxins, from over-application on commercial tourist facilities such as hotel gardens and golf courses
- Tourist water-borne transportation polluting water with oil products, human waste and detergents.
- Individual tourists dumping litter in water bodies.

In addition water quality can be reduced by input of road surface run-off containing oil and fuel contamination as a result of increased traffic or from roads constructed specifically for tourism.

4.1.2.7 Flora - Flora can be affected directly or indirectly (Mieczowski, 1994). Direct impacts include the physical removal or destruction of plants either to clear an area for recreational development such as hotels or for recreational activities, such as for path clearance. The greatest direct negative impact on plants is, according to Hammit and Cole (1987), trampling by feet and vehicles as it reduces vegetation cover and diversity of species. Motorised traffic is twice as damaging as horses which are nine times more damaging than hikers (Weaver and Dale, 1978). Major indirect effects on flora include the

consequences of changes to the soil resulting from compaction and littering which can modify the nutrient status of the soil, prevent soil aeration and block sunlight.

4.1.2.8 Fauna - A major impact on fauna due to recreation is reduction in numbers and changes in the balance of predator/prey relationships caused by hunting and fishing. Opening an area for recreational access may also lead to an increase in poaching by giving the perpetrators an excuse for being there legitimately. Increased tourist transportation can result in increased numbers of animals and birds being killed by collision with road vehicles. Animals can also be disturbed by the presence of tourists. This may cause them to change their behaviour or possibly be displaced from their habitat altogether (Hammit and Cole, 1989). Breeding success in birds can be reduced by disturbance of the incubating female, destruction of nests by trampling or of increased predation of young or eggs when adults are kept from the nest by disturbance (Satchell and Marren, 1976). Satchell and Marren (1976) also noted that wildlife disturbance is much less significant on established tourist paths in wooded area provided that tourists do not stray from the paths where their presence has become accepted.

4.1.2.9 Habitat Degradation and Loss - Tourists can destroy vegetation by trampling, depriving animals of food and cover from predators. Littering may attract scavenging animals and birds and thus change the habitat and its ecological balance. Water borne pollution can affect habitats with an aquatic element. Habitats can be reduced in size by tourist development and fragmented by roads, leaving populations genetically isolated. Satchell and Marren (1976) noted that the resilience of ecosystems to human impact depends on multiple factors but, in general, the degree of resilience is proportional to their maturity. Thus complex, mature ecological communities,

such as mature woodland, which are more stable than communities at early seral stages, such as grassland, are able to withstand more human pressure.

4.2 Carrying Capacity of the Study Area.

While it has been established that the study area has the capacity to physically accommodate an increase in visitor use without appearing to be overcrowded, to what level this use can be increased and still remain sustainable has not been established.

Mieczowski (1995) defines the level of recreational use of an area that is sustainable as the Recreational Carrying Capacity, a level of recreational use which:

- does not lower the quality of the natural environment,
- does not decrease the perceived quality of the recreational experience and the satisfaction of the participants, and
- does not harm the broadly-defined well-being of the residents.

The Recreational Carrying Capacity is a combination of:

- Physical Carrying Capacity - the number of people who can physically use a resource,
- Ecological Carrying Capacity - determined by the level of human interference that the ecosystem in question can tolerate without impairing its sustainable functioning, and,
- Social Carrying Capacity - the number of tourists a destination can absorb before it is regarded as overcrowded by the tourists and/or the local residents.

In practice the Recreational Carrying Capacity is determined by one of these variable factors being limiting. Within the study area the limiting factor(s) will be the Ecological Carrying Capacity and/or the Social Carrying Capacity.

Carrying capacity is difficult to assess before it has been exceeded and damaging effects such as erosion, species decline or perceived overcrowding become apparent. The matter is further complicated because there is frequently a time delay between cause and effect, especially for ecological change. In addition, nature is not static but dynamic and it is often difficult to determine whether an observed change is due to human impact or natural processes - especially after the change has occurred.

Therefore, as it is not possible to determine the Recreational Carrying Capacity in advance, caution must be exercised in any proposal to increase visitor use of the study area. Regular monitoring will be required, both before and after implementation of the proposal, to ensure that, should the Ecological or Social Carrying Capacity be exceeded, the fact will be identified quickly, allowing remedial action to be taken swiftly. Periodic survey of visitor numbers and a questionnaire survey of visitors and residents opinion will allow early identification that the Social Carrying Capacity has been exceeded. Informed opinion should be sought to try to avoid exceeding the Ecological Carrying Capacity at all, and to identify key indicators, such as plant, bird or animal species particularly sensitive to disturbance. These can then be monitored to identify that the Ecological Carrying Capacity has been reached.

4.3 Methods of Increasing Visitor Use.

Though much has been written about the various methods of *marketing* tourism and "the leisure experience" (Spink, 1994, Prentice, 1993, Anderton, 1992, Croall, 1995, etc) there are only two basic means of bringing about an increase in visitor use of the study area: create new attractions or make existing attractions more attractive.

4.3.1 Creating New Attractions.

The construction of a large scale, major tourist attraction such as a theme park, holiday village, out-of-town shopping and leisure complex, etc. is inappropriate within the study area. Such development would have unacceptably high

negative impact on the acknowledged high value landscape. Its ecological impact would also be unacceptable. The large area of land required by such a scheme and its associated roads would result in loss of habitat, reduction in size and fragmentation of other habitats, increased disturbance, increased mortality due to road deaths and interfere with the functioning of the area as a wildlife corridor. A small scale attraction, with consequentially smaller negative impacts, may feasibly be constructed in the study area. However, the financial costs are likely to greatly outweigh financial benefits to the area.

4.3.2 Making Existing Attractions More Attractive.

The most appropriate method of increasing visitor use of the study area is to make use of its existing attractions. Currently, the area is attractive for the high quality of its rural landscape, for its flora and fauna and for its religious and historical heritage. The proposal must endeavour to build on these strengths by promoting them effectively, making them more accessible, and introducing mitigation measures where they are currently compromised.

4.4 Summary of Design Criteria.

The proposal to promote an increase in visitor use of the study area:

- Must be "sustainable" as measured against the benchmarks set out in Section 4.1.
- Must involve only small-scale construction.
- Must not degrade the landscape or result in degradation by facilitating inappropriate development or urban spread.
- Must minimise visual impact on the landscape especially within the Area of High Landscape Value.
- Must minimise negative impacts on the flora and fauna of the area due to habitat loss, habitat alteration, increased disturbance, and pollution, especially in the vicinity of ancient woodland sites, Brasside Pond SSSI and designated

wildlife sites. Such impacts could occur both during any construction works and during visitor use of the area.

- Must minimise negative impacts on the ecology and water quality of the River Wear throughout its length.
- Must minimise negative impacts on the archaeological and historic heritage of the area. Again such impacts could occur both during construction work and during use.
- Must minimise negative impacts on air quality. The most likely cause of a reduction in air quality would be an increase in motorised traffic.
- Must minimise increases in noise pollution.
- Must not result in overcrowding especially in those areas already under pressure and should ideally promote a reduction in overcrowding at the Finchale Banks/Cocken Woods site.
- Must allow for monitoring to identify when the Recreational Carrying Capacity has been reached.
- Should reduce dependence on the private motor car as a means of accessing the countryside in the study area.
- Must be capable of attracting funding to allow realisation of the proposal.

5.0 THE PROPOSAL.

The proposal to increase visitor use of the study area is for the creation and promotion of a "Greenway": a recreational cycleway and pedestrian route between Chester-le-Street and Durham City. The greenway will link both to the C2C Cycle route, and thus to the National Cycle Network, and also allow the creation and promotion of a number of recreational walks that do not have a high dependence on use of the private motor car. It has the potential to attract both tourism and local recreational use.

5.1 Planning.

The route was planned taking in to account guidance laid down by The Countryside Commission (1998) who identified features that people want on Greenways as:

- a "natural" green environment to make it pleasant to use and to encourage wildlife,
- to be away from the sound of traffic,
- a continuous off-road route,
- things of interest along the way,
- facilities such as refreshment stops, play areas and toilets,
- ease of access for horses prams and cycles,
- freedom from litter and vandalism,
- somewhere safe to park cars or good public transport provision to improve accessibility.

The main local users of the proposed greenway will come from casual walkers, cyclists, people keeping fit, and local commuters and family groups (Countryside Commission, 1998).

To be developed as an integral part of the National Cycle Network the route must be:

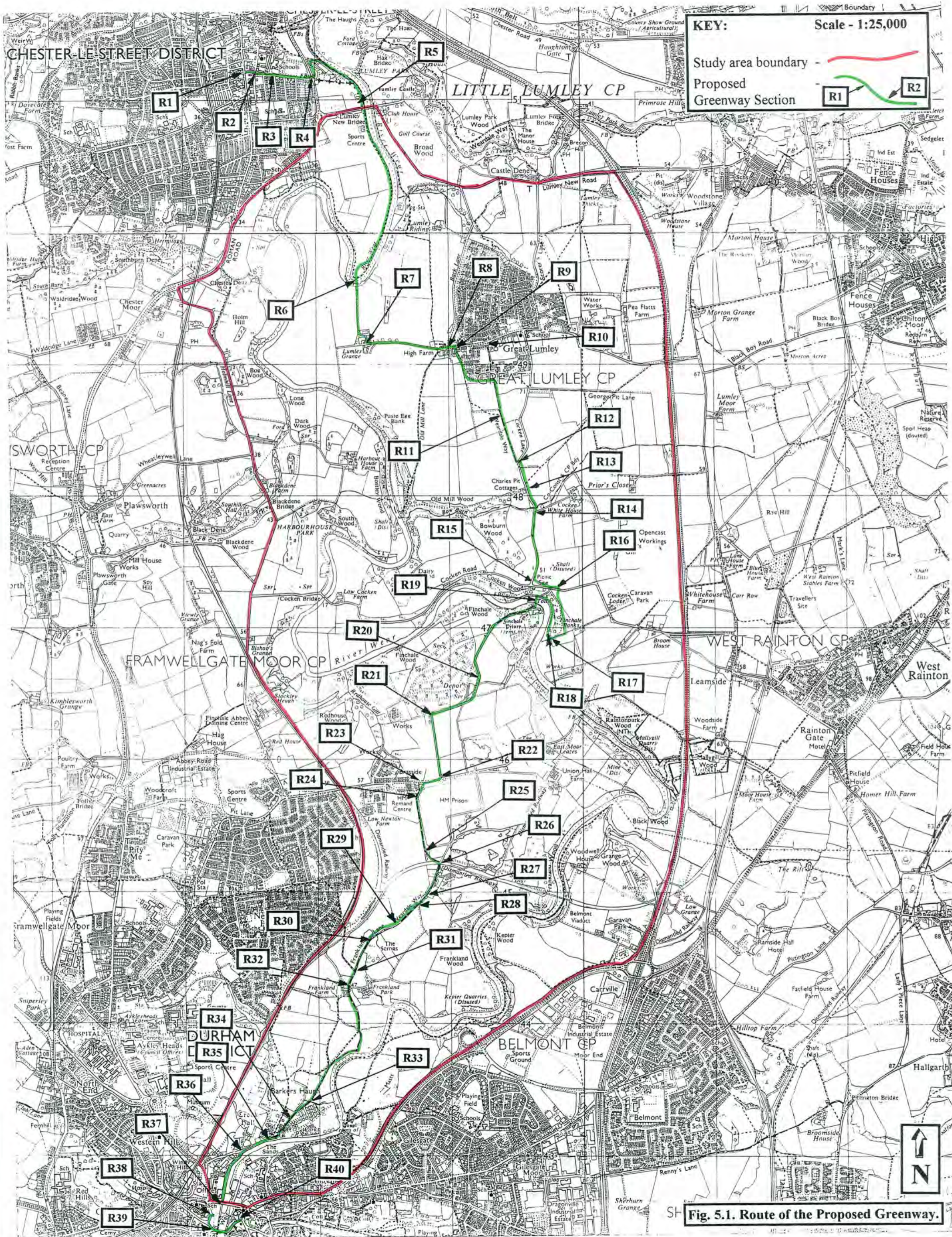
- Safe for cyclists - Where the route follows existing roads vehicle flow rates and speeds must not pose a significant danger to cyclists.
- Coherent - It must link from town centre to town centre and with existing sections of the National Cycle Network.
- Direct - For cyclists a short, direct route is preferable to a longer route and it is important that delays, such as for crossing major roads, are minimised.
- Attractive - The route should be attractive and interesting, giving good views or passing interesting places.
- Comfortable - The route should have a smooth surface and avoid prolonged exposure to traffic noise.

(Sustrans, 1996).

5.2 The Route.

The route (Fig. 5.1) and the construction methods and materials were chosen after considering and balancing the design criteria set out in Section 4. Each section of the proposed route was surveyed to assess construction requirements, and to identify potential conflicts, potential negative impacts and mitigation measures. Throughout its length, the route was planned to allow construction in accordance with the guide-lines set down for the National Cycle Network (Sustrans, 1996). For traffic-free, shared cycle/pedestrian paths the design standards and the construction details are shown in Fig. 5.2.

The route is considered in sections (Fig. 5.1).



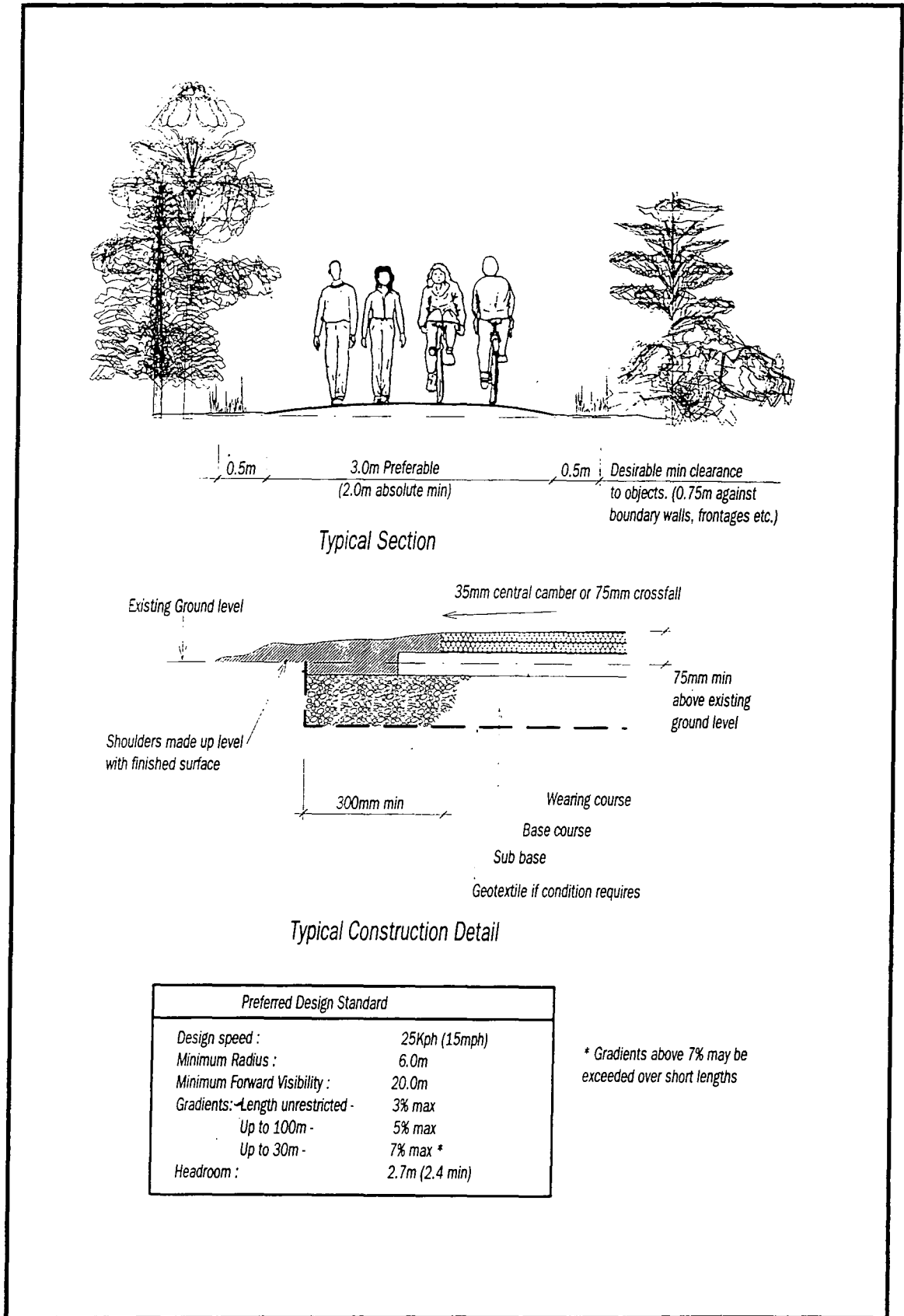


Fig. 5.2 Preferred Construction and Design Detail for Shared Cycle/Pedestrian Paths (After Sustrans, 1996)

5.2.1 Route Section R5 - R8.

Chester-le-Street Riverside to Great Lumley (Fig.5.3)

5.2.1.1 Description - The route follows an existing path from Chester-le-Street Riverside North (R5), under the re-aligned Lumley New Bridge, along the west bank of the River Wear to a sharp meander (R6). Here it crosses the river and follows a farm track south along a hedge line to Lumley Grange (R7) (Fig. 5.13) where it turns east up an existing road to Great Lumley (R8).

5.2.1.2 Detail and Construction Requirements - The existing path R5 - R6 is composed of tarmac and compacted aggregate. It is generally in good repair though some sections will require surface repairs or restoration of width to 2 metres where it has been reduced by grass incursion. Verge widths and forward visibility is adequate throughout.

Crossing the River Wear at R6 will require the construction of a new bridge ensuring that the design allows for natural movement of the meander, south, over time (Fig. 5.4.). The verge width on the north bank at R6 is adequate to allow a gradual, curved approach to the bridge (Fig.5.4).

The route from the south side of the bridge to the road at Lumley Grange (R7) is currently a tractor track and will therefore require the construction of a path (approximately 500 metres long) in accordance with Sustrans Guide-lines (Fig. 5.2). The route through or around Lumley Grange to the road (R7) will require negotiation with the owners/ tenants.

The route from R7 - R8 follows an existing tarmac road. Motorised traffic levels are low as the road serves only to access Lumley Grange.

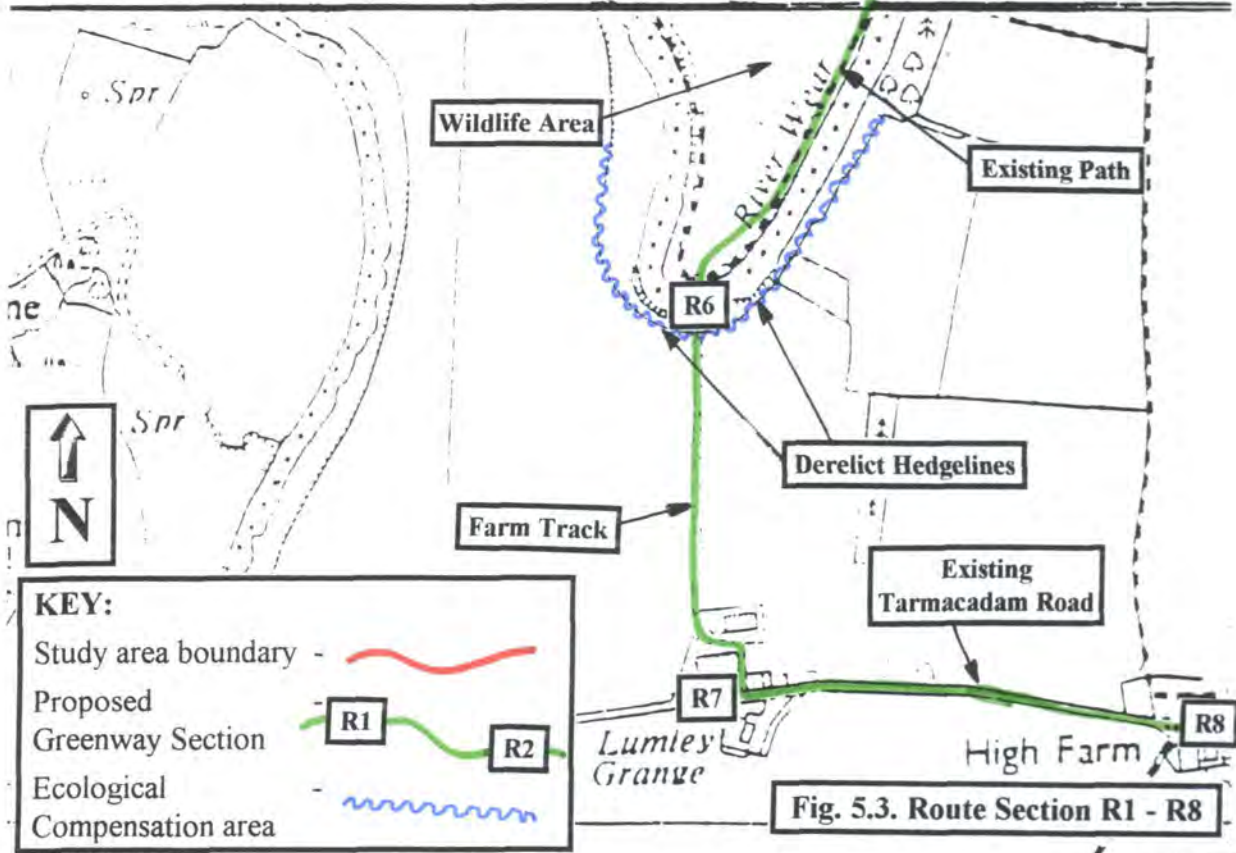
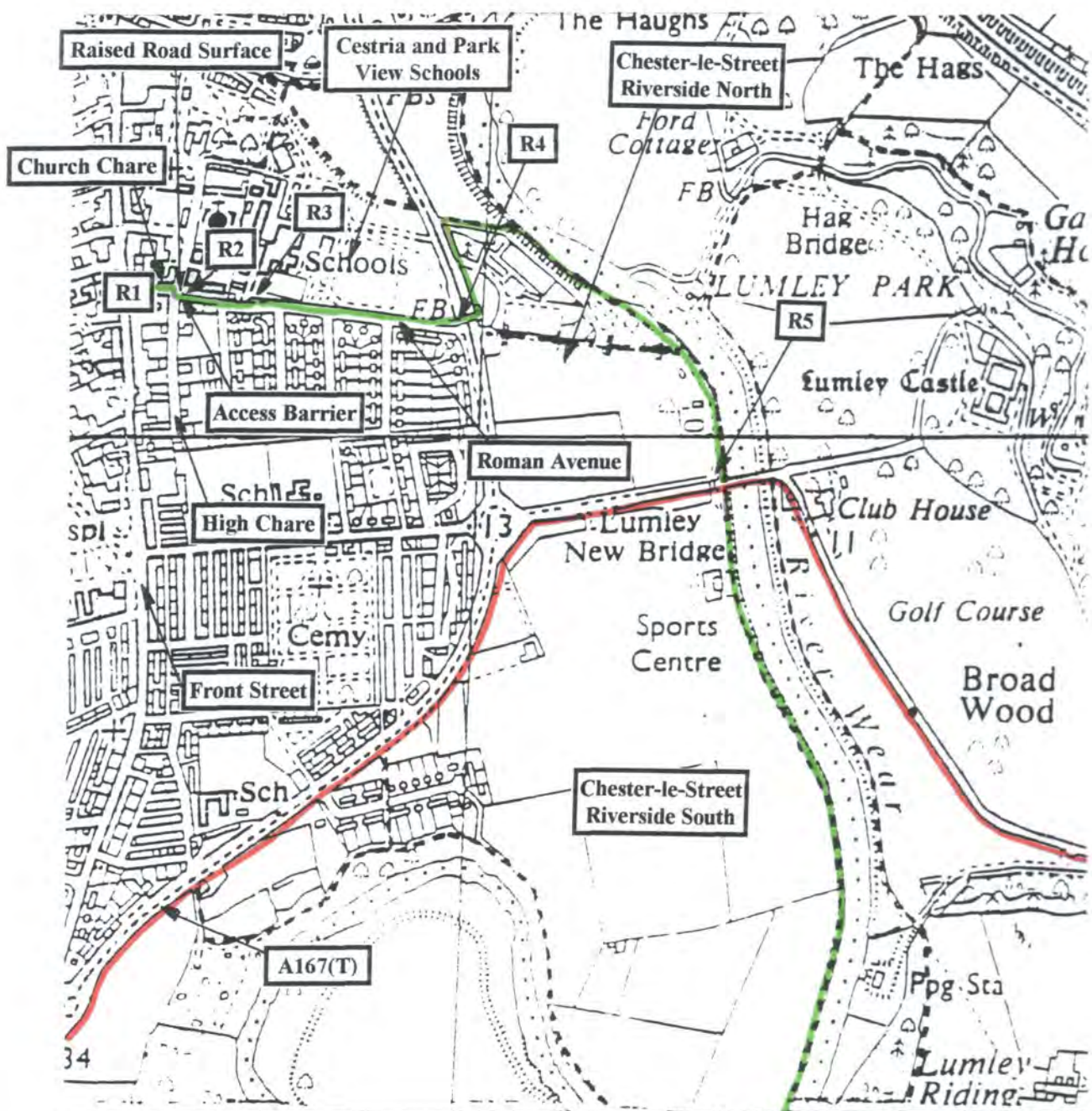


Fig. 5.3. Route Section R1 - R8

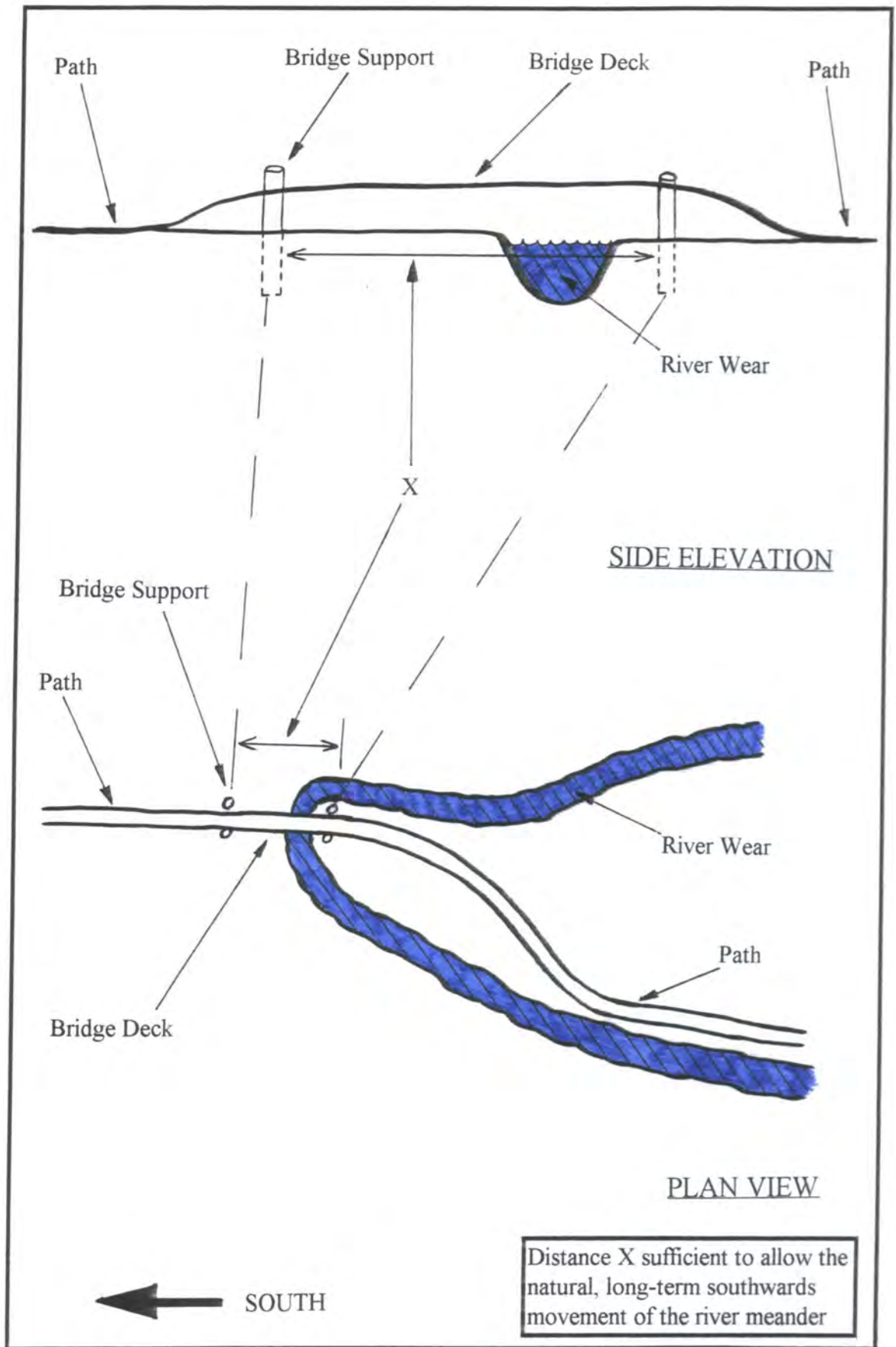


Fig. 5.4 Preferred Construction Detail for River Crossing at R6.

The road surface is generally sound though some surface repairs will be required in places. The gradient exceeds the preferred design standard (Fig. 5.2) in parts so adequate signs and/or physical measures such as "sleeping policemen" will be required to reduce speed of downhill cyclists. The road is in private ownership so use will have to be negotiated.

5.2.1.3 Potential Local Impacts and Mitigation -

- Some possibility that increased use of path section R5 - R6 may cause disturbance to wildlife in the wildlife area to the west of the path.

Mitigation: If necessary, increase density of scrub/tree planting at the eastern edge of the wildlife area.

- Increased disturbance to wildlife along section R6 - R7, especially to the hedgerow to the west of the path, both during construction and use.

Mitigation: Minimise time required for bridge construction, taking this into account at the design selection stage. Restrict construction of bridge and path to outside the breeding season of hedgerow birds. Restore adjacent derelict hedgelines (Fig. 5.3) by infill planting, with increased local native species diversity, as ecological compensation. Restoration to be carried out a minimum of two seasons prior to construction.

- Disturbance to current users of the path R5 - R6 during construction.

Mitigation: Generate good will by consulting with current users at an early planning stage. Timetable construction to the time of least use.

- Increased disturbance to occupants of Lumley Grange during construction and use.

Mitigation: Resolve by negotiation.

5.2.1.4 Further Work Required -

- Consultation with local community and current users of the area.
- Negotiation of route through/around Lumley Grange.
- Negotiation of use of road section R7 - R8.

- Ecological survey of hedgerow (R6 - R7) and those highlighted for restoration to confirm appearance of species-poor, mechanically cut, Hawthorn (*Crataegus monogyna*) dominated hedge.
- Appraisal of historical importance of Lumley Grange, though no buildings are shown here on the First Edition (1861) Ordnance Survey map (Fig.2.11).
- Design of bridge at R6.

5.2.2 Section R8 - R12.

Great Lumley to Cocken Lane (Fig. 5.5)

5.2.2.1 Description - At Great Lumley the route joins the C89 road (R8) and follows it east for 45 metres before turning south (R9) along Cambridge Drive. The route leaves Cambridge Drive (R10) to follow the Weardale Way bridleway south until it meets Cocken Lane (R12)

5.2.2.2 Detail and Construction Requirements - The road surface used by the route R8 - R9 is in good repair. The speed limit on this section of the road is 30 mph but actual speeds on the section will be lower due to the sharp road bend at R8. This, coupled with the low AADT of 2,610 (Fig. 2.26), make it unnecessary to segregate cyclists from motorised traffic on this section (Fig. 5.6), though signs should be installed on the road approaches warning drivers of the presence of cyclists.

Cambridge Drive (R9 - R10) also has a 30 mph speed restriction in force and as it serves only to access residential areas, traffic flows will be less than on section R8 - R9 (although no measured AADT is available). Road width and forward visibility on this section are adequate and again segregation of cyclists and motorised traffic is not required (Fig. 5.6). The road surface is in good repair.

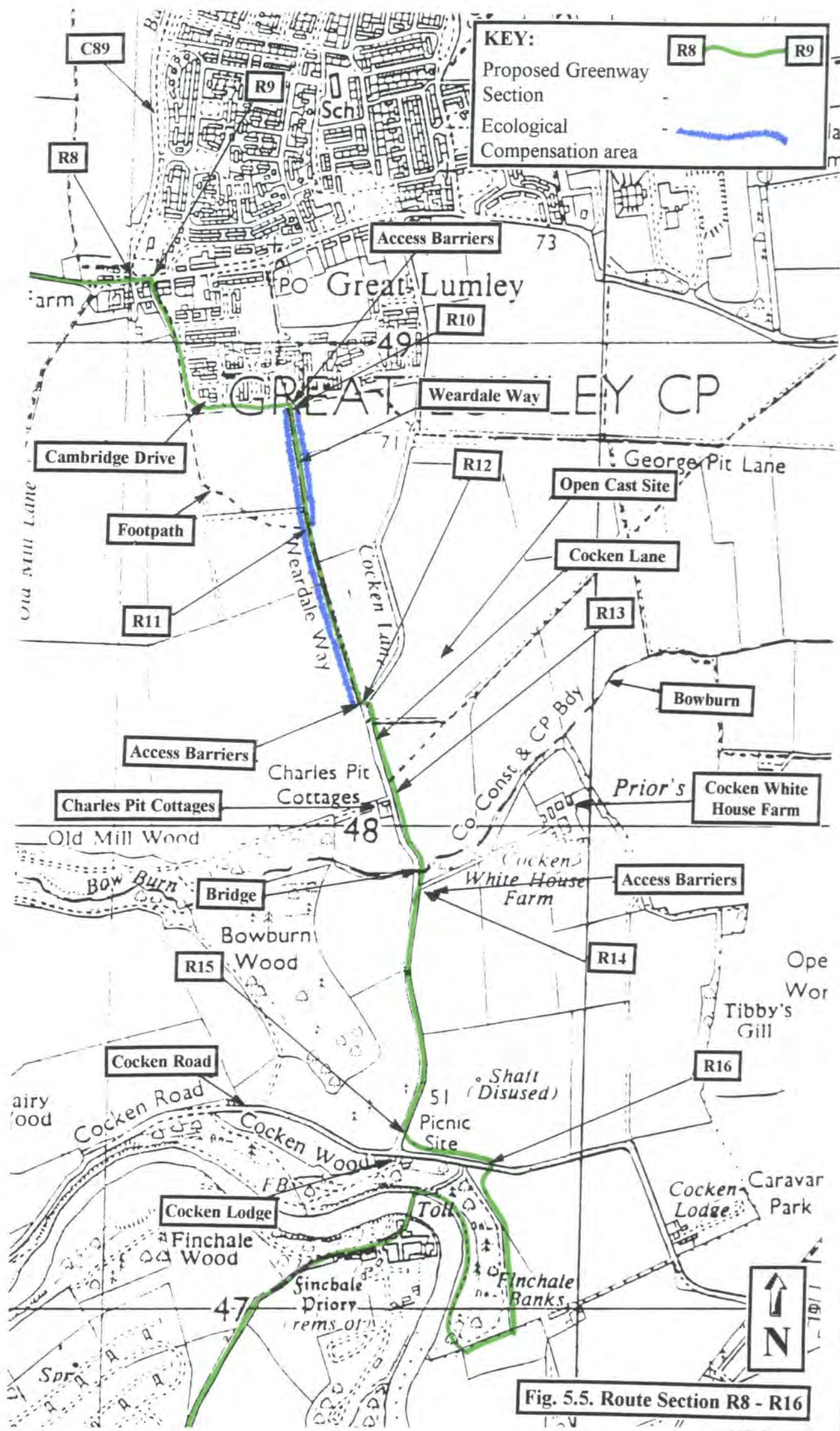


Fig. 5.5. Route Section R8 - R16

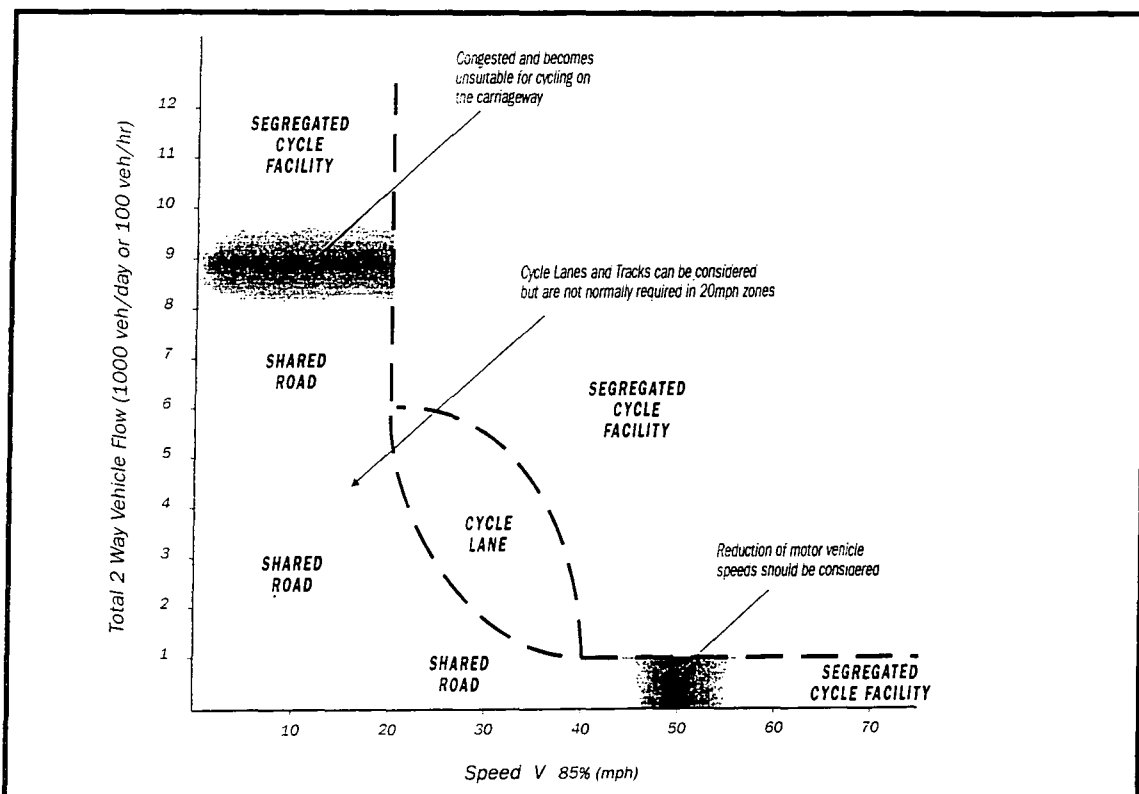


Fig. 5.6 Motorised Traffic Flow and Speed Specification Criteria for Selection of Cycle Facility (After Sustrans, 1996).

The route from R10 - R11 follows a track of bare earth surface with some areas of compacted aggregate between two hedges, predominantly of Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*), 3 metres apart. From R11 - R12 the route follows a track of earth along a 6 metre wide strip of uncultivated land, open to the east but bounded to the west by a low-cut hedge of, predominantly, Hawthorn (*Crataegus monogyna*) (Fig. 5.15). Again the track surface is bare earth. The whole section R10 - R12 is muddy and waterlogged in winter and construction of a path (approximately 600metres long) in accordance with Sustrans guide-lines (Fig. 5.2.) will be required.

Installation of access barriers (Fig. 5.7) at R10 and R12 will be required to slow cyclists before re- joining motor traffic routes and to prevent unauthorised access by motor vehicles. Dropped kerbs will also be required at the same two locations to allow cyclists to re-join the road smoothly.

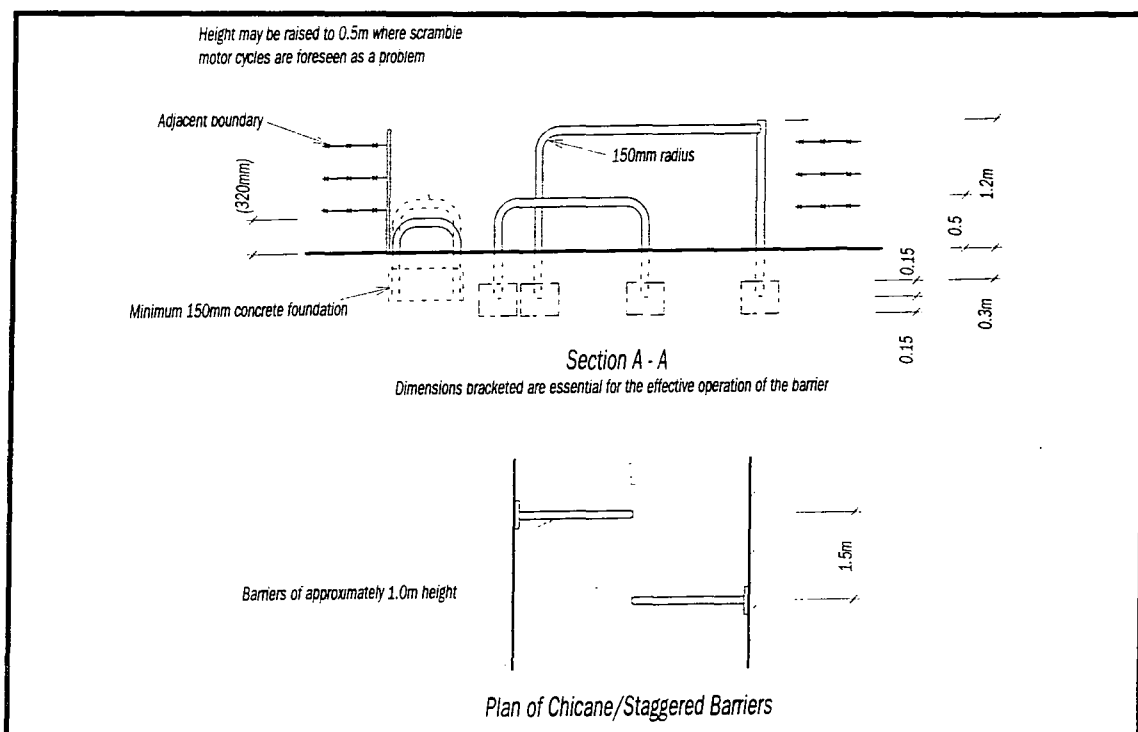


Fig. 5.7 Access Barrier Design (After Sustrans, 1996)

5.2.2.3 *Potential Local Impacts and Mitigation -*

- Increased disturbance to wildlife along section R10 - R12, both during construction and use, especially to the hedgerows bordering the path and to ground nesting birds (including Skylark (*Alauda arvensis*) and Lapwing (*Vanellus vanellus*); species currently in decline) in adjoining fields.

Mitigation: Restrict construction of path to outside the breeding season of hedgerow and ground nesting birds. Promote or facilitate management of existing hedges to allow an increase in width on the side away from the path and to provide an increased diversity of local native hedgerow species (by infill planting) and diversity of hedge height and width (by varying cutting regime throughout the length) as ecological compensation. Ecological compensation measures to be started at least two seasons prior to construction work. Monitor breeding success of ground nesting birds for effect of increased use of the paths and/or users straying from the path. If negative effects observed,

consider creation of a low hedge to the east of section R11 - R12 to prevent users straying from the path.

- Disturbance to existing users of the path and local residents in the Cambridge Drive area during construction. Mitigation: Generate

good will by consulting with local residents and current users at an early planning stage and keeping them informed of developments. Minimise time required for construction and timetable construction for time of least use.

This is likely to be in the winter but consultation should confirm or disprove this.

- Disturbance to existing users of the path during use.

Mitigation: Generate good will by consulting with current users at an early planning stage and once the route is in use. Propose improvements to the surface of the footpath to the east (Fig. 5.5), which is muddy in winter, as compensation and to promote its use by local pedestrian traffic.

- Loss of land in widening paths and hedgerows.

Mitigation: Identify landowner and resolve by negotiation/ compensation/ purchase.

5.2.2.4 Further Work Required -

- Consultation with local residents and existing users.
- Identification of, and negotiation with, adjacent land owners.
- Breeding Bird Census of the area, in accordance with British Trust for Ornithology approved methodology, prior to any construction work to provide a bench mark against which to monitor effect of increased use of the area on ground nesting birds.

5.2.3 Section R12 - R16

Cocken Lane to Finchale Banks/ Cocken Woods (Fig. 5.5.)

5.2.3.1 Description - At R12 the route crosses Cocken Lane before turning south and running parallel to, and east of, the road. Initially it runs in a 10 metre wide strip of uncultivated land between the road and the spoil heap wall around the open cast site to the east (R12 - R13) (Fig.5.16). Where the boundary spoil heap turns away to the east, the route continues to run south, parallel to the road, through an uncultivated field then a narrow strip of woodland along Bow burn; crossing Bow burn to rejoin Cocken Lane at the entrance road to Cocken White House Farm (R14) (Fig.5.17). An alternative route R12 - R14 using Cocken Lane is not suitable. Bends and crests immediately south of Charles Pit Cottages restrict forward visibility on a narrow road, tightly constricted by hedges and fences and would make this section very off-putting for inexperienced cyclists and family groups.

The route section R14 - R15 follows Cocken Lane which is wide with good forward visibility in this section. The AADT is 760 (Fig. 2.26), which is acceptable for shared use (Fig. 5.6). At R15, the route leaves Cocken Lane and runs off-road, parallel to Cocken Road, through agricultural land, on the north side of the roadside hedge, to R16 where it crosses Cocken Road (Fig. 5.18). Use of Cocken Lane and Cocken Road to proceed from R15 to R16 is not an option. Traffic flow on Cocken Road with an AADT of 2495 (Fig. 2.23), coupled with high vehicle speeds in excess of 30 mph, make a carriageway cycle lane or segregated cycle facility necessary (Fig. 5.6). A segregated facility is preferable especially as the adjoining greenway sections have low traffic levels (to the north) or no motorised traffic (to the south).

5.2.3.2 Detail and Construction Requirements - Access barriers (Fig. 5.7) will be required on the east side of Cocken Lane at R12, at R14 and R15, and on both sides of Cocken Road at R16. Visibility at the crossing points R12 and R16 is good, though both would benefit from measures to reduce motorised traffic speeds, especially in the vicinity of R16. Construction of new paths (Fig. 5.2) will be required for sections R12 - R14 (approximately 400 metres long) and R15 - R16 (approximately 200 metres long). Bridging of Bow burn, immediately prior to R14, can be achieved by utilising the bridging works associated with Cocken Lane which project 6m east of the edge of the road surface and at a lower level. There is an existing substantial roadside barrier here which will serve to give a sense of protection to cyclists (Fig. 5.17).

5.2.3.3 Potential Local Impacts and Mitigation -

- Increased disturbance to residents of Charles Pit Cottages, Cocken White House Farm and Cocken Lodge (Fig. 5.5)

Mitigation: Generate good will by consulting with local residents at an early planning stage and keeping them informed of developments. Minimise time required for construction and timetable construction to cause least disturbance.

- Loss of ecological habitat of the woodland strip along Bow burn as a result of path construction.

Mitigation: Minimise loss by minimising path width in this short section by routeing around trees, thus avoiding removal of any mature trees (survey shows this to be possible) (Fig. 5.17), and promoting good construction practice to minimise collateral damage during construction.

- Disturbance to wildlife along section R12 - R14 during construction and use.

Mitigation: Minimise time required for construction and timetable construction to be outside the breeding season.

- Loss of land in construction of path sections R12 - R14 and R15 - R16.

Mitigation: Identify landowners and resolve by negotiation/ compensation/ purchase.

- Increased likelihood of archaeological discoveries in section R15 - R16 as previous finds have been made in this location (Fig. 2.10)

Mitigation: Timetable and budget for delays and investigative work that would be necessary should finds be made.

5.2.3.4 Further Work Required -

- Consultation with operator of open-cast site to east of section R12 - R14 to ascertain restoration and/or expansion plans and projected life of the site.
- Consultation with local residents.
- Detailed ecological survey of the section R12 - R14 to identify any ecological value of this uncultivated strip of land.

5.2.4 Route Section R16 - R19

Cocken Wood/ Finchale Banks to Finchale Priory. (Fig. 5.8)

5.2.4.1 Description - Having crossed Cocken Road at R16, the route follows a new cycle-only path through agricultural land parallel to the eastern and southern edges of Finchale Bank woodland. Use of existing paths within the woodland on the upper valley side is not acceptable because of potential and existing walker/cyclist conflict on narrow paths with limited forward visibility, along steep banks. At R17 the route turns back north into the woodland, east of the field boundary junction and south of a solitary large Holly tree (*Ilex aquifolium*), to proceed north west to rejoin the existing footpath on a level stretch (R18). From R18 the route follows the existing riverside footpath north to the old toll bridge (R19) which it uses to cross the river to Finchale Priory. A small shop, cafe and toilet facilities are available at Frankland Farm.

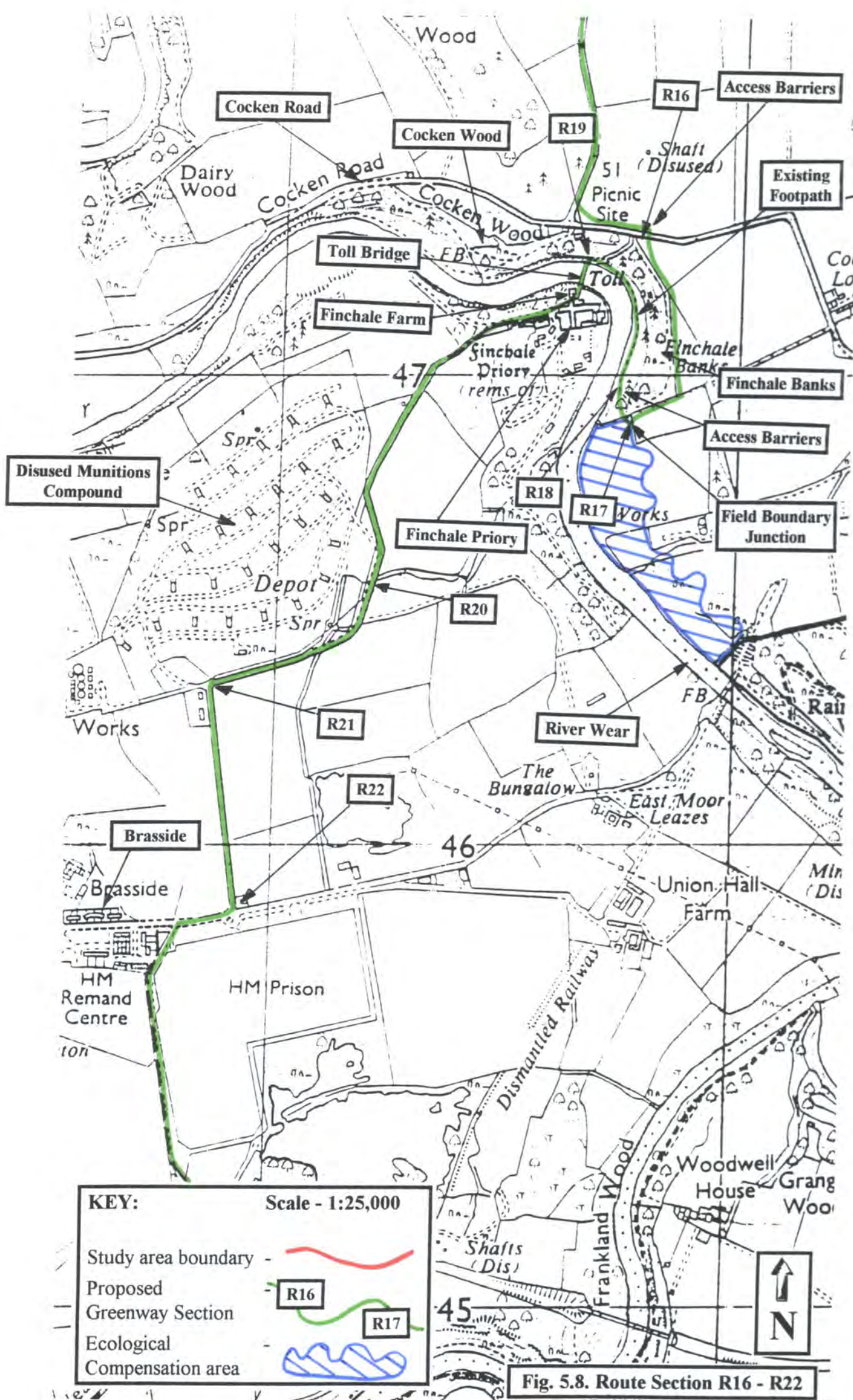


Fig. 5.8. Route Section R16 - R22

5.2.4.2 Detail and Construction Requirements - A new path (Fig. 5.2) of approximately 500 metres, will have to be constructed over section R16 - R18. The gradient will exceed the preferred design standard (Fig. 5.2) in parts of this section so adequate signs and/or physical measures will be required to reduce cyclists speed. Access barriers will be required at R16 and especially at R18 to reduce cyclist speed to zero before joining the path section shared with pedestrians. Adequate signs and or physical measures will be required to effectively segregate cyclists and pedestrians at R16 and R18. The riverside path R18 - R19 is of bare earth and the surface will require upgrading to the accepted standard (Fig. 5.2.) and the riverside edge stabilised against collapse. Width is restricted in parts by mature Yew trees (*Taxus baccata*) but forward visibility is good. The surface of the toll bridge is adequate though cycles will have to be carried up/down six steps at the north end and three at the south.

5.2.4.3 Potential Local Impacts and Mitigation -

- Increased disturbance to wildlife along the diverse woodland edge habitat (R16 - R17) and locally rare ancient replanted woodland habitat (R16 - R9) (Fig. 2.13), both during construction and use.

Mitigation: Promote/ facilitate creation of a riverside woodland belt with woodland edge of diverse form and with no public access, in the improved pasture fields to the south (Fig. 2.12), as ecological compensation (Fig. 5.8). This will serve to replace the disturbed woodland edge (R16 - R17), increase the size of woodland habitat in the area, connect the woodland habitat blocks of Finchale Banks/ Cocken Woods and Raintonpark Woods, and increase the area of riverside edge woodland which is itself a valuable wildlife habitat and has benefits for river ecology (NRA, 1994). Planting stock to be native species from local stock and widely spaced to allow natural

regeneration to infill. Planting to take place a minimum of seven years prior to construction.

- Potential for path section R17 - R19 to have a negative visual impact in an aesthetically sensitive area.

Mitigation: Reduce visual impact by using natural materials of muted colour in upgrading the path.

- Increased disturbance to existing users during construction.

Mitigation: Generate good will by consulting with current users at an early planning stage and keeping them informed of developments. Minimise time required for construction and timetable construction for time of least use.

- Increased disturbance to existing users of section R18 - R19 caused by an increase in use.

Mitigation: Reduction in cycle/ pedestrian conflict on the upper slopes of Finchale Banks as a result of construction of section R16 - R18.

- Loss of agricultural land in creating path section R16 - R17 and the ecological compensation woodland.

Mitigation: Identify landowners and resolve by negotiation/ compensation/ purchase.

5.2.4.4 Further Work Required -

- Consultation with existing users of Finchale Banks/ Cocken Woods, and residents of Finchale Farm.
- Identification of, and negotiation with, adjacent land owners.
- More detailed ecological assessment of the value of the existing habitat in the area of the proposed ecological compensation woodland.
- Identification of acceptable material for construction of path section R18 - R19.

- Negotiation of access to the toll bridge which is not a Public Right of Way but controlled by English Heritage.

5.2.5 Route Section R19 - R22.

Finchale Priory to Brasside (Fig. 5.8)

5.2.5.1. Description - Having crossed the River Wear the route follows an existing tarmacadam road through Finchale Farm, past the disused munitions compound to its junction with the road to Brasside (R22).

5.2.5.2 Detail and Construction Requirements - Road surfaces and forward visibility is adequate throughout and, although no measured AADT is available, as the road serves only as an access route and not a through-route, it is reasonable to assume that traffic flows will be less than on section R8 - R9 (Fig. 2.26) and therefore acceptable (Fig. 5.6). The gradient of the road approaching Finchale Farm from the west exceeds the preferred design standard (Fig. 5.2) so adequate signs and/or physical measures such as "sleeping policemen" will be required to reduce the speed of downhill cyclists.

It would be desirable to alter the management of the tall hedge to the west and north of the road (R20 - R21) to more effectively screen the disused munitions compound from the road as it is an unattractive feature in this area. Some infill planting of the hedge would also help as would promoting scrub and woodland growth within the north western section of the disused munitions compound as previously recommended (Section 3.4.1.5.5).

5.2.5.3 Potential Local Impacts and Mitigation -

- Increased disturbance to occupants of Finchale Farm during use.

Mitigation: Resolve by negotiation. The occupants run the shop and cafe there so will potentially be compensated by an increase in trade.

5.2.5.4 Further Work Required -

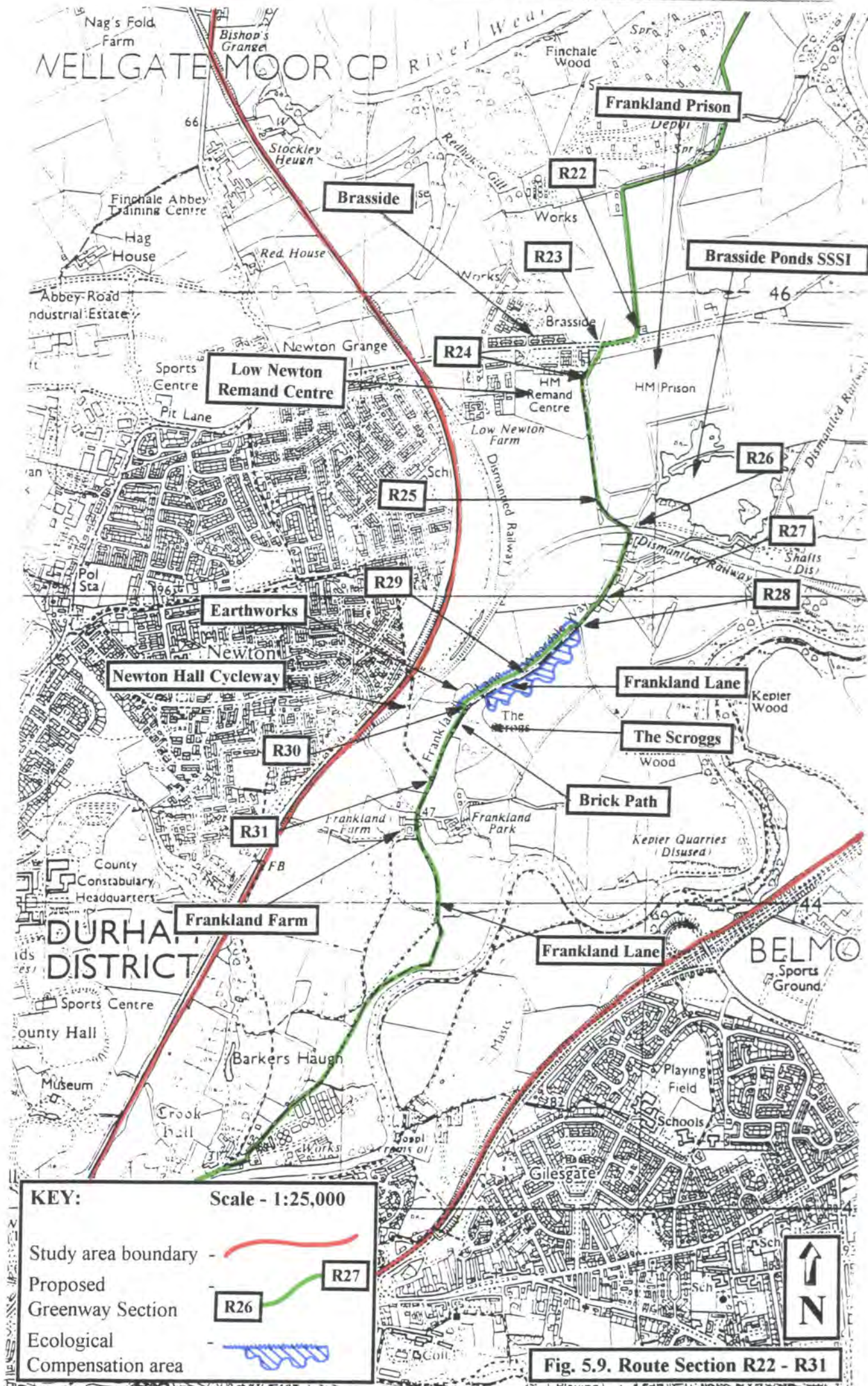
Consultation with occupants of Finchale Farm.

5.2.6 Route Section R22 - R28.

Brasside to Frankland Lane (Fig. 5.9)

5.2.6.1. Description - From R22 the route turns west and uses the road to Brasside for approximately 120 metres before turning south (R23) to join an existing bridleway (part of the Weardale Way) via an access road to Frankland Prison. It follows this bridleway between Frankland Prison and Low Newton Remand Centre, turning south west at R26 and continuing to follow the bridleway along Frankland Lane to R28 where it enters a narrow strip of woodland.

5.2.6.2 Detail and Construction Requirements - The road surface and forward visibility on section R22 - R23 are adequate and again, although no measured AADT is available, as the road serves only as an access route and not a through-route, it is reasonable to assume that traffic flows will be less than on section R8 - R9 (Fig. 2.26) and therefore acceptable (Fig. 5.6). The access road to the prison facilities (R23 - R24) is undergoing construction/ repair works (1998) and the suitability of its surface will need to be confirmed on completion, though it is likely to be adequate. The entrance way (R23) is, however, not welcoming and adequate signs will be needed to encourage users that they are on the



MELLGATE MOOR CP

Frankland Prison

Brasside

Low Newton Remand Centre

Earthworks

Newton Hall Cycleway

Frankland Farm

DURHAM DISTRICT

Frankland Lane

BELMO



Fig. 5.9. Route Section R22 - R31

right track. The entrance way would also benefit from garden planting to make the area more attractive.

Section R24 - R27 is a minimum of 3 metres wide throughout with adequate forward visibility but its surface of tarmac and/or compacted aggregate is badly pot-holed with a loose gravel surface and will require upgrading throughout.

Section R24 - R25 is unattractive due to the high walls and security fences of the adjoining penal institutions. This could be remedied by planting/ management of screening trees along this section, and while there is sufficient verge width to allow this, security implications may prohibit such management (there is evidence of trees having been cut down on the eastern verge in the past).

Section R27 - R28 is a minimum of 3 metres wide throughout but its surface of compacted aggregate/ bare earth is pot-holed and waterlogged in winter and construction of a new path surface (Fig. 5.2) of approximately 100 metres will be necessary.

5.2.6.3 Potential Local Impacts and Mitigation -

- Increased disturbance to existing users of the bridleway R23 - R28 during construction and use.

Mitigation: Generate good will by consulting with current users at an early planning stage and keeping them informed of developments. Minimise time required for construction and timetable construction for time of least use.

- Increased disturbance to residents of properties in the vicinity of section R26 - R27 during construction.

Mitigation: Generate good will by consulting with residents at an early planning stage and keeping them informed of developments. Minimise time required for construction and timetable construction for time of least use.

Resolve by negotiation and compensation of upgraded access road (R23 - R27).

- Security implications for Frankland Prison and Low Newton Remand Centre during construction and use.

Mitigation: Consult with relevant authority at an early planning stage.

Minimise time required for construction. Resolve by negotiation.

- Potential for disturbance to wildlife in the ecologically important Brasside Ponds SSSI if increase in use of the section promotes an increase in visits to the site.

Mitigation: Adequate directional signs in the region of R26 to prevent accidental visits to the SSSI. Monitor deliberate visits to the SSSI and their effect. Consider physical measures to deter casual visitors if negative impacts observed.

5.2.6.4 Further Work Required -

- Consultation with current users and local residents.
- Consultation with Prison authorities
- Consultation with English Nature to determine best method of monitoring to detect any impact at Brasside Ponds SSSI.

5.2.7 Route Section R28 - R31

Frankland Lane to Newton Hall Cycleway (Fig. 5.9)

5.2.7.1 Description - From R28 the route leaves the bridleway through an existing gate and skirts the western edge of the narrow strip of woodland, that encloses Frankland Lane from this point south, over agricultural land making use of existing gateways in hedgelines (R28 and R29) (Fig. 5.20). Path widths and forward visibility are inadequate (Fig. 5.2) on the existing bridleway and it is inappropriate to remove trees to correct this in an already narrow strip of wood,

ecologically important as a wildlife corridor connecting to an ancient woodland site: The Scroggs.

At R30 the route rejoins the existing bridleway where it is now at the edge of The Scroggs and path width and forward visibility accord with the preferred design standard (Fig. 5.2). At R31 the route joins the existing Newton Hall Cycleway.

5.2.7.2 Detail and Construction Requirements - Section R28 - R30 will require the construction of a new path (Fig. 5.2) with a stock proof boundary to its western edge. Existing farm access gateways at R28, R29, and R30 will need to be widened and cycle access barriers (Fig. 5.7) installed at the eastern side of the openings. Adequate signs and physical measures, such as stile access to the old bridleway, will be required at R28 and R30 to direct cycle traffic onto the new route. Section R29 - R30 currently runs as a stream in winter and will require the surface, which is composed of bare earth, compacted brick rubble and some areas of laid bricks, upgrading to the preferred standard (Fig. 5.2). All-round visibility at the junction with the Newton Hall Cycleway at R31 is good and an access barrier will not be necessary. An existing access barrier at Frankland Farm will serve to exclude motor vehicles.

5.2.7.3 Potential Local Impacts and Mitigation -

- Increased disturbance to wildlife along section R28- R31, both during construction and use, especially to the woodland edge of a narrow corridor habitat and to locally rare ancient woodland habitat (Fig. 2.13).

Mitigation: Promote/ facilitate creation of a woodland belt with woodland edge of diverse form in the improved pasture fields to the south east (Fig. 2.12), as ecological compensation (Fig. 5.9). This will serve to replace the disturbed woodland edge and increase the size of woodland habitat in the area. Planting stock to be native species from local stock and widely spaced

especially at its southern end to allow natural regeneration to infill. Planting to ideally take place a minimum of seven years prior to construction.

- Loss of hedgerow habitat in widening gateways at R28, R29 and R30.

Mitigation - Creation of a new hedgerow using a diversity of local native species grown from local stock as the stock-proof boundary at the western edge of the path section R28 - R30. Creation of the hedgerow to take place at least seven years prior to construction of the route.

- Increased disturbance to existing users of the bridle-way during construction.

Mitigation: Generate good will by consulting with current users at an early planning stage. Minimise time required for construction and timetable construction for time of least use.

- Loss of agricultural land in creating path section R28 - R30, adjoining hedge, and the ecological compensation woodland.

Mitigation: Identify landowners and resolve by negotiation/ compensation/ purchase.

- Possibility of archaeological discoveries in section R29 - R30. There is a distinctive pattern of earthworks in the field to the west of Frankland Lane near R30 (Fig. 5.9) and the significance of the laid brick sections of path (R30 - R31) is not yet known.

Mitigation: Timetable and budget for delays and investigative work that may prove necessary.

5.2.7.4 Further Work Required -

- Investigation of the significance of the earthworks to the west of Frankland Lane and the laid brick sections of path (R30 - R31).
- Consultation with existing users of the bridle-way.
- Identification of, and negotiation with, adjacent land owners.

- More detailed ecological assessment of the value of the existing habitat in the area of the proposed ecological compensation woodland and of the hedgerows to be widened at R28, R29 and R30.

5.2.8 Route Section R31 - R40.

Newton Hall Cycleway to Durham City (Fig. 5.10)

5.2.8.1 Description - From R31 the route follows the existing Newton Hall Cycleway. It passes through Frankland Farm (R32), follows Frankland Lane south passing the sewage treatment works at Barkers Haugh (R33) to join Framwelgate Waterside (R36). It follows Framwelgate Waterside beneath the Milburn Gate Shopping Precinct at R37, turns south onto Milburngate (R38) and then east (R39) to cross Framwelgate Bridge to access the city centre (R40).

5.2.8.2 Detail and Construction Requirements - The route surface of section R31 - R32 is of compacted aggregate. Forward visibility and path surface condition and width was observed to be adequate (Fig. 5.2) throughout the full length of this section, as would be expected of a designated cycleway. Section R32 - R40 utilises existing tarmac roads and consequently path width was observed to be adequate throughout. Forward visibility is adequate except at the road bend at the entrance to the sewage treatment works (R35). Some surface repairs will be required in areas in section R32 - R35 where some bad pot-holes were noted. No AADT was available for Framwelgate Waterside or Milburngate but, because this is already designated as a cycleway, it can be assumed that the motor traffic volume and flow over this section is within the preferred guide-lines (Fig. 5.6). The fact that these are access roads, not through roads, would tend to support this assumption.

In section R33 - R35, the sewage treatment works to the south is both visually unattractive and malodorous. Planting a dense hedge of willow (also called a

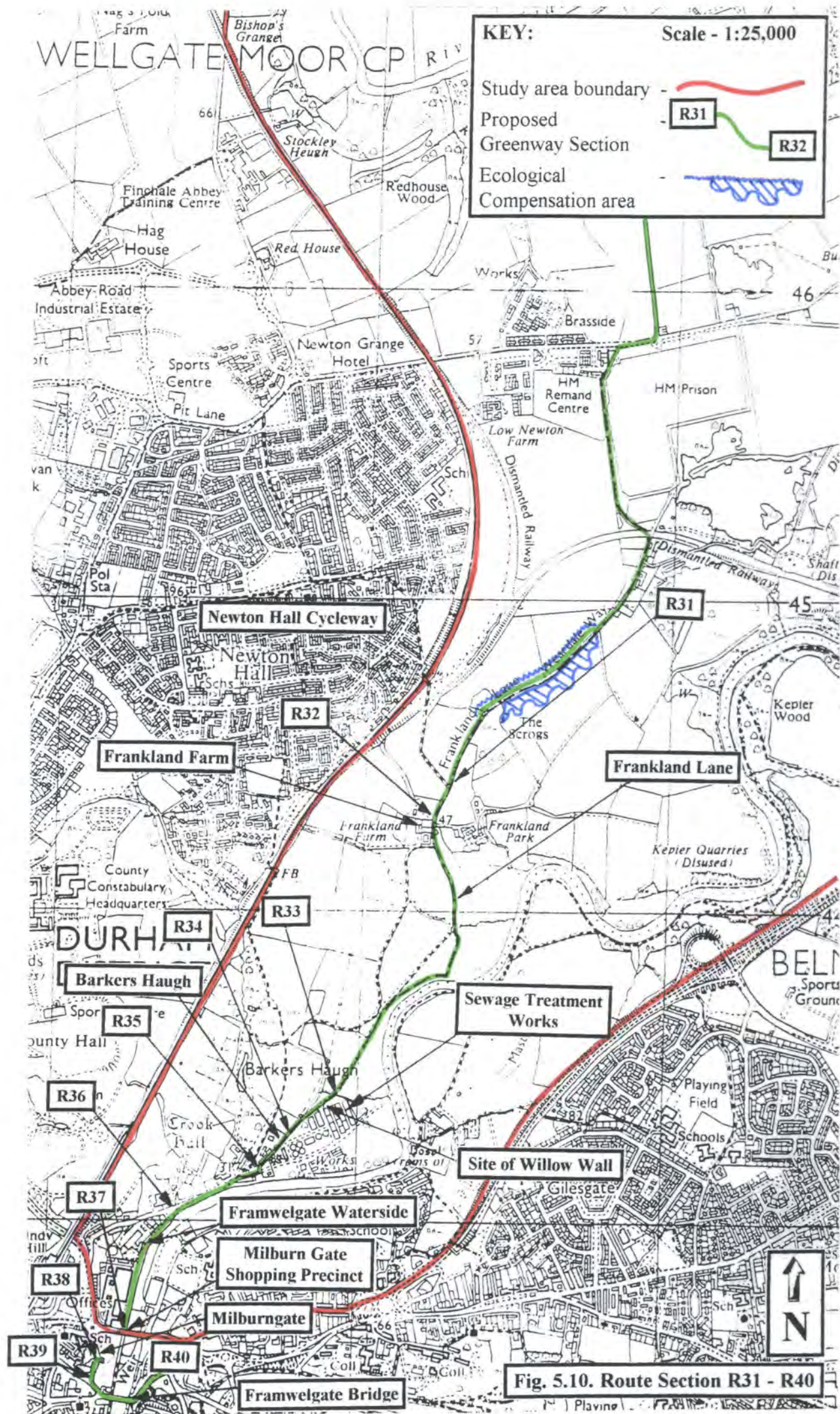


Fig. 5.10. Route Section R31 - R40

"Willow Wall"), to encompass the existing perimeter fence, and maintaining it at the current fence height of approximately 2.5 metres, will screen the treatment works and may serve to deflect odour carrying winds up and over the cycleway. The use of Willow (*Salix sp.*) is in keeping with the use of the site and with the presence of existing Willow trees (*Salix sp.*) within the compound.

The industrial compound to the north west of section R34 - R35 is also visually unattractive. Management of the existing tall, thin hedge along its perimeter to promote a denser habit will make this section more attractive.

Some areas of Framwelgate Waterside are visually unattractive, and the whole of section R33 - R37 gives an impression of neglect and would benefit from improvement works.

Adequate directional signs will be required at R32, R35, R36, R38 and R39.

Signs warning drivers and cyclists of the others' presence will be required at R35.

Signs instructing cyclists to dismount will be required at R39 as, currently, there is no vehicular access to Framwelgate Bridge from the north. Negotiation of west to east cycle access would be a preferable option for section R39 - R40.

5.2.8.3 Potential Local Impacts and Mitigation -

- Increased disturbance to occupants of Frankland Farm during use.

Mitigation - Resolve by negotiation

5.2.8.4 Further Work Required -

- Negotiation of cycle access to Framwelgate Bridge from the west.
- Consultation with residents of Frankland Farm and businesses along Framwelgate Riverside and Barkers Haugh at an early planning stage.
- Promotion/facilitation of improvement works on Framwelgate Riverside and especially at Barkers Haugh as detailed above.

- Investigate and/or provide adequate secure cycle parking in Durham City Centre.
- Identify and investigate potential links from the route to other community and leisure facilities within the city, and ensure the route connects with the proposed link to the C2C route.

5.2.9 Section R5 - R1.

Chester-le-Street Riverside to Chester-le-Street Town Centre. (Fig. 5.3)

5.2.9.1 Description - The route follows existing paths from Chester-le-Street Riverside North (R5) under the newly constructed river crossing completed in 1998, Lumley Bridge, to the footbridge over the A167(T) (R4). Here it crosses the A167(T), follows the path adjacent to Roman Avenue and then the path adjacent to Cestria and Park View Schools before crossing Church Chare and accessing Chester-le-Street Front Street (R1) via High Chare.

5.2.9.2 Detail and Construction Requirements - The paths R1 - R4 are composed of tarmac and/or compacted aggregate and are in good repair. Verge widths and forward visibility are adequate throughout this length. The footbridge at R4 (Fig. 5.3) has restricted visibility. The cutting of "windows" into the central concrete section near each end will be required (Fig. 5.11) and construction of a new ramped exit route from the eastern end to connect with existing paths would be desirable. Physical measures to restrict downhill speed on the extended exit route would be necessary.

The path to Church Chare (R4 - R3) is composed of tarmac and in generally good repair. There is restricted forward visibility by the wall at the eastern entrance to the school grounds (R3). There is room to increase the path width at this point which will improve the forward visibility to the recommended minimum (Fig. 5.2). Existing barriers at the end of the path (R2) and the raised, tactile road

surface used to slow traffic on Church Chare at this point ensure cycle traffic can join the road safely and use the road surface of High Chare to access Front Street. The short length of High Chare ensures traffic speeds remain low and vehicle flow levels will be below the recommended levels for shared road use (Fig 5.6)



Fig. 5.11 Footbridge Crossing A167(T) Showing Restricted Visibility.

5.2.9.3 Potential Local Impacts and Mitigation -

- Some possibility of pedestrian/cycle conflict around the entrances to the schools (R3 - R2) at start and end of school day.

Mitigation - Consider segregation of cyclists and pedestrians on this path section and signs and/or physical measures to reduce cyclists speed on the eastern approach to this area.

5.2.9.4 Further Work Required -

- Investigate and/or provide adequate secure cycle parking in Chester-le-Street.
- Identify and investigate potential links from the route to other community and leisure facilities.
- Ensure connection with the proposed link to the C2C route.

5.3 Environmental Impact of the Greenway.

The overall impact of the greenway on the study area was assessed by considering its impact on those areas considered in the original Environmental Assessment (Section 2.0). The impacts below are in addition to the specific local impacts discussed previously (Section 5.2).

5.3.1 Geology

The proposed greenway will have no significant impact on the geology of the study area. The proposed route does not impinge on the Sacriston Channels County Geological Site. Construction of new path sections will not disturb underlying geology. There may be limited disturbance caused by construction of the bridge at R6 (Fig. 5.1)

5.3.2. Soils.

Impact on soils will be minimal. There will be some compaction and, effectively, soils will be lost beneath new path sections R6 - R7, R10 - R14, R15 - R19, and R27 - R31 (Fig. 5.1). There will also be some compaction of soils within the immediate vicinity of these new path sections as a result of construction operations, especially R6 - R7 as heavier machinery will be required for bridge construction at R6. The total area in question will be relatively small and spread throughout the study area. Compaction can be minimised by restricting construction to times when the ground is dry, and the soil therefore less susceptible, and minimising the weight of machinery used. Greater priority

should, however, be given to avoiding fauna breeding seasons than to avoiding soil compaction when timetabling construction.

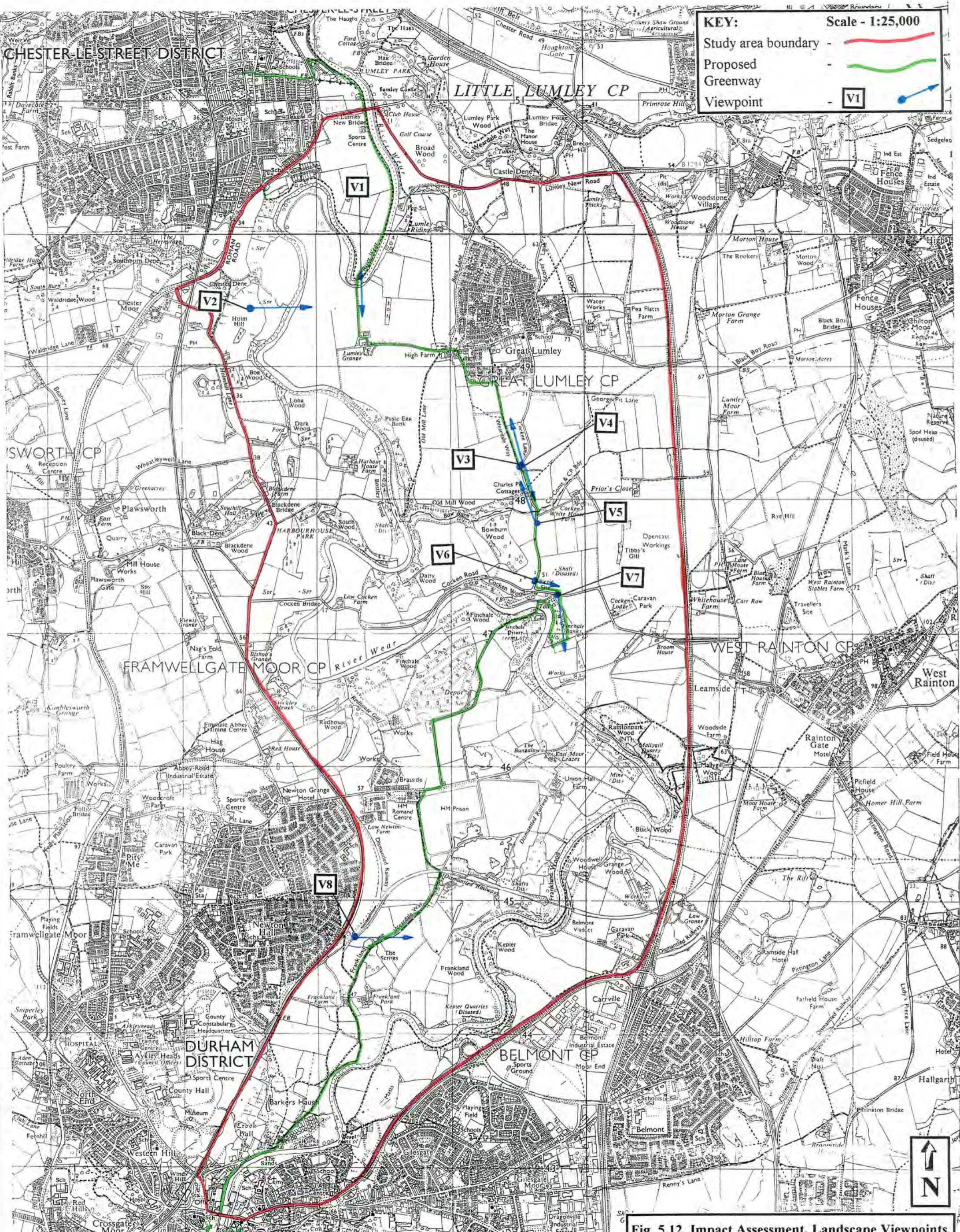
5.3.3 Landscape.

The proposed greenway involves no major construction or earth-moving works. The major impact of the proposal on the landscape, both during and after construction, will therefore be visual. This visual impact was assessed from view points selected to overlook the proposed route (Fig. 5.12).

As with the previous landscape assessment (Section 3.4), finding viewpoints which overlooked the proposed route proved difficult. Overall, the visual impact of the proposed route on the landscape is minimal:

- No new section of the greenway will dissect an existing field parcel.
- The proposed bridge at R6 (Fig. 5.1) has the potential to have the greatest visual impact. However, no viewpoint served by public access could be found that gave a view of the site of the proposed bridge other than from the proposed route itself: V1 (Fig. 5.13). Assessment from private land at V2 (Fig. 5.14) shows that the impact of the bridge will be acceptable provided the bridge design is of an appropriate scale and colour, sympathetic to its surroundings.
- Elsewhere, sections R1 - R6, R7 - R10, R14 - R15, R19 - R28, and R30 - R40 (Fig. 5.1) are already in existence and, provided the surface upgrading/ repair works detailed earlier are carried out using materials of a muted colour, sympathetic to the surroundings, there will be no increase in the visual impact of these sections on the landscape.
- The greenway sections requiring the construction of complete new paths at R6 - R7, R10 - R12, R12 - R14, R15 - R16, R16 - R18 and R18 - R19 (Fig. 5.1) again have minimal impact.

Section R6 - R7 is visible only from the proposed route itself: V1 (Fig. 5.13). From V2 in the west (Fig. 5.14) it will be screened by the existing



KEY: Scale - 1:25,000

- Study area boundary - —
- Proposed Greenway - —
- Viewpoint - VI →

Fig. 5.12. Impact Assessment. Landscape Viewpoints.



Fig. 5.13 Visual Impact Assessment. View from V1, looking south. Showing site of proposed Bridge at R6 and path section R6 - R7 as far as Lumley Grange.



Fig. 5.14 Visual Impact Assessment. View from V2, looking east. Showing site of proposed Bridge at R6 and path sections R6 - R7, and R7 - R8.

hedge along its western side and the buildings of Lumley Grange.

Section R10 - R12 is on top of the highest ground in that area. It follows an existing track, is enclosed by two hedges at its northern end and visible only from a short section of Cocken Lane at its southern end: V3 (Fig. 5.15).

Section R12 - R14 will be constructed on degraded, open-cast land and is visible only from Cocken Lane at the northern and southern extremes of the section: V4 (Fig. 5.16) and V5 (Fig. 5.17).

Section R15 - R16 will only be visible from Cocken Lane: V6 (Fig. 5.18).

The northern portion of section R16 - R18 will be visible only from Cocken Lane: V7 (Fig. 5.19), though the southern portion will be visible from the farm to the east (Fig 5.13).

Section R17 - R18 will be visible only from the route itself but its position in an area of high visual amenity, within ancient woodland close to Finchale Priory, make it especially important that the construction materials used are sympathetic to the surroundings.

Section R28 - R30 will be visible from paths on the eastern boundary of Newton Hall Junction Local Nature Reserve: V8 (Fig. 5.20) but the path surface itself will be screened by the hedgerow along its western edge.



Fig. 5.15 Visual Impact Assessment. View from V3, looking north. Showing path section R11 - R12.



Fig. 5.16 Visual Impact Assessment. View from V4, looking south. Showing path section R12 - R13.



Fig. 5.17 Visual Impact Assessment. View from V5, looking north. Showing part of path section R13 - R14.



Fig. 5.18 Visual Impact Assessment. View from V6, looking east. Showing path section R15 - R16.



Fig. 5.19 Visual Impact Assessment. View from V7, looking south. Showing part of path section R16 - R17.



Fig. 5.20 Visual Impact Assessment. View from V8, looking east. Showing part of path section R28 - R30.

5.3.4 Archaeological and Historical Heritage.

The impact of the proposal was assessed by closer consideration of the proposed route utilising the First Edition Ordnance Survey Map of 1861, relevant Tithe plans and maps, the List of Historic Buildings held in the County Record Office, and the County Sites and Monuments Record (SMR) (Fig. 2.10).

5.3.4.1 First Edition Ordnance Survey Map (1861) - Reference to the map reveals that the only entries that lie directly in the line of the proposed route are previously used roads, tracks or waggonways (Fig 5.1):

- Route section R7 - R8 was already in existence as a road or track in 1861 and known as "Fentonwell Lane". No new construction work is proposed for this section other than minor repairs to the existing tarmacadam surface.
- Route section R10 - R12 follows the line of what was the "Lumley Waggonway" (presumably associated with Lumley Colliery). A new surface will be constructed along this site.

The following information from within the vicinity of the proposed route is also worthy of note:

- "Fish Locks" are marked in the vicinity of the old Lumley New Bridge
- Route section R5 - R6 passes the crossing point of the "Lumley Ferry".
- The fields to the east of Section R6 - R7 were referred to as "Ox Pastures".
- No buildings are shown at Lumley Grange (R7), only "Fenton Well".
- Route section R15 - R16 skirts a field marked as containing "Cocken Pit (Coal)" and "Brick Fields".

- To the east of route section R25 - R26 "Brickfield. Ovens" are marked.

5.3.4.2 *Tithe Plans and Maps*. - Reference to maps for the Townships of Framwellgate (1838), Great And Little Lumley (1840), Cocken (1846), Pittington (1840), and Chester-le-Street (1846) revealed the following names, descriptions, or other details for fields which are still wholly or largely intact today (Fig. 5.16):

- | | | |
|--|-------------------------------|--------------------------|
| 1. Banks | 2. Far Meadows | 3. Bottom |
| 4. Frankland Estate (for which no plan is available) | | |
| 5. South Haugh | 6. North Haugh | 7. Garden |
| 8. Home Pasture | 9. Great Field | 10. Meadow Field |
| 11. Far Meadowfield | 12. South Wastes | 13. Shank End |
| 14. Sheep Field | 15. Paddock | 16. Miles Field |
| 17. Swinburne Field | 18. Fifteen Acre Close | 19. Thirteen Acres |
| 20. Little Bowling Green | 21. South Great Bowling Green | |
| 22. Calf Close | 23. Windales Field | 24. Peggy Hunter's Close |
| 25. Jacksons Bottom | 26. Low Flooden | 27. Harlands East Field |

The proposed route does not sub-divide any of these historical land parcels.

5.3.4.3 *SMR Entries* - The sites of 11 entries (Fig. 5.21) lie directly on the proposed route (Fig. 5.1):

	SMR No	Description	OS Grid Reference
Prehistoric Entries	952	"Two flint flakes found"	NZ 299479
	953	"Flints"	NZ 298479
	3207	"Cist burial destroyed by ploughing"	NZ 296472
	378	"Enclosure"	NZ 297475
	150	"Flint finds"	NZ 298470
	1294	"Enclosure. Crop mark"	NZ 297475
Mediaeval Entries	1301	"Finchale Priory"	NZ 29664709
	1297	"Priory Mill"	NZ 29624718
	1295	"Finchale Priory"	NZ 296471
	1299	"Building - unclassified"	NZ 295471
Post Mediaeval	1291	"John Duck's Hospital"	NZ 28964916

Fig. 5.21 SMR Entries Lying Directly on the Proposed Route.

5.3.4.4 Known Impact. - The known impact of the route on the archaeological and historical heritage of the study area is minimal. The proposal does not impinge on any site in the County Durham List of Historic Buildings. No new construction work is required in the immediate vicinity of SMR entries 1291, 1301, 1297, 1295, 1299, 3207, and 378.

However, the proximity of path sections R15 - R16 and R17 - R18 (Fig. 5.1) to SMR entries 150, 952, 953, and 1294 will make a more detailed archaeological investigation of these areas necessary, prior to construction.

In addition, the wealth of archaeology already recorded in the area increases the possibility that construction of the bridge at R6 and of new paths over sections R6 - R7, R10 - R14, R16 - R17, and R28 - R31 (Fig.

5.1) may reveal new evidence. The potential costs and time delays associated with such discoveries should be borne in mind.

5.3.5 Flora and Fauna.

Negative impacts on flora and fauna are an inevitable consequence of increasing the number of visitors to the study area but the proposal selected minimises these. Some flora will be destroyed by path creation but the route planning minimises the area involved and ensures only short life-cycle species are lost. No trees are to be removed. Creation of a good path surface will encourage its use but there is potential for visitors leaving the paths in which case their presence may reduce vegetation cover and species diversity by trampling and disturb fauna, especially ground nesting birds. The use of tracks already in existence wherever possible, reduces the impact of disturbance on fauna (Satchell and Marren, 1976). The path width is not sufficient to significantly degrade or fragment habitats or isolate populations.

5.3.6 Climate.

The proposal is not of a scale that can have an impact on climate.

5.3.7 Air.

No reduction in air quality within the study area is anticipated. The proposal will not result in any increase in industrial process or in an increase in motorised traffic, and actively seeks to reduce the latter. There is potential for negative impact on air quality in the surrounding area if popularity of the route were to lead to an increase in private motor cars being used to reach the access points of Chester-le-Street Riverside and Durham City. This should be monitored and public transport options actively promoted.

5.3.8 Water.

The proposal will not result in any significant reduction in water quantity within the study area or its immediate surroundings. There is potential for a reduction in water quality as a result of pollution from accidental spillage during construction of the bridge and path at R6 - R7 (Fig. 5.1) and the path at R16 - R19 and from deliberate littering by users of the greenway. However, promoting good working practice will reduce the risk of the accidental pollution while provision of litter bins and periodic cleaning patrols on sections R5 - R6 and at R19 should reduce deliberate littering.

5.3.9 Noise.

After construction is completed, the proposed greenway will not adversely affect the semi-tranquil nature of the study area.

5.3.10 Population,

The proposal will not result in any significant change in the size or distribution of the permanent population of the study area, or of the area immediately surrounding it.

5.3.11 Communications.

The proposed greenway will provide an additional north-south communication route linking Chester-le-Street, Great Lumley, Brasside, Newton Hall and Durham City, as well as scattered individual houses along the route. This is a beneficial addition as the route is a communication link for sustainable transport only.

5.3.12 Level of Visitor Use.

It is the purpose of the proposed greenway to increase visitor use of the study area.

5.3.13 Level of Accessibility.

The proposed greenway will increase accessibility to the countryside for casual visitors and, being seen as safe, will appeal to visitors who might not otherwise have the confidence to venture into the wider countryside (Countryside Commission, 1998).

5.4 Further Essential Work.

In addition to the specific investigations and assessments identified in the earlier consideration of the greenway route, in order for the proposal to fulfil its potential further investigation will be required in the following areas.

5.4.1 Associated Circular Routes.

Investigation and design of potential circular walks or cycle routes of varying lengths, associated with the greenway and centred on Durham City and Chester-le-Street Riverside will promote and encourage increased visitor use of the study area.

5.4.2 Interpretation.

Interpretative leaflets and/or trails will similarly promote and encourage use of the greenway and the associated circular routes. Potential themes for interpretation of the greenway include the areas religious heritage, its industrial heritage, the ecological importance of the ancient woodlands, and, possibly, an extension of the sculpture trail which currently exists in Chester-le-Street Riverside South.

5.4.3 Improvements in Public Transport.

Improvements in the frequency of public transport providing access to the area have the potential to promote an increase in use. The potential for additional public transport services and/or additional pick-up/drop-off points to allow circular routes into the study area from both Durham City and Chester-le-Street

to be completed by a combination of cycling/walking and public transport should be investigated. Existing services, any improvements to them, and any additional services should be actively promoted to encourage the use of sustainable transport to access the study area and to encourage visitor pressure away from the Cocken Woods/ Finchale Banks site.

5.4.4 Promotion of the Proposal.

Promotion to a variety of potential users is essential to the success of the proposal both as a local recreational and commuter route and as a visitor attraction. Further investigation will be necessary to identify the most effective means of promotion in each case. It is likely, however, that some of the following means of promotion will prove valuable:

- Raising the profile of the area by utilising publicity surrounding sponsorship and design of the bridging project.
- Design and production of interpretative leaflets and trails both for the greenway and for circular walks built around it.
- Promotion of the greenway as part of the National Cycle Network and especially as part of the C2C route by means of leaflet insertions in C2C promotional literature.
- Adequate signing of the routes in accordance with accepted guide-lines (Sustrans, 1996).
- Promotion of the potential of the greenway to local businesses and residents as a sustainable commuter route. Local businesses should be encouraged to provide adequate secure cycle parking, showers and changing facilities.

5.4.5 Public Consultation.

Already highlighted as being essential at a local level (Section 5.2), public consultation is also vital on a regional level to ensure the acceptability of the proposal and thereby ensure it is well used. Consultation will also promote the proposal. The results of this consultation may show a requirement for use by

horses in which case the path construction will need to be altered in accordance with accepted guide-lines. (Sustrans, 1996).

5.4.6 Identification of Ecological Carrying Capacity Indicators.

Identification of suitable indicators to identify when the Ecological Carrying Capacity of specific parts, or all, of the study area is being exceeded is an essential prerequisite to implementation of the proposal. Breeding success of ground-nesting and/ or woodland birds may provide a suitable, readily-monitored indicator.

5.4.7 Identification of Recreational Carrying Capacity Indicators.

Design of a methodology to ascertain when the Recreational Carrying Capacity of parts, or all, of the study area is being exceeded is also an essential prerequisite to implementation of the proposal. Such a methodology is likely to involve the design and use of a structured questionnaire.

5.5 Sustainability Credentials of the Proposal.

The proposal measures favourably against the Sustainability criteria previously identified (Section 4.1):

- It is sustainable in that it will:
"maintain the environment, social and economic integrity and well-being of natural, built and cultural resources"

within the study area

"in perpetuity."

(Federation of Nature and National Parks in Europe, 1993)

- Enjoyment of the study area by future generations and its long-term survival have not be prejudiced by short-term considerations.

- The relationship between tourism/recreational use and the environment will be managed so that it is stable in the long term. Tourism has not been allowed to damage the resource, prejudice its future enjoyment, or bring unacceptable impacts.
- The proposal respects the scale, nature and character of the place in which it is sited.
- In developing the potential of the greenway as a sustainable commuter, as well as recreational route, the proposal seeks to make essential changes to the local environment beneficial.
- The proposal will not lead to overcrowding and seeks to reduce overcrowding where it already exists in Finchale Banks/ Cocken Woods and the peninsula in Durham City and where it may develop in future in Chester-le-Street Riverside.
- The proposal seeks to reduce traffic congestion by providing a sustainable transport route for commuting between Durham City, Great Lumley and Chester-le-Street, and by promoting the use of public transport to access the gateways to the study area.
- The creation of a path of a construction standard appropriate to the proposed use, coupled with adequate maintenance, will prevent wear and tear becoming a problem in the study area. In seeking to draw visitors from the peninsula in Durham City, it also seeks to reduce wear and tear in that area.
- The proposal is an appropriate development for the study area and will not facilitate other, inappropriate development.
- The proposal seeks to minimise conflicts with the local community by recommending early consultation, followed by regular updates and by promoting appropriate construction methods and timetabling to minimise disturbance.

5.6 Additional Benefits of the Proposal.

As well as promoting sustainable visitor use of the study area, the proposal selected, and its design, also have the potential to benefit the study area and its immediate surroundings, including Chester-le-Street and Durham City, in the following ways:

- Linking the proposal to the National cycle network, and particularly the C2C recreational route, has the potential to attract overnight visitors to both Chester-le-Street and Durham City allowing both to increase tourism receipts without promoting an increase in motor traffic. This is especially advantageous for Durham City.
- Linking the proposal to the National cycle network will help towards meeting national targets for sustainable transport and increases the possibility of attracting funding from sources other than local authority budgets.
- The proposed new bridge over the River Wear is a discrete, high profile project with the potential both to attract commercial finance and to generate publicity for the proposal. Potential investors could include Durham County Cricket Club, its commercial sponsors, and/or the Riverside Sports Pavilion.
- The proposal will help the Chester-le-Street Riverside Development fulfil its declared function of being a "gateway to the countryside" (Chester-le-Street District Council, 1996)
- The proposal has the potential to provide a sustainable commuter route between Chester-le-Street, Great Lumley and Durham. The link between Great Lumley and Chester-le-Street can play an important role in maintaining the latter's status as an important centre for shopping, employment and social activity.

5.6.1 Local Authority Policies.

The proposal will also help relevant local authorities meet declared targets and comply with statements of intent made in local plans and other documents. In

doing so, the proposal itself benefits by having a greater chance of being adopted and attracting local authority and other funding.

The study area already lies wholly within the Central Corridor strategic planning area which is described as:

"generally the most prosperous part of the County, and the most attractive to inward investment"

and as containing

"some attractive environments, particularly within and around Durham City, and important areas of open countryside".

(Durham County Council, 1998)

The stated planning strategy for the Central Corridor is to:

"build on its existing advantages to attract investment and development for the benefit of the County as a whole, but to recognise the environmental capacity of parts of the area, particularly Durham City and Chester le Street."

(Durham County Council, 1998)

The proposal complies with the spirit of this strategy and will promote, facilitate or complement the following declared key elements of it:-

- inward investment opportunities to be further developed;
- role of the area as an important provider of tourism and recreation facilities to be enhanced;
- the character and setting of Durham City to be safeguarded by the designation of a Green Belt whilst enabling its role as a location for high quality employment, education and tourism development (sic);
- Chester le Street to be supported as a main town for employment, shopping, and social facilities, whilst protecting the remaining countryside and the separate identities of the towns and villages in the District;

- the image of the County to be enhanced by protecting important landscapes, high quality built environments and areas of open countryside.

(Durham County Council, 1998)

The proposal also satisfies, facilitates, or complements the following Structure Plan and Local Plan Policies. (Numerically referenced policies: Durham County Council, 1998; Alphanumerically referenced policies: Chester-le-Street District Council, 1996) Some paragraphs have been omitted from policies, where not relevant to the study area and not essential to the understanding of the policy. Policies are listed in no order of importance and statements most pertinent to the proposal have been italicised:

- Policy 1: In accordance with the principles of sustainable development, *new development should not detract from and, where possible, should contribute to maintaining and enhancing the quality of the environment for future generations. Accordingly, it should have an acceptable impact on:*
 - a) *The built and natural environment, including the amenity of local communities, the landscape and nature conservation.*
 - b) *The existing infrastructure including the ability of the existing highway network to accommodate any additional traffic generated by the development.*

Any benefits to the community and the local economy arising from a development should also be taken into account.
- Policy 4. *The character and appearance of the countryside should be conserved and enhanced. Accordingly:*
 - a) New development should, wherever possible, be located within the existing physical framework of towns and villages;
 - b) Development on the fringes of built up areas should have regard to the needs of agricultural and countryside activities;
 - c) *The countryside should be protected from development which does not*

need to be located there;

d) Development which, exceptionally, needs to be located in the countryside in accordance with other policies of the plan should respect the character and appearance of the countryside, maintain the physical and visual separation between towns and villages and avoid ribbon development.

- Policy 5. *There shall be a Green Belt in North Durham south of the Tyne and Wear conurbation covering the following general areas:*

a) north of Consett and Stanley, and eastwards to Chester-le-Street

b) extending south westwards from Chester-le-Street, east of Kimblesworth, south of Witton Gilbert, east of Bearpark and southwards to Croxdale, and then north-eastwards to Sherburn and West Rainton, to encircle Durham City, and

c) north and north west to Seaham.

Precise boundaries, including those around towns and villages, will be defined in district local plans.

- Policy 6. *The openness of the North Durham Green Belt should be preserved. Within the Green Belt the construction of new buildings would be inappropriate unless required for agriculture, forestry, essential facilities for outdoor sport and outdoor recreation, for cemeteries and for other uses of land which do not conflict with the purposes of including land in the Green Belt.*

- Policy 29A. *The County Council with district councils will seek to reduce the adverse environmental impact of travel:*

a) to and from the County's main towns, and in particular Durham City

b) between the County and the Tyne and Wear and Tees Valley conurbations

Specific measures will also be introduced to increase the relative

attractiveness of bus, rail, and, where appropriate, cycling in providing for such journeys.

- Policy 36. *The County Council with district councils will examine the scope for increased cycle use and walking within each of the County's main towns and will develop proposals for implementation.*
- Policy 37. In considering development proposals full account should be taken of the needs of pedestrians and cyclists.
- Policy 41. In association with the provision of new by-passes *the environment of communities should be enhanced through the introduction of appropriate measures including:*
 - a) environmental enhancement schemes;
 - b) traffic calming and bus priority;
 - c) *improved pedestrian and cycle networks;* and
 - d) the appropriate development of highway land rendered surplus by the by-pass.
- Policy 48. *Proposals which maintain and enhance the viability, vitality and attractiveness of existing town centres through improvements to the range of retail, social, cultural, residential and commercial facilities and to the environment will be encouraged.*
- Policy 50. *Access to the centres of the main towns should be enhanced by:*
 - a) *increasing the attractiveness of public transport, walking, cycling and facilities for disabled people.*
- Policy 52. *To help further stimulate the growth of tourism and recreation opportunities in County Durham. Provision should be made for appropriate development which would:*
 - a) *increase the range and choice of tourist and recreation facilities;* or
 - b) *reduce recognised and significant deficiencies in recreation provision;*

or

 - c) *help to spread the benefits of tourism throughout the County or extend the length of the tourist season.*

- Policy 54. *Access to the countryside will be improved by the maintenance of public rights of way and other public footpaths, bridleways and cycleways, and through the provision of new and improved routes. The following strategic long distance routes will be developed, maintained and improved:*

Pennine Way

Teesdale Way

Weardale Way

Wear Valley Way

Coastal Footpath

The Durham Railway Walks

Coast to Coast (Cumbria to Wearside/Tyneside) Cycle Route

National Cycle Network

- Policy 58. *Tourism and recreation facilities will be encouraged in association with the Great North Forest. In particular provision should be made for the development of:*
 - a) *a network of recreational routes for walkers, cyclists and horseriders:*
 - and
 - b) *'gateway sites' providing access to recreation and visitor facilities*
- Policy 64. *The quality of the County's landscape should be maintained and enhanced by ensuring that:*
 - a) *Where development can be justified in an Area of High Landscape Value it does not detract from the areas Special character*
- Policy 66. *Scheduled ancient monuments or other archaeological remains of national importance including their settings should be preserved and, where appropriate, enhanced. Sites and monuments of lesser importance should be preserved in situ wherever possible. Where sites are affected by proposed development an archaeological evaluation should be required.*
- Policy 67D. *The County's nature conservation interest will be maintained and enhanced. Protected species and local nature conservation features should be protected from development which may significantly damage their habitat or nature conservation value. The creation of new wildlife habitats and local nature reserves will be encouraged.*

- Policy 68. Strategic wildlife corridors will be consolidated and strengthened. *Development within a strategic wildlife corridor should not impair its integrity and where possible should contribute to its nature conservation interest through appropriate landscaping, restoration or management.*
- Policy 69. *An increase in tree cover in the County will be sought where there are no significant adverse impacts on the character of the landscape, nature conservation interest or heritage features.*

Areas of ancient woodland should be identified in local plans and protected from development that would result in any loss or damage.

(Durham County Council, 1997)

- Policy T2. *Chester-le-Street District Council will seek to protect the existing network of public footpaths and bridleways, and augment it by providing new routes wherever possible, but in particular the following:*
 - i) From the Sustrans C2C route to Waldrudge Fell, the town centre and the Riverside via the Congburn Valley;*
 - ii) a new path along the River Wear from the Riverside to Durham City.*
- Policy T3. *Chester-le-Street District Council will continue to promote and encourage the use of the C2C cycle path and its connections, and ensure that the physical integrity of the route is maintained in order that the use of part of the route for future light rail use will not be precluded.*
- Policy RL13. *Chester-le-Street District Council will seek to maintain existing recreational routes and establish a new route from the Riverside to Durham City.*
- Policy TM10. *The Council will support the introduction of a series of 'green routes' to link the attractions of Beamish, Waldrudge Fell and Chester-le-Street Riverside.*
- Policy TM11. *The Council will support the introduction of a series of circular walks around Beamish, Waldrudge Fell and Chester-le-Street Riverside which will be able to link in with the new green routes.*

- Policy TM12. *The Council will, along with Parish Councils, Durham County Council and the Great North Forest, continue to upgrade and improve the rights of way network within the District.*
- Policy TM 13. *The Council will continue to support the C2C route to the north of the District and will provide a link from the route into Chester-le-Street town centre in order to provide access for visiting cyclists and local resident.*

(Chester-le-Street District Council, 1996)

The proposal will also satisfy, facilitate or complement the following statements of intent:

- *Durham County Council will protect the county's most attractive landscapes and sites of ecological importance from mineral exploitation and other development.*
- *Durham County Council will provide for the enjoyment of the countryside by all people including walkers, cyclists, the disabled and families with small children.*
- *Durham County Council will adopt an integrated approach towards countryside management, conservation, access, tourism and the rural economy.*
- Durham County Council will encourage high standards of building design and landscaping
- *Durham County Council will give consideration to the provision of cycle routes.*

(Durham County Council, 1993a)

- *Durham County Council will ensure that the County heritage of wild flora and fauna should remain as large and diverse as possible.*
- *Durham County Council will establish nature conservation as a key consideration within County Council policy formation and implementation.*

- *Durham County Council will enhance the ecological interest of the County by encouraging the use of appropriate countryside management and landscaping and habitat creation techniques.*
- *Durham County Council will ensure that, wherever possible, sites of importance for nature conservation are protected from harmful development and are managed to conserve and enhance their ecological interest."*

(Durham County Council, 1993b)

6.0 CONCLUSION.

6.1 Potential of the Study Area to Attract an Increase in Visitor Use.

Environmental assessment of the study area has demonstrated that it does have the potential to attract visitors.

The landscape of the study area was found to be one of high value. Much of it has been designated as an Area of High Landscape Value and proposed as a Green Belt. Detailed landscape assessment confirmed the value of the designated areas and showed that away from the AHLV, the landscape is still of high value, only degraded in small areas, most notably at Frankland Prison and Low Newton Remand Centre at Brasside, and the disused munitions depot nearby. Major communication links at its boundaries, are audibly intrusive in places.

The study area has a rich historic heritage in its own right and lies close to the World Heritage Site of Durham Castle and Cathedral. Archaeological evidence exists to show occupation from prehistoric times to the present day and it contains fifteen buildings listed for their architectural and historic importance, including three Grade I listed buildings. Finchale Priory and the disused stone quarries are particularly significant due to their association with the World Heritage Site.

The area is also ecologically important. The River wear, running throughout the length of the study area, is an important ecological resource. So are the important wetland site in the Brasside Ponds SSSI, the eleven County Wildlife sites and the significant proportion of County Durham's ancient woodland found in the study area. The study area as a whole forms an important north - south wildlife corridor, penetrating well into the Durham City at its southern end.

The climate does not prohibit outdoor summer activity, and there are no significant air or noise pollution problems, though the quality of the water in the River Wear and its

tributaries would be improved by reduction in the amount of organic pollution entering them. Possible future reductions in minewater pumping would have a gross effect on water quality.

The area is well connected to the rest of the County, and the country, by rail and by major roads. Major cycleways pass close by but do not yet connect directly to the study area. Public transport services mainly access the area at its northern and southern ends; at Durham City and Chester-le-Street Riverside respectively. The area would be made more accessible to potential visitors by an increase in the frequency of local public transport services, especially evening and Sunday services. Again it is Durham City and Chester-le-Street Riverside which are best served with car parks.

6.2 Capacity of the Study Area to Accommodate an Increase in Visitor Use.

The study area was found to have the capacity to absorb an increase in visitor use.

The area is sparsely populated. Current visitors are concentrated at the Chester-le-Street Riverside development, Finchale Banks/Cocken Woods picnic area and at Finchale Priory. The former two would benefit from these visitors being encouraged to disperse further into the study area.

Away from these "honeypot" areas, field survey showed the study area to be capable of physically accommodating an increase in visitor use without becoming overcrowded but it remains to be determined *how much* of an increase can be accommodated without it becoming unsustainable. The number of visitors who can use the area sustainably (the Recreational Carrying Capacity) will be limited to the lower of either the number who can use it without having a negative impact on the ecology (the Ecological Carrying Capacity) or the number who can use the area without it being perceived as overcrowded (the Social Carrying Capacity). The Ecological and Social Carrying Capacities cannot be determined in advance and appropriate methods of monitoring when these capacities start to be exceeded need to be identified.

The County as a whole can accommodate an increase in over-night and day visits. The study area has the potential to attract a proportion of any such increase, bringing financial benefits to the local economy.

6.3 Availability of Potential Visitors.

There is a large catchment of potential visitors to the study area in the residents of nearby population centres, supplemented by a large student population, and existing tourists already visiting the surrounding area. The estimated potential catchment population is in excess of 2,000,000.

6.4 Appropriate Methods of Increasing Visitor Use.

Identification of potentially damaging effects of visitor use pertinent to the study area allowed a suitable proposal for increasing visitor use to be formulated.

While the geology of the study area was not found to present any potential problems to construction projects of moderate scale, construction of major tourist developments and/or communication links is inappropriate due to their gross effects on the quality of the landscape and on the ecology. Such major construction work would result in fragmentation and loss of habitat, and increased disturbance to species, and the aquatic environment was identified as particularly vulnerable to pollution. The permanent loss of farmland based on good agricultural soils is also inappropriate.

An increase in visitor use should be achieved by capitalising on the areas existing attractions: the quality of its landscape, its flora and fauna and its religious and historic heritage.

6.5 Proposed Method of Increasing Visitor Use.

The most appropriate proposal to bring about an increase in visitor use of the study area is for the creation of a greenway linking Durham City to Chester-le-Street Riverside, and to the C2C cycleway and the National Cycle Network; for the creation of a number of

circular routes centred on the greenway; and for interpretation of the area's landscape, ecology and historic heritage. The proposed greenway route has been surveyed and planned in detail and has the potential to increase visitor use of the study area in a sustainable and environmentally appropriate way.

The link to the National Cycle Network will bring new tourists to both Durham City and Chester-le-Street, especially given the C2C cycleways connection to the existing tourist attraction of Beamish Open Air Museum. These are tourists who currently pass to the north of the study area. They will be using sustainable transport and will, being over-night visitors, financially benefit the local economy where they stay, without contributing to current problems of traffic congestion.

The proposal also has the potential to convert a number of the existing day visitors to Durham City to over-night visitors. Interpretation of the study area, and especially its historic heritage, including Finchale Priory, will add to the range of "attractions" associated with the City and the greenway will make this heritage accessible. By attracting current visitors to the City to areas other than the peninsula, the proposal can reduce overcrowding there. However, the success of such a scheme will depend upon integrating the greenway with reliable, frequent public transport alternatives, including cycle hire and of promoting more of the areas historic heritage than just Finchale Priory. Tourists who spend a holiday cycling from coast-to-coast will see a route option incorporating a stop-over in the historic City of Durham as an attractive proposition. But, tourists who spend their holiday touring the country's historic heritage by coach are less likely to choose to walk 5 km to view Finchale Priory and then walk 5km back. They will however, be more likely to venture into the study area if they are aware of the valley's wider historic heritage, its attractive landscape, its ecological value and that there are a range of alternative circular routes and transport alternatives.

The greenway will also provide a valuable recreational resource and commuter route for local residents.

6.6 Added Benefits of the Proposal.

As well as the benefits associated with promoting an increase in visitor use of the study area detailed above, the proposal provides a sustainable transport route linking Durham City, Great Lumley and Chester-le-Street Riverside. It will promote the use of sustainable transport. It will help local government meet declared targets and comply with statements of intent made in respect of the planned use of the study area.

6.7 Further Work.

During the study a number of areas were identified where further work is essential for the proposal to realise its full potential.

A series of circular routes incorporating the greenway, both as recreational options and as connections to shops, centres of business and other local services need to be investigated and designed.

The frequency and flexibility of public transport to and within the study area should be increased, integrated with the greenway and associated routes, and actively promoted.

Public consultation is essential to promote a sense of local ownership.

Identification and base-line monitoring of Ecological Carrying Capacity, and Social Carrying Capacity Indicators is essential prior to implementation of the proposal. Regular monitoring after implementation will ensure early identification that the Recreational Carrying Capacity of the area has been reached.

The proposal will need to be promoted to potential visitors and, especially, to the companies who run organised nationwide tours if an increase in overnight visitors to Durham City is to be achieved. When the cycleways linking both Durham City and Chester-le-Street to the C2C Cycleway are completed, the proposal must be actively

promoted as a route option, and both Durham City and Chester-le-Street as potential stop-overs.

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Appendix 1

Agricultural Land Classification of England and Wales, 1977.

GRADE 1: Land with very minor or no physical limitations to agricultural use. The soils are deep, well drained loams, sandy loams, silts loams or peat, lying on level sites or gentle slopes and are easily cultivated. They retain good reserves of available water, either because of storage properties of the soil or because of the presence of a water table within reach of the roots, and are either well supplied with plant nutrients or highly responsive to fertilisers. No climatic factor restricts their agricultural use to any major extent.

Yields are consistently high on these soils and cropping highly flexible since most crops can be grown, including the more exacting horticultural crops.

GRADE 2: Land with some minor limitations which exclude it from Grade 1. Such limitations are frequently connected with the soil; for example, its texture, depth or drainage, though minor climatic or site restrictions, such as exposure or slope, may also cause land to be included in this grade.

These limitations may hinder cultivations or harvesting of crops, lead to lower yields or make land less flexible than that in grade 1. However, a wide range of agricultural and horticultural crops can usually be grown, though there may be restrictions in the range of horticultural crops and arable root crops on some types of land in this grade.

GRADE 3: Land with moderate limitations due to the soil, relief or climate, or some combination of these factors which restrict the choice of crops, timing of cultivation, or level of yield. Soil defects may be of structure, texture, drainage, depth, stoniness or water holding capacity.

GRADE 4: Land with severe limitations due to adverse soil, relief or climate, or a combination of these. Adverse soil characteristics include unsuitable texture and

structure, wetness, shallow depth, stoniness or low water holding capacity. Relief and climate restrictions may include steep slopes, short growing season, high rainfall or exposure.

Land in this grade is generally only suitable for low output enterprises. A high proportion of tit will be under grass, with occasional fields of oats, barley and forage crops.

GRADE 5: Land with very severe limitations due to adverse soil, relief or climate, or a combination of these. The main limitations include very steep slopes, drainage, shallow depth of soil, excessive stoniness, low water holding capacity and severe plant nutrient deficiencies or toxicities.

Grade 5 land is generally under grass or rough grazing, except for occasional pioneer forage crops.

Appendix 2.

Sites and Monuments Record Entries.

Prehistoric Entries.

SITE NAME: Great Lumley SITE TYPE: Flints SMR No.:1044

O.S.GRID REF: NZ 295495

DESCRIPTION: Material collected by Preston in 1932 included "a broken knife, notched with use and flaked at the end, a small scraper and several flakes"

SITE NAME: KEPHIR SITE TYPE: Enclosure SMR No.: 372

O.S.GRID REF: NZ 282483

DESCRIPTION: Rectilinear, ditched enclosure with linear earthwork.

SITE NAME: Harbour House SITE TYPE: Ring ditch SMR No.:1287

O.S.GRID REF: NZ 27894799

DESCRIPTION: A crop mark of a small ring-ditch (approx. 10 - 15 m in diameter) with a break in the west side so that it resembles the drainage gully of a round-house.

SITE NAME: None SITE TYPE: Flints SMR No.: 952

O.S.GRID REF: NZ 299479

DESCRIPTION: Two flint flakes found.

SITE NAME: None SITE TYPE: Flints SMR No.: 953

O.S.GRID REF: NZ 298479

DESCRIPTION: One core and one flake found

SITE NAME: Priory Farm SITE TYPE: Cist burial SMR No.: 3207

O.S.GRID REF: NZ 296472

DESCRIPTION: Cist destroyed by ploughing in field adjacent to Priory Farm, Finchale.

SITE NAME: North Finchale SITE TYPE: Enclosure SMR No.: 378

O.S.GRID REF: NZ 297475

DESCRIPTION: Three sides of a rectilinear ditched enclosure with bowed sides.

SITE NAME: Finchale Banks SITE TYPE: Find spot SMR No.: 150

O.S.GRID REF: NZ 298470

DESCRIPTION: Material recorded by Preston from "right bank of Wear opposite Priory" included three cores, six flakes, two scrapers.

SITE NAME: North Finchale SITE TYPE: Enclosure SMR No.:1294

O.S.GRID REF: NZ 297475

DESCRIPTION: A rectangular enclosure consisting of a single ditch, situated just north of the steep Wear valley and on the bank opposite Finchale priory. The crop mark is faint and there is no sign of internal structures. A further crop mark at NZ 29934746 of a subrectangular enclosure has been disturbed.

SITE NAME: Finchale Priory Farm SITE TYPE: Find spot SMR No.: 102

O.S.GRID REF: NZ 296470

DESCRIPTION: Material collected of ploughed land by Preston comprised one core, three scrapers, many flakes.

SITE NAME: Finchale Nab SITE TYPE: Find spot SMR No.: 97

O.S.GRID REF: NZ 297473

DESCRIPTION: Four collections of flint material including microliths, probably from the same site, held in Sunderland Museum, Bowes Museum and Antiquities Museum, Newcastle.

SITE NAME: Finchale Banks SITE TYPE: Find spot SMR No.: 98

O.S.GRID REF: NZ 298470

DESCRIPTION: Cores and flakes collected by Preston now in Sunderland Museum.

SITE NAME: Harbour House SITE TYPE: Find spot SMR No.: 99
O.S.GRID REF: NZ 294468
DESCRIPTION: Flint cores and flakes collected by Preston.

SITE NAME: Frankland Wood SITE TYPE: Chipping Floor SMR No.: 1043
O.S.GRID REF: NZ 296454
DESCRIPTION: Abundant flint material collected in the 1950's and 60's from ploughed land on the edge of Frankland Wood overlooking the west bank of the Wear. 94 pieces of flint are known including ten cores, one end scraper, one denticulated blade, one burin, one notched blade, seven utilised flakes, ten flint pebbles.

SITE NAME: Union Hall SITE TYPE: Find spot SMR No.: 103
O.S.GRID REF: NZ 298458
DESCRIPTION: Four flint flakes in Skipton Museum.

SITE NAME: Woodwell House SITE TYPE: Ring ditch SMR No.: 2417
O.S.GRID REF: NZ 300452
DESCRIPTION: Clear crop marks of a circular ditched feature - possibly a barrow - and some rectilinear marks which may be part of a field system.

SITE NAME: Kepier quarry SITE TYPE: Core SMR No.: 261
O.S.GRID REF: NZ 293440
DESCRIPTION: Broken core found in ploughed fields above the car (sic)

SITE NAME: North Lodge SITE TYPE: Enclosure SMR No.: 407
O.S.GRID REF: NZ 280533
DESCRIPTION: Circular enclosure with nearby ring ditch.

SITE NAME: Chester-le-Street SITE TYPE: Axe SMR No.: 2147

O.S.GRID REF: NZ 2751

DESCRIPTION: A bronze socketed axe, found with Roman remains, considered to be of "Gaulish" type.

Roman Entries.

SITE NAME: Chester-le-Street SITE TYPE: Bridge SMR No.: 2166

O.S.GRID REF: NZ 27535157

DESCRIPTION: The remains of a supposed Roman bridge discovered 1930 - 1 at a point north of the corner of Chester-le-Street fort described as "large blocks of masonry with cramp and lewis-holes on the south bank of the Cong Burn in line with the west rampart."

SITE NAME: Chester-le-Street SITE TYPE: Cremation cemetery SMR No.: 2167

O.S.GRID REF: NZ 27995117

DESCRIPTION: Cinerary urns found AD 1935.

SITE NAME: Chester-le-Street SITE TYPE: Cemetery SMR No.: 2170

O.S.GRID REF: NZ 27005111

DESCRIPTION: Roman burials 90 yards south of the fort.

SITE NAME: Congcangium SITE TYPE: Fort SMR No.: 2153

O.S.GRID REF: NZ 275513

DESCRIPTION: The Roman fort of Chester-le-Street - numerous finds made.

A cavalry fort founded AD 216.

A series of excavations between 1938 and 1978 revealed a range of detail about the internal structure of the fort. Main building uncovered was the Commanders house which went through two phases of use. Firstly as residential quarters. Secondly it was modified by the division into smaller units one of which contained a small furnace, another a small

bath house. The building had a fairly comprehensive hypocaust system (hot air underfloor heating system).

Some sections of the inter vallum road were uncovered, most notably in the south - east corner.

The defences were composed of a rampart and a series of 3 external ditches, the rampart having been made by the material thrown up from the innermost ditch. A stone revetment was later added to the outer face of the rampart. The ditches showed signs of having been periodically cleaned out and recut.

SITE NAME: Chester-le-Street SITE TYPE: Bath house SMR No.: 2168
O.S.GRID REF: NZ 27635118

DESCRIPTION: Foundations of a hypocausted building found in 1856 immediately outside south rampart of the fort and running parallel with it. Interpreted as a "villa". From the evidence of a conduit close by it is probable that this was once the fort bath-house, later perhaps converted to industrial use. In 1927 an apsidal or circular structure of rubble walls faced with brick was located in the same field, and may form part of the bath-house. A short distance east the cobbled surface and kerbstones of a road running north - north east were also uncovered.

SITE NAME: Chester-le-Street SITE TYPE: Drain SMR No.: 2171
O.S.GRID REF: NZ 276513

DESCRIPTION: A stone built sewer, possibly Roman, exposed in a section for construction of new squash courts.

In addition to the above, the SMR entries 2619 through to 2626 record numerous altar and other inscribed stones from the Roman period found in and around the site of the fort at Chester-le-Street, between 1849 and 1886.

Early Medieval Entries.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 700

O.S.GRID REF: NZ 276514

DESCRIPTION: Fragment of cross-base in the upper room of the Anchorage. Broken but unworn.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 701

O.S.GRID REF: NZ 276514

DESCRIPTION: Fragment of cross-base in the upper room of the Anchorage. Broken but unworn.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 702

O.S.GRID REF: NZ 276514

DESCRIPTION: Cross-base in the upper room of the Anchorage. Decoration shows equivocal scene.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 703

O.S.GRID REF: NZ 276514

DESCRIPTION: Cross arm in the upper room of the Anchorage. Mutilated and worn.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 704

O.S.GRID REF: NZ 276514

DESCRIPTION: Incomplete cross shape in the upper room of the Anchorage. Worn, weathered and mutilated.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 705

O.S.GRID REF: NZ 276514

DESCRIPTION: Part of cross shaft in the upper room of the Anchorage. Mutilated by re-use.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 706

O.S.GRID REF: NZ 276514

DESCRIPTION: Incomplete cross shaft in the upper room of the Anchorage. Damaged by re-use. Decoration on four faces showing possible Anglo-Scandinavian influence.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 707

O.S.GRID REF: NZ 276514

DESCRIPTION: Part of cross shaft in the upper room of the Anchorage. Broken and worn by re-use. Decoration on four faces.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 708

O.S.GRID REF: NZ 276514

DESCRIPTION: Fragment of cross shaft in the upper room of the Anchorage. Relatively unworn. Decoration on four faces.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 709

O.S.GRID REF: NZ 276514

DESCRIPTION: Incomplete cross shaft re-used as door jamb.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 710

O.S.GRID REF: NZ 276514

DESCRIPTION: Cross shaft, lost in 1882. A record of its decoration survives.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 711

O.S.GRID REF: NZ 276514

DESCRIPTION: Upper part of cross shaft, in the upper room of the Anchorage. Incomplete but not very worn.

SITE NAME: Chester-le-Street SITE TYPE: Sculpture SMR No.: 712

O.S.GRID REF: NZ 276514

DESCRIPTION: Cross shaft, in the upper room of the Anchorage. It is incomplete, with two faces worn and two unworn. Decoration includes inscriptions in runes and Anglo-Saxon capitals.

SITE NAME: SS Mary and Cuthbert SITE TYPE: Cathedral SMR No.: 2150

O.S.GRID REF: NZ 27605132

DESCRIPTION: The See of Lindisfarne had a cathedral at Chester-le-Street from 833 until 995 when it was removed to Durham. The early cathedral is usually referred to as having been of timber. The church was rebuilt in stone in 1056 by Bishop Egelric. The current church although largely Early English in style still appears to contain significant elements of the late Saxon church mainly in the west part of the south wall.

Medieval Entries.

SITE NAME: Harbour House SITE TYPE: Manor House SMR No.: 1289

O.S.GRID REF: NZ 28214829

DESCRIPTION: The present Harbour House is of modern, probably 18th century, date on the site of the ancient mansion. The manor of Harbourhouse is mentioned in 1315.

SITE NAME: Harbour House SITE TYPE: Chapel SMR No.: 1290

O.S.GRID REF: NZ 282483

DESCRIPTION: In 1432, Bishop Langley licensed a domestic chapel within the manor of Harbourhouse. " The little chapel is still standing.... in use as a smith's shop. The piscina still remains on the south of the altar and a few old lancet lights are closed up in the south and west walls" (1840). "The chapel measures 8.5m by 4.5m and is in use as a hen house. There is no trace of the piscina or altar, the lancet window is partially blocked up and the east window completely blocked up. Now in a poor state of preservation.

"(1954). "The chapel is in a dilapidated condition. There are holes in the walls and roof."
(1960).

SITE NAME: Finchale SITE TYPE: Wall SMR No.: 1301

O.S.GRID REF: NZ 29664709

DESCRIPTION: Remains of the precinct wall of the priory.

SITE NAME: Priory Mill SITE TYPE: Mill SMR No.: 1297

O.S.GRID REF: NZ 29624718

DESCRIPTION: "The present farm house, formerly connected with the Priory Mill, the ruined base course of which may be traced along the waterside. The remains of the dam are distinctly seen when the water is low." (1976).

SITE NAME: Finchale Priory SITE TYPE: Priory SMR No.: 1295

O.S.GRID REF: NZ 296471

DESCRIPTION: About 1110 St. Godric settled near Finchale. His first habitation was about 1 mile from the site of the Priory, but in 1118 he moved to Finchale itself. He died in 1170. The chapel of St. John the Baptist, which had been erected for St. Godric was taken over by the Benedictines of Durham, two of whom lived there until 1196. The site was then acquired for Austin canons but it was made over to the Prior of Durham, and in 1196 a regular Benedictine house was founded there as a cell of Durham. The construction of the regular buildings of the Priory was not begun until about 1237. The construction of the claustral buildings continued into the 14th century. In the latter part of the 14th century, Finchale was adopted as a holiday home for the monks of Durham. This arrangement led to the modification of the buildings, the church being reduced in size. The life of the community then settled on the Prior's house, a 13th century building adapted and altered in the 15th century. The site was transferred to the Office of Works in Jan. 1916.

SITE NAME: Finchale SITE TYPE: Building (unclassified) SMR No.: 1299

O.S.GRID REF: NZ 295471

DESCRIPTION: "The stables ... are evidently a portion of the ancient buildings ... a small trefoil window, some pier capitals and other fragments have been used up in these buildings." (1977)

SITE NAME: Finchale SITE TYPE: Wall SMR No.: 1300

O.S.GRID REF: NZ 29594686

DESCRIPTION: Remains of the precinct wall of the Priory.

SITE NAME: Crook Hall SITE TYPE: Chapel SMR No.: 1250

O.S.GRID REF: NZ 27454315

DESCRIPTION: "In the eastern gable of Crook Hall are closed up lancet windows and pointed doorway of a domestic chapel, of much earlier date than the remainder of the building." (1954)

SITE NAME: Crook Hall SITE TYPE: Moat SMR No.: 1251

O.S.GRID REF: NZ 27454315

DESCRIPTION: Crook Hall was surrounded by a dry moat, still visible on the north side. The ditch is on average 15m wide and 0.6m deep. There is a wide inner bank in places, 1m maximum height. A causeway crosses the ditch at one point, but may be modern.

SITE NAME: Crook Hall SITE TYPE: Manor House SMR No.: 1252

O.S.GRID REF: NZ 27454315

DESCRIPTION: "The outbuilding on the east of Crook Hall is formed by the main rooms of a mediaeval manor house, the Hall with single light, trefoiled, ogee-headed windows, the kitchen with an enormous fireplace and primitive staircase to the upper floor. The mediaeval part is joined to a smaller part built in 1671, with one hood-moulded window on the ground floor. The remainder of the house is Georgian. In the

east gable ... a domestic chapel. An inventory of 1597 makes no mention of a chapel." The structure of 1671 appears to be more in the nature of a rebuilding than a separate addition. The ogee-headed windows are in the north and south walls of the east wing, and the hood-moulded window is on the north side of the house adjoining the Georgian wing. On the south side of the central portion is a Tudor type doorway over which is an inscription "16JMF71". There are no traces of lancet windows in the east gable but there is a blocked doorway visible from the inside. The east wall has apparently been an interior dividing wall and it is possible that the wall with the lancets has been demolished together with that part of the house which contained the chapel. The building is in fair condition and in use as a store and residence.

SITE NAME: Kepier Hospital SITE TYPE: Hospital SMR No.: 1264

O.S.GRID REF: NZ 28214327

DESCRIPTION: The hospital of St. Giles, founded by Bishop Flambard in 1112, stood on the hill near St. Giles church which originally served as the hospital chapel and still incorporates early 12th century architecture. Bishop Pudsey completely rebuilt the hospital on a new site at Kepier, and included an infirmary, dormitory and church dedicated to St. Mary and All Saints. Only the fine buttressed gateway, built by Bishop Bury in 1341, remains at this second site. It leads to a courtyard on the opposite side of which is a 14th century building, now the farmhouse, partly on 12th century foundations. The hospital was dissolved in 1545-6.

SITE NAME: Chester-le-Street SITE TYPE: Village SMR No.: 2159

O.S.GRID REF: NZ 2752

DESCRIPTION: Chester-le-Street urbanised mediaeval village.

SITE NAME: St. Stephen's Hospital SITE TYPE: Hospital SMR No.: 2164

O.S.GRID REF: NZ 2752

DESCRIPTION: The hospital of St. Stephen at Pelaw, mentioned in 1260 and 1313, is last recorded in 1450.

SITE NAME: Chester New Bridge SITE TYPE: Bridge SMR No.: 2162

O.S.GRID REF: NZ 28455228

DESCRIPTION: Chester New Bridge is of four pointed arches, each having five wide ribs with chamfered corners. Total span is about 60 yds., the roadway 16 ft. wide. Mentioned in 1528 as Newbrigge and described by Leland as Chester Bridge.

SITE NAME: The Anker's House SITE TYPE: Church SMR No.: 2151

O.S.GRID REF: NZ 27605132

DESCRIPTION: There is an "Anchorage" at the north side of the west end of the church. It is partly of mediaeval and partly of 17th century date.

SITE NAME: SS Mary and Cuthbert SITE TYPE: College SMR No.: 2152

O.S.GRID REF: NZ 27605132

DESCRIPTION: A college was founded at the church in 1286, and dissolved in 1547. No collegiate buildings survive.

SITE NAME: Chester-le-Street SITE TYPE: Memorial Effigy SMR No.: 2533

O.S.GRID REF: NZ 276513

DESCRIPTION: In St. Cuthberts church, the freestone effigy of Sir William of Sir Roger Lumley, late 13th century.

SITE NAME: Chester-le-Street SITE TYPE: Memorial Effigy SMR No.: 2534

O.S.GRID REF: NZ 276513

DESCRIPTION: The late 13th century, freestone effigy of an unknown knight of the Fitzmarmaduke family. In St. Cuthberts church

SITE NAME: Chester-le-Street SITE TYPE: Memorial Effigy SMR No.: 2536

O.S.GRID REF: NZ 276513

DESCRIPTION: In St. Cuthberts church, the 13th century freestone effigy of a bishop. Perhaps St. Cuthbert?

SITE NAME: Ankers House SITE TYPE: Anchorite Cell SMR No.: 239

O.S.GRID REF: NZ 276513

DESCRIPTION: Originally constructed by walling off the westernmost arcade of the north aisle of the church with two rooms added later. Became an almshouse about the reformation and many alterations from then on have obscured its original form. Two blocked and original apertures on the ground floor are visible. The hagioscope upstairs sights onto the altar in the south aisle. Now used as a museum.

SITE NAME: SS Mary and Cuthbert SITE TYPE: Church SMR No.: 2149

O.S.GRID REF: NZ 27605132

DESCRIPTION: The present church at Chester-le-Street dates from 1262. Heavily buttressed short tower with a western stair turret, spire c. 1400 on an octagonal storey. The south aisle projects as far west as the west front to the tower. The aisle arcades were originally three bayed but had two more added at a later date.

The religious associations with the site began in AD 883 when wandering monks carrying the remains of St. Cuthbert rested here and established a church which housed the remains until 995. The church became collegiate in 1286 and remained as such until the Reformation. There was an anchorage built into the church.

SITE NAME: Lumley Castle SITE TYPE: Castle SMR No.: 2154

O.S.GRID REF: NZ 28785105

DESCRIPTION: Sir Ralph Lumley obtained licences from Bishop Skirlaw in 1389 and from Richard III in 1392 to crenellate and rebuild his castle at Lumley. In plan the castle is a quadrangle enclosing a square courtyard with a large tower at each corner. These towers are rectangular with their greatest length east and west. Access to the courtyard is gained by a vaulted passage on the east side. Externally the outline of the original buildings has changed little, although many of the Windows have been replaced by some of 16th and 18th century date. The east range of buildings contains the remains of an earlier manor house. Licence for a chapel was granted in 1432. The buildings to the north east are modern.

SITE NAME: Lumley Castle SITE TYPE: Manor House SMR No.: 2155

O.S.GRID REF: NZ 28785105

DESCRIPTION: The remains of a mediaeval manor house are incorporated in the later Lumley Castle and are visible on the inner face of the west range.

SITE NAME: Lumley Castle SITE TYPE: Chapel SMR No.: 2156

O.S.GRID REF: NZ 28785105

DESCRIPTION: In 1432, Bishop Langley granted licence to build a chapel within Lumley Castle ... This chapel was in the north east tower, in the floor immediately above the basement. It is now divided by a partition into two rooms.

Post Mediaeval Entries

SITE NAME: John Duck's Hospital SITE TYPE: Hospital SMR No.: 1291

O.S.GRID REF: NZ 28964916

DESCRIPTION: The hospital was founded by John Duck Esq. by indenture of 29,ix, 1686, to accommodate 12 aged people, as witnessed by the inscription over the door: "*HOSPITAL PRI XII PAUPERIBUS FUNDAT: PER JOHAN: DUCK: AR: UN: ALDERMANNOR: DUNELM: CIVIT: ANNO DOMINI MDCLXXXV*". "There are twelve apartments, one of which used to be the chapel, only 9 are occupied. The inscribed tablet was weather worn and is now covered over by cement. The hospital is in the form of a square comprising 12 apartments of one storey only with a central courtyard and entrances in the east and west sides. The chapel was in the north east corner. Built of stone and brick with pantiled roof. Dilapidated and much repaired" (1954) "Almshouse now demolished" (1971)

SITE NAME: Godric's Garth SITE TYPE: Building unclassified SMR No.: 1292

O.S.GRID REF: NZ 29914633

DESCRIPTION: The remains of extensive buildings dug out by J.J. Smith around 1953 and claimed by him to be the original habitation and chapel of St. Godric. This is

certainly erroneous, indeed loony (pers. comm, P. Turnbull.). The remains, devoid of any ecclesiastical feature, are of at least two periods and appear to represent the foundations of a farm or country house.

SITE NAME: Kepier SITE TYPE: Kiln SMR No.: 3227

O.S.GRID REF: NZ 28334341

DESCRIPTION: A disused kiln.

SITE NAME: Lambton Hall SITE TYPE: Mansion SMR No.: 2157

O.S.GRID REF: NZ 29575238

DESCRIPTION: Lambton hall, seat of the Lambtons, was demolished prior to 1787.

The remains were retrieved from a state of ruin and converted into two cottages. Parts of the walls and one each of the cross-shaped quatrefoil openings on the front are ancient.

The cottages referred to are probably Brewery Cottages which probably represent only the brewery of the Hall, which was an H-shaped building immediately to the south.

SITE NAME: Lambton Castle SITE TYPE: Mansion SMR No.: 2160

O.S.GRID REF: NZ 29835258

DESCRIPTION: Lambton Castle was built at the beginning of the 19th century.

Embattled towers and turrets, buttressed hall and curtain walls set amid sweeping lawns.

Original castle dismantled in 1797. Existing building constructed in the "modern style" and castellated in 1833.

Various statues depicting the legend of the Lambton Worm are on show at Lambton Castle. The stone trough from which the dragon drank its tribute of milk was on display but has since vanished.

SITE NAME: Harraton Hall SITE TYPE: Mansion SMR No.: 2161

O.S.GRID REF: NZ 29835258

DESCRIPTION: Lambton Castle was built on the site of an Elizabethan house called Harraton Hall, seat of the Hedworths. The original building, dated 1600, was pulled

down in 1797. Surtees, 1816, mentions a Chapel at Harraton which may be an estate chapel associated with the Hall itself.

SITE NAME: Chester-le-Street SITE TYPE: Non-antiquity SMR No.: 2653

O.S.GRID REF: NZ 275513

DESCRIPTION: Tombstone of altar shape, 16 ins. by 44 ins., believed to be a 19th century copy of an altar found in 1803.

SITE NAME: Lumley Park SITE TYPE: Deer Park SMR No.: 2174

O.S.GRID REF: NZ 286512

DESCRIPTION: Lumley Park marked in Staxton's Survey of 1576.

Undetermined Entries.

SITE NAME: Chester-le-Street SITE TYPE: AP Site (Unclassified) SMR No.: 2719

O.S.GRID REF: NZ 283503

DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 2783

O.S.GRID REF: NZ 279480

DESCRIPTION: AP site.

SITE NAME: Harbour House SITE TYPE: AP Site (Unclassified) SMR No.: 1288

O.S.GRID REF: NZ 279480

DESCRIPTION: Cropmarks of 2 x possible short stretches of ditch, one at NZ 27964805, c. 15m. long incorporating a right angled bend, the other at NZ 27994804, c. 10m. long, straight. The surrounding area shows several other rather confused marks. The field itself is criss-crossed with frost cracks.

SITE NAME: Ford Cottage SITE TYPE: Enclosure (rectilinear) SMR No.: 2442

O.S.GRID REF: NZ 279475

DESCRIPTION: The faint remains of three sides of a subrectangular ditched enclosure, on sloping ground overlooking River Wear. No indication of internal feature or of date.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 2779

O.S.GRID REF: NZ 297475

DESCRIPTION: AP site.

SITE NAME: Bowburn Wood SITE TYPE: Field System SMR No.: 1293

O.S.GRID REF: NZ 291475

DESCRIPTION: APs show collection of straight and curvilinear narrow cropmarks. Field centred NZ 29244762 shows the highest concentration They appear to be far too irregular for field drains but probably relate to earlier field boundaries or as drains connected with the pond that was situated at NZ 29374747. there is a possibility that the features a around NZ 29254753 form a large roughly square enclosure, but a clear gap of 70m. exists at NZ 29224753. The features centred on NZ 29014773 are a series of straight lines in a roughly triangular lay-out. They appear too atypical to be considered field drains.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 2780

O.S.GRID REF: NZ 271469

DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 3232

O.S.GRID REF: NZ 271469

DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 2782
O.S.GRID REF: NZ 29004630
DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 3234
O.S.GRID REF: NZ 29004630
DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 2781
O.S.GRID REF: NZ 295456
DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 3233
O.S.GRID REF: NZ 295456
DESCRIPTION: AP site.

SITE NAME: Low Grange SITE TYPE: Enclosure SMR No.: 1277
O.S.GRID REF: NZ 298448
DESCRIPTION: A rectangular enclosure at Low Grange on a flat area just east of the steep valley of the Wear. The single ditch of the enclosure is clear, but the internal circular crop mark is very faint and appears very large in relation to the outer rectangle, raising the possibility that the two may relate to different occupations.

SITE NAME: St. Giles SITE TYPE: AP Site (Unclassified) SMR No.: 1262
O.S.GRID REF: NZ 284438
DESCRIPTION: Light rect. cropmark.

SITE NAME: St. Giles Hospital SITE TYPE: AP Site (Unclassified) SMR No.: 1263
O.S.GRID REF: NZ 284434
DESCRIPTION: Complex cropmark arrangement outside grounds of St. Giles Hospital remains.

SITE NAME: Kepier SITE TYPE: Enclosure (rectilinear) SMR No.: 1272
O.S.GRID REF: NZ 28244352
DESCRIPTION: Soilmark ... appearing to form part of a roughly rectangular enclosure. The north side does not appear to be showing. Visible dimensions c. 110m. x 90m. . There are some confused markings at the south end of this feature which seems to include at least one short line running south.

SITE NAME: North Lodge SITE TYPE: AP Site (Unclassified) SMR No.: 2825
O.S.GRID REF: NZ 27535362
DESCRIPTION: AP site.

SITE NAME: North Lodge 2 SITE TYPE: Trackway SMR No.: 3472
O.S.GRID REF: NZ 280533
DESCRIPTION: Ditched trackway, appears unrelated but very close to Iron Age enclosure (SMR 407). Undated on present evidence.

SITE NAME: Swinburn's Leap SITE TYPE: SMR No.: 2169
O.S.GRID REF: NZ 284522
DESCRIPTION: Traditionally, the place where a runaway horse and its rider were killed.

SITE NAME: Lambton Park SITE TYPE: Artefact SMR No.: 2175
O.S.GRID REF: NZ 2952
DESCRIPTION: Sandstone sphere, 50mm. dia. , perhaps a shot.

SITE NAME: Chester-le-Street SITE TYPE: AP Site (Unclassified) SMR No.: 2720

O.S.GRID REF: NZ 281510

DESCRIPTION: AP site.

SITE NAME: SITE TYPE: AP Site (Unclassified) SMR No.: 2172

O.S.GRID REF: NZ 28125105

DESCRIPTION: Three circles - clear.

Appendix 3.
Species List for the Study Area. Compiled from Existing Surveys and Lists for
Designated Wildlife Sites.

Flora

<i>Acer pseudoplatanus</i>	Sycamore
<i>Adoxa moschatellina</i>	Moschatel
<i>Agrostis canina</i>	Brown Bent
<i>Agrostis capillaris</i>	Common Bent
<i>Alisma plantago-aquatica</i>	Water Plantain
<i>Allium ursinum</i>	Ramsons
<i>Alnus glutinosa</i>	Alder
<i>Anemone nemorosa</i>	Wood Anemone
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Arum maculatum</i>	Lords and Ladies (or Cuckoo Pint)
<i>Asplenium adiantum-nigrum</i>	Black Spleenwort
<i>Betula pendula</i>	Birch
<i>Blechnum spicant</i>	Hard Fern
<i>Brachypodium sylvaticum</i>	False Brome
<i>Calliergon cuspidatum</i>	Moss sp.
<i>Calluna vulgaris</i>	Heather
<i>Caltha palustris</i>	Marsh-marigold
<i>Cardamine pratensis</i>	Cuckooflower
<i>Carex flacca</i>	Glaucous Sedge
<i>Carpinus betulus</i>	Hornbeam
<i>Chamerion angustifolium</i>	Rosebay Willow-herb
<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage
<i>Circaea lutetiana</i>	Enchanter's Nightshade

<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Cratoneuron filicinum</i>	Moss sp.
<i>Cytisus scoparius</i>	Broom
<i>Dactylorhiza purpurella</i>	Northern Marsh-orchid
<i>Deschampsia flexuosa?</i>	Wavy hair grass
<i>Deschampsia cespitosa</i>	Tufted Hair-grass
<i>Drepanocladus aduncus</i>	Moss sp.
<i>Dryopteris dilatata</i>	Broad Buckler Fern
<i>Dryopteris felix-mas</i>	Male Fern
<i>Eleocharis palustris</i>	Common Spike-rush
<i>Eleocharis palustris</i>	Common Spike-rush
<i>Endymion non-scriptus</i>	Bluebell
<i>Epilobium hirsutum</i>	Great Willowherb
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Eriophorum angustifolium</i>	Common Cotton-grass
<i>Fagus sylvatica</i>	Beech
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fraxinus excelsior</i>	Ash
<i>Galium saxatile</i>	Heath Bedstraw
<i>Gallium odorata</i>	Sweet woodruff
<i>Geranium robertianum</i>	Herb Robert.
<i>Geum urbanum</i>	Wood Avens
<i>Hedera helix</i>	Ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Heracleum</i>	Giant Hogweed
<i>Hippuris vulgaris</i>	Mare's Tail
<i>Holcus mollis</i>	Yorkshire fog
<i>Humulus lupulus</i>	Hop
<i>Hydrocotyle vulgaris</i>	Marsh Pennywort

<i>Ilex aquifolium</i>	Holly
<i>Impatiens glandulifera</i>	Indian Balsam
<i>Iris pseudacorus</i>	Yellow Iris
<i>Juncus acutiflorus</i>	Sharp-flowered Rush
<i>Juncus effusus</i>	Smooth Rush
<i>Juncus inflexus</i>	Hard Rush
<i>Lathraea squamaria</i>	Toothwort
<i>Lemna trisulca</i>	Common Duckweed
<i>Lonicera periclymenum</i>	Honeysuckle
<i>Lonicera xylosteum</i>	Fly Honeysuckle
<i>Luzula sylvatica</i>	Great Wood-rush
<i>Melica uniflora</i>	Wood Melick
<i>Mercurialis perennis</i>	Dog's Mercury
<i>Milium effusum</i>	Wood Millet
<i>Myriophyllum spicatum</i>	Spiked Water-milfoil
<i>Myrrhis odorata</i>	Sweet Cicely
<i>Narcissus pseudonarcissus</i>	Wild Daffodil
<i>Oxallis acetosella</i>	Wood Sorrel
<i>Pellia epiphylla</i>	Liverwort sp
<i>Petasites hybridus</i>	Butterbur
<i>Phalaris arundinacea</i>	Reed Canary-grass
<i>Pinus sp.</i>	Pine
<i>Pinus sylvestris</i>	Scots Pine
<i>Polygala serpyllifolia</i>	Heath Milkwort
<i>Polygonatum multiflorum</i>	Solomon's Seal
<i>Populus sp.</i>	Poplar
<i>Potamogeton natans</i>	Broad-leaved Pondweed
<i>Potamogeton pectinatus</i>	Fennel Pondweed
<i>Potentilla erecta</i>	Tormentil
<i>Primula vulgaris</i>	Primrose

<i>Prunus padus</i>	Bird Cherry
<i>Pteridium aquilinum</i>	Bracken
<i>Quercus petraea</i>	Sessile Oak
<i>Quercus robur</i>	Pedunculate Oak
<i>Ranunculus sp.</i>	Water Crowfoot
<i>Ranunculus facaria</i>	Lesser Celandine
<i>Ricciocarpus natans</i>	Liverwort sp.
<i>Rosa arvensis</i>	Field Rose
<i>Rubus fruticosus</i> agg.	Bramble
<i>Salix spp.</i>	Willow species
<i>Salix fragilis</i>	Crack Willow
<i>Salix caprea</i>	Goat Willow
<i>Sambucus nigra</i>	Elderberry
<i>Sanicula europaea</i>	Sanicle
<i>Schoenoplectus lacustris</i>	Common Club-rush
<i>Silene dioica</i>	Red Campion
<i>Solidago virgaurea</i>	Goldenrod
<i>Sorbus aucuparia</i>	Rowan
<i>Sphagnum squarrosum</i>	Moss sp.
<i>Sphagnum fimbriatum</i>	Moss sp.
<i>Stachys officinalis</i>	Betony
<i>Symphytum officinale</i>	Common Comfrey
<i>Taxus baccata</i>	Yew
<i>Teucrium scordonia</i>	Wood Sage
<i>Tilia platyphyllos</i>	Large-leaved Lime
<i>Tilia cordata</i>	Small-leaved Lime
<i>Typha latifolia</i>	Reedmace
<i>Ulex europaeus</i>	Gorse
<i>Ulmus procera</i>	English Elm
<i>Ulmus glabra</i>	Wych-elm

<i>Urtica dioica</i>	Nettle
<i>Vaccinium myrtillus</i>	Bilberry
<i>Valeriana officinalis</i>	Common Valerian
<i>Viburnum lantana</i>	Wayfaring Tree
<i>Viburnum opulus</i>	Guelder Rose

Birds

<i>Accipiter nisus</i>	Sparrowhawk
<i>Alauda arvensis</i>	Skylark
<i>Asio otus</i>	Long-eared Owl
<i>Asio flammeus</i>	Short-eared Owl
<i>Athene noctua</i>	Little Owl
<i>Columba palumbus</i>	Wood Pigeon
<i>Dendrocopus major</i>	Great Spotted Woodpecker
<i>Erithacus rubecula</i>	Robin
<i>Falco tinnunculus</i>	Kestrel
<i>Garrulus glandarius</i>	Jay
<i>Miliaria calandra</i>	Corn Bunting
<i>Motacilla cinerea</i>	Grey wagtail
<i>Parus caeruleus</i>	Blue Tit
<i>Parus major</i>	Great Tit
<i>Passer montanus</i>	Tree Sparrow
<i>Picus viridis</i>	Green Woodpecker
<i>Pyrrhula pyrrhula</i>	Bullfinch
<i>Scolopax rusticola</i>	Woodcock
<i>Strix aluco</i>	Tawny Owl
<i>Troglodytes troglodytes</i>	Wren
<i>Tyto alba</i>	Barn Owl

Mammals

Sciurus carolinensis

Grey Squirrel

Sciurus vulgaris

Red Squirrel

Amphibia

Rana temporaria

Common Frog

Triturus vulgaris

Smooth Newt

Appendix 4.

Descriptions of Designated Wildlife Sites.

DURHAM

BRASSIDE POND

Status:

Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.

Local Planning Authority:

Durham District Council

National Grid Reference:

NZ 292452

Ordnance Survey Sheets

1:50000 88
1:10000 NZ 24 NE, NW

Area:

25.1 hectares 62.0 acres

First notified: 1966*

Date of revision: 1985

Description

The two large ponds in the north of the site occupy flooded clay workings and comprise one of the largest expanses of unpolluted open water in County Durham, other than in reservoirs. They are the most important breeding site for wildfowl in County Durham. Great crested grebe, little grebe, pochard, tufted duck, mallard, and coot have bred in recent years. Birds regularly seen wintering or on passage include wigeon, shoveller and goldeneye.

The pools are fringed by stands of reed-mace (Typha latifolia), and very locally by common club-rush (Schoenoplectus lacustris). Adjacent scrub contains pedunculate oak (Quercus robur), hawthorn (Crataegus monogyna) and willows (Salix spp.). Aquatic plants include mare's tail (Hippuris vulgaris), fennel pondweed (Potamogeton pectinatus), spiked water-milfoil (Myriophyllum spicatum), common duckweed (Lemna trisulca) and the aquatic moss Drepanocladus aduncus.

South of the disused railway line small ponds and fen have developed in abandoned clay workings and are surrounded by acid grassland. Aquatic plants include broad-leaved pondweed (Potamogeton natans) and the liverwort Ricciocarpus natans. In the species-rich fen the mosses Calliergon cuspidatum and Cratoneuron filicinum and the liverwort Pellia epiphylla form a continuous carpet, and locally hummocks of bog moss (Sphagnum fimbriatum, S. squarrosum) have developed. Other species in the fen include marsh horsetail (Equisetum palustre), common cotton-grass (Eriophorum angustifolium) and glaucous sedge (Carex flacca). These diverse communities give way to a species-poor fen of smooth rush (Juncus effusus) and hard rush (J. inflexus).

The acid grassland surrounding the wetlands is dominated by common bent (Agrostis capillaris) and contains heath bedstraw (Galium saxatile), heath milkwort (Polygala serpyllifolia) and tormentil (Potentilla erecta), characteristic species of acid soils.

The site has a varied invertebrate fauna. Seven species of dragonfly and damselfly (Odonata) breed at this site, including the brown aeshna (Aeshna grandis).

Other Information

The site boundary has been amended both by extension and deletion.

* Under Section 23 of the National Parks and Access to the Countryside Act 1949.

SITE NAME	Newton Hall Junction	SITE NUMBER	4.22
DISTRICT	Durham	GRID REFERENCE	NZ285452
AREA	6ha	OS MAP NUMBER	NZ 24 NE
OWNER	Durham County Council		

HABITAT(S)	... Marsh, acid & neutral, grassland, scrub	ASPECT	..... Open
GEOLOGY	..... Coal Measures	SLOPE	..... Small banks in places
SOIL	.....	LAND USE	.....
ALTITUDE	..... 60m	ADJACENT LAND USE..	Arable
DATE	..... May 1991	SURVEYOR	..... V. Standen

Description of Ecological Interest

A varied site which has developed between two dismantled railways and another existing embankment carrying the main line. Parts of the dry embankment support acid grassland with heather (Calluna vulgaris), birch/oak scrub, occasional ash (Fraxinus excelsior) trees and herb-rich grassland with developing oak/hawthorn scrub. Wetter areas in the hollows between the embankments now contain wet herb-rich grassland and marshy areas with sharp-flowered rush (Juncus acutiflorus), northern marsh-orchid (Dactylorhiza purpurella) and cuckooflower (Cardamine pratensis) and small areas of standing water with bulrush (Typha latifolia), yellow iris (Iris pseudacorus), marsh horsetail (Equisetum palustre), broad-leaved pondweed (Potamogeton natans) and willow (Salix sp.).

Other comments

The site has considerable potential as a local conservation site as it supports a variety of habitats within a very small area.

SITE NAME Frankland Pond	SITE NUMBER 4.24
DISTRICT Durham	GRID REFERENCE NZ 275435
AREA 1ha	OS MAP NUMBER NZ 24 SE
OWNER 1.	
HABITAT(S) ...Pond	ASPECT .....Open
GEOLOGY .....Coal Measures	SLOPE .....Nil
pH WATER.....7.0	LAND USE .....Waste ground
ALTITUDE .....30m	ADJACENT LAND USE..Industrial
DATE .....July 1991	SURVEYOR .....V. Standen

Description of Ecological Interest

A large flooded brick works pond lying within scrub and grass-land. The pond contains a wide variety of plants including bulrush (Typha latifolia), reed canary-grass (Phalaris arundinacea), water-plantain (Alisma plantago-aquatica), marsh-marigold (Caltha palustris), common spike-rush (Eleocharis palustris), yellow iris (Iris pseudacorus), broad-leaved pondweed (Potamogeton natans) and water crowfoot (Ranunculus sp.).

The pond supports good populations of a wide variety of invertebrates, frogs (Rana temporaria) and smooth newt (Triturus vulgaris).

Other comments

This site is adjacent to Hopper's Wood. The pond to the south-west no longer exists.

SITE NAME	The Scroggs	SITE NUMBER	4.3
DISTRICT	Durham	GRID REFERENCE	NZ 283445
AREA	2ha	OS MAP NUMBER	NZ 24 SE
OWNER	Durham County Council	TENANT	Mr. T.W. Clark Frankland Park Farm

HABITAT(S)	... Woodland	ASPECT	..... Open
GEOLOGY	..... Coal Measures	SLOPE	..... Slight
SOIL	..... Brown earth	LAND USE	.....
ALTITUDE	..... 50m	ADJACENT LAND USE..	Arable
DATE	..... February 1991	SURVEYOR	..... V. Standen

Description of Ecological Interest

A small area of woodland on an ancient woodland site with an even aged stand of mature sessile oak (Quercus petraea) probably planted 100-120 years ago. A few sycamore (Acer pseudoplatanus) trees and occasional alder (Alnus glutinosa) grow in the northern edge of the wood. The understorey is very well developed with holly (Ilex aquifolium) and hazel (Corylus avellana) most abundant. The ground flora contains species typical of acid woodland.

Other comments

The Scroggs was part of the Franklands Medieval Woodlands and records exist dating back to the fifteenth century. The wood is surrounded by a moat, said to be the remains of an ancient deer fence and a field drain has recently been diverted into it.

SITE NAME Frankland & Kepier Woods SITE NUMBER 4.9
 DISTRICT Durham GRID REFERENCE NZ 297449
 AREA 80ha OS MAP NUMBER NZ 24 NE/SE
 NZ 34 NW
 OWNER 1) Mr. T.W. Clark Part: Grange Farm Est.
 Frankland Park Farm

HABITAT(S) ... Woodland ASPECT Banks of R.Wear
 GEOLOGY Coal Measures SLOPE Steep in places
 sandstone
 SOIL Brown earth LAND USE Partly grazed
 ALTITUDE 35 - 65m ADJACENT LAND USE.. Arable
 DATE January 1991 SURVEYOR V. Standen

Description of Ecological Interest

Semi-natural woodland, predominantly sessile oak (Quercus petraea), with sycamore (Acer pseudoplatanus), ash (Fraxinus excelsior), wych elm (Ulmus glabra) and alder (Alnus glutinosa) by the River Wear. The understorey shrubs include holly (Ilex aquifolium), goat willow (Salix caprea), rowan (Sorbus aucuparia), bird cherry (Prunus padus) and honeysuckle (Lonicera periclymenum). The ground flora is characteristic of acid soils with abundant ferns in places, areas where great wood-rush (Luzula sylvatica) and dog's mercury (Mercurialis perennis) are dominant and wood-sorrel (Oxalis acetosella) and herb-robert (Geranium robertianum) throughout. Ramsons (Allium ursinum) occurs on the deeper, richer soils and bilberry (Vaccinium myrtillus) and hard fern (Blechnum spicant) on some dry slopes. Parts of the wood are grazed by cattle and here the ground flora is impoverished and dominated by grasses. Small sections of the wood have been cleared in the past, one of these is a grassy glade and the other has developed as grass/heather heath with some oak regenerating within it.

Other comments

East bank well used and some evidence of damage to trees. Sandstone cliffs unstable in places.

Frankland Wood was formerly part of Frankland Park Estate and well documented records exist of its management from 1463 onwards including its productivity in terms of wood products supplied to Durham Castle and Cathedral.

SITE NAME	Moorhouse Wood	SITE NUMBER	4.8
DISTRICT	Durham	GRID REFERENCE	NZ 310460
AREA	3.5ha	OS MAP NUMBER	NZ 34 NW
OWNER	National Trust	TENANT	Durham Wildlife Trust
	Scot's Gap		Low Barns Nature Reserve
	Morpeth		Witton-le-Wear
	Northumberland		

HABITAT(S)	... Woodland	ASPECT	..... Plateau above R. Wear
GEOLOGY	..... Coal Measures	SLOPE	..... Steep in places by Mally Gill
SOIL	..... Brown earth	LAND USE	..... Nature Reserve
ALTITUDE	..... 50 - 70m	ADJACENT LAND USE..	Arable & A1(M)
DATE	..... January 1991	SURVEYOR	..... V. Standen

Description of Ecological Interest

Oak-ash woodland with english elm (Ulmus procera) and a small amount of sycamore (Acer pseudoplatanus). Most of the wood was probably felled in the 1940's and many of the existing trees have coppiced from the base. The understorey contains hawthorn (Crataegus monogyna), rowan (Sorbus aucuparia) and guelder-rose (Viburnum opulus). The ground layer is varied with patches of dog's mercury (Mercurialis perennis), wood-sorrel (Oxalis acetosella), wood anemone (Anemone nemorosa), bluebell (Hyacinthoides non-scripta) and primrose (Primula vulgaris) throughout the wood and opposite-leaved golden-saxifrage (Chrysosplenium oppositifolium) along the sides of Mally Gill. The wood has good populations of the field-rose (Rosa arvensis) which is near to its northern limit. A number of common woodland birds breed in the wood and red squirrels (Sciurus vulgaris) have been seen in recent years.

Other comments

The DWT is managing the site to restore it as an oak wood.

SITE NAME North Brasside Claypit SITE NUMBER 4.6
DISTRICT Durham GRID REFERENCE NZ 292461
AREA 4ha OS MAP NUMBER NZ 24 NE
OWNER Mrs. Cosker

HABITAT(S) ...Pond ASPECTOpen
GEOLOGY SLOPE
SOIL LAND USE
ALTITUDE60m ADJACENT LAND USE..Angling
DATEAugust 1991 SURVEYORV. Standen

Description of Ecological Interest

A large and a small pond originating from clay workings which became flooded. The large pond is very deep with steeply shelving sides and hence little emergent bankside vegetation, although many of the commoner aquatic and marginal species are present. Some value for wintering waterfowl but interest limited by degree of angling.

The smaller pond is partly shaded by trees and bordered by scrub of gorse (Ulex europaeus) and hawthorn (Crataegus monogyna) along the west side. The margins of the pond support a number of plants such as common spike-rush (Eleocharis palustris) and water-crowfoot (Ranunculus sp.). Invertebrates are abundant and include several species of damsel fly.

SITE NAME:	Redhouse Wood and former Munitions Store	SITE NUMBER:	4.4
DISTRICT:	Durham	GRID REFERENCE:	NZ 282465
AREA:	34 ha	OS MAP NUMBER:	NZ 24 NE
OWNERS:	Mr Charlton Redhouse Farm Newton Hall	TENANT:	Mr Welsh Finchale Pricry Farm
	Sharon Dixon Chester Lea Hill Lane Plawsworth Chester le Street	(Correspondence:	Mr E S Ward High Close Bolam Village Darlington DL2 2UL)
HABITAT(S):	Woodland and rough grassland	ASPECT:	Plateau and steep sided valley
GEOLOGY:	Coal Measures	SLOPE:	Precipitous in places
SOIL:	Brown earth	LAND USE:	Unmanaged
ALTITUDE:	50m	ADJACENT LAND USE:	Arable
DATE:	(largely) February 1991	SURVEYOR:	V Standen

Description of Ecological Interest

Deciduous woodland, some sections with mature sessile oak (Quercus petraea), ash (Fraxinus excelsior) and wych elm (Ulmus glabra) along steep sides of streams leading into the River Wear. The understorey is not particularly well developed but contains holly (Ilex aquifolium), hazel (Corvulus avellana) and some yew (Taxus baccata). The ground flora is mostly bramble (Rubus sp.) and grasses but with dog's mercury (Mercurialis perennis), primrose (Primula vulgaris) and bluebell (Hvacinthoides non-scripta) abundant in patches. The flatter portion of the wood is even aged silver birch (Betula pendula) probably 50 years old but with some beech (Fagus sylvatica), hazel (Corvulus avellana), sycamore (Acer pseudoplatanus) and occasional yew (Taxus baccata) where it slopes down towards the river. A red squirrel (Sciurus vulgaris) was seen and they are reported to be frequent at this site.

The boundary was extended in 1955 to include the land on which the former munitions store was situated. This consists of rough grassland with small patches of mature broadleaves and is noted for its very high ornithological importance. All five species of owl found in the county have been recorded there on a fairly regular basis and the site is also known for the presence of many other species including kestrel, sparrowhawk, woodcock, great spotted woodpecker, green woodpecker, skylark, corn bunting and tree sparrow.

Contains a rare species

SITE NAME Finchale Priory Woods SITE NUMBER 4.5
DISTRICT Durham GRID REFERENCE NZ 293473
AREA 20ha OS MAP NUMBER NZ 24 SW
OWNER 1) Terrace Wood:- OWNER 2) Durham County
Mr. Nicholson Council
Harbour House
Plawsworth

HABITAT(S) ... Woodland ASPECT South facing slopes
GEOLOGY Coal Measures SLOPE Precipitous in places
SOIL Brown earth LAND USE Unmanaged
ALTITUDE 25 - 35m ADJACENT LAND USE.. Arable
DATE January 1991 SURVEYOR V. Standen

Description of Ecological Interest

Mixed deciduous woodland on steep, mainly south facing slopes of the River Wear. The canopy and the shrub layer have a good structure on the whole with sessile oak (Quercus petraea), sycamore (Acer pseudoplatanus), silver birch (Betula pendula), ash (Fraxinus excelsior), yew (Taxus baccata), hazel (Corylus avellana), holly (Ilex aquifolium) and hawthorn (Crataegus monogyna). The ground flora is characteristic of dry acid woodland except where mineral-rich flushes support cuckooflower (Cardamine pratensis), opposite-leaved golden-saxifrage (Chrysosplenium oppositifolium) etc. The cliff face provides habitat for a rare fern, black spleenwort (Asplenium adiantum-nigrum).

A number of interesting plant species occur in the wood such as toothwort (Lathraea squamaria) and moschatel (Adoxa moschatellina) and including several species introduced during its long association with the Priory. These include fly honeysuckle (Lonicera xylosteum), wayfaring-tree (Viburnum lantana), Solomon's-seal (Polygonatum multiflorum) and hop (Humulus lupulus).

Appendix 5.
Species Lists for Ecological Survey Sites.

Site 1 (Old Mill Lane)

Flora

	AGRICULTURAL BARLEY
<i>Acer pseudoplatanus</i>	SYCAMORE
<i>Acer campestre</i>	FIELD MAPLE
<i>Aegopodium podagraria</i>	GROUND ELDER
<i>Alliaria petiolata</i>	GARLIC MUSTARD
<i>Allium ursinum</i>	RAMSONS
<i>Anemone nemorosa</i>	WOOD ANEMONE
<i>Anthriscus sylvestris</i>	COW PARSLEY
<i>Arctium minus</i>	LESSER BURDOCK
<i>Betula pendula</i>	SILVER BIRCH
<i>Centaurea nigra</i>	BLACK KNAPWEED
<i>Chaerophyllum temulentum</i>	ROUGH CHERVIL
<i>Chenopodium album</i>	FAT HEN
<i>Cirsium arvense</i>	CREEPING THISTLE
<i>Cirsium vulgare</i>	SPEAR THISTLE
<i>Corylus avellana</i>	HAZEL
<i>Crataegus monogyna</i>	HAWTHORN
<i>Dryopteris felix-mas</i>	MALE FERN
<i>Endymion non-scriptus</i>	BLUEBELL
<i>Epilobium angustifolium</i>	ROSE BAY WILLOW HERB
<i>Filipendula ulmaria</i>	MEADOWSWEET
<i>Fraxinus excelsior</i>	ASH
<i>Galium mollugo</i>	HEDGE BEDSTRAW
<i>Galium odoratum</i>	WOODRUFF
<i>Gallium aparine</i>	COMMON CLEAVERS

<i>Geranium robertianum</i>	HERB ROBERT
<i>Geum urbanum</i>	HERB BENNET
<i>Hedera helix</i>	IVY
<i>Heracleum mantegazzianum</i>	GIANT HOGWEED
<i>Heracleum sphondylium</i>	HOGWEED
<i>Impatiens glandulifera</i>	HIMALAYAN BALSAM
<i>Lamium album</i>	WHITE DEAD NETTLE
<i>Lonicera periclymenum</i>	HONEYSUCKLE
<i>Luzula sylvatica</i>	GREAT WOOD-RUSH
<i>Matricaria perforata</i>	SCENTLESS MAYWEED
<i>Medicago lupulina</i>	BLACK MEDICK
<i>Mercurialis annua</i>	ANNUAL MERCURY
<i>Myrrhis odorata</i>	SWEET CICELY
<i>Papaver rhoeas</i>	FIELD POPPY
<i>Pinus sylvestris</i>	SCOTS PINE
<i>Plantago major</i>	GREATER PLANTAIN
<i>Plantago lanceolata</i>	RIBWORT PLANTAIN
<i>Polygonum aviculare</i>	KNOTGRASS
<i>Populus sp.</i>	POPLAR
<i>Prunus spinosa</i>	BLACKTHORN
<i>Pteridium aquilinum</i>	BRACKEN
<i>Quercus robur</i>	PEDUNCULATE OAK
<i>Ranunculus acris</i>	MEADOW BUTTERCUP
<i>Ranunculus ficaria</i>	LESSER CELANDINE
<i>Rosa canina</i>	DOG ROSE
<i>Rosa sp.</i>	ROSE
<i>Rubus fruticosus</i>	BRAMBLE
<i>Rumex obtusifolius</i>	BROAD-LEAVED DOCK
<i>Sambucus nigra</i>	ELDERBERRY
<i>Sanguisorba major</i>	GREAT BURNET

<i>Senecio jacobaea</i>	RAGWORT
<i>Senecio vulgaris</i>	GROUNDSEL
<i>Silene dioica</i>	RED CAMPION
<i>Solidago virgaurea</i>	GOLDEN ROD
<i>Stachys arvensis</i>	FIELD WOUNDWORT
<i>Stellaria holostea</i>	GREATER STITCHWORT
<i>Teucrium scorodonia</i>	WOOD SAGE
<i>Trifolium repens</i>	WHITE CLOVER
<i>Trifolium pratense</i>	RED CLOVER
<i>Urtica dioica</i>	PERENNIAL STINGING NETTLE
<i>Urtica urens</i>	ANNUAL STINGING NETTLE

Birds

<i>Anas platyrhynchos</i>	FERAL PIGEON
<i>Apus apus</i>	MALLARD
<i>Ardea cinerea</i>	SWIFT
<i>Carduelis cannabina</i>	GREY HERON
<i>Certhia familiaris</i>	LINNET
<i>Columba palumbus</i>	TREECREEPER
<i>Corvus monedula</i>	WOOD PIGEON
<i>Corvus corone</i>	JACKDAW
<i>Dendrocopus major</i>	CARRION CROW
<i>Emberiza citrinella</i>	GREAT SPOTTED WOODPECKER
<i>Erithacus rubecula</i>	YELLOWHAMMER
<i>Falco tinnunculus</i>	ROBIN
<i>Fringila coelebs</i>	KESTREL
<i>Garrulus glandarius</i>	CHAFFINCH
<i>Larus ridibundus</i>	JAY
	BLACK-HEADED GULL

<i>Passer domesticus</i>	HOUSE SPARROW
<i>Phylloscopus sibilatrix</i>	WILLOW WARBLER
<i>Pica pica</i>	MAGPIE
<i>Prunella modularis</i>	DUNNOCK
<i>Sitta europaea</i>	NUTHATCH
<i>Sylvia atricapilla</i>	BLACK CAP
<i>Sylvia communis</i>	WHITETHROAT
<i>Troglodytes troglodytes</i>	WREN
<i>Turdus merula</i>	BLACKBIRD

Mammals

<i>Capreolus capreolus</i>	ROE DEER
<i>Erinaceus europaeus</i>	HEDGEHOG
<i>Meles meles</i>	BADGER
<i>Oryctolagus cuniculus</i>	RABBIT
<i>Talpa europaea</i>	MOLE
<i>Vulpes vulpes</i>	FOX

Site 2. (Holmhill Lane)

Flora

<i>Acer pseudoplatanus</i>	SYCAMORE
<i>Achillea millefolium</i>	YARROW
<i>Aegopodium podagraria</i>	GROUND ELDER
<i>Aesculus hippocastanum</i>	HORSE CHESTNUT
<i>Ajuga reptans</i>	BUGLE
<i>Alliaria petiolatai</i>	GARLIC MUSTARD
<i>Allium ursinum</i>	RAMSONS

<i>Alnus glutinosa</i>	ALDER
<i>Anthriscus sylvestris</i>	COW PARSLEY
<i>Arctium minus</i>	LESSER BURDOCK
<i>Arum maculatum</i>	CUCKOO PINT
<i>Castanea sativa</i>	SWEET CHESTNUT
<i>Centaurea nigra</i>	BLACK KNAPWEED
<i>Chaerophyllum temulentum</i>	ROUGH CHERVIL
<i>Chenopodium album</i>	FAT HEN
<i>Cirsium vulgare</i>	SPEAR THISTLE
<i>Cirsium arvense</i>	CREEPING THISTLE
<i>Cochlearia officinalis</i>	COMMON SCURVY-GRASS
<i>Conopodium majus</i>	PIGNUT
<i>Corylus avellana</i>	HAZEL
<i>Crataegus monogyna</i>	HAWTHORN
<i>Epilobium angustifolium</i>	ROSE BAY WILLOW HERB
<i>Fagus sylvatica</i>	BEECH
<i>Filipendula ulmaria</i>	MEADOWSWEET
<i>Fraxinus excelsior</i>	ASH
<i>Galium odoratum</i>	WOODRUFF
<i>Gallium aparine</i>	COMMON CLEAVERS
<i>Geranium robertianum</i>	HERB ROBERT
<i>Geum urbanum</i>	HERB BENNET
<i>Hedera helix</i>	IVY
<i>Heracleum sphondylium</i>	HOGWEED
<i>Ilex aquifolium</i>	HOLLY
<i>Impatiens glandulifera</i>	HIMALAYAN BALSAM
<i>Laburnum sp.</i>	LABURNUM
<i>Lamium album</i>	WHITE DEAD NETTLE
<i>Larix decidua</i>	EUROPEAN LARCH
<i>Matricaria perforata</i>	SCENTLESS MAYWEED

<i>Medicago lupulina</i>	BLACK MEDICK
<i>Mercurialis annua</i>	ANNUAL MERCURY
<i>Mimuartia hybrida</i>	FINE LEAVED SANDWORT
<i>Myosotis sp.</i>	FORGET ME NOT
<i>Myrrhis odorata</i>	SWEET CICELY
<i>Petasites hybridus</i>	BUTTERBUR
<i>Plantago lanceolata</i>	RIBWORT PLANTAIN
<i>Plantago major</i>	GREATER PLANTAIN
<i>Populus tremula</i>	ASPEN
<i>Prunella vulgaris</i>	SELF HEAL
<i>Prunus spinosa</i>	BLACKTHORN
<i>Prunus padus</i>	BIRD CHERRY
<i>Pteridium aquilinum</i>	BRACKEN
<i>Quercus petraea</i>	SESSILE OAK
<i>Quercus robur</i>	PEDUNCULATE OAK
<i>Ranunculus acris</i>	MEADOW BUTTERCUP
<i>Ranunculus ficaria</i>	LESSER CELANDINE
<i>Reynoutria japonica</i>	JAPANESE KNOTWEED
<i>Rhododendron ponticum</i>	RHODODENDRON
<i>Ribes sanguineum</i>	FLOWERING CURRANT
<i>Rosa canina</i>	DOG ROSE
<i>Rosa sp.</i>	ROSE
<i>Rubus fruticosus</i>	BRAMBLE
<i>Rumex obtusifolius</i>	BROAD-LEAVED DOCK
<i>Salix cinerea</i>	SALLOW
<i>Salix alba</i>	WHITE WILLOW
<i>Sambuca nigra</i>	ELDERBERRY
<i>Sanguisorba minor</i>	SALAD BURNET
<i>Sanguisorba major</i>	GREAT BURNET
<i>Senecio jacobaea</i>	RAGWORT

<i>Senecio vulgaris</i>	GROUNDSEL
<i>Silene dioica</i>	RED CAMPION
<i>Solanum dulcamara</i>	BITTER SWEET
<i>Sonchus oleraceus</i>	SMOOTH SOW THISTLE
<i>Stachys arvensis</i>	FIELD WOUNDWORT
<i>Stallaria media</i>	COMMON CHICKWEED
<i>Stellaria holostea</i>	GREATER STITCHWORT
<i>Taraxacum vulgare</i>	DANDELION
<i>Tilia cordata</i>	SMALL LEAVED LIME
<i>Trifolium pratense</i>	RED CLOVER
<i>Trifolium repens</i>	WHITE CLOVER
<i>Urtica dioica</i>	PERENNIAL STINGING NETTLE
<i>Urtica urens</i>	ANNUAL STINGING NETTLE

Birds

<i>Aegithalos caudatus</i>	LONG TAILED TIT
<i>Apus apus</i>	SWIFT
<i>Columba palumbus</i>	WOODPIGEON
<i>Corvus corone</i>	CARRION CROW
<i>Delichon urbica</i>	HOUSE MARTIN
<i>Dendrocopus major</i>	GREAT SPOTTED WOODPECKER
<i>Emberiza citrinella</i>	YELLOW HAMMER
<i>Erithacus rubecula</i>	ROBIN
<i>Fringilla coelebs</i>	CHAFFINCH
<i>Garrulus glandarius</i>	JAY
<i>Hirundo rustica</i>	SWALLOW
<i>Parus caeruleus</i>	BLUE TIT
<i>Parus ater</i>	COAL TIT
<i>Parus major</i>	GREAT TIT

<i>Passer domesticus</i>	HOUSE SPARROW
<i>Phylloscopus collybita</i>	CHIFFCHAFF
<i>Prunella modularis</i>	DUNNOCK
<i>Sturnus vulgaris</i>	STARLING
<i>Sylvia atricapilla</i>	BLACK CAP
<i>Troglodytes troglodytes</i>	WREN
<i>Turdus merula</i>	BLACKBIRD
<i>Turdus philomelus</i>	SONG THRUSH

Mammals

<i>Apodemus sylvaticus</i>	LONG-TAILED FIELD MOUSE
<i>Erinaceus europaeus</i>	HEDGEHOG
<i>Meles meles</i>	BADGER
<i>Mustela nivalis</i>	WEASEL
<i>Oryctolagus cuniculus</i>	RABBIT
<i>Talpa europaea</i>	MOLE

Appendix 6.

VISITOR USAGE SURVEY PROFORMA

CHESTER LE STREET TO DURHAM

DATE:

WEATHER:

SURVEY TIMES: FROM

TO

LOCATION:

PEDESTRIANS (SINGLE):

PEDESTRIANS (GROUPS)*:

CYCLISTS (SINGLE):

CYCLISTS (GROUPS)*:

OTHERS:

TOTAL:

*N.B. TOTAL IS FOR NUMBER OF INDIVIDUALS IN ALL GROUPS NOT THE NUMBER OF GROUPS

Appendix 7.
Frequency of Bus Services to the Study Area

Service Number	Service Description	via (potential access points)	Mon. - Sat.	Sun. and Evenings
X1	Newcastle - Durham - Middlesborough	Chester-le-St.	1/hr	5 each way
X2	Belmont - Durham - Metro Centre	Newton Hall, Chester-le-St.	3 - 4 each way, Sat only	No Service
X6	Langley Park - Sunderland	Chester-le-St.	1/hr	No Service
X46	Crook - Durham - Newcastle	Newton Hall, Chester-le-St.	2/hr Crook - Durham, 1/hr from Newcastle	1/hr Crook - Durham
X54	Esh Winning - Metro Centre	Chester-le-St.	1 each way, Weds only	No Service
X69	Newcastle - Blackpool - Preston	Durham	1 each way	1 each way
X79	Durham - Beamish Museum	Durham	No Service	Sun.s and Bank Holidays, 25/5 - 28/9
722/723	Darlington - Durham - Newcastle	Chester-le-St.	2/hr	1/hr
724	Bishop Auckland - Newcastle	Durham Nevilles Cross, Chester-le-St.	1/hr	1/hr
725	East Hedleyhope - Newcastle	Chester-le-St.	1/hr	1/hr
231/31	Newcastle - Peterlee - Hartlepool	Chester-le-St., Great Lumley (31)	1/hr	1/hr (31)
37	Durham - Ouston	Chester-le-St., Great Lumley	4 - 5 each way	No Service
180	Houghton-le-Spring - Concord	Chester-le-St., Great Lumley	1/hr	No Service
735	Newcastle - Houghton-le-Spring	Chester-le-St.	1/hr	1/hr
775/778	Consett - Sunderland	Chester-le-St.	2/hr	1/hr
551	Sacrison - South Shields	Chester-le-St.	1/hr	1/hr
726	Langley Park/Witton Gilbert - Newcastle	Chester-le-St.	1/hr	No Service
752	Wolsingham - Chester-le-St.	Chester-le-St.	4/day	No Service
739/740	Grange Villa - Chester-le-St.	Chester-le-St.	4/hr	2/hr
809	Chester-le-St. - Metro Centre	Chester-le-St.	1/hr	No Service
720	Stanley - Durham	Durham	1/hr	No Service
729	Stanley - Chester-le-St.	Chester-le-St.	4/hr	1/hr
730	Chester-le-St. - Urpeth Grange/Birtley	Chester-le-St.	1/hr	No Service
731	Waldridge Park/Chester-le-St. - Washington	Chester-le-St.	No Service	1/hr
179	Chester-le-St. - Concord	Chester-le-St.	2/hr	No Service
220/222	Durham - Sunderland	Durham	4/hr	2/hr

Service Number	Service Description	via (potential access points)	Mon. - Sat.	Sun. and Evenings
X40	Easington Village - Durham	Durham	1 - 3 each way, Mon. - Fri.	No Service
64	Amison Centre/Brasside - Sherburn	Newton Hall, Durham City Centre	3/hr	1/hr Brasside - Durham, 1/hr Amison Centre - Sherburn
240	Durham - Easington - Hartlepool	Durham	1/hr	No Service
241/242/243	Durham - Peterlee - Hartlepool	Durham	2/hr	1/hr
244	Durham - Easington	Durham	No Service	1/hr
22A	Wheatley Hill - Durham	Durham	1 - 2 each way	No Service
13	Darlington - Ferryhill - Durham	Durham	1/hr	No Service
20/20A	Wheatley Hill/ Cassop - Durham	Durham	1/hr	No Service
56	Spennymoor - Stobb Cross - Durham	Durham	1/hr	1/hr Stobb Cross - Durham
57	Kelloe - Durham	Durham	1/hr	No Service
58	Ferryhill - Durham	Durham	3 each way, Mon. - Fri.	No Service
235	Durham - Stockton - Middlesborough	Durham	1/hr	1/hr
X85	Sunderland - Durham - Alston - Kendal	Durham	No Service	Sat.s and Bank Holidays, 24/5 - 27/9
5/6.	Shildon - Durham	Durham	4/hr Durham - Bishop Auckland, 2/hr to/from Shildon	No Service
X5	Bishop Auckland - Durham - York - Leeds	Durham	1 each way Sat. only	No Service
X61	Durham - Scarborough	Durham	Daily 21/7 - 31/8	Daily 15/6 - 20/7
43	Esh Winning - Durham	Durham	3/hr	1/hr
49/49A	Brandon, Sawmills Estate - Durham	Durham	4/hr	1/hr
50	Brandon, Dere Park Estate - Durham	Durham	2/hr	1/hr
51	Wolsingham - Tow Law - Durham	Durham	2 each way	No Service
41	Hett - Merryoaks - Elvet Hill Road	Durham City Centre	1/hr Merryoaks - Elvet Hill Road including 4 to/from Hett	No Service
44	East Hedleyhope - Durham	Durham	3 each way	No Service
46/48	New Brancepeth - Durham	Durham	3/hr	2/hr
X65/X66	Consett - Durham	Durham	2 each way Mon. - Fri.	No Service

Service Number	Service Description	via (potential access points)	Mon. - Sat.	Sun. and Evenings
53	Langley Park - Durham	Durham	2/hr	1/hr
753	Langley Park - Durham	Durham	1/hr	No Service
765	Shotley Bridge - Durham	Durham	1/hr	1/hr
718	Stanley - Durham	Durham	1/hr	No Service
719	Shotley Bridge Hospital - Durham	Durham	1/hr	No Service
54	Langley Park - Durham	Durham	1/hr	No Service
754	Langley Park - Durham	Durham	1/hr	1/hr

Local Services

Service Number	Service Description	via (potential access points)	Mon. - Sat.	Sun. and Evenings
61	DURHAM CITY LOCAL SERVICE: Finchale Training Centre - North Road	Newton Hall	3 each way Mon. - Fri.	No Service
62/62A	DURHAM CITY LOCAL SERVICE: Brasside - Belmont	Newton Hall, Durham City Centre	2/hr	No Service
63	DURHAM CITY LOCAL SERVICE: Arnison Centre/ Brasside - Musgrave Gardens	Newton Hall, Durham City Centre	3/hr	1/hr
66/ 66A/ 67/ 67A	DURHAM CITY LOCAL SERVICE: Newton Hall - Belmont	Durham City Centre	4/hr	No Service

Appendix 8.

Train Services Stopping at Chester-le-Street or Durham

OPERATOR	TO	FROM	DAYTIME FREQUENCY OF ARRIVAL
Great North Eastern Railways	Durham	London, Stevenage, Peterborough, Grantham, Newark, Retford, Doncaster, Leeds, York, Northallerton, Darlington and Middlesborough	30 - 60 MINS.
Great North Eastern Railways	Durham	Inverness, Perth, Stirling, Aberdeen, Montrose, Arbroath, Dundee, Leuchars, Kirkcaldy, Inverkeithing, Glasgow, Motherwell, Edinburgh, Dunbar, Berwick, Alnmouth and Newcastle	30 - 70 MINS.
Virgin Trains	Durham	Aberdeen, Glasgow, Motherwell, Edinburgh, Berwick and Newcastle,	70 - 105 mins.
Virgin Trains	Durham	Bristol, Reading, Birmingham, Tamworth, Burton-on-Trent, Derby, Chesterfield, Sheffield, Doncaster, Wakefield, Leeds, York and Darlington	54 - 125 mins.
Regional Railways North East	Durham and Chester-le- Street	Newcastle, Bishop Auckland, Darlington, Middlesborough, Redcar, Saltburn.	31 - 63 mins.

Appendix 9.

LANDSCAPE ASSESSMENT - FIELD SURVEY FORM

VIEWPOINT No.: 1 DATE: 28/4/9 PHOTO Nos: 1, 2, 3,

LOCATION: PUBLIC FOOTPATH BETWEEN A183 AND "THE HAGS"

O.S. GRID REF.: ^{NZ} 287 518 DIRECTION OF VIEW: WEST → SOUTH

BRIEF DESCRIPTION:

Describe the main elements and features of the landscape, and the way in which they are organised.

This area is dominated by the A1 and the settlement of Chester le St. beyond. The village of Kelton is visible on the ridge to the NW beyond Ch. le St. The civic centre is a dominant feature within Ch le St due to its reflective roof. The railway viaduct over Cong Burn is a striking feature within the town as is the spire of the church of St. Mary, St. Cuthbert. The river Wear is not visible from this point but its course can be determined by the bridge carrying the A(M) and the open, flat, grassed flood plain beyond the motorway. There are significant numbers of trees both within Ch le St. itself and screening the A167 trunk rd in the middle distance. Mainly deciduous with some exotic conifers. To the southwest

ANNOTATED SKETCH. (SEE PHOTOS)

the A(M) becomes screened by the foreground pasture fields and mixed deciduous woodland, of semi natural appearance, beyond it, partially obscures the outskirts of Ch le St.

Two transmission masts are visible on the skyline which is a mixture of woodland, open field and ^{village} settlement.

LANDSCAPE ELEMENTS:

Which are the dominant elements in the landscape?

- | | | | |
|-----------------|-------------------|--------------|----------------|
| Landform | Hedgerow Trees | Industry | Power lines |
| Field Pattern | Mineral Workings | Walls | River |
| Farmland | Fences | <u>Roads</u> | Standing water |
| <u>Woodland</u> | <u>Settlement</u> | Railways | Other |

AESTHETIC FACTORS. Circle those which apply.

BALANCE	Harmonious	<u>Balanced</u>	Discordant	Chaotic
SCALE	Intimate	Small	<u>Medium</u>	Large
ENCLOSURE	Confined	Enclosed	<u>Open</u>	Exposed
TEXTURE	Smooth	Textured	Rough	<u>Very rough</u>
COLOUR	Monochrome	Muted	<u>Colourful</u>	Garish
DIVERSITY	Uniform	Simple	<u>Diverse</u>	Complex
UNITY	Unified	Interrupted	<u>Fragmented</u>	Chaotic
FORM	<u>Straight</u>	Angular	Curved	Sinuous

Note any special aesthetic factors including any *attractors* or *detractors*, any *visual evidence of ecological* or *historical significance*, and any *seasonal variation*.

AIM is a visual and audible detractor. Civic centre and the building in front of it* are out of keeping and discordant with the rest of the buildings in Ch U St.

Further development of the deciduous stand on the rear side of the A1(M) - and its foliation in summer - may serve to screen the motorway; visually + for noise; to some extent.

GUIDELINES:

What conservation or enhancement measures might be appropriate to strengthen or improve the landscape character of this area?

Prevent urban spread ~~beyond~~ towards the viewpoint beyond the A167 trunk rd into the river flood plain

Taller tree species in front of the industrial style building* in front of the civic centre may screen it.

Appendix 10.

Guidance Notes on Descriptive Vocabulary for Recording Aesthetic Factors **(Countryside Commission, 1993)**

BALANCE AND PROPORTION.

The relative quantities of different elements within the view affect balance and proportion. Criteria such as the 'rule of thirds' can be used to assess how well balanced the landscape is in aesthetic terms. Temporal effects should also be considered.

Proportions may change with the seasonal addition or loss of elements.

SCALE.

Here the overall scale of the landscape must be assessed once the factors that define it have been established. These include the degree of enclosure by landform or woodland and the main positions from which the landscape is viewed - scale increases with elevation and distance. Scale is closely related to balance, proportion and enclosure.

ENCLOSURE.

Where elements are arranged so that they enclose space, this has an effect on the overall composition so that the space and mass become as one. It also has a great effect on scale due to the interaction of the height of the enclosing elements and the distance between them.

TEXTURE.

This varies according to scale, but can be defined in relative terms as coarse, intermediate or fine. Texture is determined by crops, tree cover, size of trees species, size of fields, etc. It is an important contributor to design unity and diversity, susceptible to change by loss or addition of elements.

COLOUR.

This refers to the dominant colour of the fields, woodlands, the built environment and other landscape elements. It includes any notable seasonal effects due to farming activity and seasonal change.

DIVERSITY.

This needs to be assessed in two ways. First within the boundaries of the landscape type the minor variations of the landscape should be assessed to determine overall how uniform or diverse the landscape is. Second, the diversity of a typical composition should be evaluated. Additionally, trends for change should be borne in mind, that is whether the degree of diversity is increasing or decreasing.

UNITY.

The repetition of similar elements, balance and proportion, scale and enclosure, all contribute to unity. The degree to which contrasting elements disrupt a composition depends also on the context. For example a single quarry in the midst of an otherwise unified landscape pattern may cause a high degree of disunity.

FORM.

This term describes the shapes of fields, woods, or linear structures, of landform, e.g. rectangular, curvilinear, rounded, flat, etc. It is a very important factor in defining ancient or planned landscapes. We pick out forms and shapes very quickly, often on slight evidence.

