



**NRA**

*National Rivers Authority  
Thames Region*

**BLACKWATER RIVER  
CATCHMENT MANAGEMENT PLAN  
CONSULTATION DRAFT**



FULL REPORT  
NOVEMBER 1992



National Rivers Authority  
Information Centre  
Head Office

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**BLACKWATER RIVER CATCHMENT MANAGEMENT PLAN  
CONSULTATION DRAFT**

November 1992

**FOREWORD**

The National Rivers Authority was created in 1989 to conserve and enhance the natural water environment. In our role as Guardians of the Water Environment we are committed to preparing a sound and thorough plan for the future management of the region's river catchments.

This consultation document is a step towards achieving that goal for the Blackwater River catchment. As a vehicle for consultation it will provide a means of seeking a consensus on the way ahead and as a planning document it will be a means of seeking commitment from all parties to realising the environmental potential of the catchment.

We look forward to receiving the contributions of those organisations and individuals involved with the river and its catchment.

Les Jones  
Regional General Manager

# *Blackwater River*

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## **CATCHMENT MANAGEMENT PLAN**

*Consultation Draft*

*November 1992*

*National Rivers Authority  
Thames Region  
King's Meadow House  
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**BLACKWATER RIVER CATCHMENT MANAGEMENT PLAN**  
**CONSULTATION DRAFT**

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# BLACKWATER RIVER CATCHMENT MANAGEMENT PLAN

## CONSULTATION DRAFT

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*Section 1*

**INTRODUCTION**





## 1.1 THE NATIONAL RIVERS AUTHORITY

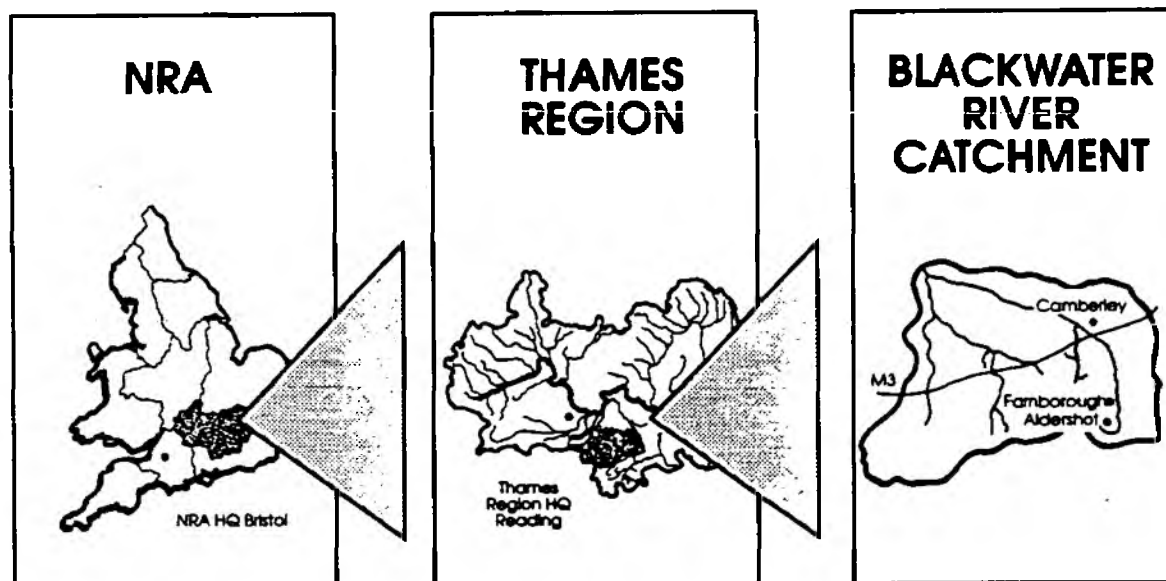
The National Rivers Authority (NRA) was established by the 1989 Water Act as an independent public body with statutory responsibilities for water resources, pollution control, flood defence, fisheries, recreation, conservation, and navigation in England and Wales.

We are funded through a variety of charges (e.g. water abstraction charges, flood defence levies, effluent discharge charges, rod and net fishing licence fees, navigation fees) and government grants from the Department of the Environment (DoE), Ministry of Agriculture, Fisheries and Food (MAFF), and Welsh Office (WO).

As Guardians of the Water Environment we have set ourselves the following mission statement:

'The National Rivers Authority will protect and improve the water environment. This will be achieved through effective management of water resources and by substantial reductions in pollution. The Authority aims to provide effective defence for people and property against flooding from rivers and the sea. In discharging its duties it will operate openly and balance the interests of all who benefit from and use rivers, ground waters, estuaries and coastal waters. The Authority will be businesslike, efficient and caring towards its employees.'

In our role as Guardians of the Water Environment we are committed to preparing a sound and thorough plan for the future management of the region's river catchments. This Draft Catchment Management Plan is a step towards achieving that goal for the Blackwater River catchment, which lies within the Thames Region of the NRA (NRA TR).





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## 1.2 CATCHMENT MANAGEMENT PLANNING

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The water environment (e.g. estuaries, coastal waters, rivers, streams, lakes, ponds, aquifers, springs) is subject to a wide variety of uses which invariably interact and sometimes conflict with each other. Catchment management planning is a process developed by the NRA to help manage these interactions and conflicts for the overall benefit of the natural water environment and its users.

Although we have a pivotal role to play in the management of the natural water environment our catchment management planning (CMP) process recognises that consultation with other users, including the general public, is essential. Consequently, we have produced this document as a means of initiating detailed consultation with all interested parties. The aim of the consultation phase is to develop a consensus based strategy for realising the environmental potential of the river catchment, within prevailing technical, economic and social constraints.

Each section of this document contains its own introduction but in summary the plan comprises:

- a description of the relevant natural features of the catchment (Section 2);
- a description of the actual and potential uses (e.g. ecology, water abstraction, navigation, flood defence) of the catchment and draft objectives for the conservation and enhancement of the uses (Section 3);
- a description of the current status of the catchment in relation to the key characteristics of water quality, water resources and flood defence (Section 4); and,
- a presentation of catchment-specific issues (Section 5).

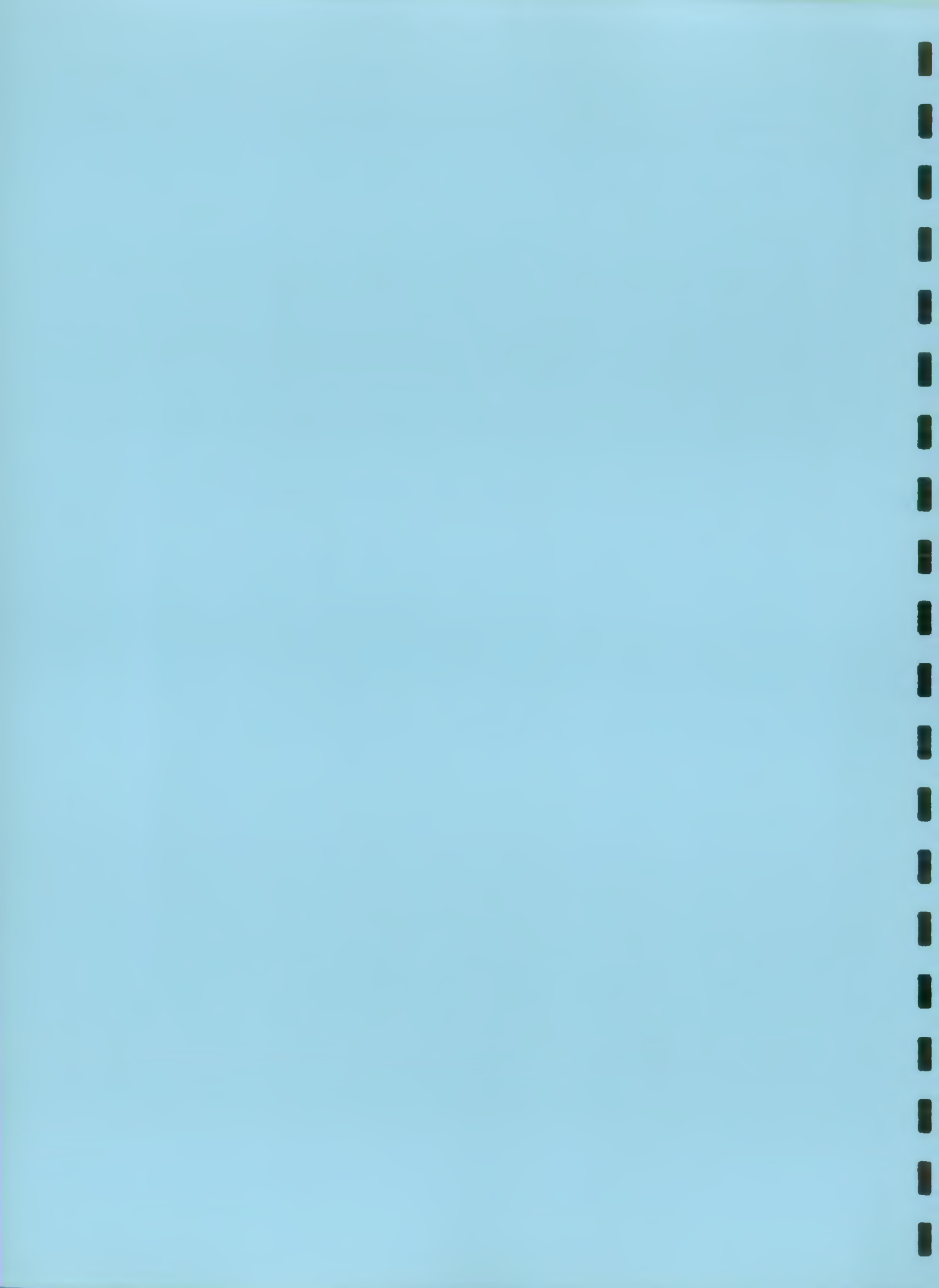
Within each section synoptic maps are used in conjunction with the text to illustrate relevant features.

This document is a starting point for consultation on the future of the natural water environment of the Blackwater River catchment and is part of a process that will enable us to develop a 'vision' for the catchment which will guide all our activities for the following 5 to 10 years. Regular monitoring and updating of the Plan will be an integral part of the process.

We welcome your comments on the document. Details of the consultation process are given in Section 6.

*Section 2*

**CATCHMENT DESCRIPTION**



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## 2.1 INTRODUCTION

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The purpose of this section is to provide a broad introduction to the catchment for those not acquainted with it and to describe the natural features of the catchment under the headings:

- topography;
- geology and hydrogeology;
- rainfall and river flow; and,
- surface water system.

We have defined the boundary of the Blackwater River catchment to include all land which drains surface water runoff to the Blackwater River and its tributaries which include the River Whitewater, River Hart, Fleet Brook and Cove Brook.

A section is also enclosed to highlight the County and District Council areas which fall within the catchment area of the Blackwater River.

### KEY STATISTICS

Catchment Area (sq. km)	356
Population	250 000
(Major towns : Aldershot, Camberley, Farnborough, Fleet, Hartley Wintney, Hook, Sandhurst, Yateley)	
Average Annual Rainfall (mm)	680
Main River Length (km) (maintained by NRA for flood defence purposes)	87
Controlled Water Length (km) (monitored by NRA for water quality purposes)	125

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## 2.2 GENERAL FEATURES

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The catchment is one of contrasts. On its western side the Whitewater and Hart Rivers drain a largely undeveloped catchment (apart from the towns of Fleet and Hook), whilst on the eastern side the Blackwater River and Cove Brook drain a heavily urbanised area comprising the towns of Aldershot, Farnborough, Camberley, Sandhurst and Yateley.

The crescent of intensive development within the Blackwater valley is a result of a number of influences including:

- the development of military training facilities in the last century;
- ease of access by rail to central London; and,
- inclusion of the area within a sub-region of the south-east of England identified for major growth from the late 1950's to the mid 1980's.

Good transport communications (e.g. the M3 motorway and rail links to Waterloo) continue to play an important role in the area's development. The 'Blackwater Valley Route' is currently being implemented to improve north to south road communications within the area.

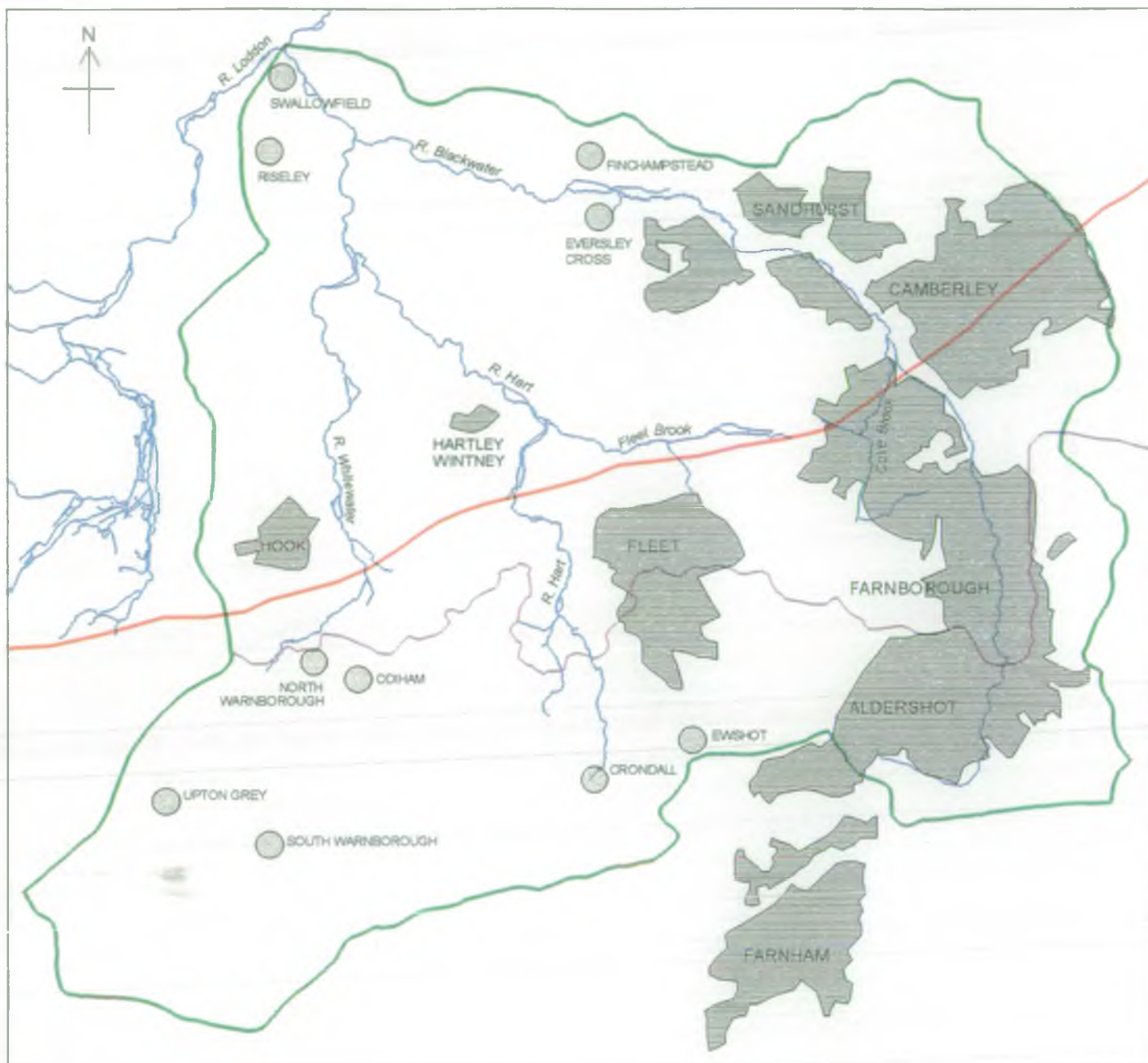
Surveys undertaken by the NRA highlight major variations in river water quality within the catchment. The River Whitewater is of a "high" quality and supports a natural population of brown trout. In contrast, the Blackwater River is in part of a "poor" quality, although its downstream reaches are considered to be of "fair" quality. Most of the tributaries of these two rivers are considered to be of "fair" quality.

The chalk downland in the south-west of the catchment is an indicator of the water bearing strata (e.g. Chalk and Greensand) underlying the entire catchment. Whilst much of this strata is overlain by impervious deposits (e.g. London Clay) the Chalk and Greensand do act as a source both of drinking water supplies and of several springs which feed the Whitewater and Hart Rivers. Although the Blackwater River is also spring fed, sewage effluent is the major component of flow in the river.







River gravels in the Blackwater valley area have been worked for at least the last forty years and this activity is continuing to proceed downstream towards the confluence of the Blackwater River and the River Whitewater. Since 1971 County Councils and Local Authorities interested in the future of the valley have undertaken a number of measures to manage positively the major land use changes in the valley. The 'Blackwater Valley Recreation and Countryside Management Service' is currently funded by 11 Authorities and operates to achieve the recreation and landscape strategies developed for the valley.

The Basingstoke Canal runs in a west-to-east direction through the catchment along the 75 metre ground contour. Opened in 1794, the canal had, by the early part of this century, become impassable. However, many years of restoration work have led to the recent re-opening of the canal. The canal supports a number of Sites of Special Scientific Interest and is considered by many to be of national ecological importance.

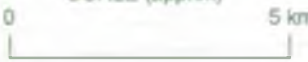
Other water dependent habitats in the catchment which are designated as Sites of Special Scientific Interest include fens, lakes, bogs and water meadows, making this a particularly diverse and rich area in ecological terms.



KEY

	Watercourses		Village				
	Basingstoke Canal						
	Catchment Boundary						
	Urban Area						
	M3 Motorway						

SCALE (approx)



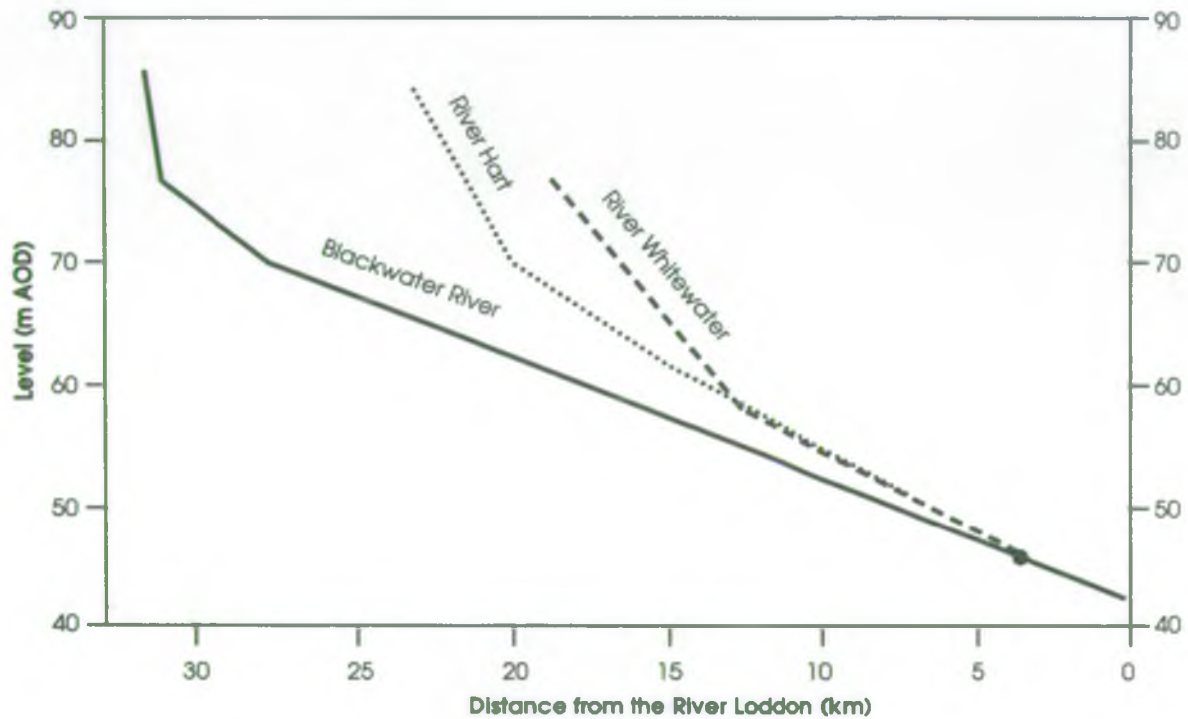
0 5 km



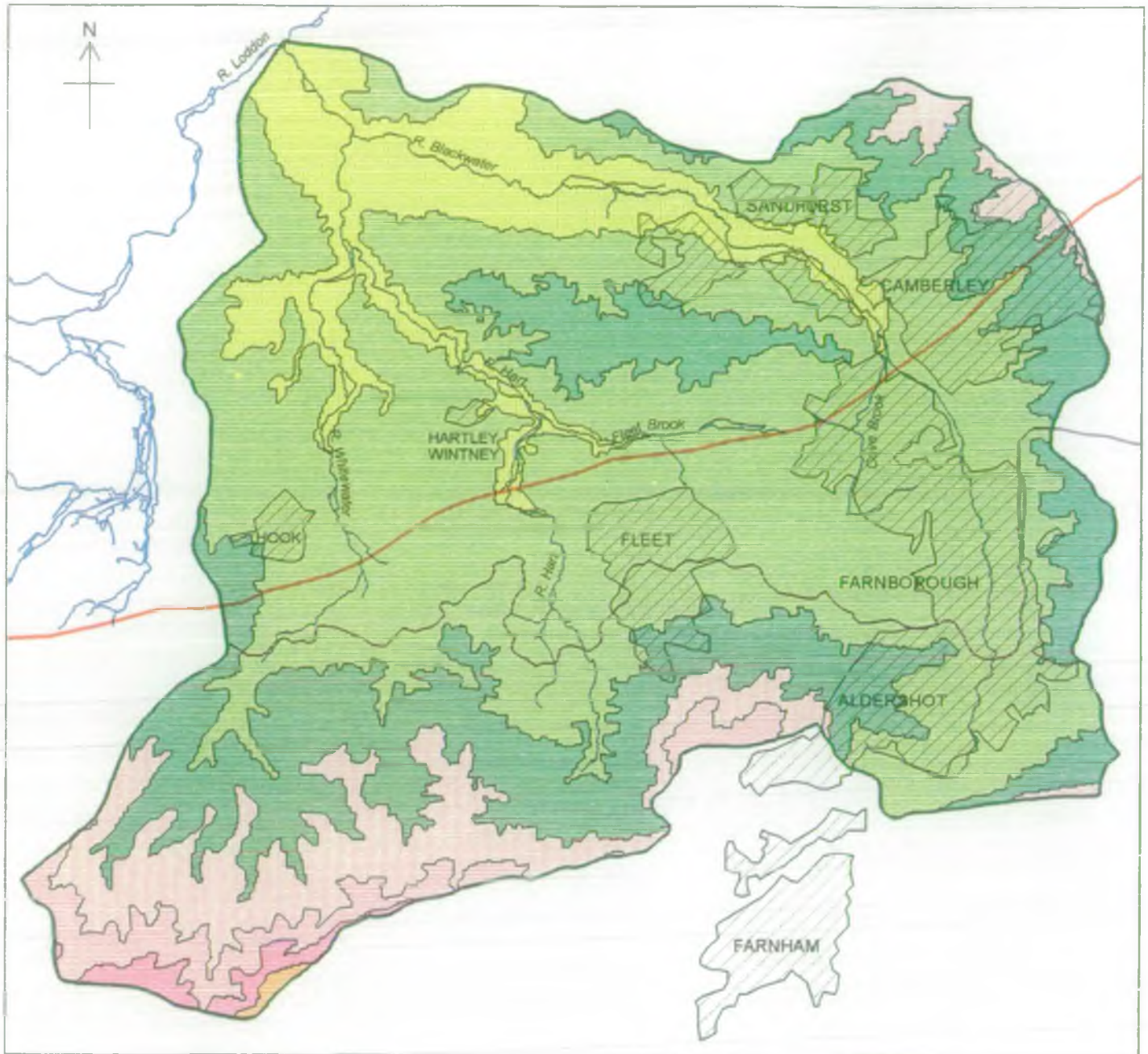
### 2.3 TOPOGRAPHY

The catchment rises from around 45m AOD (Above Ordnance Datum) at the confluence of the Blackwater River and the River Loddon, to over 225m AOD at Swaines Hill in the North Downs.

River profiles of the Blackwater, Whitewater and Hart Rivers are shown below.



The slope of the bed of the Blackwater River is about 1 in 1000. This compares to a value of 1 in 500 for the middle reaches of the Whitewater and Hart Rivers. As a result average flow velocities in the River Whitewater are faster than those in the Blackwater River. This factor influences the water quality and ecology of the two watercourses.



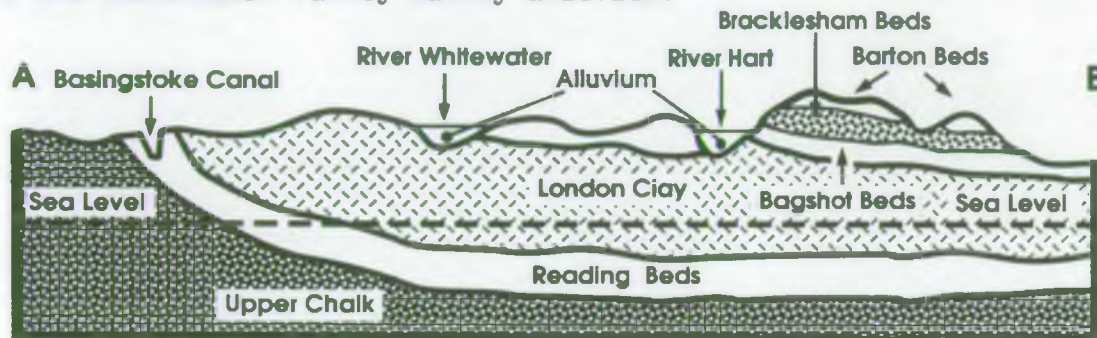
KEY

		GROUND LEVELS (Metres AOD)					
	Watercourses						
	Basingstoke Canal		up to 60		150 to 180		
	Catchment Boundary		60 to 90		180 to 210		
	Urban Area		90 to 120		over 210	SCALE (approx) 0 ————— 5 km	
	M3 Motorway		120 to 150				



### Geology

The solid geology of the catchment comprises a series of overlying strata. Working from depth these strata include: Upper Greensand and Chalk (both of which are water bearing and are major aquifers); Reading Beds, London Clay and Bagshot Beds (which are sandy clays which generally do not permit the passage of water: this is especially true of the London Clay); and, Bracklesham and Barton Beds (which are generally sands). Overlying these solid strata are drift deposits which in the Blackwater valley comprise gravels and alluvium and in the Whitewater valley mainly alluvium.



**GEOLOGICAL SECTION A-B (Vertical Exaggeration x 15)**

The solid strata dip gently northwards away from the Hogs Back, which is a ridge of more steeply dipping strata located to the south of Aldershot. The Blackwater River occupies a valley far larger than would be expected through consideration of its present flow. This is because its headwaters were previously (in a geological timescale) those of the current River Wey to the south.

Under natural conditions the rivers of the catchment have a sinuous, rather than meandering, pattern. They have gravel beds and are not powerful enough to overcome the resistance of their banks to erosion.

### Hydrogeology

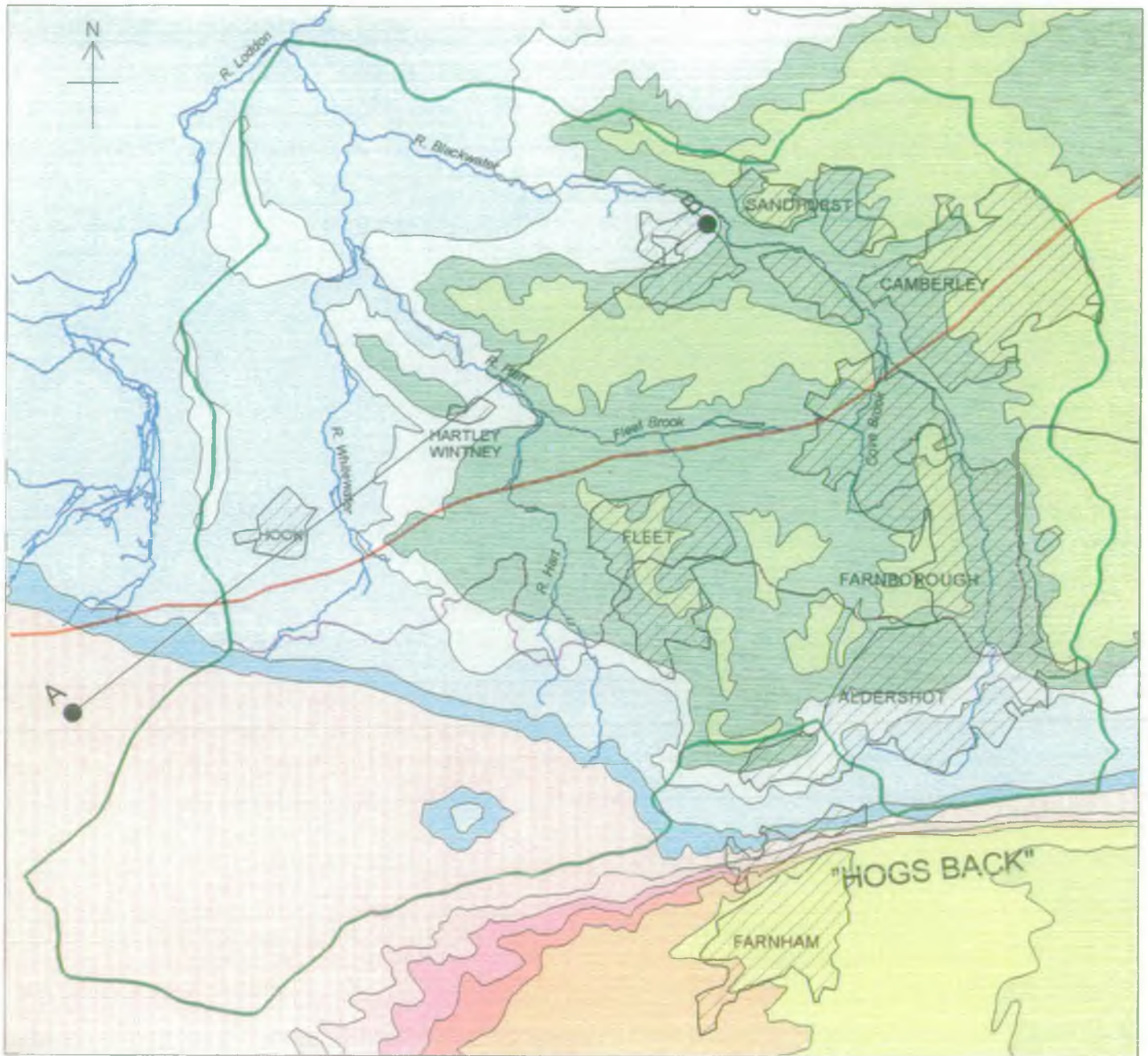
The Blackwater River is fed by springs rising on the edge of the Bagshot Beds. This gives rise to fairly acidic water. It then flows over impermeable London Clay before passing back onto the more permeable Bagshot and Bracklesham Beds. There is normally a bed of valley gravels and alluvium between the river and the solid geology.

The River Whitewater is fed by springs rising on the upper chalk at Greywell. This gives rise to an alkaline water. The river flows on a bed of alluvium and valley gravels on the London Clay up to where it joins the Blackwater River.

The River Hart and its tributaries are also fed by chalk springs. The tributaries then pass onto the impermeable London Clay. The River Hart flows on a bed of alluvium throughout its length. From the London Clay it crosses onto the more permeable Bagshot Beds and the Bracklesham Beds before passing back onto the London Clay until it joins the River Whitewater. Again, there is normally a bed of valley gravels and alluvium between the river and the solid geology.



# GEOLOGY AND HYDROGEOLOGY



## KEY

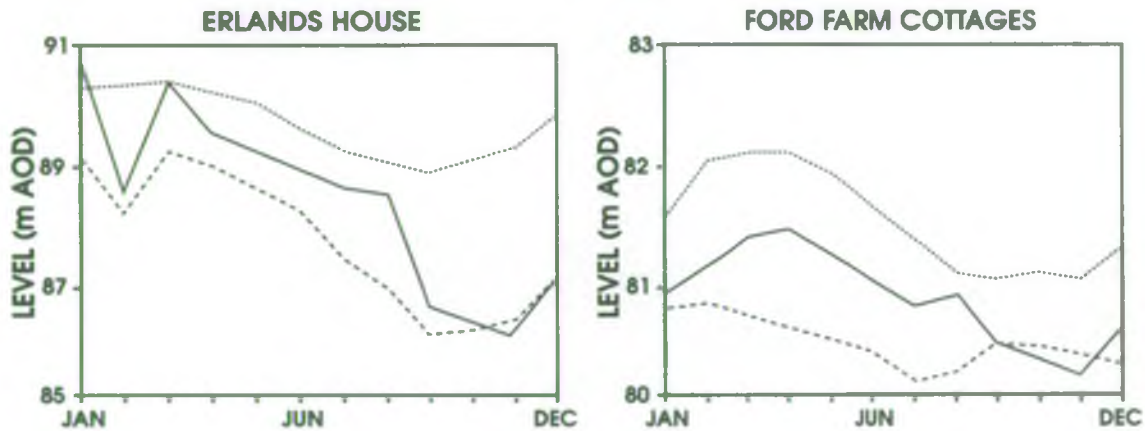
	Watercourses		Barton Beds		Upper Chalk		Folkestone Beds
	Basingstoke Canal		Bracklesham Beds		Middle Chalk		Sandgate Beds
	Catchment Boundary		Bagshot Beds		Lower Chalk	A — B	Geological Section
	Urban Area		London Clay		Upper Greensand	SCALE (approx) 0 ————— 5 km	
	M3 Motorway		Reading Beds		Gault		

2.5 RAINFALL AND RIVER FLOW

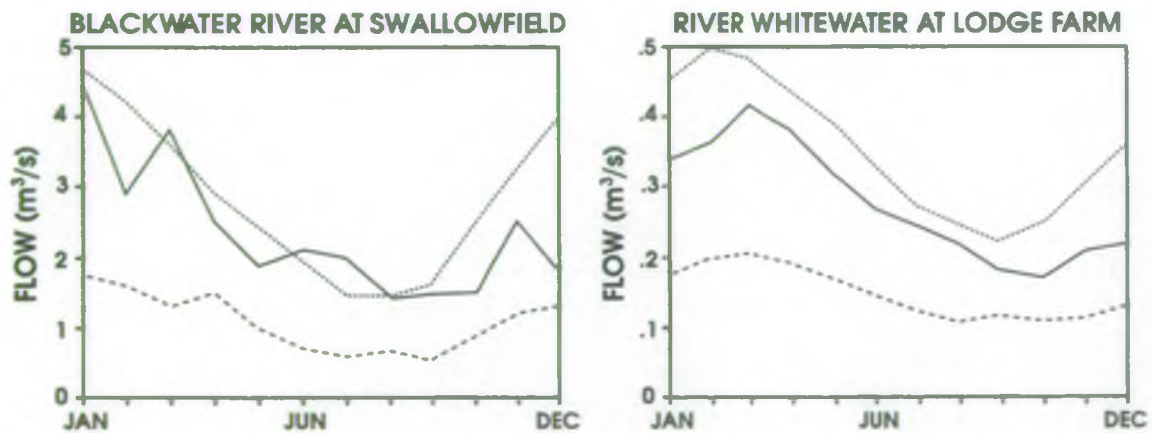
The catchment's climate has little to distinguish it from most other parts of the south-east of England. Rainfall averages about 680mm per year over the whole catchment. However, it is heavier on the higher ground of the chalk downland in the south-west of the catchment. The prevailing wind direction is west-north-west to south-south-west.

River flow and groundwater levels are measured by the NRA in order to manage and understand the response of the surface and groundwater systems to both rainfall and the range of catchment uses identified in Section 3. Records for two groundwater level and two river flow monitoring sites are summarised below. The groundwater level records in particular are indicative of how severe the current drought is.

**GROUNDWATER LEVELS**



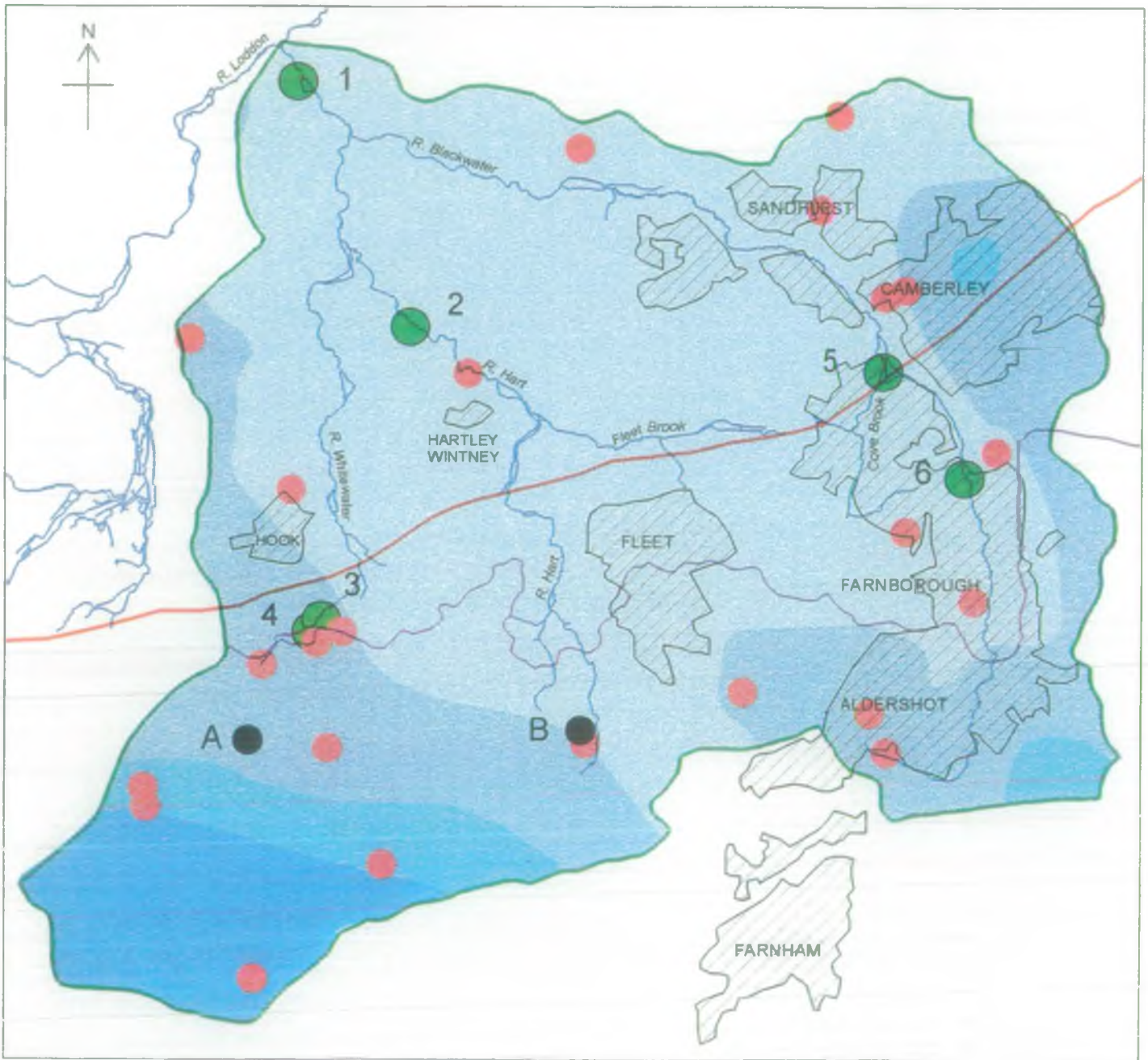
**RIVER FLOWS**



KEY: MINIMUM RECORDED VALUE - - - AVERAGE VALUE ..... VALUE FOR 1991 —



# RAINFALL AND RIVER FLOW



## KEY

	Watercourses	ANNUAL RAINFALL (mm)			FLOW GAUGE		RAINFALL STATION
	Basingstoke Canal		up to 700	1. SWALLOWFIELD 2. BRAMSHILL			GROUNDWATER LEVEL
	Catchment Boundary		700 to 750	3. LODGE FARM (OLD WEIR) 4. LODGE FARM (NEW WEIR)		A. ERLANDS HOUSE B. FORD FARM COTTAGES	
	Urban Area		750 to 800	5. HAWLEY ROAD BRIDGE 6. FRIMLEY		SCALE (approx)	
	M3 Motorway		over 800			0 <span style="float: right;">5 km</span>	



## 2.6 SURFACE WATER SYSTEM

The surface water system comprises a wide range of discrete, but inter-connected elements which include rivers, streams, ditches, field drains and urban features such as drains and sewers. Artificial lakes and ponds (as well as similar natural features) often influence the response of the system.

Watercourses are classified by the NRA for both 'flood defence' and 'water quality' purposes. In the case of the Blackwater River catchment the watercourses classified for these two purposes are not always identical, although they are broadly the same.

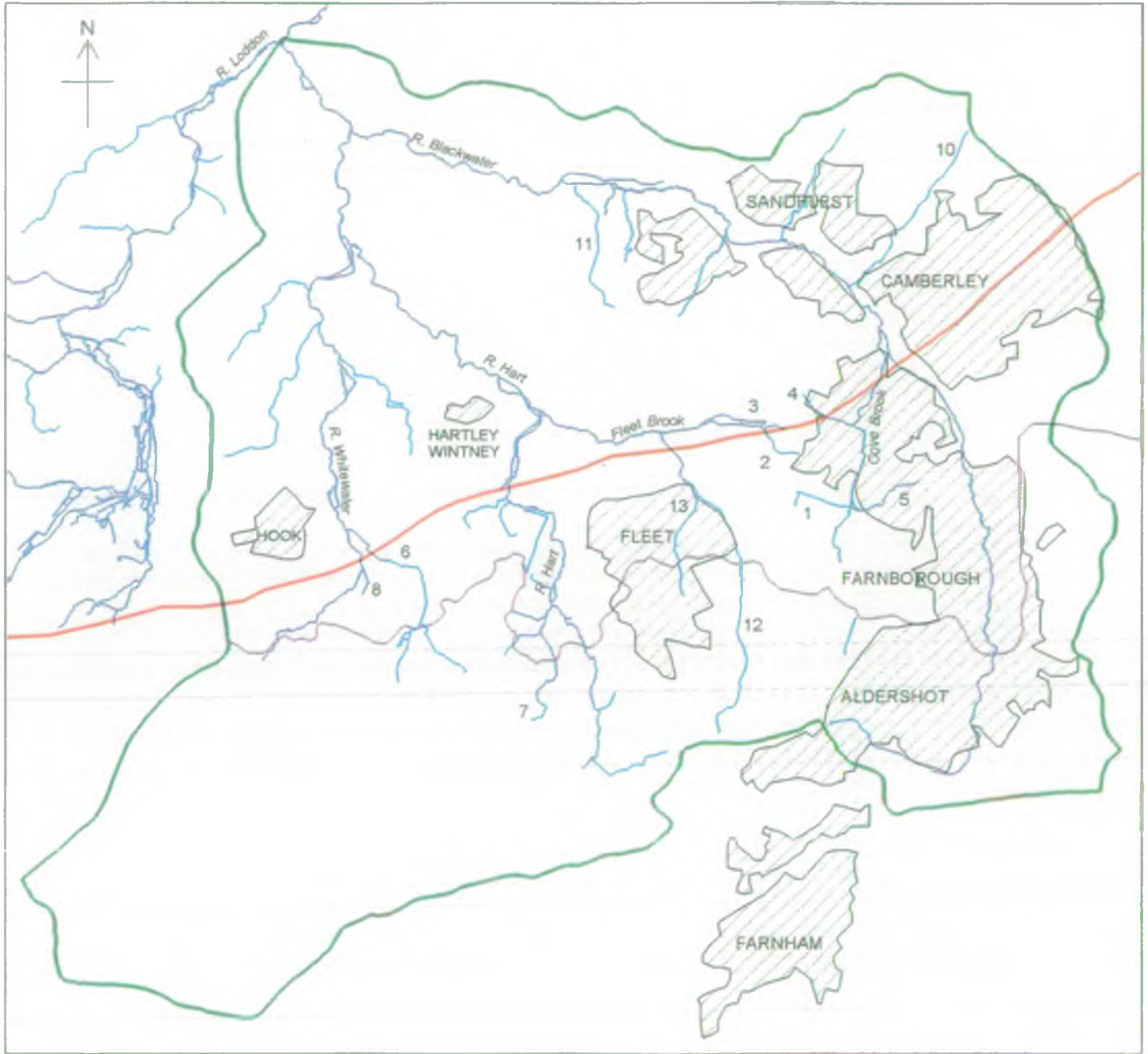
In the case of 'flood defence', the classified watercourses are known as 'main river'. On these watercourses, the NRA is able to exert control over activities affecting the channel and undertake improvement and maintenance works. All natural waters in the catchment are known as 'controlled waters', for the purpose of water pollution control. The more significant of the watercourses are currently classified on a quality scale from 1 to 4. Monitoring of the water quality enables the NRA to assess whether or not the river is meeting the standards for its classification. Class 1 rivers are of the highest quality.

The map opposite shows the watercourses and canal recorded on the Ordnance Survey 1:10 000 scale maps. The classified watercourses, however, cover only the significant watercourses as described below:

<u>Watercourse</u>	<u>'Main River'</u> <u>length (km)</u> (Flood Defence)	<u>Classified 'Controlled Waters'</u> <u>length (km)</u> (Water Quality)
Blackwater River	32.45	35.68
- Cove Brook	4.70	6.48
- Pyestock Tributary	-	1.63
- Hawley Lake Stream	0.90	-
- Marrow Brook	0.65	-
River Whitewater	15.20	19.03
- River Hart	17.55	21.57
- Fleet Brook	4.70	5.76
- Minley Brook/Ditches	4.87	3.61
- Potbridge Brook	1.85	-
- Itchel Brook	2.85	-
- Grubes Farm Ditches	1.03	-
<b>TOTAL</b>	<b>86.75</b>	<b>93.76</b>
<u>Canal</u>		
Basingstoke Canal	-	31.65

The majority of the water bodies (e.g. lakes, ponds, reservoirs) in the catchment are man-made. Gravel workings have created a string of lakes in the Blackwater valley from Ash to Eversley Cross. Elsewhere, open water bodies are the result of landscape and amenity demands or the need to provide supplies of water for drinking, recreation and navigational purposes.

# SURFACE WATER SYSTEM



## KEY

	Watercourses		Minor Watercourses		
	Basingstoke Canal		1 Pyestock Tributary	9 Grubes Farm Ditches	
	Catchment Boundary		2 Minley Brook	10 River Wish	
	Urban Area		3 Minley Ditches	11 Firgrove Lake Stream	
	M3 Motorway		4 Hawley Lake Stream	12 Gelvert Stream	
			5 Marrow Brook	13 Brookley Stream	
			6 Potbridge Brook		
			7 Itchell Brook		
			8 Poland Ditch		
					SCALE (approx) 0 ————— 5 km



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## 2.7 LOCAL AUTHORITIES

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For almost its entire length the Blackwater River delineates part of the County boundary between Hampshire and, Surrey and Berkshire. The following table summarises the distribution of the catchment area of 356 km<sup>2</sup> amongst County Councils and Local Authorities falling within the catchment boundary.

<u>County Councils</u>		<u>District Councils</u>	
Hampshire	76%	Hart DC	59%
		Rushmoor BC	10%
		Basingstoke & Deane BC	6%
		East Hampshire DC	1%
Surrey	14%	Surrey Heath BC	8%
		Guildford BC	5%
		Waverley BC	1%
Berkshire	10%	Wokingham DC	5%
		Bracknell Forest BC	5%
TOTAL	<u>100%</u>	TOTAL	<u>100%</u>

Most of the County Councils and District Councils have recently revised, or are currently, revising their statutory land use development plans. Taken into account along with regional guidance on planning matters these documents provide the best means for identifying possible future land use trends in the catchment which may have an impact on, or interact with, the natural water environment. The following development plans were reviewed for this Plan:

### County Councils

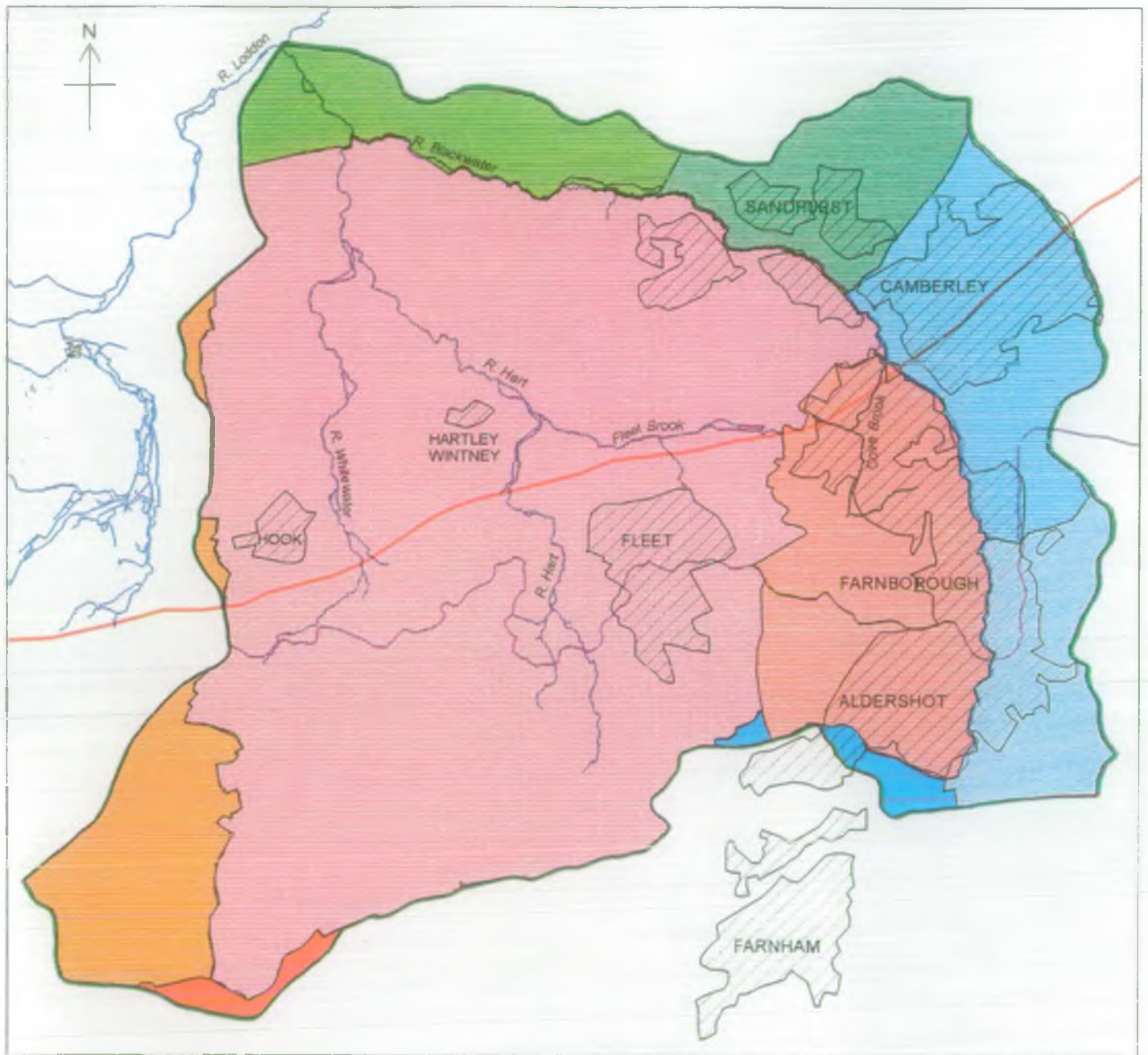
North East Hampshire Structure Plan - Approved 2nd Alteration (October, 1989)  
Surrey Structure Plan - Draft (September, 1991)  
Berkshire Structure Plan - Draft (November, 1991)

### District Councils

Hart District Local Plan - Deposit Draft (November, 1990)  
Rushmoor Local Plan - Deposit Draft (October, 1990)  
Basingstoke Area Local Plan - Consultation Draft (June, 1991)  
East Hampshire District Local Plan - Deposit Draft (November, 1990)  
Surrey Heath Local Plan - Deposit Draft (October, 1990)  
Guildford District Plan - Deposit Draft (October, 1990)  
Waverley District Plan - Deposit Draft (January, 1990)  
Wokingham District - South East Area Plan - Deposit Draft (June, 1990)  
Bracknell District - Sandhurst Crowthorne Local Plan - Adopted (April, 1991).

The population of the catchment is almost 250 000, the majority of whom live within the Blackwater valley. It is interesting to note that at the turn of the century the population of the catchment was around 60 000.

# LOCAL AUTHORITIES



## KEY

	Watercourses		HAMPSHIRE		SURREY		BERKSHIRE
	Basingstoke Canal		Hart		Guildford		Wokingham
	Catchment Boundary		Rushmoor		Waverley		Bracknell
	Urban Area		Basingstoke and Deane		Surrey Heath	SCALE (approx) 0 <span style="display: inline-block; width: 100px; border-bottom: 1px solid black;"></span> 5 km	
	M3 Motorway		East Hants				





*Section 3*

**CATCHMENT USES**





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### 3.1 INTRODUCTION

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The purpose of this section is to describe current and future uses of the natural water environment within the catchment. (Current uses include activities planned to be completed in the short-term. Future uses include potential, possible and likely uses). For each of the catchment uses the following information is provided:

- (i) a page of text divided into the following sections:

**General** - this describes some of the general characteristics of the use, the scope of the use heading and any key relationships the use may have with other uses.

**Catchment Perspective** - this describes how the use manifests itself within the Blackwater River catchment. Two sub-headings are provided: current use and future use.

**Objectives** - this contains draft objectives for the conservation and enhancement of the use and/or the water environment. The objectives are broadly based and could form the basis for a future catchment strategy.

- (ii) a colour synoptic map designed to enhance the information in the text and highlight the geographical context of the use.

In most cases the description of the use is a summary of detailed technical studies produced by the NRA and/or other organisations. Support documents may therefore be available for those interested in learning more about the catchment.

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## 3.2 ECOLOGY

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### *General*

This use relates to the protection of all aquatic flora and fauna along with dependent organisms. Dependent organisms are plants and animals which rely, at some stage of their life cycle, on the aquatic environment or associated land. A healthy river corridor will be characterised by a diverse and abundant plant and animal community and a variety of habitat types. The habitats of rivers, gravel pits, still waters, springs, wet pasture, mill leats and canals are all considered within this section.

### *Catchment Perspective*

#### Current Use

The upper sections of the Blackwater River and the Cove Brook are extensively developed and the river therefore provides an essential ecological corridor even though surveys indicate it is not of great intrinsic value. The nearby still waters (gravel pits, marshes etc.) have a greater species diversity and create a wildlife reservoir for the Blackwater valley. The Whitewater and Hart valleys are much less developed and have a more natural structure and higher water quality. The Basingstoke Canal is considered by a number of environmental groups to be of national significance for its water dependent ecology.

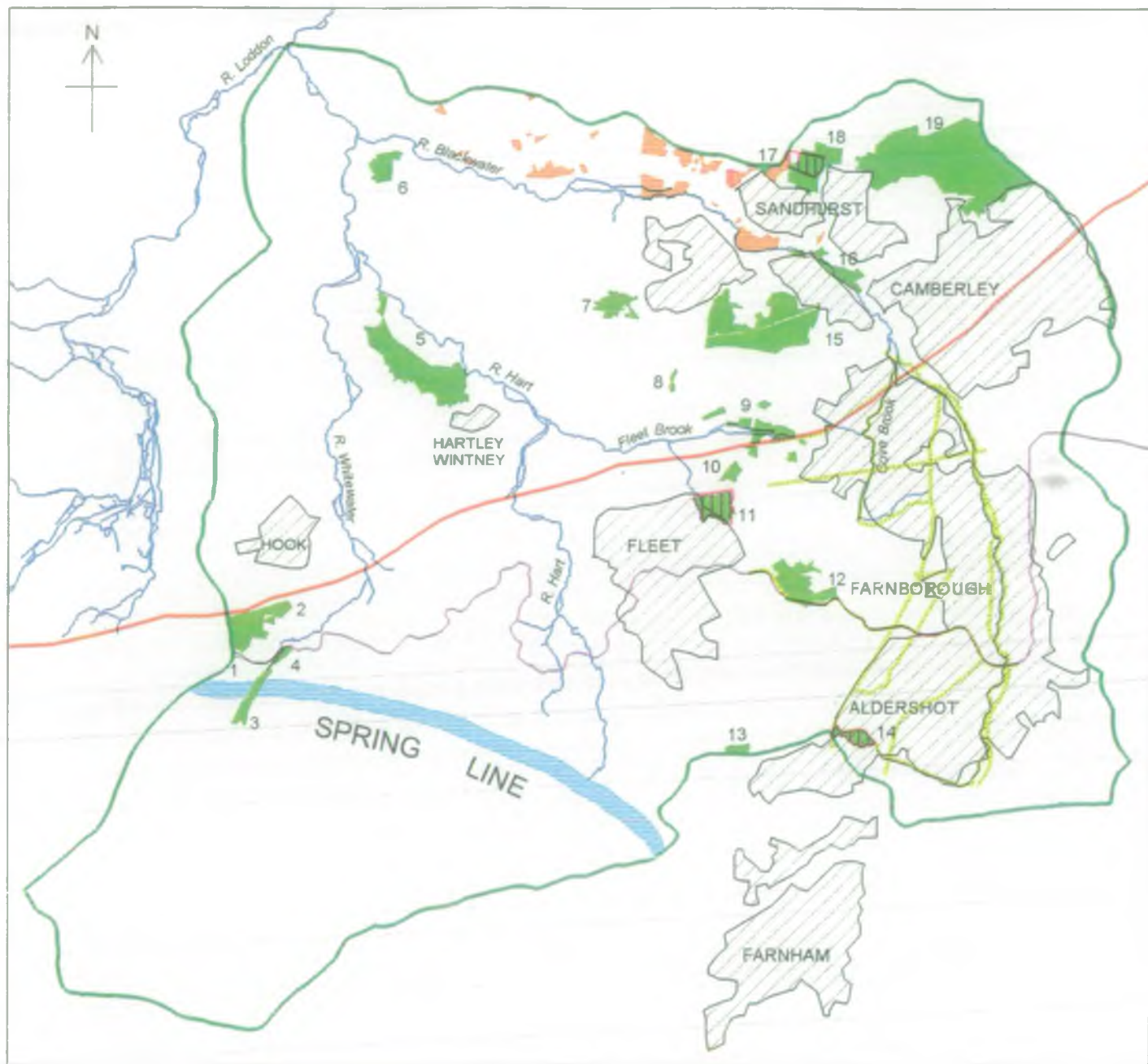
There are 20 Sites of Special Scientific Interest in the catchment of which 17 have a wetland interest. These include: meadows and wet grasslands (e.g. Blackwater Valley and Foxlease and Anells Meadow); bogs, marshes and mires (e.g. Eelmoor Marsh and Greywell Fen); lakes and ponds (e.g. Fleet Pond and Upper Hale Gravel Pits); and, several sections of the Basingstoke Canal, including Greywell Tunnel which gives shelter to the largest population of bats of any known site in Britain. Several sites are designated as Local Nature Reserves and a number of important sites (known as Wildlife Heritage Sites) have been identified by the Berks, Bucks and Oxon Naturalists' Trust.

#### Future Use

The chalk springline in the south-west of the catchment is considered by the local Wildlife Trust to support a number of unprotected but important habitats. Cove Brook, Marrow Brook and the Blackwater River are designated as green chains by the local authority, in part to recognise their potential as ecological resources. On-going work by the NRA to restore the natural form of the Blackwater River, planned water quality improvements and other initiatives are likely to lead to enhancements in the ecological value of the river.

#### *Objectives*

- \* *To safeguard the special conservation interest for which sites have been designated (e.g. SSSI, LNR). (All relevant waters)*
- \* *To promote all aquatic life and dependent non-aquatic organisms, so that the ecosystem is consistent with the physical, chemical and biological characteristics, flow regime and location of the controlled water. (All other waters).*



KEY

	Watercourses		Sites of Special Scientific Interest			Green Chains
	Basingstoke Canal		1. Greywell Tunnel	11 Fleet Pond		Local Nature Reserves
	Catchment Boundary		2. Butter Wood	12 Elmoor Marsh		Wildlife Heritage Sites
	Urban Area		3. Greywell Fen	13 Upper Hale Gravel Pits	SCALE (approx) 	
	M3 Motorway		4. Basingstoke Canal	14 Rowhill Copse		
			5. Hazely Heath	15 Yately Common		
		6. Bramshill	16 Blackwater Valley			
		7. Castle Bottom	17 Wellington College Bog			
		8. West Minley Meadow	18 Sandhurst to Oxtmoor Bogs and Heath			
		9. Foxease & Anells Meadow	19 Broadmoor to Bagshot Woods and Heath			
		10. Yately Common				



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### 3.3 FISHERIES

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#### *General*

This use relates specifically to the maintenance of breeding populations of salmonoid (i.e. game) and cyprinid (i.e. coarse) fish. European Commission (EC) Freshwater Fisheries Directive (78/659/EEC) "on the quality of waters needing protection or improvement in order to support fish life" provides a statutory basis for the protection of water quality in certain rivers.

#### *Catchment Perspective*

##### Current Use

The Blackwater River has several sites with good fish populations. Roach, chub and dace predominate but population distributions vary with location and also include pike, perch, tench, bream and gudgeon. The poorest populations are found downstream of the sewage treatment works' outfalls. The Blackwater River is an EC designated cyprinid fishery downstream of Eversley Cross.

The River Whitewater is a high quality river with a good fish population (including some breeding populations of native brown trout) and is an EC designated salmonid fishery from its source to its confluence with the River Hart. From the River Hart to the Blackwater River it is a designated cyprinid fishery. The River Hart is also a designated cyprinid fishery from Elvetham Park Bridge to the River Whitewater.

The Basingstoke Canal is a designated cyprinid fishery from Greywell Tunnel to Eelmoor Bridge, and supports good fish populations in many sections.

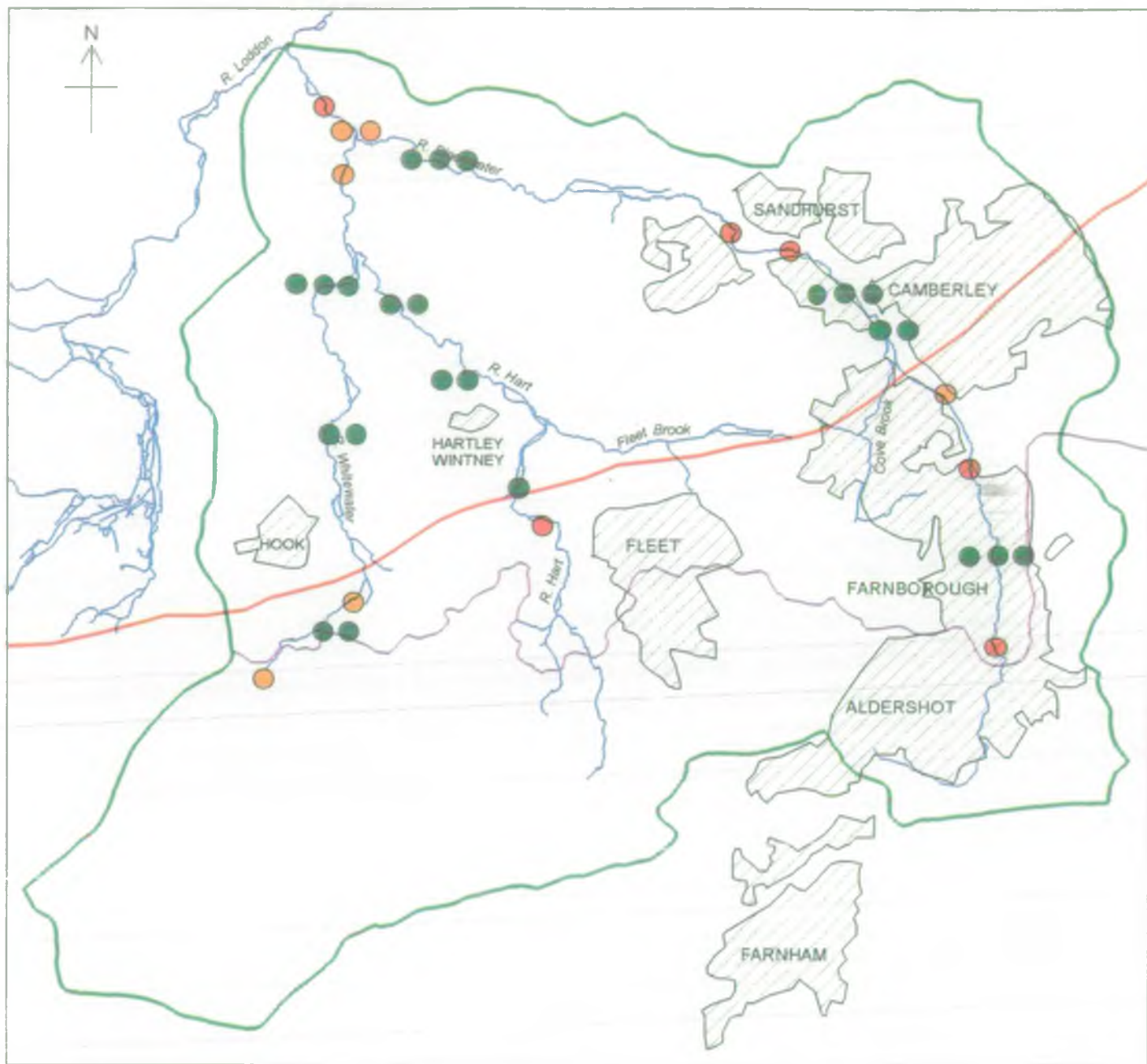
The gravel pits and lakes in the catchment are mainly privately owned (or leased) by angling clubs and societies. Many of the gravel pits are excellent coarse fisheries.

##### Future Use

Planned improvements in the water quality and physical form of the Blackwater River will enable it to begin to achieve its full potential as a cyprinid fishery. Similar work on the River Whitewater will lead to increases in the numbers of native brown trout.

#### *Objectives*

- \* *To sustain a natural fish population appropriate to the typical physical, chemical and biological characteristics and flow regime features of the relevant sites. (All relevant waters)*
- \* *To safeguard and maintain the water quality of all designated salmonid and cyprinid fisheries. (All waters designated under EC Directive 78/659/EEC. See Section 4.2).*



KEY

			QUALITY OF FISHERY		BIOMASS OF FISHERY	
	Watercourses					
	Basingstoke Canal	●	GOOD	○○○	> 20	
	Catchment Boundary	●	MODERATE	○○	10 - 20	
	Urban Area	●	POOR	○	< 10	SCALE (approx) 0 ————— 5 km
	M3 Motorway				Values in gram per sq. metre	



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## 3.4 LANDSCAPE

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### *General*

The landscape reflects the complex interplay between the natural environment and man's activities. Geomorphology, topography and drainage provide the basic elements of the landscape and, together with associated vegetation and settlement patterns, determine the essential landscape character of different areas.

### *Catchment Perspective*

#### Current Use

Of the several distinct landscape zones within the catchment the downlands in the south-west of the catchment, the military heathlands between Fleet and Aldershot and the Forest of Eversley (lying between the Whitewater and Blackwater valleys north of the M3) are significantly less dependent on water for their character than the landscape zones of the Basingstoke Canal, Whitewater valley and Blackwater valley.

The broad, shallow valley of the River Whitewater is in part open to extensive views but generally forms a more intimate, smaller scale landscape characterised by lanes, attractive villages, deciduous woodlands (often of ancient origin) and small but valuable historic parks such as Wellington County Park. Grassland and meadows in the wet valley bottom are a key part of this landscape. The NRA have undertaken tree planting in the river corridor to reinforce the landscape value of the valley.

Running west-to-east the Basingstoke canal forms a linear feature linking a number of sites including Odiham Common and Dogmersfield Park.

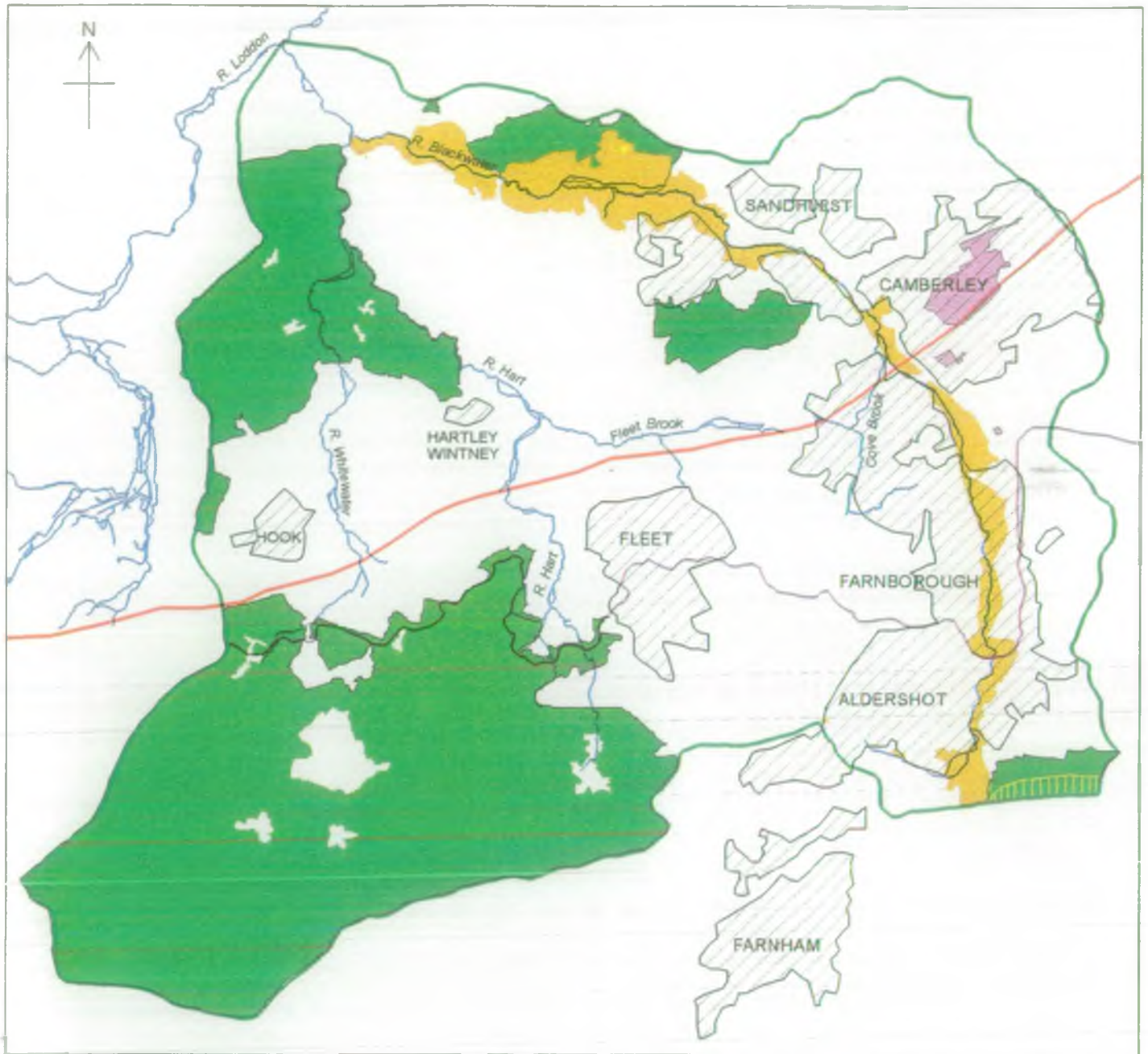
Prior to 1940 the Blackwater valley was primarily agricultural land. However, subsequent extensive development on either side of the floodplain has led to typical urban fringe problems and its use as a "backyard" by towns such as Aldershot. This is a poor quality landscape unlike much of the catchment which is protected by land use planning designations (e.g. Areas of Particular Landscape Importance).

#### Future Use

A detailed landscape study of the Blackwater valley was completed in 1976 by the relevant County Councils. This study identified the features to be preserved and the guiding principles to be followed in order to create an attractive setting for recreational activities. The strategy developed is still considered to be valid and has as a key objective extensive woodland planting. The Blackwater valley is designated by several local authorities as a landscape improvement area.

### *Objectives*

- \* *To safeguard the special landscape interest for which sites have been designated (e.g. Areas of Particular Landscape Importance). (All relevant waters)*
- \* *To conserve and enhance all river corridor and water related landscapes. (All waters)*



KEY

	Watercourses		Area of Landscape Importance / Great Landscape Value			
	Basingstoke Canal		Blackwater Valley Improvement Area / Lakes Area / Policy Area			
	Catchment Boundary					
	Urban Area		Area of Outstanding Natural Beauty			
	M3 Motorway		Area of Urban Landscape Quality			





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## 3.5 AMENITY AND RECREATION

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### *General*

Activities such as walking, bird watching, angling, boating, sailing, rowing and picnicking bring people into close proximity with the water. The principal concerns are general aesthetic acceptability of water features, access to and along watercourses and the provision of appropriate facilities.

### *Catchment Perspective*

#### Current Use

Boating, sailing, rowing, windsurfing and waterskiing activities are mostly carried out on the lakes and gravel pits in the catchment, notably in the Blackwater valley. Boating and canoeing are the main activities on the Basingstoke Canal. Canoeing, however, is also carried out on the Blackwater River and probably on the River Whitewater. People are known to swim and paddle in the River Whitewater at North Warnborough.

The Basingstoke Canal Anglers Association manages fishing on the canal which is well stocked with roach, bream, tench, pike and carp and the River Whitewater supports a number of trout fishing clubs. Angling is probably the most popular recreational activity in the Blackwater valley. In addition to the river several lakes support managed coarse (and in some cases game) fisheries for the purposes of angling.

Access by foot alongside the Blackwater River is reasonable and improving, to the Basingstoke Canal excellent, and to the River Whitewater limited. Fleet Pond and Wellington County Park are sites which attract a large number of visitors. Cove Brook and Marrow Brook act as green chains within a heavily built-up area (see Section 3.2).

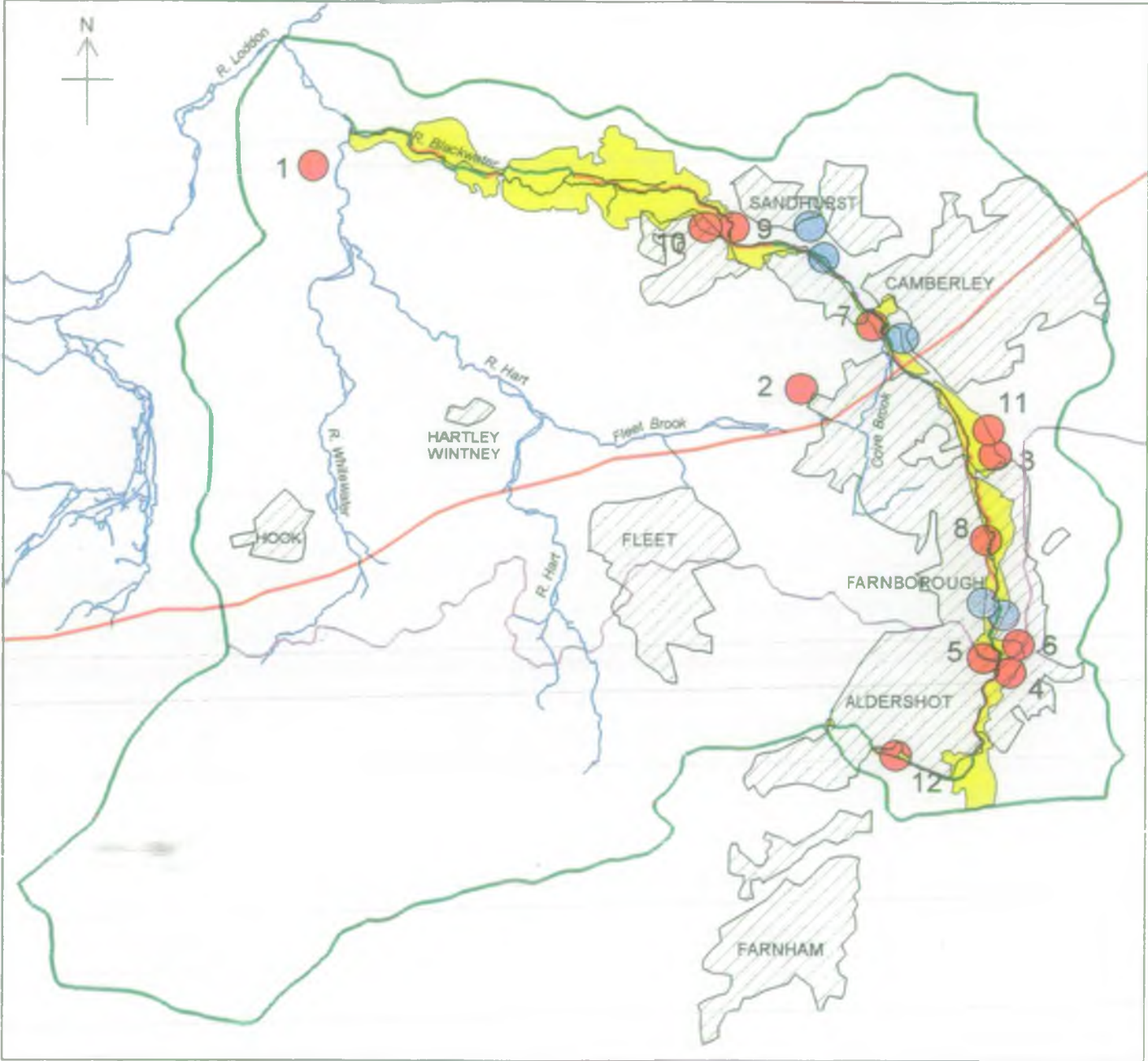
#### Future Use

The key aim of the Blackwater Valley Countryside and Recreation Management Service is "to realise the full potential of the Blackwater Valley as a recreational resource with an emphasis on countryside recreation, for the local communities". The land-use planning policies of all the relevant authorities fully support this objective and see the valley as providing the water-based recreational needs of a significant catchment area. Recreation is therefore planned to become the major use of the valley which is already of importance for water sports. Future uses are planned to include: a footpath along the full length of the river (thereby allowing linking of the Thames Valley and Loddon Valley footpaths to the Blackwater River); canoeing and rowing in the lower reaches; improved facilities and routes for horse riders and cyclists; and, greater facilities for picnicking. Due to the phasing of gravel workings no new lakes are likely to be created before the turn of the century once the Church Farm and Chandlers Farm sites have been worked out. There is a demand for more opportunities for casual fishing, especially on the Blackwater River itself, and for game fishing.

### *Objectives*

- \* *To maintain or improve water quality, river flow and channel characteristics in order to prevent public nuisance arising from visual and smell problems. (All waters)*
- \* *To protect and promote all suitable recreational uses. (All relevant waters)*

AMENITY AND RECREATION



KEY

	Watercourses		FORMAL RECREATION SITES		Blackwater Valley Area
	Basingstoke Canal	1 Wellington Country Park (S,R,W,C)	7 Blackwater Valley (A)		BV Footpath (Existing)
	Catchment Boundary	2 Hawley Lake (S,R,W,C,WS)	8 Mytchet Mere (A)		BV Footpath (Proposed)
	Urban Area	3 Coleford Bridge Lake (S,R,W,C,WS)	9 Tri - Lakes (A)	SCALE (approx) 0 ————— 5 km	
	M3 Motorway	4 Willow Park Lake (S,R,W,C,WS,A)	10 Yateley Lakes (A)		
		5 Spring Lakes (S,W,C,WS,A)	11 Frimley Lakes (A)		INFORMAL RECREATION SITES
		6 RMC Lakes (W,C,A)	12 Badshot Lea (A)		
		Key : S - Sailing C - Canoeing R - Rowing W - Windsurfing WS - Water - Skiing			



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## 3.6 NAVIGATION

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### *General*

This use relates to those waterways for which there is a statutory right of passage for boat traffic.

### *Catchment Perspective*

#### Current Use

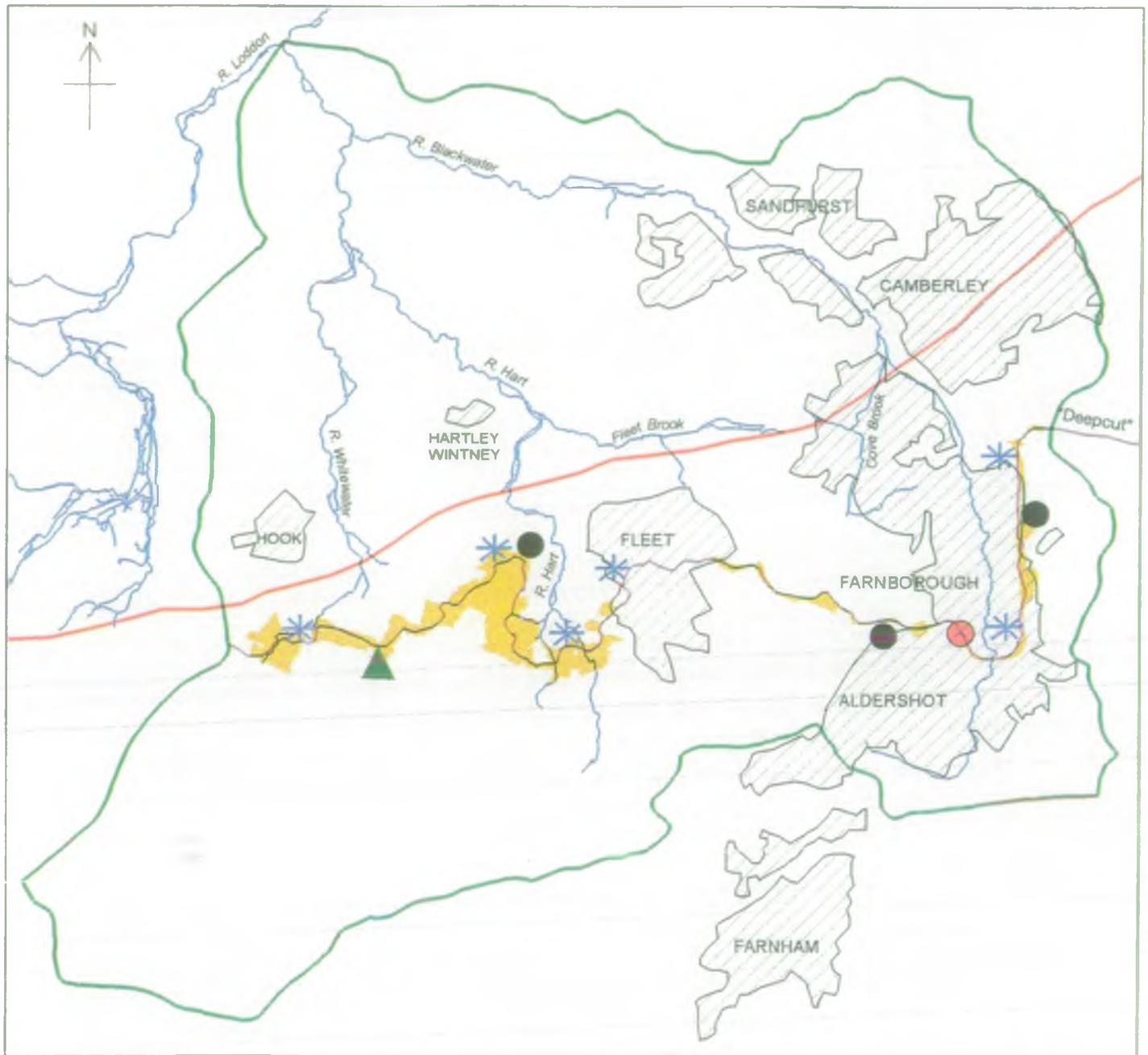
The Basingstoke Canal is the only watercourse in the catchment with a statutory right of navigation. It was opened in 1794 and was intended to form part of a wider network of canals that would link Southampton with London. This never happened and the canal only served to boost agricultural and forestry trade in central Hampshire. The canal, however, never prospered and eventually transferred to public ownership (Surrey and Hampshire County Councils) in 1975. Restoration work on the canal commenced formally in 1973 and it was re-opened only last year. The canal is navigable from Greywell Tunnel to Deepcut. However, a boom has been placed at the Whitewater Winding Hole as this is the last place before the tunnel that boats can turn. Navigational use is constrained by a lack of water in the upper reaches and the need to balance the requirements of navigation users with the ecological value of the waterway.

#### Future Use

There are no known plans to change the intensity of uses of the canal in the future. The Basingstoke Canal Authority (jointly funded by Surrey and Hampshire County Councils) is keen to encourage canoeing, predominantly in the pound west of Ash Lock, as this use is seen to be environmentally friendly and does not require the locks to be operated. Land use planning designations adopted by the relevant Authorities constrain the range of activities that are acceptable not only on the canal but also on adjoining land.

### *Objectives*

- \* *To maintain or improve water quality, water resources and physical characteristics in order to sustain suitable navigational use. (All relevant waters)*



KEY

	Watercourses		Basingstoke Canal Conservation / policy area				
	Basingstoke Canal		Ash Lock				
	Catchment Boundary		Slipway				
	Urban Area		Mooring				
	M3 Motorway		Boatyard				





## 3.7 WATER ABSTRACTION

### *General*

This use deals with surface and groundwater abstractions for potable (i.e. public water supplies) and non-potable (e.g. industrial, agricultural, recreational) supplies. Major potable abstractions are operated by Water Supply Companies. Since 1963 abstractions have been licensed to ensure they do not derogate either existing sources or the natural water environment, including surface water flows. Abstractions of less than 20m<sup>3</sup> per day for domestic use do not require a licence from the NRA.

### *Catchment Perspective*

#### Current Use

Abstractions from groundwater for potable supplies are made by the Mid-Southern Water Company, who supply the area, at: Greywell and Itchel (12.45 Ml/d) on the chalk outcrop; Boxalls Lane, Aldershot on the confined chalk and Upper Greensand; and, Tongham on the Upper Greensand. The latter two abstractions (19.28 Ml/d) are from strata which are not in continuity with the surface waters of the Blackwater River. The Itchel and Greywell abstractions though are on the chalk outcrop in the vicinity of springs that feed the River Hart and River Whitewater respectively. At Itchel the abstraction is considered by the NRA to have a significant impact on a modest spring source, but flow records on the River Whitewater dating from 1910 show that the Greywell abstraction does not have any significant effect on flows in the River Whitewater.

There are 32 non-potable licences (total of 9.93 Ml/d) in the catchment comprising 18 groundwater (6.05 Ml/d) and 14 surface water (3.88 Ml/d) abstractions. Of these abstractions: 13(0.09 Ml/d) are for general agricultural use; 7(2.57 Ml/d) are for spray irrigation; 6(4.34 Ml/d) are for industrial purposes; and, 6(2.93 Ml/d) are for recreational lake filling.

#### Future Use

It is unlikely that any further major abstractions will be licensed in the catchment for potable supply. It is probable though that additional minor abstractions that do not have a significant impact upon the water resources will be allowed.

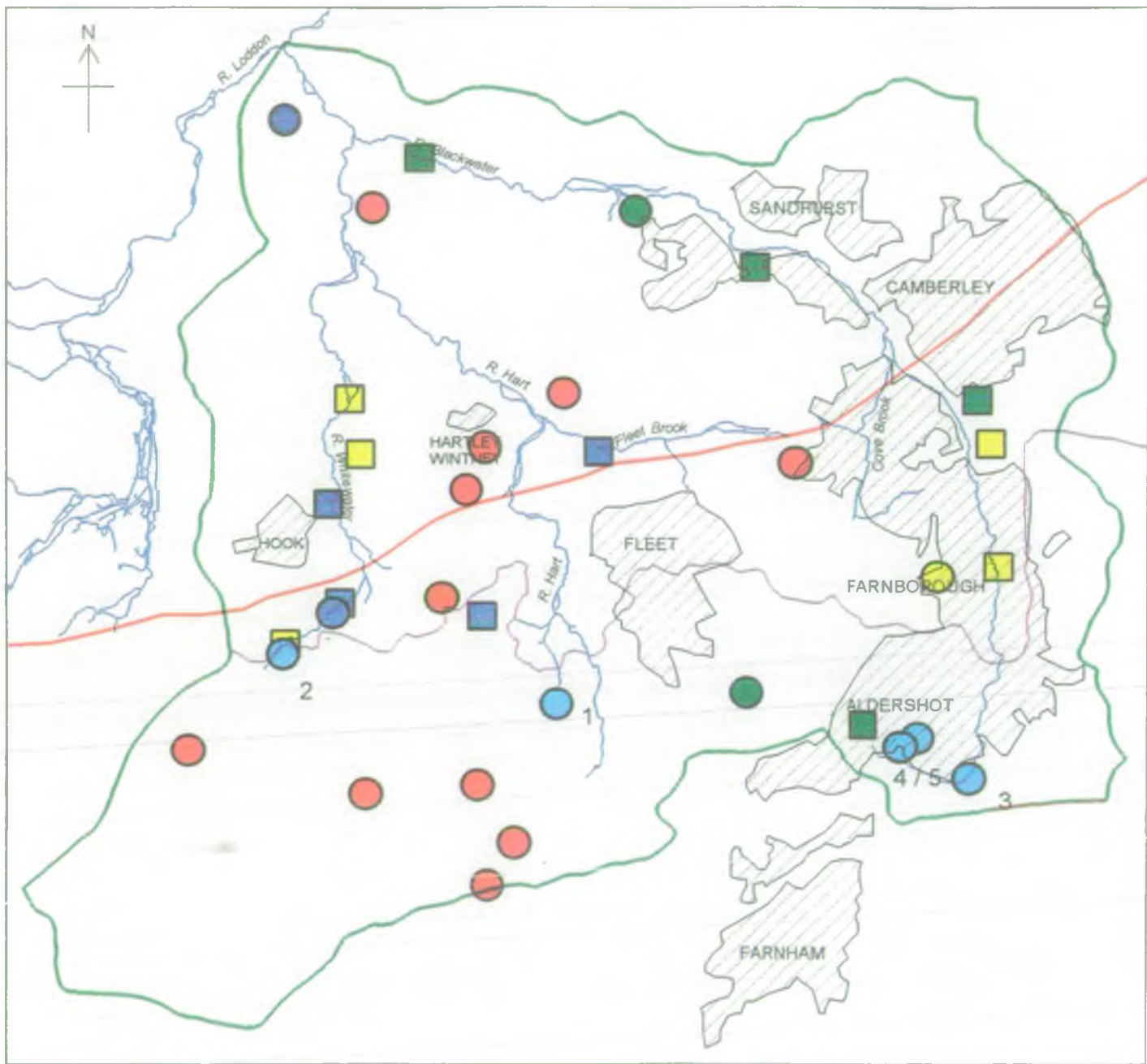
Gravel extraction is planned to continue in the Blackwater valley and hence there will be an on-going demand for gravel washing water. Agricultural demand may rise in the future but industrial demand is unlikely to rise significantly bearing in mind the land use planning policies being followed by the relevant Authorities. On-going water supply problems for the Basingstoke Canal may lead to extra demands on adjacent watercourses.

### *Objectives*

- \* *To safeguard potable, industrial and agricultural abstraction points with respect to water quality and quantity. Water quality should be maintained to meet appropriate standards with the aim to safeguard public health, avoid damage to crops and protect the well-being of supplied animals. (All relevant waters)*
- \* *To manage water resources in such a way that a balance is achieved between all abstractors and the natural environment in order that the best use of water resources is made. (All waters)*



# WATER ABSTRACTION



## KEY

	Watercourses	LICENSED WATER ABSTRACTIONS						
	Basingstoke Canal		WATER COMPANY		AGRICULTURAL			RECREATION
	Catchment Boundary	1. Itchel 2. Greywell			SPRAY IRRIGATION	SCALE (approx)  0 5 km		
	Urban Area	3. Tongham 4/5. Boxalls Lane			INDUSTRIAL			
	M3 Motorway	NB: SOURCE OF WATER ABSTRACTION INDICATED AS FOLLOWS CIRCLE (GROUNDWATER) SQUARE (SURFACE WATER)						

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## 3.8 EFFLUENT DISPOSAL

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### *General*

The majority of the consented discharges made to watercourses are from sewage treatment works. The raw sewage entering a treatment works usually consists of both household sewage and trade effluent from industrial premises. Control of each discharge is achieved by imposing consent conditions which limit the volume and quality of the effluent. The consents are calculated based upon the upstream water quality and flow in the receiving watercourse. The NRA has a statutory duty to monitor the discharges and assess them against the consent.

### *Catchment Perspective*

#### Current Use

Five large sewage treatment works discharge sewage effluent to the Blackwater River: Aldershot Town; Aldershot Military Town; Ash Vale; Camberley; and, Sandhurst. There are a further two smaller discharges at Eversley Cross and Eversley Lower Common. The tributaries of the Blackwater River mainly have only small works discharging to them. Fleet sewage treatment works discharges to the Fleet Brook, and the Hartley Wintney works (which also drain Hook) to the River Hart. The Pyestock Tributary, the Marrow Brook and the Cove Brook carry trade effluent, cooling water and sewage effluent from the National Gas Turbine Establishment and Royal Aerospace Establishment.

Sewage effluent constitutes the majority of the flow in the Blackwater River above the River Whitewater confluence (as much as 85% during summer months). Clearly the effluent quality is the main factor in determining the river water quality. The consent limits of the main sewage treatment works are as follows:

	<u>Consented Quality</u>	<u>Consented Volume</u>
	(Suspended solids/Bio-Chemical Oxygen Demand /Ammoniacal Nitrogen)	
Aldershot Town	20/12/3	9,900 m <sup>3</sup> /Day
Aldershot Military	15/10/8	16,400 m <sup>3</sup> /Day
Ash Vale	40/12/15	5,500 m <sup>3</sup> /Day
Camberley	20/10/5	29,600 m <sup>3</sup> /Day
Sandhurst	25/9/12	13,000 m <sup>3</sup> /Day
Fleet	60/35/20	7,900 m <sup>3</sup> /Day

#### Future Use

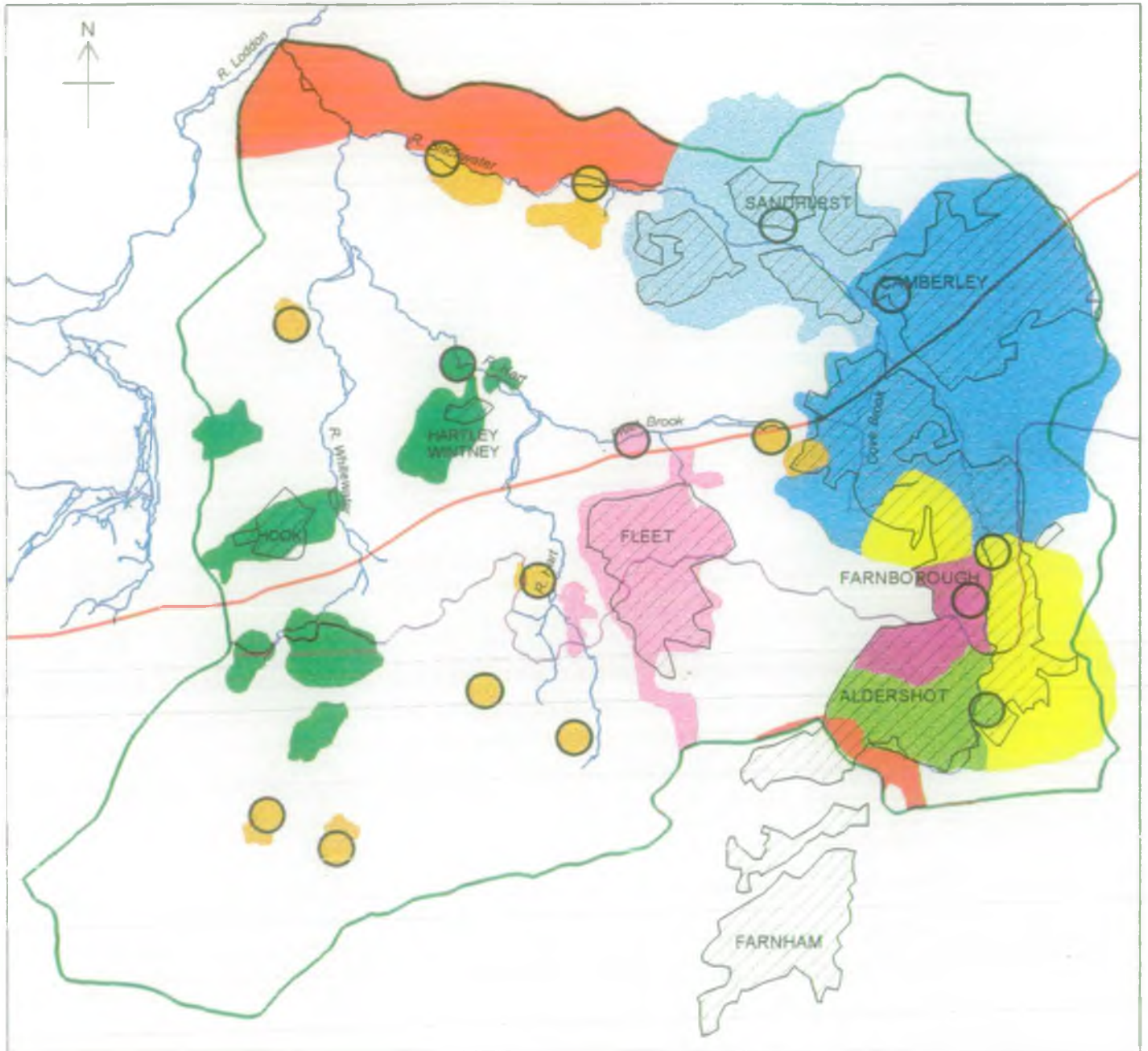
The population of the urbanised areas of the catchment is planned to grow by upto fifteen thousand over the next ten years and hence the volume of effluent discharged will continue to rise.

### *Objectives*

- \* *To control the discharge of effluent to the water environment in such a way that water quality objectives are met and other uses are not compromised. (All waters)*



# EFFLUENT DISPOSAL



## KEY

Watercourses		Sewered Areas and Sewage Treatment Work Locations					
	Basingstoke Canal		Sandhurst		Hartley Wintney		Exported from catchment
	Catchment Boundary		Camberley		Fleet		
	Urban Area		Ash Vale		Aldershot Military	SCALE (approx) 0 <span style="display: inline-block; width: 100px; border-bottom: 1px solid black;"></span> 5 km	
	M3 Motorway		Aldershot		Minor Works		



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## 3.9 AGRICULTURE AND FORESTRY

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### *General*

This use covers commercial forestry and all types of agriculture. These activities may affect the quality of surface and ground waters (e.g. leaching of pesticides and nitrate) or require flood defence/land drainage activities to be undertaken so as to ensure field drains can operate freely.

### *Catchment Perspective*

#### Current Use

The chalk downlands in the south-west of the catchment are of considerable value as an agricultural resource, hence their designation as an 'area of agricultural significance' by local authorities. The free draining soils are ideal for growing cereal crops and are classified as Class 2 on the MAFF Agricultural Land Classification Map (Class 1 land is the best agricultural land). In contrast, agricultural land in the Blackwater valley is primarily Class 4 and has severe limitations on its use since it is subject to flooding and waterlogging. Grazing is the predominant agricultural activity in this area.

In the Whitewater valley the land is primarily Class 3 with mixed farming and a predominance of livestock production. Farm holdings tend to be smaller here than on the downlands and the removal of hedgerows and other features has been less pronounced.

Commercial forestry (mainly coniferous species) is concentrated on the heaths and is generally under the control of the Forestry Commission whose land covers about 5% of the catchment area.

Fish farming is not a significant activity in the catchment.

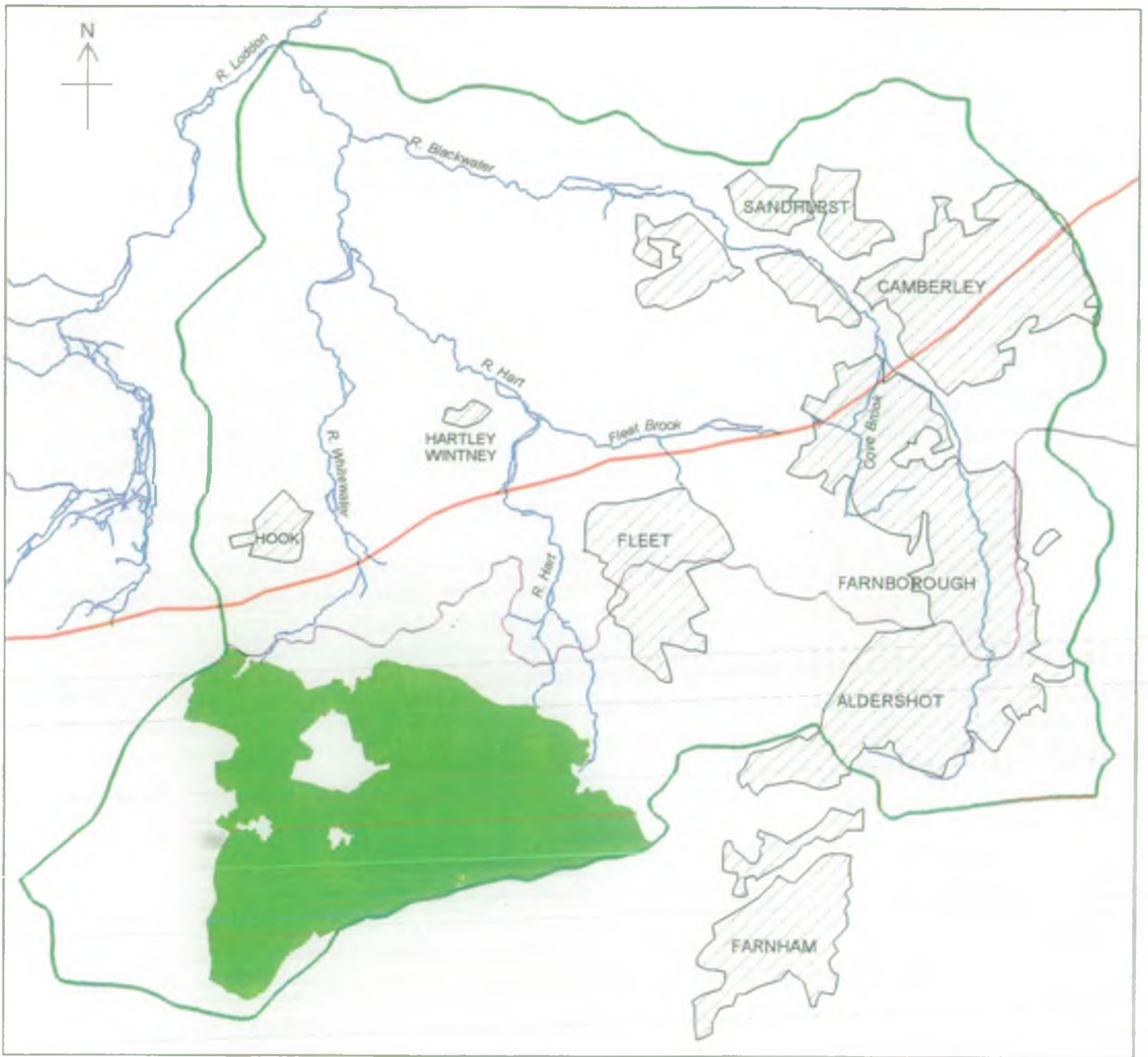
#### Future Use

Agricultural use of the Blackwater valley is likely to continue to recede as gravel workings and recreational development are promoted as the main use of the area.







### *Objectives*

- \* *Where water is abstracted for agricultural use the water quality should be maintained to meet appropriate standards with the aim of safeguarding public health, avoiding damage to crops and protecting the well-being of supplied animals. (All relevant waters)*
- \* *To ensure that the 'main river' watercourses are adequately maintained to ensure the free drainage of agricultural drains. (All relevant waters).*

# AGRICULTURE AND FORESTRY



## KEY

	Watercourses		Area of Agricultural Significance				
	Basingstoke Canal						
	Catchment Boundary						
	Urban Area						
	M3 Motorway						

SCALE (approx)  
0 5 km



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### 3.10 BUILT ENVIRONMENT

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#### *General*

This use covers residential, commercial and industrial developments. Land use planning matters are the responsibility of County and District Authorities. However, the NRA is a statutory consultee in the planning process and can play a key role in influencing such matters.

#### *Catchment Perspective*

##### Current Use

Development in the catchment is concentrated on the Blackwater valley which has played a significant role in accommodating regional (i.e. the south-east of England) growth since the late 1950's. The high rate of growth has brought prosperity to the area but also many problems, including pressure on the natural water environment.

##### Future Use

The Structure Plans for Berkshire, Surrey and Hampshire all indicate that the rate of development of land for residential and employment purposes will be reduced to take account of environmental constraints and the need to catch up on the provision of infrastructure. Growth, however, will still take place.

In housing terms the next 10 years are likely to see: limited development in the Bracknell Forest and Wokingham local authority areas (less than 1000 units, the majority being at Crowthorne); about 5500 houses being built in the Hampshire part of the catchment including 1550 at Railroad Heath to the north of Fleet and 700 at Church Crookham to the south-west of Fleet; and, limited construction in the Guildford, Waverley and Surrey Heath local authority areas falling within the catchment.

Commercial and industrial development is also likely to be severely constrained in the next 10 years, especially in the Berkshire and Surrey parts of the catchment where targets for the provision of employment land by the year 2001 have already been met. Employment land is to be developed at Hook, Fleet and Farnborough, which is likely to be the focus for commercial development in the catchment over the next 10 years.

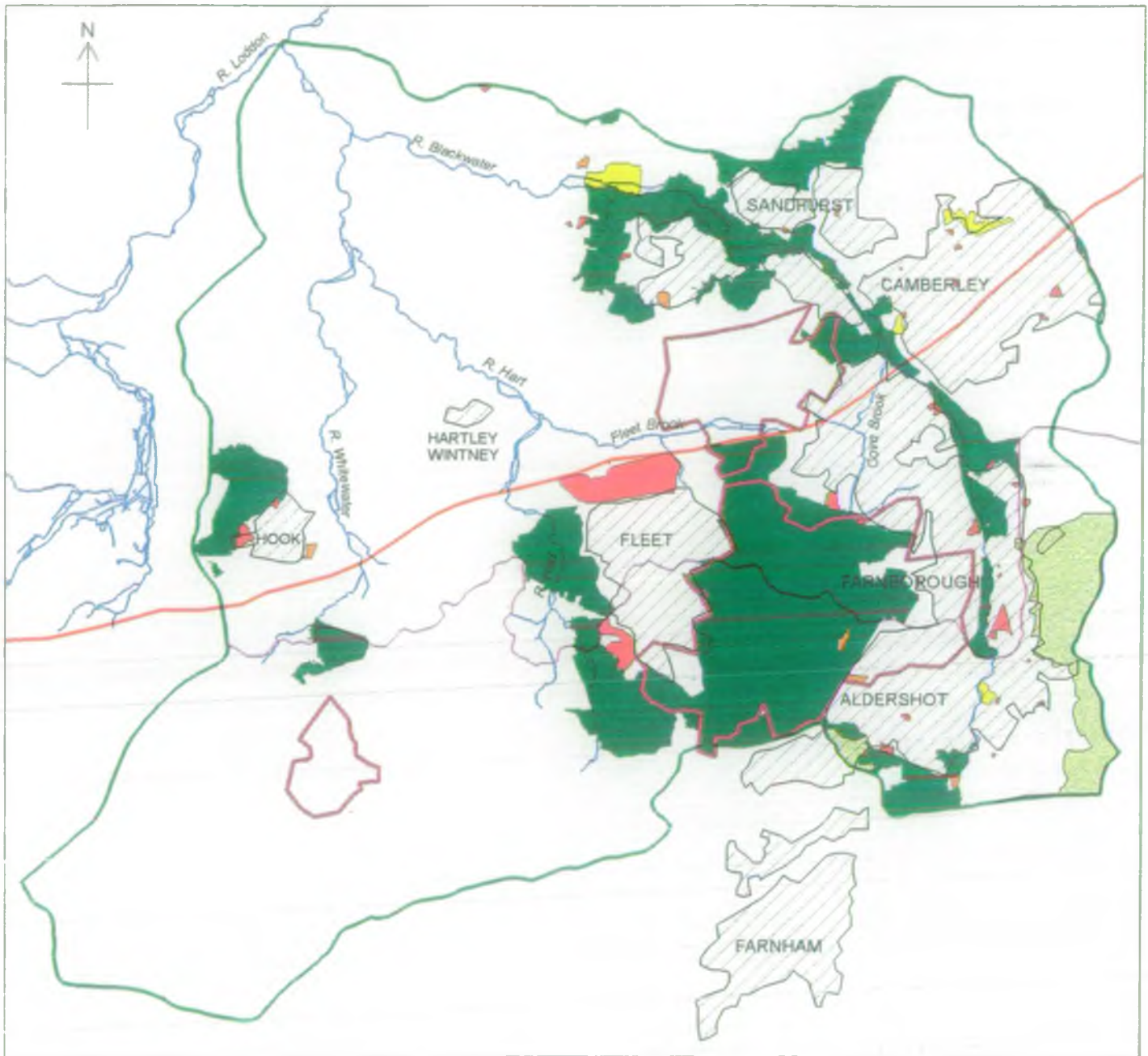
Future speculative built development in the catchment will be strongly constrained by land use policies such as those designed to prevent the coalescence of towns (e.g. Green Belt, Strategic Gaps, Important Gaps), the land ownership pattern of the catchment (e.g. Forestry Commission and Crown Land) and the area's high landscape and ecological value.

#### *Objectives*

- \* *To influence and control future built development in such a way that other uses are not compromised. (All waters)*
- \* *To seek enhancements to the water environment through built development. (All waters)*



# BUILT DEVELOPMENT



## KEY

	Watercourses		Development Proposals		Development Constraints		
	Basingstoke Canal		Residential		Strategic Gap		
	Catchment Boundary		Industrial / Commercial		Ministry of Defence Land		
	Urban Area		Recreation		Green Belt	SCALE (approx) 0 <span style="margin-left: 100px;">5 km</span>	
	M3 Motorway						

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### 3.11 MINERAL EXTRACTION AND SOLID WASTE DISPOSAL

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#### *General*

Mineral extraction has the potential to affect upon the catchment through subsidence or effluent discharge whilst works are active and when they are closed their possible use as solid waste disposal sites could lead to contamination of ground and surface water. The County Councils are the licensing authority with respect to extraction of natural resources and must through their Minerals Plan achieve adequate mineral supplies with minimal environmental cost.

#### *Catchment Perspective*

##### Current Use

The river gravels of the Blackwater valley are continuing to be extensively worked in the vicinity of Yateley and Eversley Cross. Although the yields are half those expected in the Thames valley, the area has been continuously and extensively exploited over the last 40 years.

The majority of existing non-inert waste disposal (or landfill) sites close to watercourses are former extraction sites along the Blackwater valley in the Aldershot - Farnborough- Camberley area.

Contaminated waste disposal sites in the catchment include both active and disused gasworks and sewage treatment works. Again these are in the Aldershot - Farnborough - Camberley area.

##### Future Use

The Berkshire Minerals Plan identifies Finchampstead (to be worked in 5-10 years time) in the northern part of the Blackwater Catchment as a potential gravel extraction site. The Hampshire Minerals Plan identifies five sites alongside the Basingstoke Canal for disposal of canal silt and Bosta Farm, Eversley for sand and gravel extraction. No sites within the catchment are identified in the Surrey Minerals Plan.

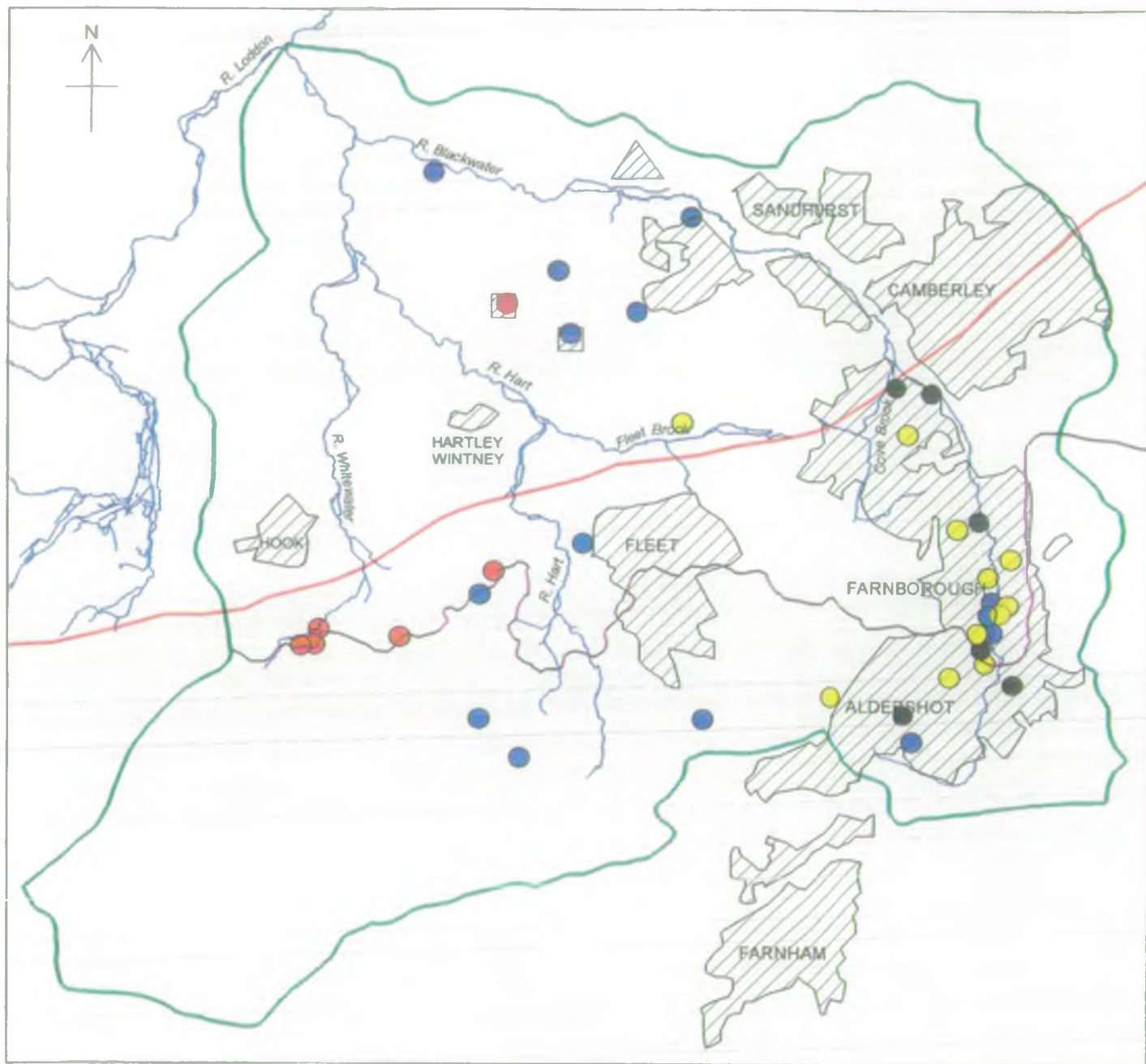
Gravel extraction in the Blackwater valley is likely to continue for many years to come.

#### *Objectives*

- \* *To control and influence mineral extraction and solid waste disposal in such a way that other uses are not compromised. (All waters)*



# MINERAL EXTRACTION AND SOLID WASTE DISPOSAL



## KEY

	Watercourses		Mineral Extraction		Solid Waste Disposal		
	Basingstoke Canal		In Progress		Inert		
	Catchment Boundary		Proposed		Domestic		
	Urban Area				Trade / Unknown	SCALE (approx) 0 <span style="display: inline-block; width: 100px; border-bottom: 1px solid black;"></span> 5 km	
	M3 Motorway				Proposed		



### **General**

This use deals with roads, railways, airports, ports, harbours, power supply, water supply, sewage disposal facilities etc. The provision of these elements may lead to significant impacts on the natural water environment.

### **Catchment Perspective**

#### Current Use

The prosperity of the area has depended very much on the availability of good transport links (e.g. the M3 motorway completed in 1972 and the rail link to Waterloo). Many elements of infrastructure in the catchment, however, have not been upgraded to meet the demands placed on them.

Blackbushe airport supports only business and recreational traffic. The airfields at Odiham and Farnborough are used for military and research purposes.

#### Future Use

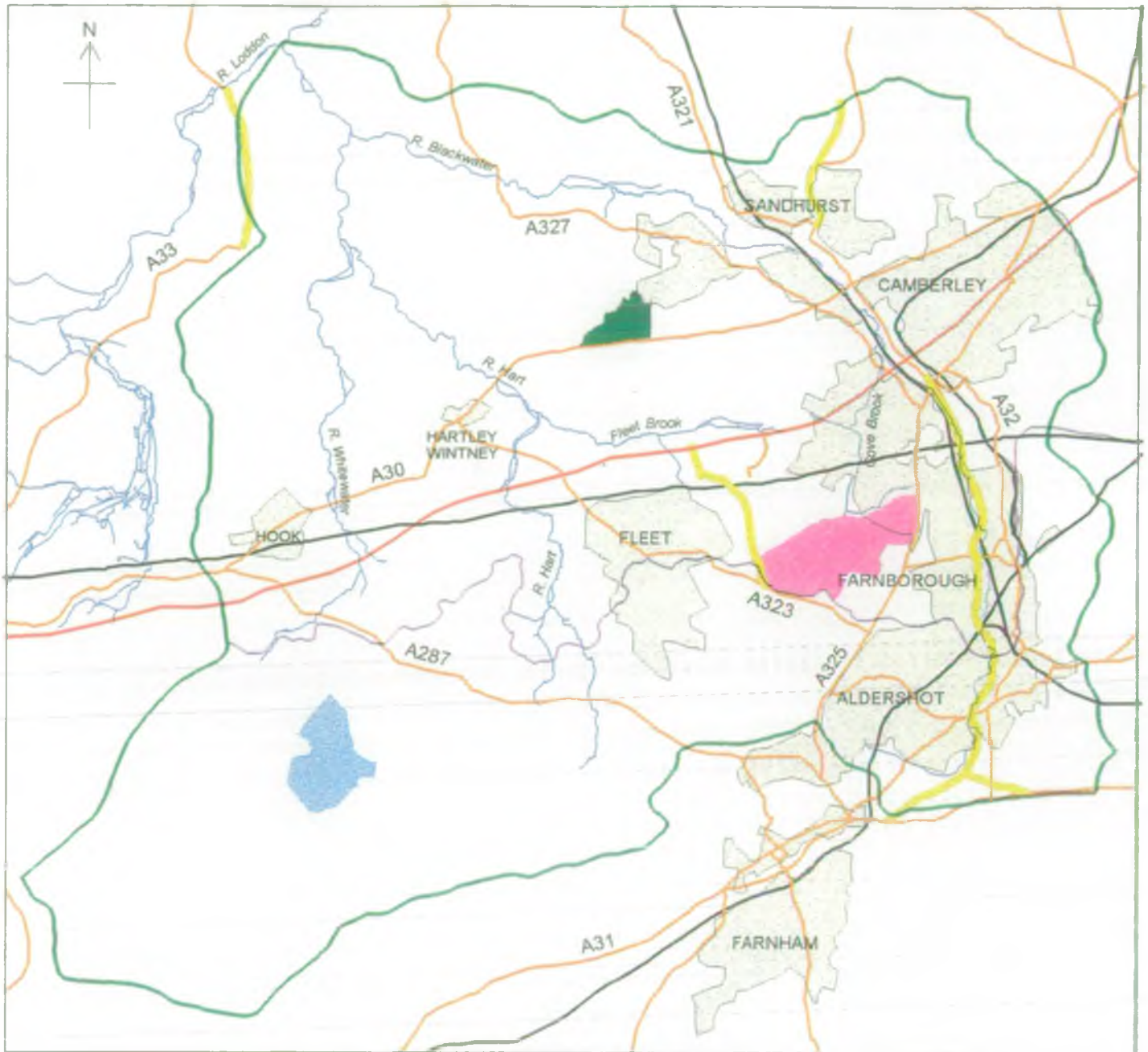
Significant road building programmes are in progress or planned to be completed in the next 10 years by the Department of Transport and the County Councils. These include: construction of a new junction on the M3 at Minley; a by-pass of Eversley on the A327; an eastern by-pass for Fleet; an eastern by-pass for Sandhurst; and, improvements to the A33. Of most significance, however, is the Blackwater Valley Road which will provide an improved north-south link between the A31 and M3. The central section of this route, which is in very close proximity to the Blackwater River for much of its length, is already complete.

Improvements to the Aldershot and Camberley sewage treatment works have recently been finished. Work is planned at the Fleet works which will have to cope with increased effluent volumes from the Railroad Heath and Church Crookham housing developments.

### **Objectives**

- \* *To ensure that infrastructure required to protect and enhance the water environment is provided in advance of its need. (All waters)*
- \* *To influence and control infrastructure provision in such a way that other uses are not compromised. (All waters)*

# INFRASTRUCTURE AND COMMUNICATIONS



## KEY

	Watercourses		'A' Roads		Blackbushe Airport		
	Basingstoke Canal		Railway		Odiham Airfield		
	Catchment Boundary		Major Road Proposals/ Road Improvements		Royal Aircraft Establishment Farnborough		
	Urban Area					SCALE (approx) 0 5 km	
	M3 Motorway						



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### 3.13      ARCHAEOLOGY AND HERITAGE

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#### *General*

This use deals with features of archaeological significance, areas which have been designated as conservation areas because of their urban form, and sites which are of heritage value because of their nature conservation, scientific, scenic, historic or archaeological importance. Many of these sites have a strong relationship with water features.

#### *Catchment Perspective*

##### Current Use

Gravel workings in the Blackwater valley have led to the discovery of many archaeological artefacts, notably from the Bronze Age in the area north of Yateley. The previous marshy nature of the valley forced communication links onto the valley sides: the Mault Way was an ancient track located on the east of the valley whilst the Roman 'Devil's Road', which ran from Staines to Silchester, passed to the north of the river. Following the withdrawal of the Romans, activity in the catchment appears to have been limited. There was a monastery at Frimley, and at Blackwater, the location of a ford, there was a noted livestock fair.

The influence of the military on the catchment is significant. Towards the end of the 18th century a large training camp was established on Bagshot Heath. This was followed in 1812 by the Royal Military College at Sandhurst and the Staff College at Camberley in 1862. A number of major estates were broken up at about this time and this allowed residential development to proceed as the area also had good rail links to London.

Many of the villages in the west of the catchment have conservation area status, notable amongst which is Odiham. The entire length of the Basingstoke Canal has also been given conservation area status by the local authorities. The area north of the M3 between the Whitewater and Blackwater Rivers has been designated as a Countryside Heritage Area. This reflects the area's status as one of the best preserved medieval forests in southern England. Countryside Conservation Areas complement the Countryside Heritage Areas. These designations are also made by Local Authorities.

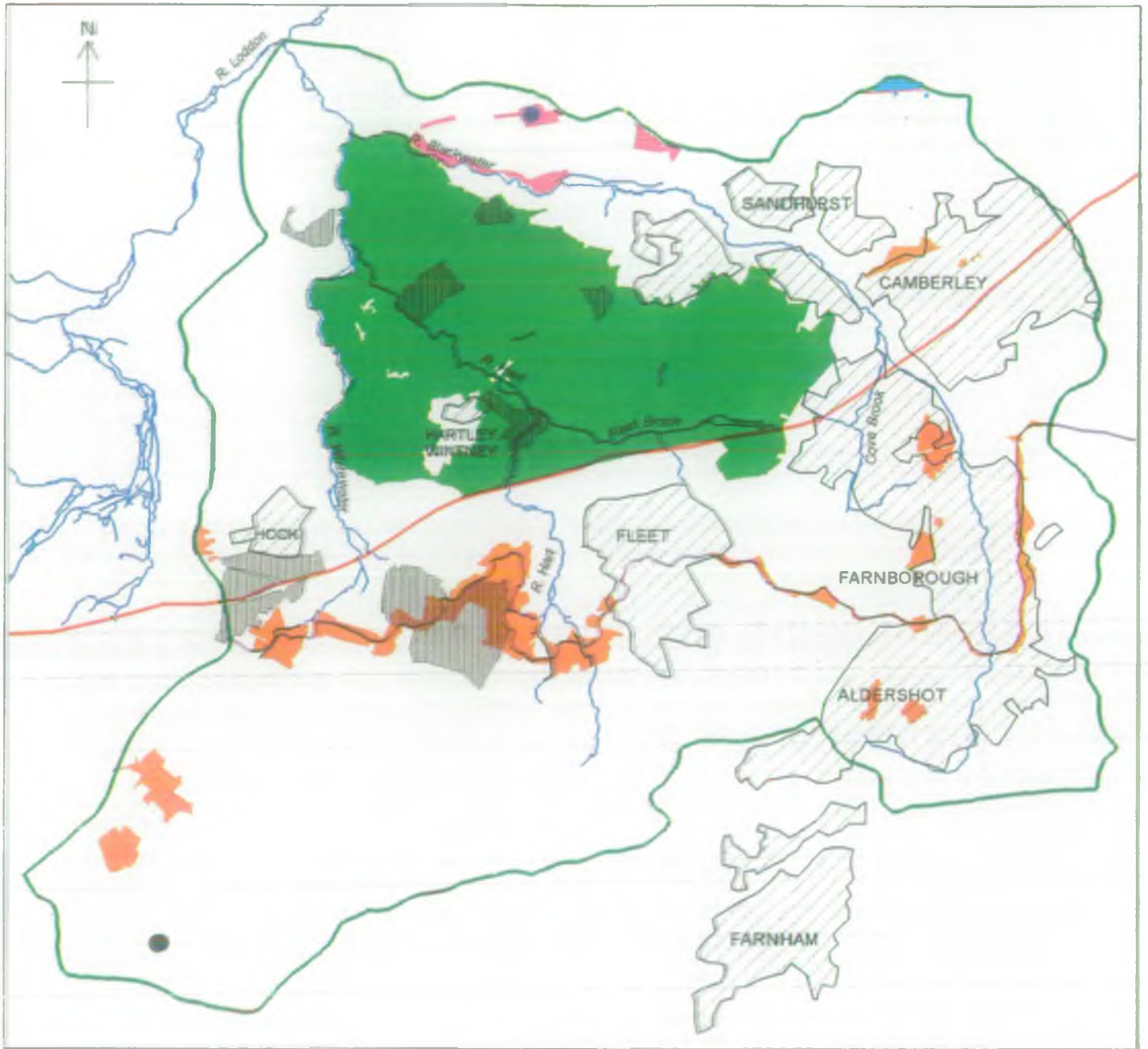
##### Future Use

Gravel workings and major infrastructure development will undoubtedly lead to the identification of more areas of interest. Hart, and Basingstoke and Deane District Councils are considering the merits of designating the Whitewater Valley as a Countryside Heritage Area.

#### *Objectives*

- \*      *To safeguard the special archaeological and heritage interest for which sites have been designated (e.g. 'Conservation Areas', 'Countryside Heritage Areas'). (All relevant waters)*





KEY

	Watercourses		Urban Conservation Area		Scheduled Ancient Monument		
	Basingstoke Canal		Forest of Eversley		Archaeological Sites of Importance		
	Catchment Boundary		Countryside Conservation Area				
	Urban Area		Countryside Heritage Site			SCALE (approx) 0 ————— 5 km	
	M3 Motorway						

### *General*

This use deals with the protection of people and property from flooding from natural watercourses. Certain watercourses are designated as 'main river'. On main rivers the NRA have permissive powers to: construct new defences; maintain defences; and, control the actions of others through the issuing of 'Land Drainage Consents'. By controlling and influencing the actions of others the risk to existing and future uses (eg. development) can be minimised. The NRA TR are the primary group involved in flood defence matters but on ordinary rivers Local Authorities are the first point of contact. For flooding from sewers the responsible group is either the Local Authority or Thames Water Utilities plc.

The standard of flood protection can be measured in terms of the frequency at which (e.g. 1 in 50 years), on average, it will prove ineffective. The standards considered appropriate vary according to the land use to be protected and the economics of providing the service. Flood defence work is closely associated with the physical form of the river and the adjacent areas. There is therefore the potential for conflict with uses which depend on the structure of the river e.g. fisheries and ecology.

### *Catchment Perspective*

#### Current Use

The map opposite highlights areas known to have flooded and the standards of flood protection the NRA aim to provide on particular reaches of river. Where the land use is primarily agricultural the standards are lower than those for urban areas.

On the River Whitewater and River Hart there are few urban areas at risk from flooding. However, in February 1990 16 properties in Crondall were flooded (previous flooding had occurred in 1968 and 1940). Works to alleviate the risk of flooding are currently being undertaken by the NRA. Following the 1968 floods significant lengths of the River Hart were widened and deepened to reduce the risk of agricultural land being flooded. Current activity to protect agricultural land from flooding and to maintain the effectiveness of drainage systems involves weed cutting during the summer. This activity is also undertaken on the Blackwater River.

The Blackwater valley is heavily developed and upto 50 properties are considered to be at risk of flooding at Blackwater, Farnborough and Aldershot. A flood storage lagoon on the Cove Brook balances surface water runoff generated by urban development in the area so that flood risks are not increased downstream. When floods are expected the NRA inspect a number of sites on the Blackwater River to ensure that constrictions in the channel (eg. bridges and culverts) are kept free of debris. Flood warnings are issued by the NRA to local Police.

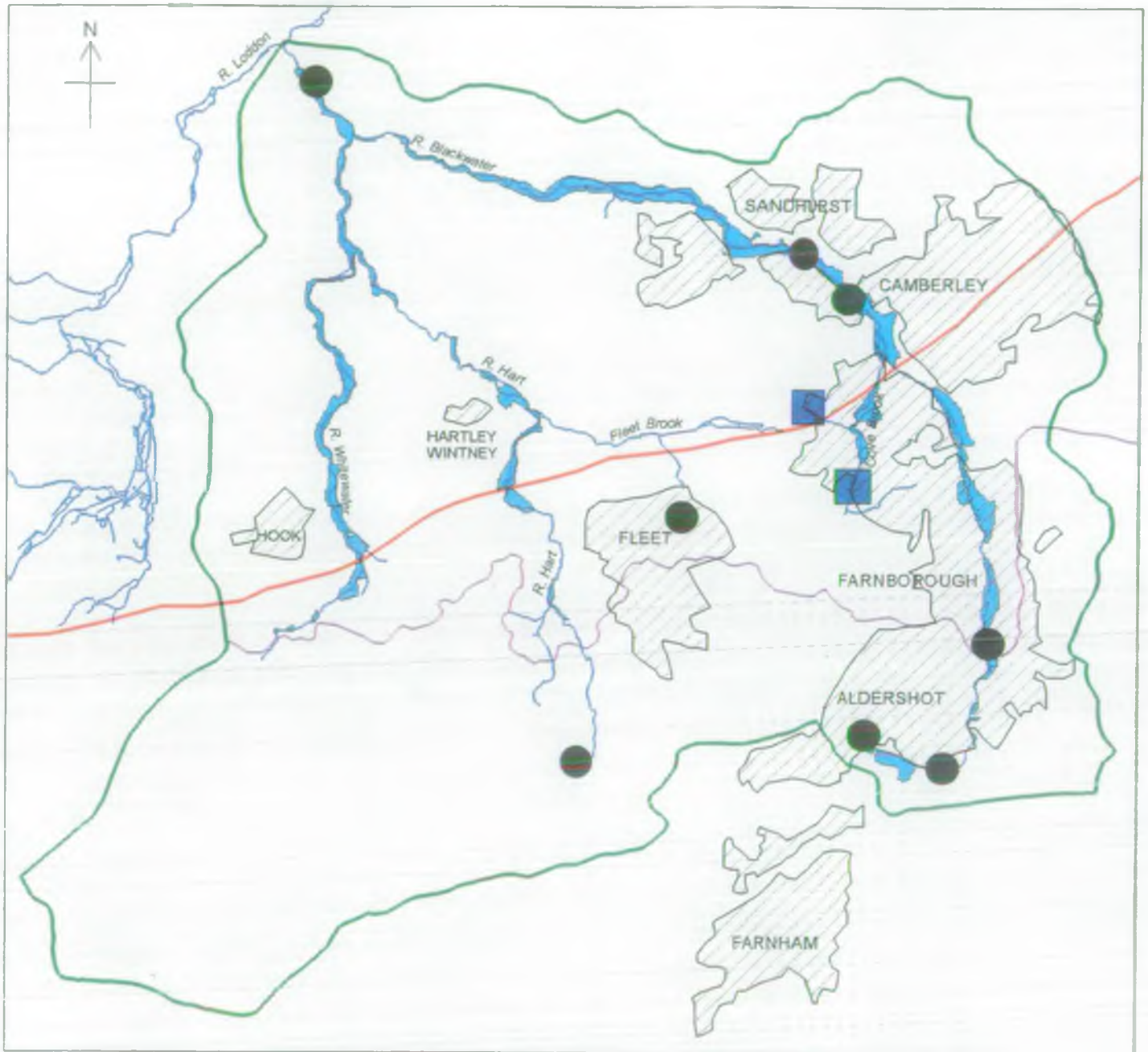
#### Future Use

The NRA are currently undertaking detailed technical investigations in order to define better the flood risk to people and property on the Blackwater River. These studies are due to be completed in 1992 and may show the need for flood defence works to be constructed in subsequent years.









#### Objectives

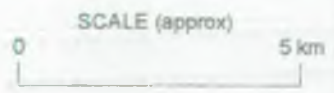
- \* *To provide effective defence for people and property against flooding from main rivers. (All relevant waters)*
- \* *To provide adequate arrangements for flood forecasting and warning. (All relevant waters)*



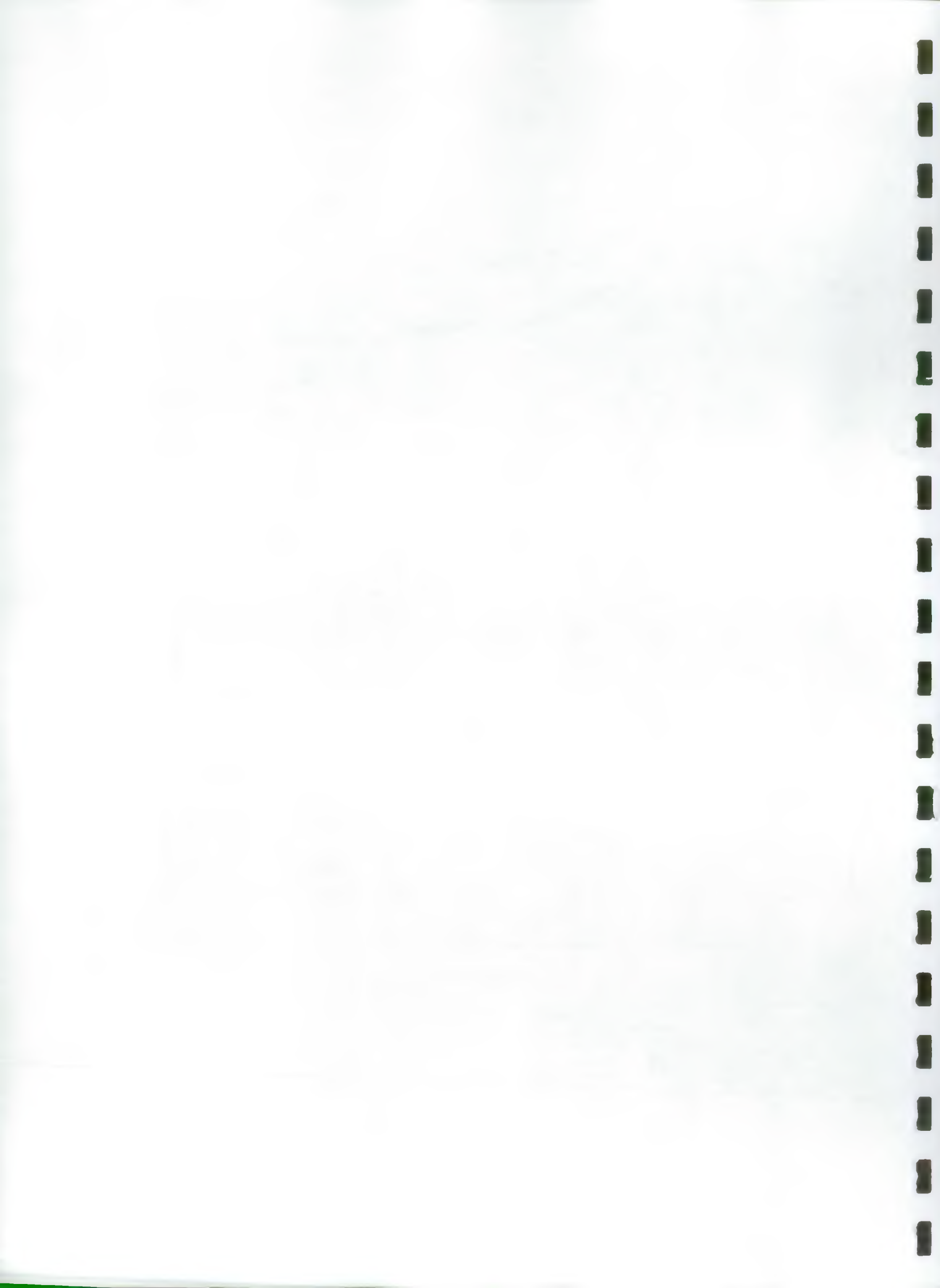


KEY

	Watercourses		Areas known to have Flooded				
	Basingstoke Canal		Urban areas at Flood Risk (including major roads)				
	Catchment Boundary		Flood Storage Ponds				
	Urban Area						
	M3 Motorway						







*Section 4*

**CATCHMENT STATUS**





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## 4.1 INTRODUCTION

---

The purpose of this section is to compare the current status of the catchment (where it is known) with overall standards/targets in respect of water quality, water resources and flood defence.

Comparison of the 'current status' with the 'overall target' enables issues - which may be problems due to failures to meet targets, or conflicts due to differing uses having opposing requirements - to be identified. The issues are presented in detail in Section 5.

## 4.2 WATER QUALITY

We currently use a system of 'River Quality Objectives' (RQOs) for the classification and assessment of watercourses (including canals). This system is derived from a 1978 National Water Council policy document and was established in 1979 using local knowledge of the uses of the watercourse and contemporary water quality data. Chemical quality standards were drawn up for these objectives so that the degree of compliance could be objectively assessed. All the classified watercourses (see Section 2.6) were given a current objective, and those where improvement was desirable, but not immediately practical, were also given future objectives.

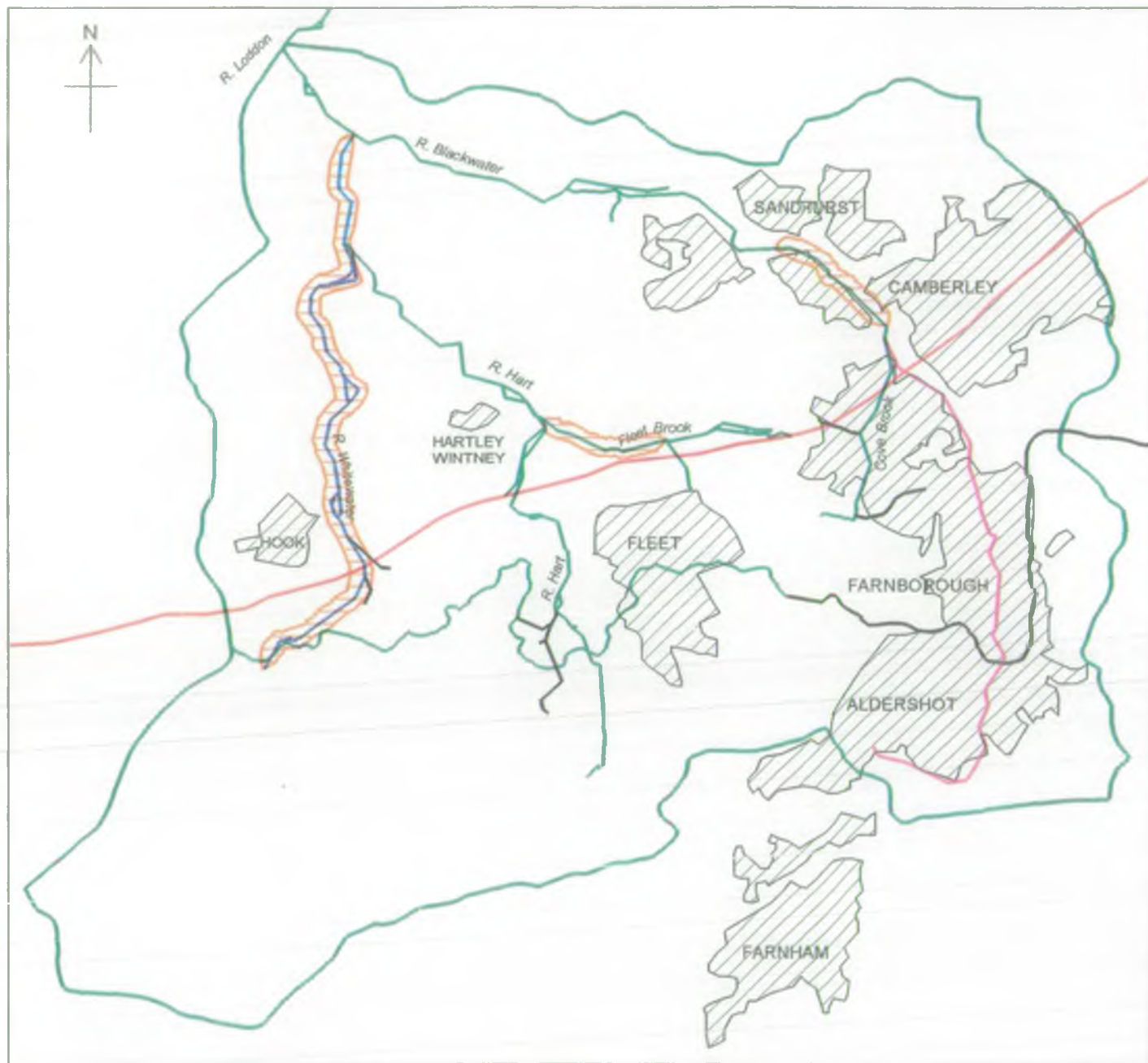
A new quality classification system, known as 'Statutory Water Quality Objectives' (SWQOs), will be introduced shortly. Although similar to the existing system it will be more clearly related to the current and future uses of the watercourse. In addition, groundwater and water bodies (e.g. lakes) will also be covered by the scheme. The information on catchment uses in Section 3 will assist in the setting of the new SWQOs.

Using the present RQOs system the following table and accompanying maps compare the current status of classified rivers (see Section 2.6) with the overall objectives (current and future situation).

RIVER	REACH	LENGTH (km)	OBJECTIVE		CURRENT STATUS
			CURRENT	FUTURE	
BLACKWATER	ALDERSHOT TO ALDERSHOT STW	4.460	3	2B	2
	ALDERSHOT STW TO ALD. MLTRY STW	3.180	3	1B	3
	ALD. MLTRY STW TO ASH VALE STW	1.720	3	1B	3
	ASH VALE STW TO F'BOROUGH STW	0.780	3	1B	2
	FARNBOROUGH STW TO COVE BROOK	6.060	3	1B	3
	COVE BROOK TO CAMBERLEY STW	0.840	2B	1B	3
	CAMBERLEY STW TO SANDHURST STW	3.320	2B	1B	3
	SANDHURST STW TO EVERSLEY	8.220	2B	1B	2
	EVERSLEY TO WHITEWATER	4.250	2A	1B	2
	WHITEWATER TO LODDON	2.850	2A	1B	2
WHITEWATER	SOURCE TO HART	15.570	1A	1A	1B
	HART TO BLACKWATER	3.460	1B	1B	2
HART	CRONDALL TO ELVETHAM PK BDG	9.730	2B	2B	1B
	ELVETHAM PK BDG TO FLEET BROOK	4.310	2A	1B	2(4)
	FLEET BROOK TO HART.WINTNEY STW	2.440	2A	2A	2
	HART.WINTNEY STW TO WHITEWATER	5.090	2A	1B	2
COVE BROOK	SOURCE TO HAWLEY LAKE STR	3.780	2B	2B	2
	HAWLEY LAKE STR TO BLACKWATER	2.700	2B	2B	1B
PYESTOCK TRIBUTARY	SOURCE TO COVE BROOK	1.630	2B	2B	2
FLEET BROOK	CHURCH CROOKHAM TO FLEET STW	5.760	2B	2B	1B
	FLEET STW TO HART	2.700	2B	2B	3
MINLEY BRK	SOURCE TO FLEET BROOK	3.610	2B	2B	2
BASINGSTOKE CANAL	GREYWELL TO EELMOOR BRIDGE	19.895	2A	1B	1B

- Notes:
- (1) Thames Region have uniquely split Class 2 into 2A and 2B. The national system uses only Class 2. 'Current Status' results reflect the national system and are for the year 1990.
  - (2) The River Quality Objective (RQO) classes are as follows:  
 Class 1A/1B - High quality waters  
 Class 2A/2B - Fair quality waters  
 Class 3 - Poor quality waters  
 Class 4 - Bad quality waters.
  - (3) The objectives and standards associated with these classes are defined in Appendix 1.
  - (4) Current status for this reach based on 1988/89 data.

# WATER QUALITY (CURRENT OBJECTIVES)



## KEY

	Watercourses	CURRENT RIVER QUALITY OBJECTIVES				
	Basingstoke Canal		CLASS 1A (HIGH)		RIVERS OUTSIDE RQO SURVEY	
	Catchment Boundary		CLASS 1B (HIGH)		CURRENT STATUS OF RIVER FALLS BELOW RQO OBJECTIVE	
	Urban Area		CLASS 2 (FAIR)			SCALE (approx) 0 ————— 5 km
	M3 Motorway		CLASS 3 (POOR)			



## 4.2 WATER QUALITY (ctd)

These results are based on a chemical assessment of quality. However, the status of the watercourses in the catchment is also regularly measured using benthic macroinvertebrates. These are the small animals which inhabit the bottom sediments of the rivers. They include insect larvae such as mayflies and caddis flies, together with snails, shrimps, worms and many others. These organisms give a lot of information about the water quality and habitat quality in the river. They are unable to move far and respond to water conditions throughout the year; including pollutants which occur infrequently or at very low levels and which may easily be missed by normal chemical sampling. The benthic macroinvertebrates present in a watercourse are related to water quality using the BMWP (Biological Monitoring Working Party) Score System which is accepted as a simple means of assessing water quality.

The table below shows the results of biological monitoring in the Blackwater River Catchment during 1991. The River Whitewater was of highest biological quality with the best scores and highest number of taxa (different families or species). Many pollution sensitive taxa were present including mayflies and caddis flies. Good scores were achieved in the River Hart and in the Blackwater River near Swallowfield. The rest of the Blackwater River and the other more minor watercourses surveyed had communities made up of only pollution tolerant taxa. Consequently BMWP Scores were low and taxa diversity poor.

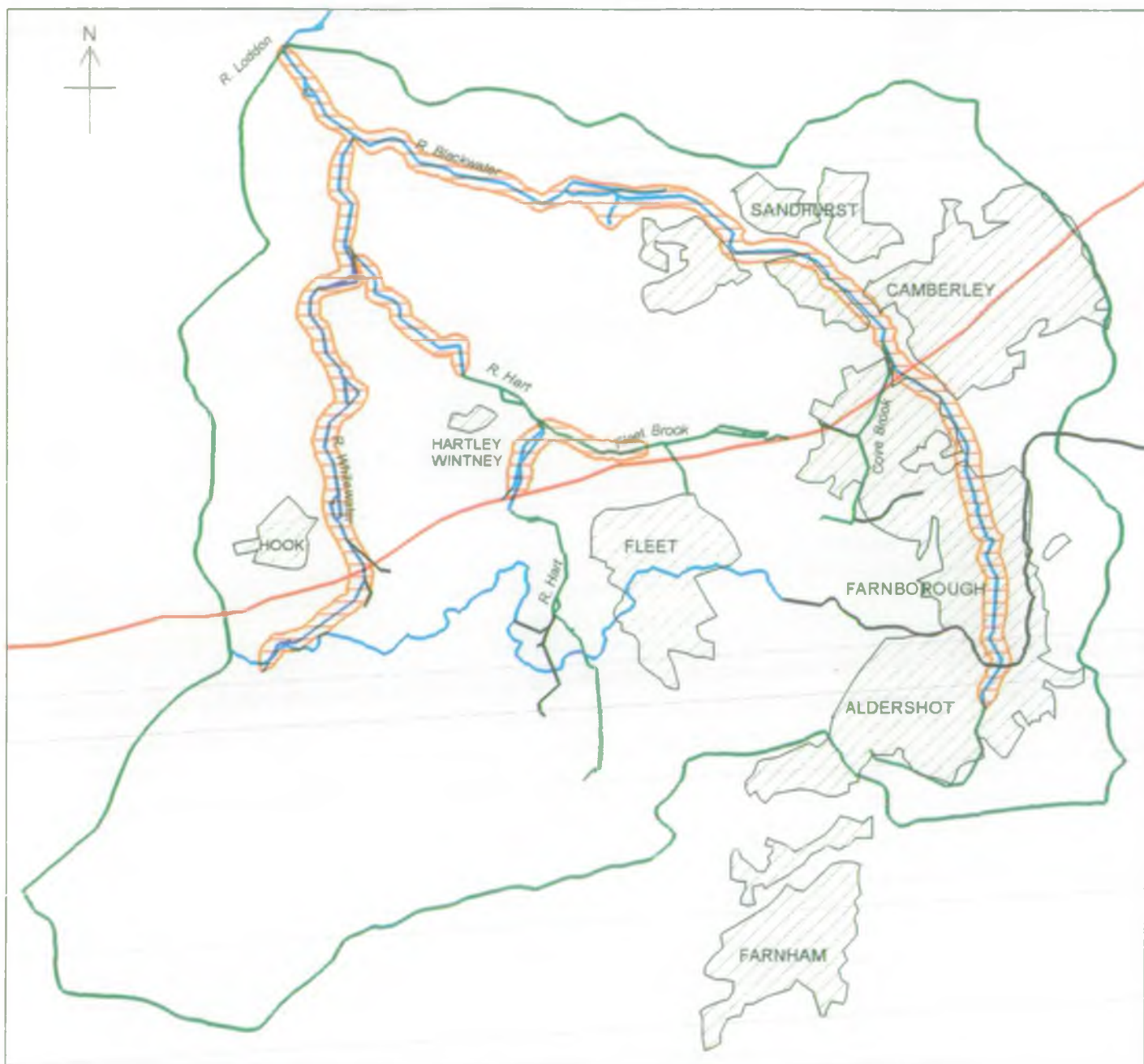
<u>RIVER</u>	<u>SITE</u>	<u>BMWP SCORE</u>	<u>NO. OF TAXA</u>
BLACKWATER	ABOVE ALDERSHOT TOWN STW	41	12
	ABOVE ALDERSHOT MILITARY STW	53	15
	FRIMLEY BRIDGES	84	21
	ABOVE SANDHURST STW	80	20
	BELOW SANDHURST STW	89	20
	SWALLOWFIELD	136	27
COVE BROOK	B3014 FARNBOROUGH	40	11
	ABOVE BLACKWATER	83	19
MARROW BROOK	FARM ROAD, FARNBOROUGH	38	11
PYESTOCK TRIBUTARY	IVELEY ROAD, FARNBOROUGH	40	11
HART	ELVETHAM PARK BRIDGE	99	22
	HARTFORD BRIDGE	113	24
	LEA BRIDGE, HAZELEY	111	21
FLEET BROOK	ABOVE RIVER HART	65	15
MINLEY BROOK	B3013 FLEET	25	8
WHITewater	HECKFIELD	176	32
	ABOVE BLACKWATER	170	33

Bacteriological sampling was undertaken in 1992 in the catchment. Although no standards exist for inland recreational waters it has been found that the Blackwater River fails to meet the European Commission (EC) Bathing Water Directive bacteriological limits for all sites downstream of Aldershot STW.

The number of recorded pollution incidents is continuing to grow. This is thought to reflect greater awareness, and therefore reporting, of incidents rather than an actual decline in standards. This does not, however, reduce the importance attached to the effect on the natural water environment.

Over half the recorded pollution incidents in the catchment occur in minor ditches and drainage channels. With regard to the classified watercourses in the catchment the Blackwater River suffers from the most pollution incidents. The majority of all the pollution incidents reported in the catchment are oil related. Details of the incidents recorded in 1990 are given below.

# WATER QUALITY (FUTURE OBJECTIVES)



## KEY

		FUTURE RIVER WATER QUALITY OBJECTIVES				
	Watercourses		CLASS 1A (HIGH)		RIVERS OUTSIDE RQO SURVEY	
	Basingstoke Canal		CLASS 1B (HIGH)		CURRENT STATUS OF RIVER FALLS BELOW RQO OBJECTIVE	
	Catchment Boundary		CLASS 2 (FAIR)			SCALE (approx) 0 <span style="display: inline-block; width: 100px; border-bottom: 1px solid black;"></span> 5 km
	Urban Area		CLASS 3 (POOR)			
	M3 Motorway					



## 4.2 WATER QUALITY (ctd)

POLLUTION TYPE	BLACK-WATER	WHITE-WATER	HART	COVE BROOK	FLEET BROOK	OTHER WATERS	TOTAL
OIL	15	0	0	11	0	22	48
CHEMICAL	4	0	0	0	0	4	8
SEWAGE	4	0	2	0	0	14	20
NATURAL	0	0	1	0	0	3	4
AGRICULTURAL	0	1	1	0	0	2	4
GENERAL	3	0	3	2	0	8	16
URBAN RUNOFF	0	0	2	2	0	0	4
NOT KNOWN	2	0	0	0	0	8	10
TOTAL	28	1	9	15	0	61	114

As well as the RQO classifications, two EC water quality directives also apply to the catchment. The first of these is Directive 78/659/EEC, commonly known as the 'fisheries directive', which is concerned with ensuring that water quality is suitable for supporting fish populations. The second directive, 76/464/EEC, known as 'the dangerous substances directive', is concerned with the discharge of substances considered to be harmful to the aquatic environment. The 'fisheries directive' applies only to designated reaches of water whereas the 'dangerous substances directive' and its associated directives apply to all waters.

The fisheries directive has two levels of quality standards, one to support a cyprinid fish population (i.e. coarse fish) and a stricter level to support a salmonid fish population (e.g. trout and salmon). The designated reaches shown on the map all achieved the appropriate standards in 1990.

We assess compliance with the 'dangerous substances directive' by monitoring for specific substances downstream of three effluent discharge points in the catchment, and monitoring for all listed substances at a single key site. The Blackwater River is sampled downstream of Aldershot Town and Camberley STWs to assess compliance with the mercury and cadmium standards, and downstream of Sandhurst STW to assess compliance with the cadmium standard. These sites all achieved the appropriate standards in 1990. The key site on the catchment is at Swallowfield, on the Blackwater River. None of the standards were exceeded in 1990. The standards for both Directives are given in Appendix I.

The issues raised from the above information include:

### Blackwater River/Cove Brook

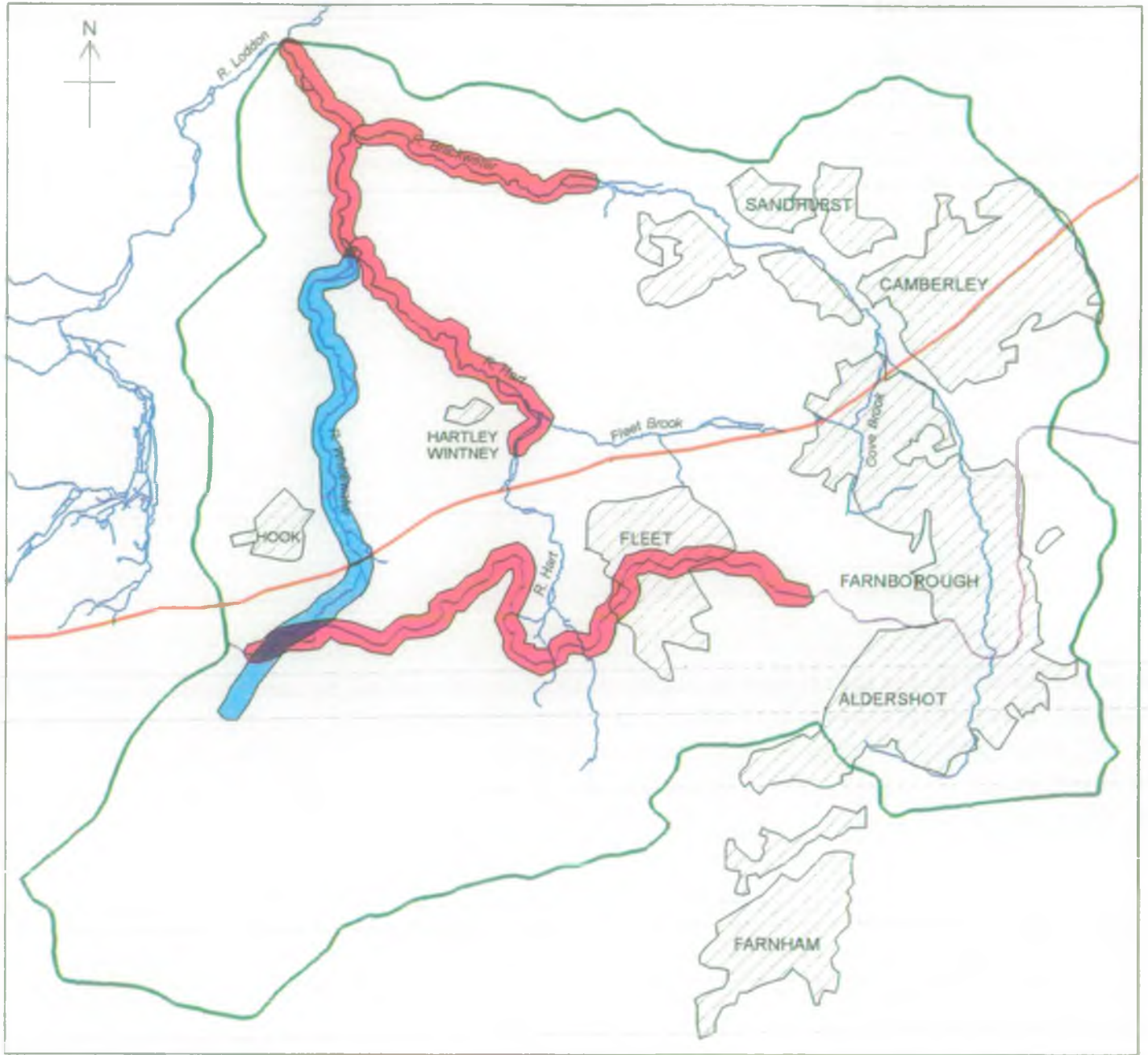
- failure to achieve current objective for current uses in the reach downstream of Camberley STW.
- comprehensive improvements will be required if the future objectives are to be met.
- high number of oil and sewage pollution incidents.
- the Cove Brook is subject to intermittent oil pollution and has a poor biological quality
- bacteriological levels in the Blackwater River generally exceed European Commission limits for Bathing Waters.

### River Hart/Fleet Brook/River Whitewater

- failure of Fleet Brook downstream of Fleet STW, and River Whitewater to meet current objectives for current uses.
- improvements will be required if future objectives are to be met.



# WATER QUALITY (EC DIRECTIVES)



## KEY

	Watercourses	EC Designated Fisheries (Directive 78/659)					
	Basingstoke Canal		Salmonid		Cyprinid		
	Catchment Boundary						
	Urban Area					SCALE (approx)	
	M3 Motorway					0	5 km

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### 4.3 WATER RESOURCES

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We aim to assess, manage, plan and conserve water resources and to maintain and improve the quality of water for all those who use it. One of our key objectives is to develop and implement a water resources strategy which takes appropriate account of both environmental and abstraction requirements.

A regional strategy is currently being prepared as are summary statements which outline the approach to be taken to water resources management at the catchment level.

No overall targets for water resources are currently available for the Blackwater River catchment and its associated groundwater catchment.

Although no overall targets are available a number of water resources related issues are known to us. These include:

#### Basingstoke Canal

- subject to periods of low natural flow and therefore constraints on boat movements through locks.

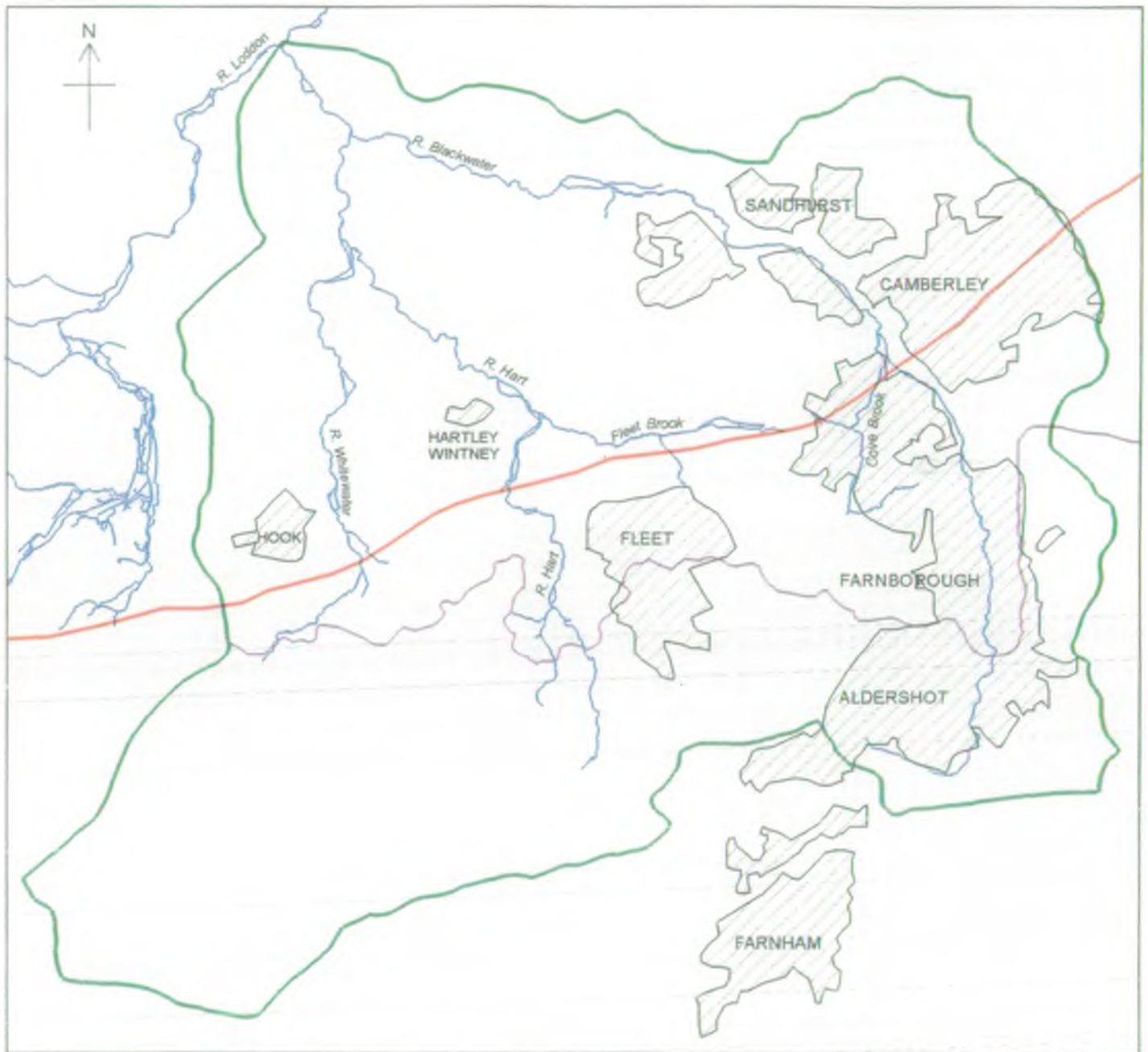
#### River Hart

- detrimental impact of groundwater abstraction on Itchel Spring.

#### River Whitewater

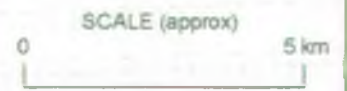
- low flow situation on river a cause for concern amongst local interest groups.





KEY

	Watercourses						
	Basingstoke Canal						
	Catchment Boundary						
	Urban Area						
	M3 Motorway						



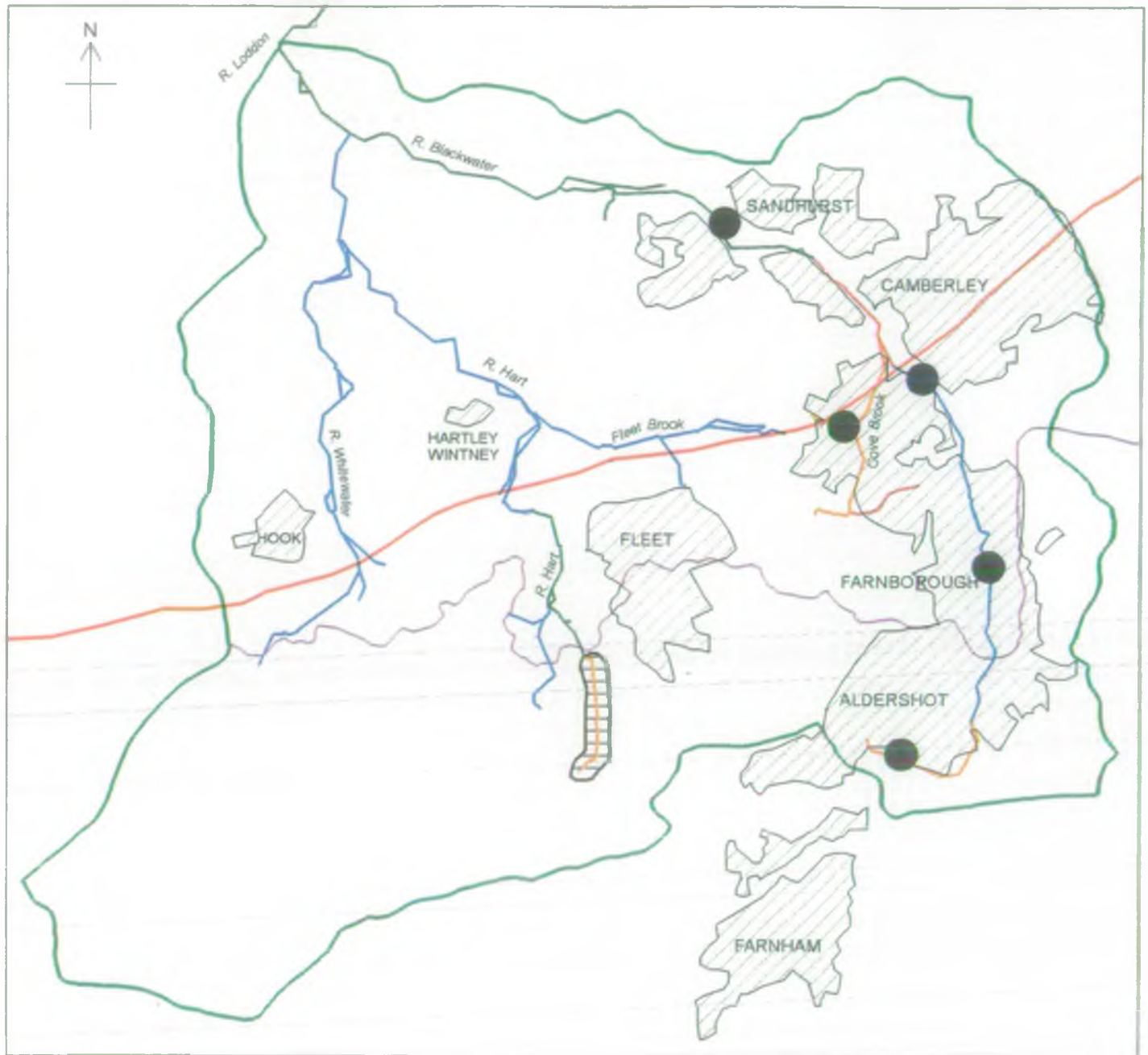


#### 4.4 FLOOD DEFENCE

'Standards of Service for Urban and Rural Flood Defence' is a system used by us to assess appropriate standards of service and to plan for providing a consistent approach towards service provision. A key feature of the system is that it relates standards of service to current land use in the floodplain. As land use varies so therefore do customer interests and the requirements for flood defence and land drainage. Different land uses have been brought together into five land use bands which range from A (heavily urbanised) to E (unintensive agriculture). Each land use band has a 'target range' of service levels. Within the Blackwater River catchment the 'main river' has been divided into reaches. For each reach we have identified the 'land use band' and hence the 'target standard of service', and evaluated the actual standard of service. This information is summarised below.

RIVER	REACH	LENGTH (km)	FLOOD AREA (ha)	LAND USE BAND(1)	ACTUAL STANDARD OF SERVICE(2)
BLACKWATER	LODDON TO NEW MILL ROAD	5.150	76	D	A
	NEW MILL RD TO FINCH BGE	3.950	71	D	A
	FINCH BRIDGE TO RAILWAY	5.950	156	D	A
	RAILWAY TO M3	4.000	87	A	O
	M3 TO RAILWAY	5.050	106	E	A
	RAILWAY TO A323	4.650	75	E	O
	A323 TO MRL	3.700	46	C	A
WHITEWATER	BLACKWATER TO H.GRN FP	5.400	77	E	A
	H.GRN FP TO C.BILLET	5.400	99	E	A
	CROOKED BILLET TO MRL	4.400	59	E	A
POTBRIDGE BROOK	WHITEWATER TO MRL	1.850	5	E	A
HART	WHITEWATER TO HTFD.BGE	5.800	44	E	A
	HTFD.BGE TO RAILWAY	4.120	70	E	A
	RAILWAY TO CANAL	4.400	17	D	A
	CANAL TO MRL	3.230	4	C	B
ITCHEL BROOK	HART TO MRL	2.850	13	E	A
GRUBES FARM DITCHES	ITCHEL BROOK TO MRL	1.025	4	E	A
FLEET BROOK	HART TO MRL	4.700	5	E	A
MINLEY BROOK	FLEET BROOK TO MRL	3.000	49	E	A
MINLEY DITCHES	MINLEY BROOK TO MRL	1.875	-	E	A
COVE BROOK	BLACKWATER TO MRL	4.700	64	C	A
HAWLEY LAKE STREAM	COVE BROOK TO MRL	0.900	-	C	A
MARROW BROOK	COVE BROOK TO MRL	0.650	-	A	A

- Notes: (1) Target Service Levels and Land Use Bands are defined in Appendix I.  
 (2) Standards of service provided are categorised as follows:  
 O - on target  
 A - above target  
 B - below target



KEY

	Watercourses	TARGET STANDARDS OF SERVICE FOR FLOOD PROTECTION				
	Basingstoke Canal		A ( 1 in 50 years on average)			
	Catchment Boundary		C ( 1 in 10 years on average)		Target Standard of Service currently not achieved	
	Urban Area		D ( 1 in 2 years on average)			SCALE (approx) 0 ————— 5 km
	M3 Motorway		E ( 3 times per year)		Access Problems (for maintenance)	

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#### 4.4 FLOOD DEFENCE (ctd)

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The significant number of river reaches which are 'above target' in terms of the actual standard of service indicator is not considered to properly reflect the actual situation. This is because the system depends on an appropriate length of historic data. Since the system has only recently been introduced the relevant amount of data has not been collected.

The issues raised from the above information information include:

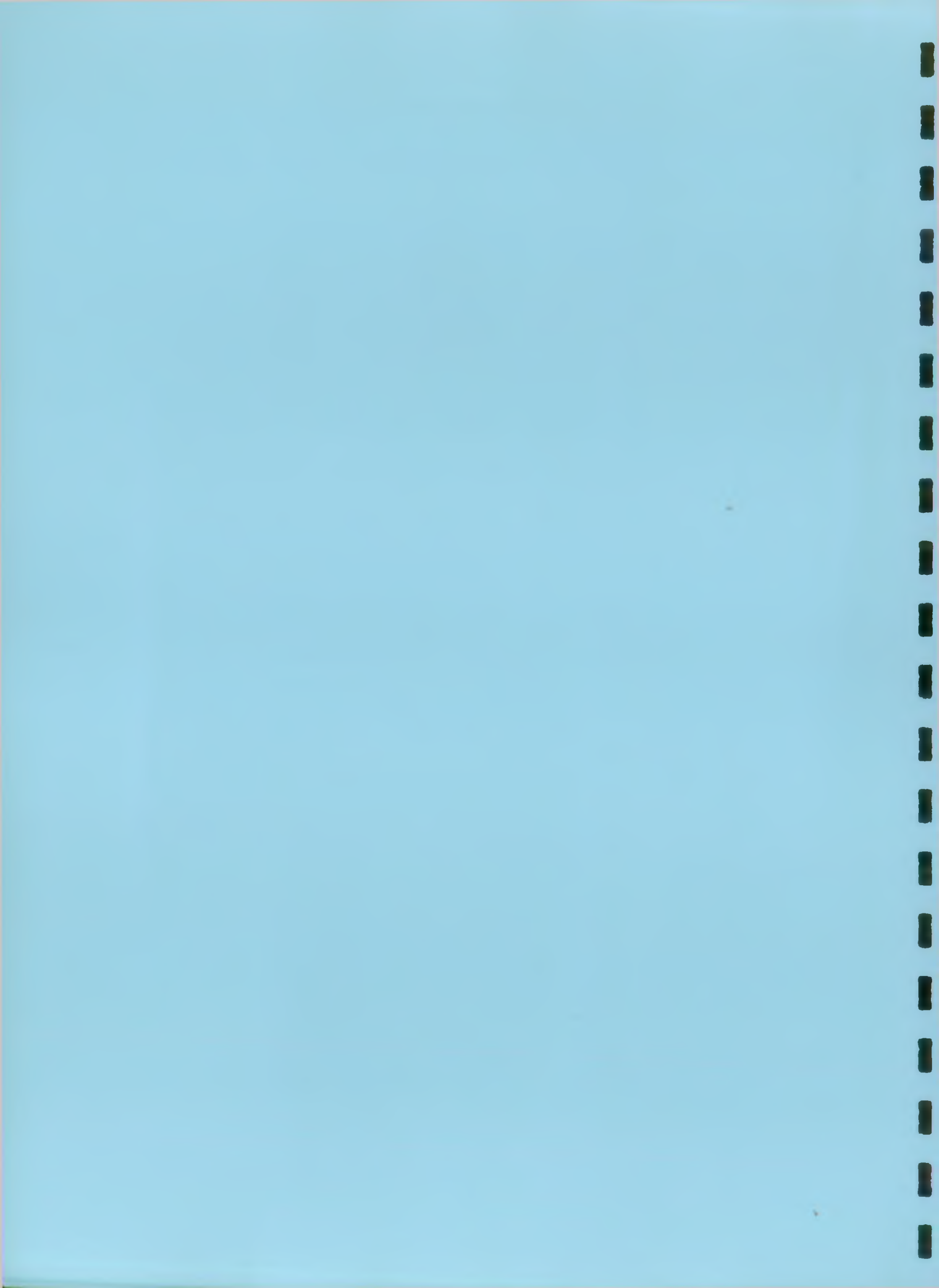
River Hart

- inadequate standard of service on upper reach (i.e. Crondall).



*Section 5*  
**CATCHMENT ISSUES**





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## 5.1 INTRODUCTION

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Through the preparation of this plan we have been able to identify a number of issues which require consideration by all those interested in the future of the catchment's natural water environment. These issues have been grouped under the following headings:

- Blackwater Valley;
- Fleet Pond;
- Basingstoke Canal;
- Habitats on the Whitewater and Hart;
- Low Flows.

Each issue is presented in the following manner:

- (i) a page (or pages) of text divided into the following sections:

**Current Use** - individual tables describe: the issue; the key uses involved in the issue; options to address the issue; and, the implications of adopting particular options (details are given in outline form only and are included to indicate the scale and nature of the issue. Detailed action plans (involving costs and timetables) will only be established after the consultation process).

**Future Use** - the section is similar to the 'Current Use' section except it deals with issues that require consideration in respect of future uses.

**Summary** - a descriptive summary of the overall issue.

- (ii) a colour synoptic map designed to enhance the points raised in the text and highlight the geographical context of the issue.



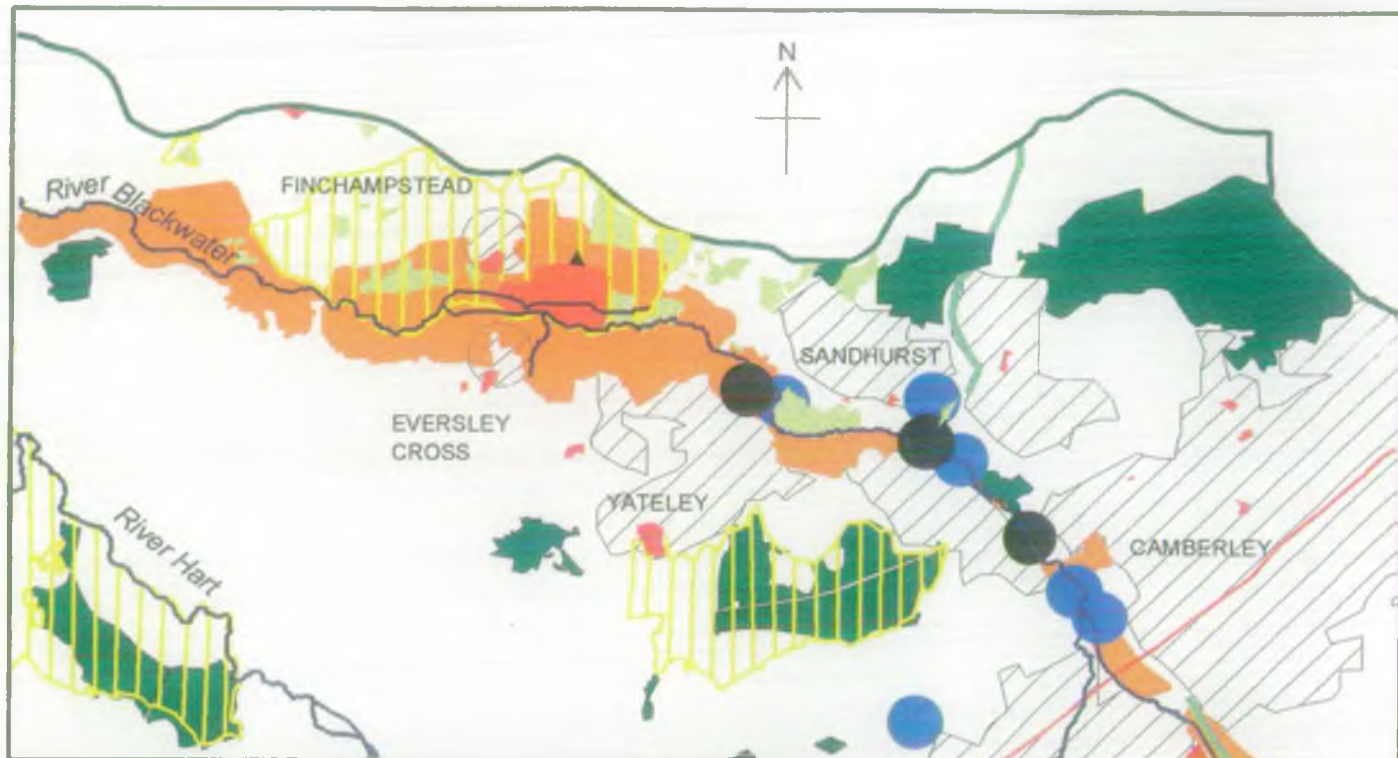
5.2 BLACKWATER VALLEY

*Current Use*

Issue:	Reach downstream of Camberley STW fails to meet RQO.
Uses:	Ecology, Fisheries, Effluent Disposal
Options:	<ul style="list-style-type: none"> <li>* monitor situation and enforce existing discharge consents</li> <li>* review discharge consents and/or seek to constrain current uses</li> </ul>
Implications:	<p>Thames Water Utilities (TWU) have recently upgraded the Aldershot Town and Camberley STWs. These improvements should enable the current water quality standards to be achieved. NRA to monitor water quality and take enforcement action if consents are breached. This option requires no major investment. If the water quality standards are not achieved, the NRA will need to review consents and impose new limits on STWs, and/or seek to constrain certain current uses through negotiations with users. The former will require moderate investment by the NRA and potentially significant investment by TWU and the Ministry of Defence (MoD), whilst the latter will reduce the environmental value of the river to the local community.</p>

Issue:	Excessive number of oil pollution incidents.
Uses:	Ecology, Fisheries, Amenity and Recreation, Effluent Disposal.
Options:	<ul style="list-style-type: none"> <li>* continue process of containing pollution near to source</li> <li>* undertake campaign to identify and educate persistent polluters to minimise future risks</li> </ul>
Implications:	<p>The NRA currently ensure that frequent oil pollution in the reach upstream of Ash Bridge, Aldershot is prevented from travelling downstream. This approach contains the worst of the problem, although pollution incidents also occur further downstream. A campaign involving the NRA, Local Authorities, local industry and the public to identify and tackle the problem at source would result in reduced risks to the river through moderate investment by all the parties concerned. The campaign would be backed by enforcement action by the NRA.</p>

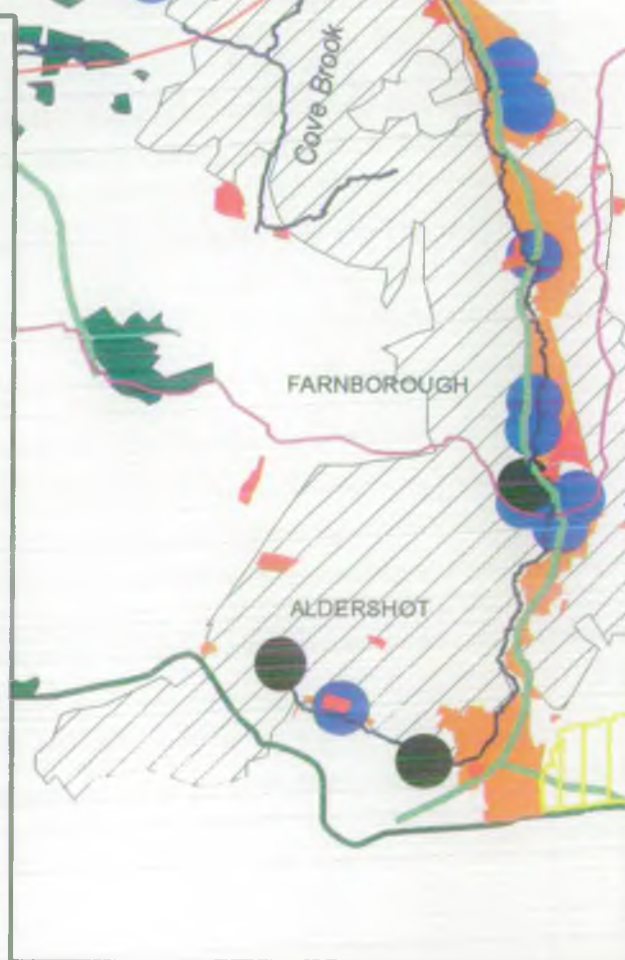
# BLACKWATER VALLEY



## KEY

	Watercourses		Recreation Sites
	Basingstoke Canal		Mineral Extraction Sites
	Catchment Boundary		Urban Areas at Flood Risk
	Urban Area		Development Proposals
	M3 Motorway		
	Village		
	Road Proposals		
	Blackwater Valley Policy Area		
	Sites of Special Scientific Interest		
	Wildlife Heritage Sites		
	Areas of Landscape Importance		

0 SCALE (approx) 5 km





5.2 BLACKWATER VALLEY (ctd)

Issue:	Flood protection falls below acceptable standards (see Section 3.14).
Uses:	Flood Defence
Options:	* provide appropriate protection through construction of flood defences
Implications:	A review of the flood protection needs of the valley will shortly be completed by the NRA. Where the benefits of undertaking the construction of flood defences are found to exceed the costs, works are likely to be completed within the next 5 years.

*Future Use*

Issue:	Need for comprehensive water quality improvements if future uses are to be achieved.
Uses:	Ecology, Fisheries, Amenity and Recreation, Effluent Disposal, Infrastructure and Communications
Options:	<ul style="list-style-type: none"> <li>* tighten discharge consents and/or seek to constrain the future uses of the river</li> <li>* manage the sources of diffuse pollution and/or seek to constrain the future uses of the river</li> <li>* manage the excessive growth of macrophytes (which deplete oxygen levels in the river) and/or seek to constrain the future uses of the river</li> </ul>
Implications:	A number of organisations have plans to enhance the ecological value of the river and its recreational use (see Section 3). At present the quality of the river is inappropriate for these proposed, potential and aspirational future uses. To achieve the required quality major investment by the community via the NRA, TWU, MoD, County and Local Authorities, Industry, the Farming Community and individual landowners will need to be undertaken. Tightened consents will achieve reductions in point pollution sources but will not reduce diffuse pollution sources (e.g. urban runoff from roads) and may only partially solve the problem of macrophyte growth. Additional measures (e.g. treatment of runoff from roads, control of pesticides, construction of buffer strips alongside the river) would be required. Such measures would require co-ordination of a wide range of activities, and investment over a long-period by all those involved. Constraints on future uses of the river would reduce the need for such investment but limit the plans and aspirations of groups such as BVC RMS.



5.2 BLACKWATER VALLEY (ctd)

Issue:	Need for significant improvements to physical features if future uses to be achieved.
Uses:	Ecology, Fisheries, Landscape, Amenity and Recreation, Angling, Mineral Extraction and Solid Waste Disposal, Infrastructure and Communications.
Options:	<ul style="list-style-type: none"> <li>* rehabilitate river channel structure by recreating natural features such as pools and riffles, and/or seek to constrain future uses</li> <li>* implement landscape improvements in the river corridor and along the river bank, and/or seek to constrain future uses</li> <li>* develop comprehensive land and water use management plans for the river corridor or respond to proposals on an ad-hoc basis.</li> </ul>
Implications:	<p>Restoration of a 'natural' channel structure has been identified as a means of: reducing macrophyte growth by increasing flow rates; increasing habitat diversity and therefore improving ecology and fisheries uses; and, reducing flood defence maintenance needs. The NRA and riparian developers have already invested in such improvements. Much investment is still required, however. Landscape improvements by the BVCRMS can assist in both improving the visual character of the valley and contributing to improvements in ecology, amenity and recreation, and fisheries. Significant investment will be required by Local Authorities, County Councils, developers and the NRA to achieve improvements in the physical features of the valley. These costs must be balanced against the benefits that changes in uses will give. The viability of proposals for future uses will also need to be considered in respect of water quality issues.</p>

*Summary*

The Blackwater valley has been the subject of intensive development over the last 30 years. As a result the natural water environment has been degraded. In particular, river water quality has suffered since investment in sewage treatment has lagged behind 'development'. The natural morphology of the channel has also been disturbed leading to a reduction in channel features such as pools and riffles. Development has therefore put severe pressure on the river corridor of the Blackwater valley, which in places is no more than a concrete strait jacket. However, opportunities often arise from development proposals (e.g. gravel extraction, by the creation of water bodies, may help in the provision of amenity and recreation facilities). Such opportunities, as well as a programme of remedial works, have been evaluated by the 'Blackwater Valley Countryside and Recreation Management Service' (BVCRMS). The BVCRMS and its supporting organisations have done much to achieve a consensus on the future direction for the use of the valley. A number of key issues still remain unresolved, however, including the role that water quality considerations should play in the future planning of the uses of the valley.

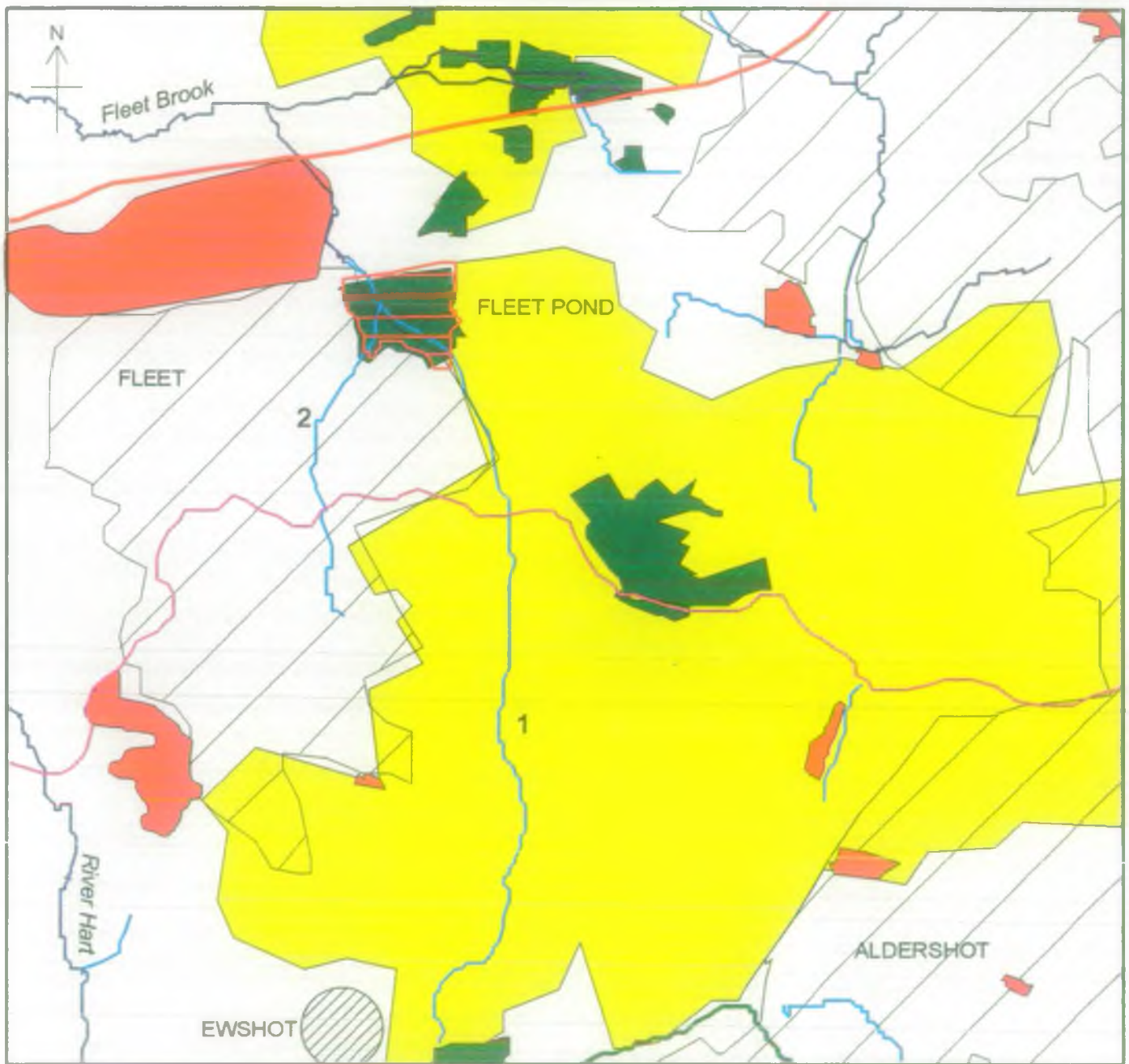
### 5.3 FLEET POND

#### Current Use

Issue:	Deterioration in ecological and fisheries value of the site
Uses:	Ecology, Fisheries, Amenity and Recreation, Angling, Effluent Disposal
Options:	<ul style="list-style-type: none"><li>* manage Gelvert Stream silt loads</li><li>* prepare site management plan</li><li>* manage fish population of pond</li><li>* allow continued deterioration of ecological and fisheries value of site</li></ul>
Implications:	To arrest deterioration of the pond and begin its restoration there is a need for the interested parties (e.g. NRA, Hart DC, English Nature and Ministry of Defence) to meet and discuss the above management options. The influence of MoD activity in the Long Valley area on silt loads in the Gelvert Stream, which flows into the pond, was identified in 1988. The NRA will need to undertake further monitoring in order to ascertain the scale of the problem and possible solutions in conjunction with the MoD. In addition to water quality improvements, management regimes for the habitats of the sites should be established by Hart DC and English Nature. These will need to take into account the amenity and recreation demands on the site. Bream now dominate the fish population of the pond. These fish may contribute to the pond's quality problems. The NRA, Hart DC and angling interests need to agree a fisheries management strategy for the pond. Preparing - and then implementing - the above proposals may require significant investment by a number of the key Authorities.

#### Summary

Fleet Pond is the largest freshwater lake in Hampshire and was designated as a SSSI in 1951. Habitats on the site include *Phragmites* reed beds, sandy heath and diverse pond margins. Species diversity and habitat quality has gradually declined over the last 20 years. Silt pollution via the Gelvert Stream is a recognised problem for which mitigation measures (i.e. land treatment areas and settlement lagoons) have been implemented by the MoD. Experience so far indicates that these measures are unlikely to be adequate to cope with the problem. The fish population has declined and its structure changed. Histological studies of fish from the pond have revealed damage to their gills which is consistent with the presence of high suspended solids loads. Liaison between the relevant Authorities and a will to tackle the issues are essential pre-requisites to reversing the current decline in the value of the site.



KEY

	Watercourses		Village		Site of Special Scientific Interest		
	Basingstoke Canal		Minor Watercourses		Fleet Pond Local Nature Reserve		
	Catchment Boundary		1 Gevert Stream 2 Brookley Stream		Ministry of Defence Land		
	Urban area				Development Proposals	Scale (approx) 0 ————— 1.5 Km	
	M3 Motorway						



## 5.4 BASINGSTOKE CANAL

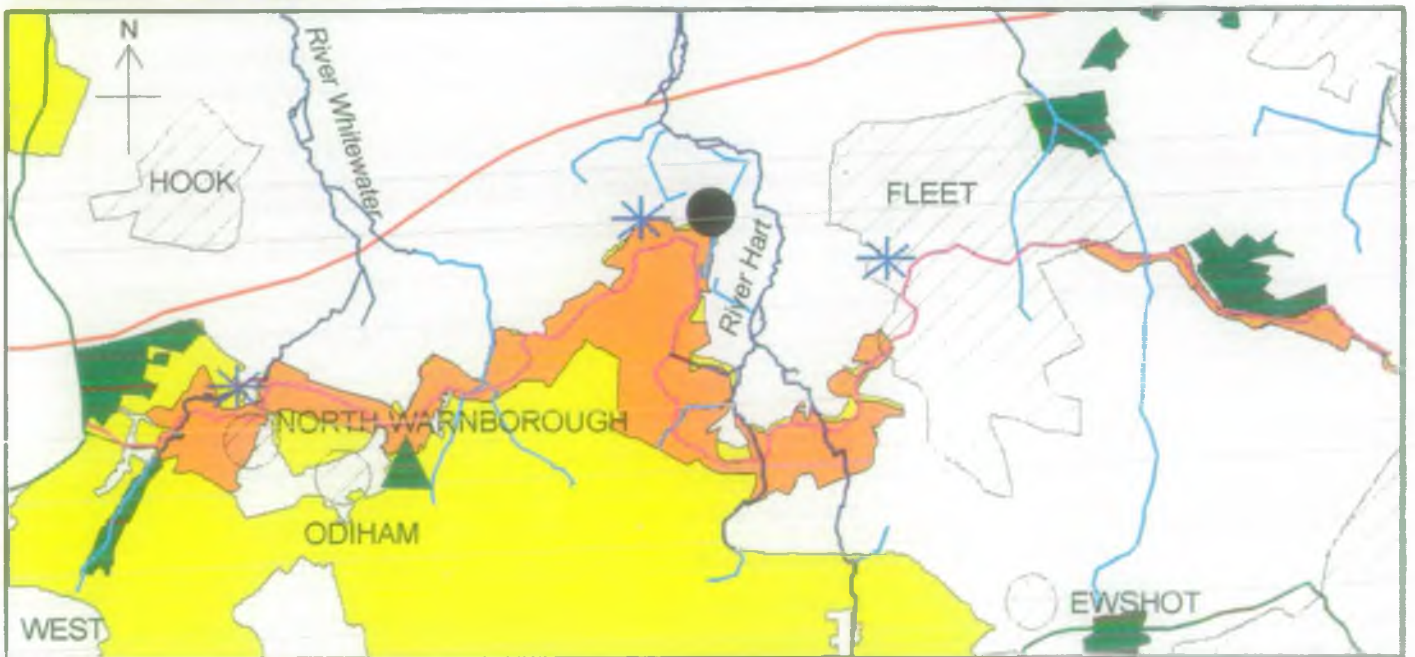
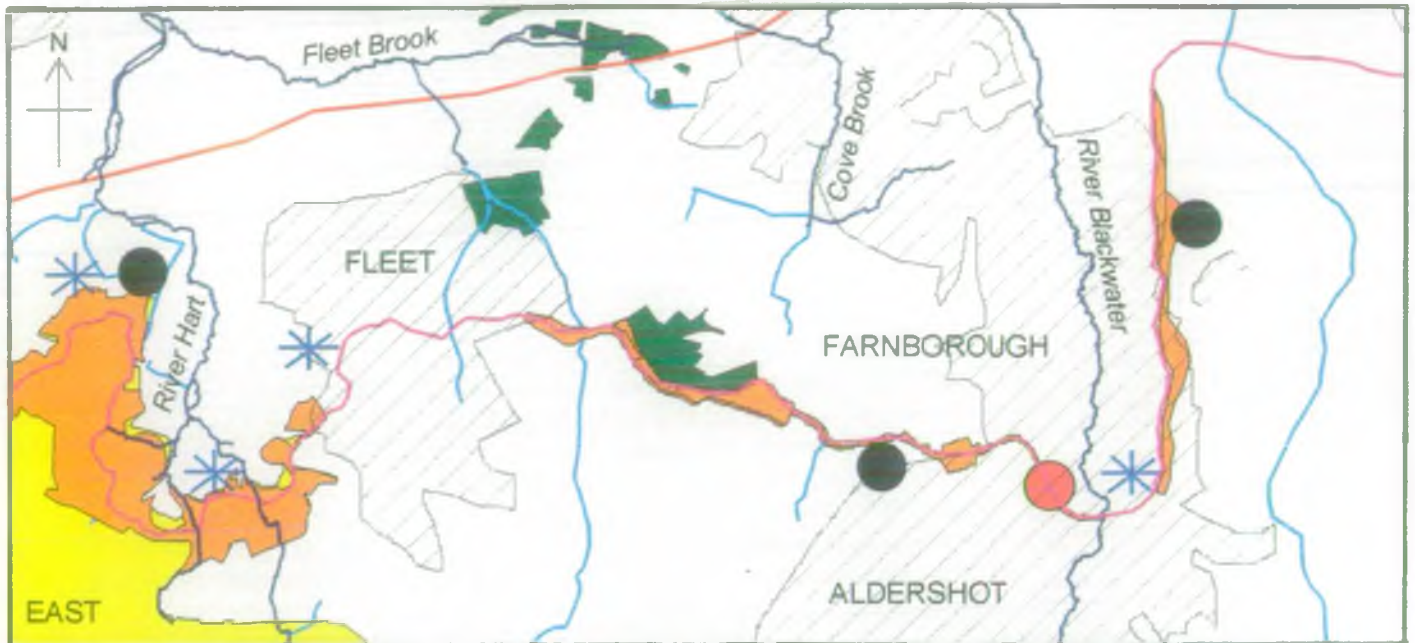
### *Current Use*

Issue:	Ensuring the continued ecological value of the site whilst recognising the need to develop the navigation for recreation and amenity purposes.
Uses:	Ecology, Fisheries, Angling, Recreation and Amenity, Navigation, Effluent Disposal, Water Abstraction
Options:	<ul style="list-style-type: none"><li>* manage water quality of the canal</li><li>* manage water supply to the canal</li><li>* evaluate inter-action between navigation uses and ecology uses</li><li>* identify sustainable uses of the canal</li></ul>
Implications:	The relevant Authorities (e.g. Blackwater Canal Authority, NRA, Surrey and Hampshire CCs, English Nature) need to establish the susceptibility of the canal's water chemistry and habitats to navigation demands (which may include the introduction of effluent and/or abstracted water). Resources may need to be committed by the relevant Authorities to assess this and other issues including that of water supply to the canal. The land use controls exerted by Local Authorities are an important element in guiding and influencing the future use of the canal.

### *Summary*

The Basingstoke Canal is recognised by many environmental groups as a nationally important water-related habitat. The water chemistry, which changes from alkaline to acid in a west-to-east direction, is the key determinand of species diversity. The canal has always had water supply problems in its upper reaches. Solutions to addrss this issue will need to be carefully considered in terms of the catchment's overall water resources.

# BASINGSTOKE CANAL



## KEY

	Watercourses		Urban Area		Moorings		
	Minor Watercourses		Village		Slipway		
	Basingstoke Canal		Basingstoke Canal Conservation Area		Lock		
	Catchment Boundary		Sites of Special Scientific Interest		Boatyard		
	M3 Motorway		Areas of Landscape Importance				

0      SCALE (approx)      3 km



## 5.5 HABITATS ON THE WHITEWATER AND HART

### Current Use

Issue:	Habitat enhancement on the Whitewater and Hart
Uses:	Ecology, Fisheries, Landscape, Heritage
Options:	<ul style="list-style-type: none"> <li>* monitor water quality situation and enforce discharge consents</li> <li>* formulate conservation and enhancement strategies for the rivers</li> <li>* remedial work to mitigate impact of past land drainage works on the River Hart</li> </ul>
Implications:	<p>TWU are progressing improvements at the Fleet STW so that the works can meet recently tightened discharge consents. NRA to monitor water quality and take enforcement action if consents are breached. Water quality in the River Whitewater during 1991 met the appropriate standards. Situation to be monitored by the NRA with a possible increase in the number of sampling points (e.g. Poland Mill). Straightening and widening work on the River Hart downstream of Pilcot Farm has damaged the physical structure of the river and its banks. Further survey work by the NRA and others will be necessary to identify remedial measures (e.g. tree planting, establishment of channel features). Implementation by the NRA and others will require moderate investment over a number of years.</p>

### Future Use

Issue:	Establishment of Whitewater Valley Countryside Heritage Area
Uses:	Ecology, Landscape, Heritage, Fisheries
Options:	<ul style="list-style-type: none"> <li>* to consider the benefits, implications and costs of the above proposal</li> </ul>
Implications:	<p>NRA to liaise with the relevant Authorities (e.g. Hampshire CC, Hart DC, Basingstoke and Deane BC) on the above proposal. The valley has a particular character and quality which requires special consideration.</p>











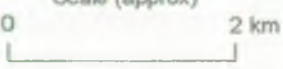

### Summary

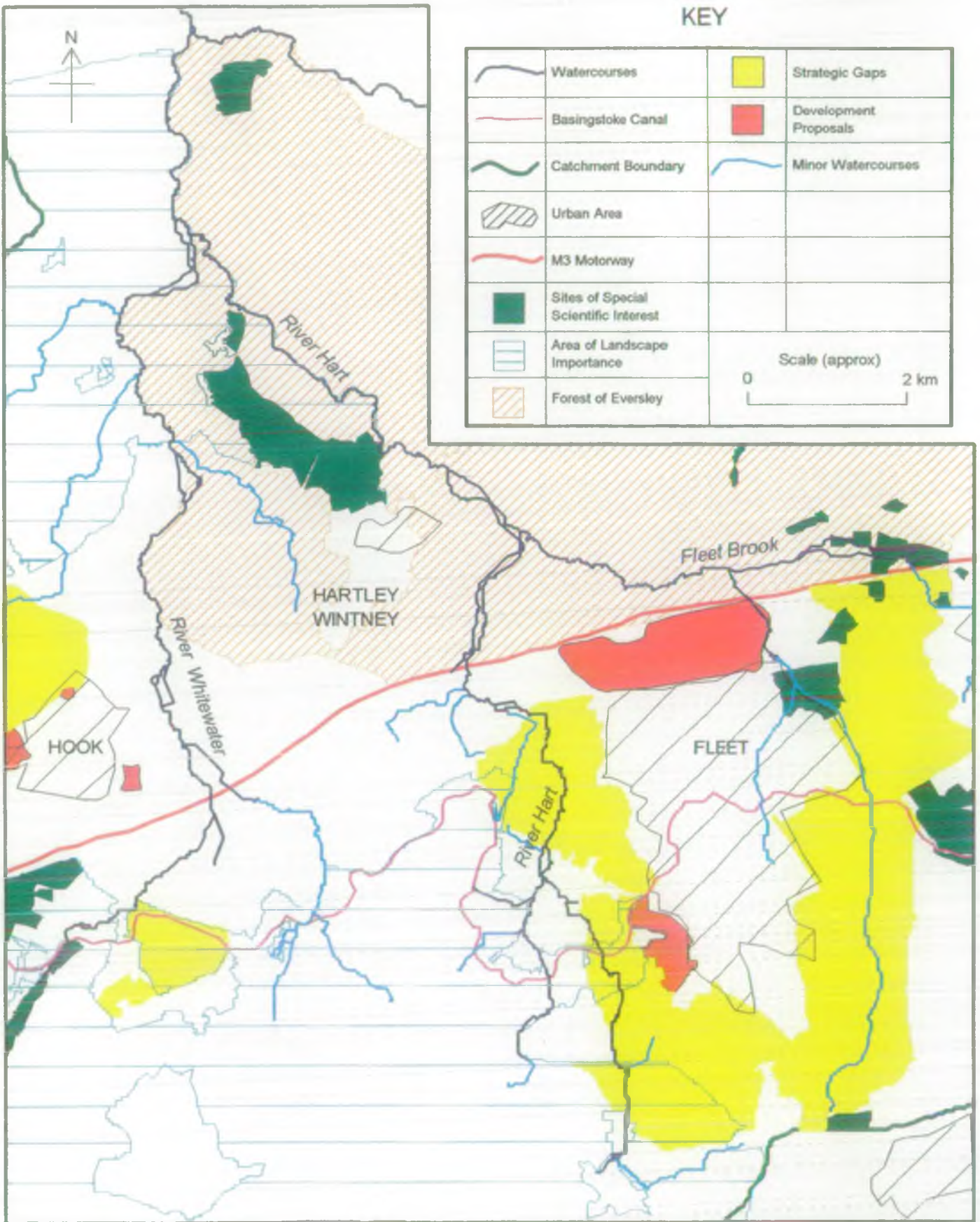
Investment by TWU at Fleet STW coupled with enhancements to the physical structure of the lower River Hart will lead to improvements in the ecological, fisheries and landscape value of the River Hart. The water quality of the River Whitewater achieved the high standards appropriate of such a watercourse in 1991 although it failed in 1990. Localised water quality problems are known to exist but in general the river continues to be capable of supporting a population of Brown Trout as well as the flora and fauna typical of chalk fed streams and rivers. The low flow situation in both rivers is dealt with in the following section.



# HABITATS ON THE WHITEWATER AND HART

## KEY

	Watercourses		Strategic Gaps
	Basingstoke Canal		Development Proposals
	Catchment Boundary		Minor Watercourses
	Urban Area		
	M3 Motorway		
	Sites of Special Scientific Interest		
	Area of Landscape Importance	Scale (approx) 	
	Forest of Eversley		





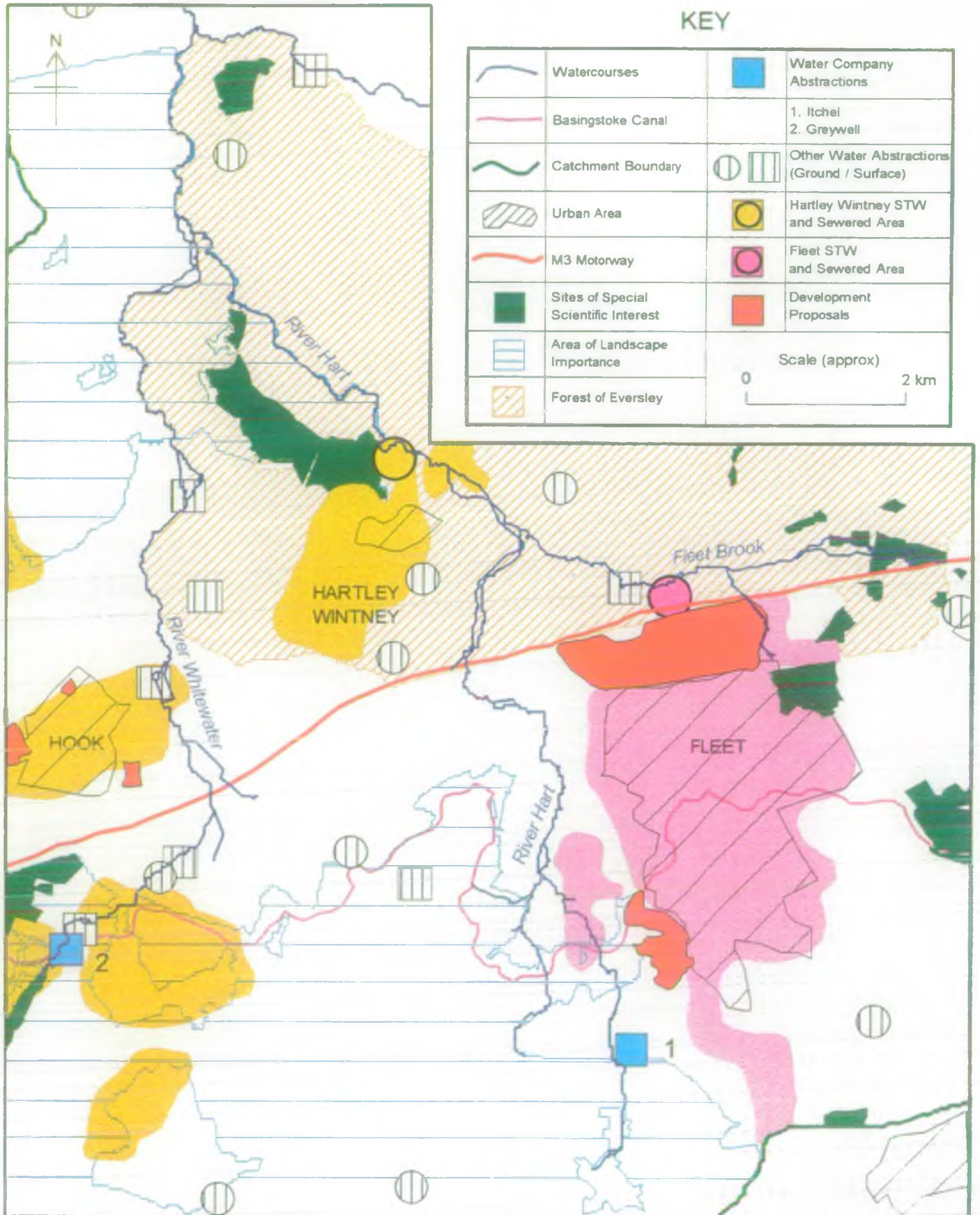
## 5.6 LOW FLOWS

### *Current Use*

Issue:	Low flow situation in the Whitewater and Hart Rivers.
Uses:	Ecology, Fisheries, Landscape, Water Abstraction, Heritage, Angling, Amenity and Recreation, Agriculture.
Options:	<ul style="list-style-type: none"><li>* monitor existing situation to assess influence on rivers of all factors affecting flows</li><li>* review existing abstraction licences for public water supply and agriculture in the area</li><li>* ensure proper management of water resources to achieve a balance between the environment and abstractors</li></ul>
Implications:	The low flow situation in the River Whitewater has attracted much local interest. The opinion of the NRA TR is that the low flows are not due to over-abstraction by users of groundwater, but are a function of recent climatic factors, possibly exacerbated by changes in river valley land use, river management regime, mill alterations etc. A revocation of existing abstraction licences would be very expensive and is not likely to lead to any perceptible increase in river flows. However, a better understanding of the influence of other man-made factors such as land use changes may help explain why levels are lower now than they used to be for equivalent flow rates. Such a study would involve work by the NRA TR, landowners and other interested parties. Initial investment would be moderate and may identify the need for particular land use/river management techniques to maximise the benefit of river flows in order the help preserve and enhance key features such as the natural population of Brown Trout. On the River Hart, however, the NRA TR recognise that the Mid-Southern Water Company abstraction at Itchel effectively 'turns off' one of the local spring sources.

### *Summary*

In managing water resources in the catchment the water abstraction licensing role of the NRA is currently exercised such that: further major groundwater abstractions are not allowed; no net summer abstractions are allowed; winter abstractions are only allowed in periods of adequate flow; and, small appropriate abstractions continue to be allowed.







*Section 6*

**THE NEXT STEPS**







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## 6.1 THE NEXT STEPS

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We have produced this document through internal discussion and a desk study of readily available reports produced by organisations such as local authorities.

Whilst every effort has been made to ensure the accuracy of the information in the plan we are aware that it may contain a number of omissions and inaccuracies. Our next step, therefore, is to consult with organisations, groups and individuals interested in the future of the catchment's water environment. We believe that consultation will enable us to:

- clarify the extent and distribution of current uses of the catchment;
- assess the importance of catchment uses;
- identify the wide range of likely, possible and potential future catchment uses;
- expose catchment specific issues to a wide audience;
- ensure decisions on the future management of the catchment are based on accurate information and the fullest possible range of views from interested parties.

In commenting on this plan we hope that you will tackle both points of detail and strategic issues. In particular we are keen for you to consider the following questions:

- have we correctly identified both current and future uses of the catchment?
- have we fairly assessed the issues and what opinions do you have on them?
- have we missed any issues?
- how should we progress evaluation of the issues and the development of strategies and action plans?

During the consultation period comments can be submitted in writing to:

Blackwater River Catchment Management Plan  
Craig Woolhouse  
National Rivers Authority Thames Region  
The Grange  
97 Crossbrook Street  
Waltham Cross  
Herts, EN8 8HE

Our Project Manager for the CMP, Craig Woolhouse, can also be contacted on 0992-645067. All comments must be with us by Friday 29th January, 1993.

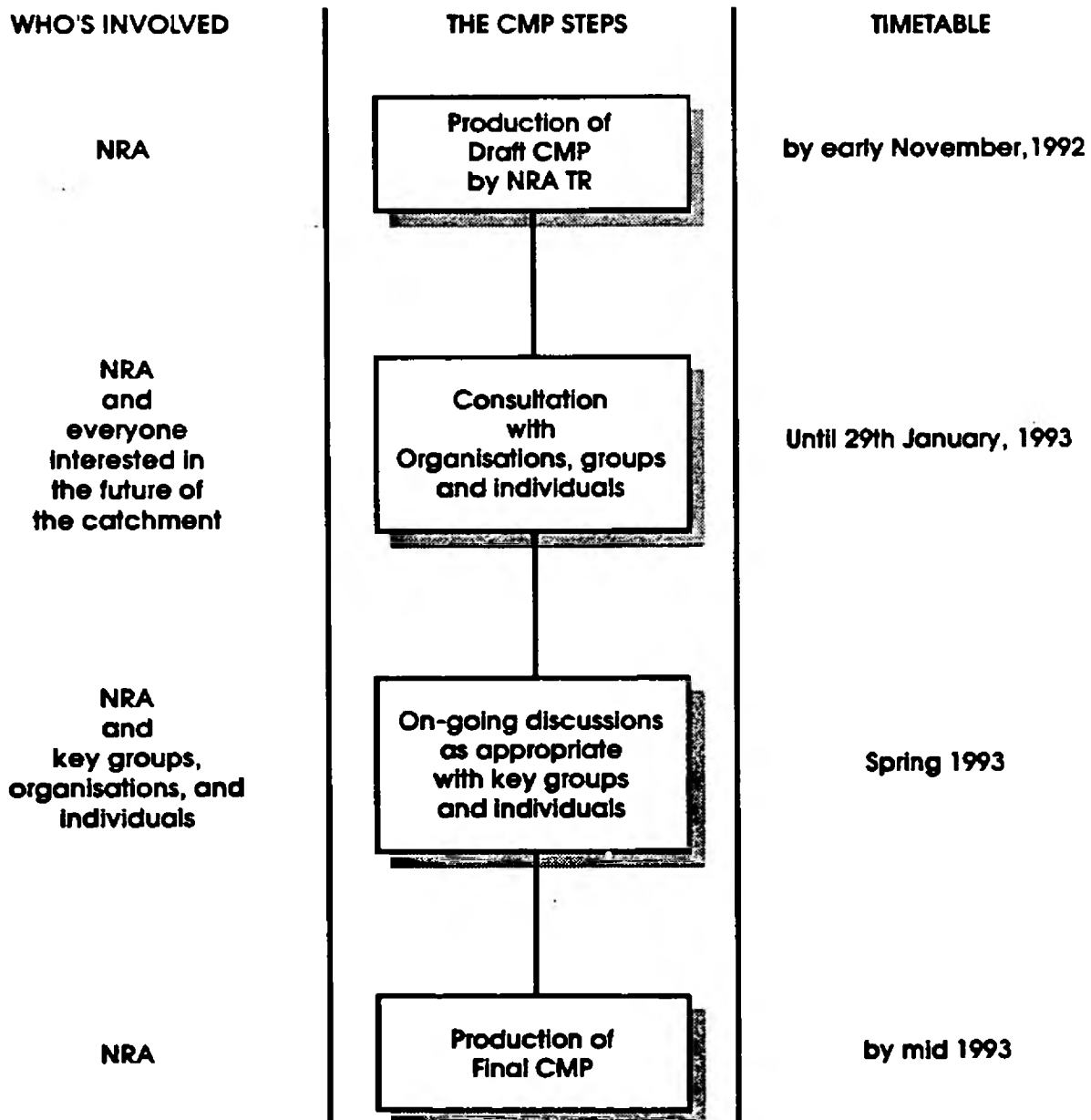
## 6.1 THE NEXT STEPS (ctd)

Our consultation phase incorporates a number of separate but linked activities. These include:

- distribution of the full plan and/or a summary leaflet to key organisations, groups and individuals;
- a display for use in libraries and other public areas; and,
- organisation of a forum for key consultees to discuss issues towards the end of the consultation phase.

At the end of the consultation phase we will have to consider in detail the results of the process before producing a definitive Catchment Management Plan. The Final Plan will define both a strategy for the future management of the catchment and a series of action plans for the NRA and others to implement in order to deliver the strategy.

The information and views you provide us with now are therefore a very important step in the overall process. We hope you will respond positively to our initiative so that we can jointly develop a vision for the Blackwater River Catchment. The next steps are shown below.



*Appendix I*  
**STANDARDS**





EC DIRECTIVE 78/659/EEC STANDARDS IN RESPECT OF CYPRINID FISHERIES

**Criteria -** Water quality not to deteriorate below the mandatory limits for pollutants as specified in the EC Fisheries Directive (78/659/EEC) for cyprinid fisheries.

<i>Standards</i>	<i>Determinand</i>	<i>Mandatory Limit</i>	<i>Guideline Limit</i>
	Dissolved Oxygen (mg/l O <sub>2</sub> )	>7 6 - 9	>8 >5
	pH	-	6-9
	Suspended Solids (mg/l)	-	<25
	BOD (mg/l O <sub>2</sub> )	-	<8
	Nitrites (mg/l NO <sub>2</sub> )	-	<0.5
	Unionised Ammonia (mg/l NH <sub>4</sub> )	<0.025	<0.005
	Total Ammonia (mg/l NH <sub>4</sub> )	<1	<0.2
	Total Residual Chlorine (mg/l HOCl)	<0.005	-
	Total Zinc (mg/l Zn)	<1	-
	Dissolved Copper (mg/l Cu)	-	<0.04

(95% of all samples taken must meet these limits except for dissolved oxygen, which must be greater than 7 mg/l or 8 mg/l for 50% of the samples, pH which must be greater than 5 for 100% of the samples, and suspended solids where the average of all samples must be less than the limit).

NB: Standard is under review

EC DIRECTIVE 78/659/EEC STANDARDS IN RESPECT OF SALMONID FISHERIES

**Criteria** - water quality must meet the mandatory limits for determinands as specified in the EC Fisheries Directive (78/659/EEC) for salmonid fisheries.

- water quality should also meet the guideline limits for determinands as specified in the EC Fisheries Directive (78/659/EEC) for salmonid fisheries.

<i>Standards</i>	<i>Determinand</i>	<i>Mandatory Guideline</i>	
		<i>Limit</i>	<i>Limit</i>

	Dissolved Oxygen (mg/l O <sub>2</sub> )	>9	>9 >7
	pH	-	6-9
	Suspended Solids (mg/l)	-	<25
	BOD (mg/l O <sub>2</sub> )	-	<5
	Nitrites (mg/l NO <sub>2</sub> )	-	<0.2
	Unionised Ammonia (mg/l NH <sub>4</sub> )	<0.025	<0.005
	Total Ammonia (mg/l NH <sub>4</sub> )	<1	<0.04
	Total Residual Chlorine (mg/l HOCL)	<0.005	-
	Total Zinc (mg/l Zn)	<0.3	-
	Dissolved Copper (mg/l Cu)	-	<0.04

(95% of all samples taken must meet these limits except for dissolved oxygen, which must be greater than 9 mg/l for 50% of the samples and greater than 7 mg/l for 100% of the samples, and suspended solids where the average of all samples must be less than the limit).



STANDARDS OF SERVICE FOR FLOOD DEFENCE AND LAND DRAINAGE

Land Use Band	Description of Typical Land Use	Target Standards of Service
A	<p>A reach containing the urban elements of residential and non-residential property distributed over a significant proportion of its length, or densely populated areas over some of its length. Any agricultural influence is likely to be over-ridden by urban interests. Amenity uses such as parks and sports fields may be prominent in view of the floodplain's proximity to areas of population density.</p>	<p>These heavily built-up areas should be protected to a standard such that the risk of flooding in any one year is no greater than 1 in 50. In some areas higher standards may be applied.</p>
B	<p>Reaches containing residential and/or non-residential property either distributed over the full length of the reach or concentrated in parts but characterised by lower densities than Band A.</p>	<p>Buildings should be protected to a standard such that the risk of flooding in any one year is between 1 in 20 and 1 in 50. However, agricultural or amenity land found in these areas should remain susceptible to regular flooding.</p>
C	<p>Limited numbers of isolated rural communities or urban fringe at risk from flooding, including both residential and commercial interests. Intensive agricultural use could also be included.</p>	<p>The chance of flooding of property in any one year would be between 1 in 10 and 1 in 50 years. Agricultural or amenity land, however, could be susceptible to more regular flooding.</p>
D	<p>Isolated, but limited number of residential and commercial properties at risk from flooding. Agricultural use will probably be the main customer interest with arable farming being a feature. In undeveloped pockets of largely urban use, amenity interests may be prominent.</p>	<p>Agriculture and amenity land in this band should be protected to a standard such that the chance of flooding or prolonged bankfull events in any one year, at a time when crops are normally susceptible to damage (ie March to October inclusive), is between 1 in 2 and 1 in 5.</p>
E	<p>There are likely to very few properties and major roads at risk from flooding in these reaches. Agricultural use will be the main customer interest with either extensive grassland or, where the flood plain extent is small, arable cropping being the most common land uses. Amenity interests are likely to be limited to public footpaths along or across the river.</p>	<p>Agricultural land in this category could be susceptible to yearly waterlogging and/or flooding, possibly occurring on several occasions throughout the year. Protection should be maintained to a standard which reduces the risk of either type of event to between one and three times per year at a time when crops are normally susceptible to damage.</p>

# RIVER QUALITY OBJECTIVE (RQO) STANDARDS

River Class	Quality criteria	Remarks	Current potential uses
<b>Class limiting criteria (95 percentile)</b>			
<b>1A</b>	(i) Dissolved oxygen saturation greater than 80%. (ii) Biochemical oxygen demand not greater than 3mg/l. (iii) Ammonia not greater than 0.4 mg/l. (iv) Where the water is abstracted for drinking water, it complies with requirements for A2** water. (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available).	(i) Average BOD probably not greater than 1.5 mg/l. (ii) Visible evidence of pollution should be absent.	(i) Water of high quality suitable for potable supply abstractions and for all other abstractions. (ii) Game or other: high class fisheries. (iii) High amenity value.
<b>1B</b>	(i) DO greater than 60% saturation. (ii) BOD not greater than 5 mg/l. (iii) Ammonia not greater than 0.9 mg/l. (iv) Where water is abstracted for drinking water, it complies with the requirements for A2** water. (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available).	(i) Average BOD probably not greater than 2 mg/l. (ii) Average ammonia probably not greater than 0.5 mg/l. (iii) Visible evidence of pollution should be absent. (iv) Waters of high quality which cannot be placed in Class 1A because of high proportion of high quality effluent present or because of the effect of physical factors such as canalisation, low gradient or eutrophication. (v) Class 1A and Class 1B together are essentially the Class 1 of the River Pollution Survey (RPS).	Water of less high quality than Class 1A but usable for substantially the same purposes
<b>2</b>	(i) DO greater than 40% saturation. (ii) BOD not greater than 9 mg/l. (iii) Where water is abstracted for drinking water, it complies with the requirements for A3** water. (iv) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available).	(i) Average BOD probably not greater than 5mg/l. (ii) Similar to Class 2 of RPS. (iii) Water not showing physical signs of pollution other than humic colouration and a little foaming below weirs.	(i) Waters suitable for potable supply after advanced treatment. (ii) Supporting reasonably good coarse fisheries. (iii) Moderate amenity value.
<b>3</b>	(i) DO greater than 10% saturation. (ii) Not likely to be anaerobic. (iii) BOD not greater than 17 mg/l*.	Similar to Class 3 of RPS.	Waters which are polluted to an extent that fish are absent or only sporadically present. May be used for low grade industrial abstraction purposes. Considerable potential for further use if cleaned up.
<b>4</b>	Waters which are inferior to Class 3 in terms of dissolved oxygen and likely to be anaerobic at times.	Similar to Class 4 of RPS.	Waters which are grossly polluted and are likely to cause nuisance.
<b>X</b>	DO greater than 10% saturation.		Insignificant watercourses and ditches not usable, where objective is simply to prevent nuisance developing.
<p>(a) Under extreme weather conditions (e.g. flood, drought, freeze up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Classes 1, 2 and 3 may have BODs and dissolved oxygen levels, or ammonia content outside the stated levels for those Classes. When this occurs the cause should be stated along with analytical results</p> <p>(b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH<sub>4</sub>.</p> <p>(c) In most instances the chemical classification given above will be suitable. However the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of a chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be downgraded on the basis of the biota actually present, and the reasons stated.</p> <p>(d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95% percentile limits.</p>			
<p>* This may not apply if there is a high degree of re-aeration.</p> <p>** EEC category A2 and A3 requirements are those specified in the EEC Council Directive of 16 June 1975 concerning the Quality of Surface Water intended for Abstraction of Drinking Water in the Member States.</p>			

*Appendix II*  
**GLOSSARY**





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## APPENDIX II - GLOSSARY

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### Abbreviations

AOD -	above Ordnance Datum
BC -	Borough Council
BVCRMS -	Blackwater Valley Countryside and Recreation Management Service
CC -	County Council
CMP -	Catchment Management Plan
DC -	District Council
DoE -	Department of the Environment
EC -	European Commission
LNR -	Local Nature Reserve
MAFF -	Ministry of Agriculture, Fisheries and Food
MoD -	Ministry of Defence
MRL -	Main River Limit
NRA -	National Rivers Authority
NRA TR -	National Rivers Authority Thames Region
RQO -	River Quality Objective
SSSI -	Site of Special Scientific Interest
SWQO -	Statutory Water Quality Objective
TWU -	Thames Water Utilities
WO -	Welsh Office

### Units

Length:	10mm	= 1 cm	(equivalent to 0.394 inches)
	100cm	= 1 m	(equivalent to 39.37 inches)
	1000 m	= 1 km	(equivalent to 0.621 miles)
Area:	10 000 m <sup>2</sup>	= 1 ha	(equivalent to 2.47 acres)
Density:	1 000 ng/l	= 1 ug/l	(equivalent to 3.53 x 10 <sup>8</sup> ounces)
	1 000 ug/l	= 1 mg/l	(equivalent to 3.53 x 10 <sup>5</sup> ounces)
Flow:	1 000 l/s	= 1 m <sup>3</sup> /s	(equivalent to 35.31 cusecs)
	1 000 m <sup>3</sup> /d	= 11.6 l/s	(equivalent to 0.41 cusecs)
	1 Ml/d	= 11.6 l/s	(equivalent to 0.224 mgd)



**BLACKWATER RIVER CATCHMENT MANAGEMENT PLAN  
NATIONAL RIVERS AUTHORITY, THAMES REGION,  
THE GRANGE, 97 CROSSBROOK STREET,  
WALTHAM CROSS, HERTFORDSHIRE, EN8 8HE.**