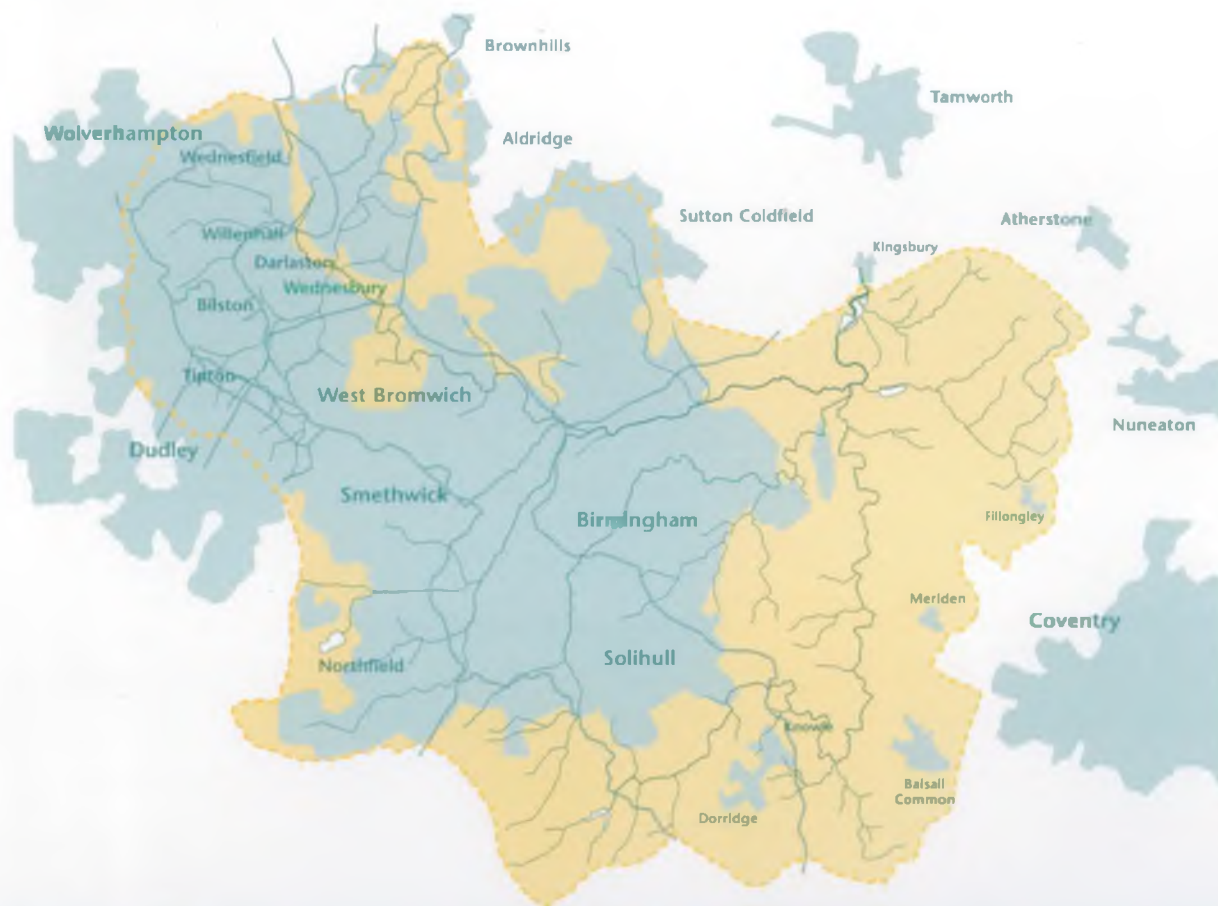


local environment agency plan

WEST MIDLANDS-TAME CONSULTATION REPORT MARCH 1998



ENVIRONMENT
AGENCY

What is this report about?

This report is about the environment of Birmingham, Solihull, much of the Black Country and parts of Warwickshire, what we call the West Midlands - Tame area. It is all the land that drains to the River Tame up to Kingsbury, just upstream of the River Purification Lakes at Lea Marston. The report looks at the physical environment of land, air, water, wildlife and heritage. It highlights the current quality of the environment, the natural resources of the area and how they can be protected. It also identifies *specific* environmental problems in the area and how they can be tackled.

Why should I read it?

The Environment Agency wants to hear your views on the issues facing the environment of the area and what you think should be done about them. Telling us your views will enable you to contribute to environmental protection and improvement and influence what the Environment Agency and others do. We will be pleased to receive any comments that you wish to make but in particular we are very keen to know:

- what you think should be done about them?
- how important do you think the issues are?
- What you think of our proposals?
- are there problems or opportunities that we have not included?
- whether you can help to tackle any of the issues.

What will the Environment Agency do with my comments?

The Agency will consider your comments prior to the production of an Action Plan which will set out proposals to protect and improve the environment of the area. If you want us to, we will reply to you on your specific comments, letting you know how they have influenced our actions, and if appropriate, the actions of others. **All comments will be treated as public information unless you ask us otherwise.**

If you want more copies of this document for colleagues or other organisations that you think would be interested, we will be pleased to send them free, either to you or direct to them.

Please return your comments to us by 25 June 1998



8 In which town or area do you live?

9 What best describes your interest? (Please tick one box only).

An officer working for a local authority or government agency/department.

☐

An officer/representative of a national organisation.

☐

A member of an environmental pressure group.

☐

A member of a local sports club.

☐

A member of a local amenity society (ie Civic Trust).

☐

A local resident.

☐

An individual interested in environmental matters.

☐

Other (Please specify)

10 Are there other issues you would like to see included in the Action Plan? Y/N

If "yes", please give brief details (use separate sheets if necessary)

11 Are there any major errors or omissions in the report? Y/N

If "yes", please give brief details (use a separate sheet if necessary)

12 If you would like a reply, please write your name and address below. Your address will not be given to anyone else, although this questionnaire will be available for public inspection.

Name:

Address:

Post Code

Comments

If you have any further comments, please write them here or continue on another piece of paper.

Thank you

For completing this questionnaire.

Environment Agency
Sentinel House
Wellington Crescent
Fradley Park
Lichfield
Staffs **WS13 8RR**

Tel: (01543) 444141
Fax: (01543) 444161

Your Views Count



The aims of the Consultation Report and Leaflet are:

- To tell you our vision, the issues we consider need to be tackled, and how we can work together. It also provides background environmental information about the local area.
- To receive your views and comments. This is your opportunity to tell us what you think and you can help by filling out this questionnaire. Alternatively a separate written statement (by letter or fax) would be welcomed. All comments received will be treated as public information unless you state otherwise.

i) **Please answer the questions in the questionnaire (it should only take five minutes).**

ii) **Write any extra comments on the back of this sheet.**

iii) **Detach the questionnaire and send it to us in the FREEPOST envelope provided.**

Questions

1 Have you heard of the Environment Agency before? Y/N

2 How did you first find out about this Local Environment Agency Plan? (Please tick box).

Letter from Agency ☐
Agency displays ☐
Radio ☐
TV ☐
Newspaper ☐

Other (please state) _____

3 Where did you get this report?

4 Have you seen the summary leaflet? Y/N

5 Our Vision for the area is:

"An improved and balanced relationship between human activity and the environment, so that neither causes harm to the other, and each may continue to benefit from the other".

Do you agree with this? Y/N

If you disagree, please explain why.

6 The principal aim of the Environment Agency is to "contribute to sustainable development".

Do you understand what is meant by "sustainable development"? Y/N

7 We have identified issues and options in Section 3 of the Consultation Report and in the summary leaflet. Please circle and mark the five issues in order of importance to you. (1=Most important, 5=Least important).

- Issue 1 Biodiversity.
- Issue 2 Lack of public access routes along river banks.
- Issue 3 Enhancement of watercourse corridors in urban areas for wildlife and amenity.
- Issue 4 Urban run-off and deoxygenation of the River Tame.
- Issue 5 Sustainable Urban Drainage.
- Issue 6 Investment by Severn Trent Water Limited to improve water quality.
- Issue 7 Lea Marston Purification Lakes.
- Issue 8 River flows and water quality in the River Blythe.
- Issue 9 Excess nutrient levels in the Sutton Park Pools.
- Issue 10 The current quality of rivers and canals.
- Issue 11 The effect of the West Midlands - Tame catchment on downstream water quality.
- Issue 12 Contaminated land.
- Issue 13 The impact of rising groundwater beneath Birmingham.
- Issue 14 Baseflow contribution to the River Tame.
- Issue 15 Water resources development strategy for canals.
- Issue 16 Litter and the aesthetic pollution of rivers and canals.
- Issue 17 Enclosure of waste transfer activities.
- Issue 18 Packington Landfill Site.
- Issue 19 Flytipping.
- Issue 20 Sustainable Waste Management.
- Issue 21 Air quality monitoring.
- Issue 22 Industrial heavy metal pollution in Pleck, Walsall.
- Issue 23 Odour problems in Sandwell.
- Issue 24 Review of flood defences on the River Tame.
- Issue 25 The proliferation of surface water balancing systems in Solihull.
- Issue 26 The future management of Park Hall Farm.

More questions overleaf

Foreword

Welcome to the consultation report of one of the Environment Agency's new Local Environment Agency Plans (LEAPs). The Environment Agency is responsible for regulating waste disposal, releases to air from some industrial processes and safeguarding and where possible improving the water environment. The Agency has set itself the aim of protecting and enhancing the whole environment through the promotion of sustainable development. One way of achieving this aim is through local environment planning and collaborative action with the community, Local Authorities and other organisations.

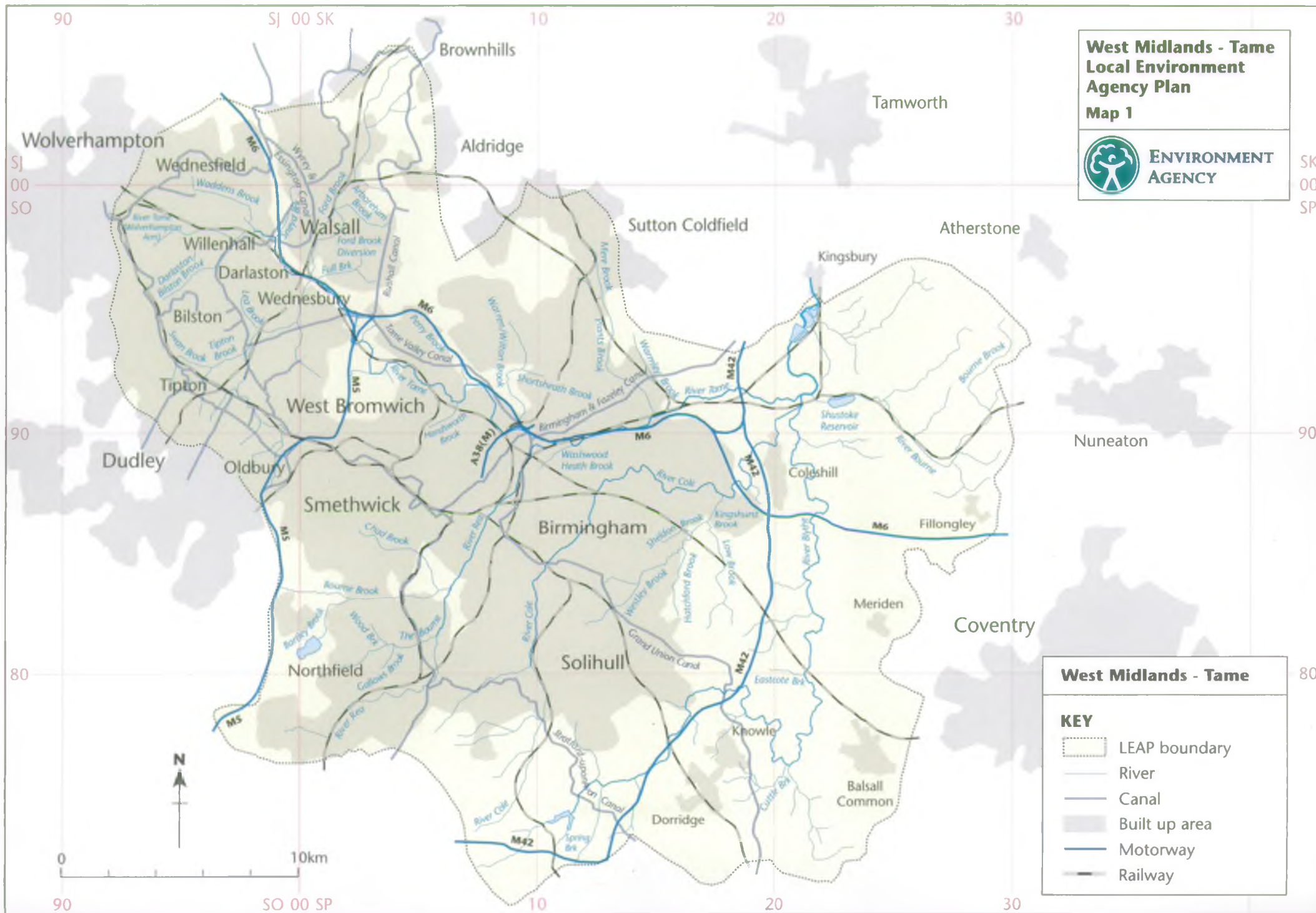
The Agency and other regulators have to work in an ever wider international context because environmental changes are occurring on a global scale. Our long term strategy must reflect global issues, and our actions at a local level will help to provide the solutions. The Agency is looking to dovetail many of its actions and activities into the Local Agenda 21 process.

The LEAP process will establish a common vision for the West Midlands - Tame area and provide a framework for protecting and improving our local environment. It will raise local environmental issues and, through partnership, will direct resources to where they are most needed. LEAP areas are based on river catchments because they provide firm environmental boundaries, and this plan relates to all the land that drains to the River Tame as far as Kingsbury, just downstream of the Lea Marston Purification Lakes.

This report is published as part of a major consultation exercise and marks the start of a three month period of consultation. It is the first stage in the LEAP process and will result in the publication of an action plan which will set out a costed programme of work by the Agency, and by agreement, other organisations, to protect and improve the environment of the West Midlands - Tame area over the next five years. Annual reviews over the five year period will report on the progress being made.

Your views are very important and will be help in the production of the action plan. I look forward to hearing from you,

Philip Burns
Area Manager
Upper Trent Area
Midlands Region
Environment Agency



Your views on this report will be considered in preparing the next phase, the Action Plan. **The entire consultation report will *not* be rewritten as part of the action plan process.** However, any errors or omissions will be acknowledged in a statement on the public consultation response, to be published soon after the consultation period ends on 25 June 1998.

The Agency hopes that the LEAP Action Plan will also influence the policies and actions of the local authorities, developers and others as well as assisting the Agency in the day to day management of the LEAP area.

How can I make my views known?

We will be holding two seminars to provide an opportunity for you to discuss this plan with us.

A seminar specifically aimed at industry and business will be held on Thursday 4 June, and a separate seminar for amenity groups, environmental organisation and other interested individuals will be held on the evening of Wednesday 10 June at Birmingham Council House.

Further details on the times and venues of the seminars are available from Dr Chris Stanley at the address shown below.

You can contact us by

- using the questionnaire and freepost envelope included at the back of this report,
- writing to us and using the freepost envelope
- telephoning us on 01543 444141
- faxing us on 01543 444161
- or you can e-mail us at Chris.Stanley@environment-agency.gov.uk

Please address your comments to:

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LEAPs Officer
The Environment Agency
Sentinel House
9 Wellington Crescent
Fradley Park
Lichfield WS13 8RR



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ENVIRONMENT AGENCY



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Acknowledgments

This report has been compiled by the Environment Agency with contributions from key organisations operating in the area. The Agency is particularly grateful to the county, city borough and district councils for the information provided and to the Farming and Rural Conservation Agency (FRCA) at Worcester for the provision of information on agriculture. The following Agency staff are members of the Project Group responsible for the development of this report. Other members of staff have also contributed through the Project Group.

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Vic Brown	Team Leader, Development Control
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Rachel Cowlshaw	IPC/RAS Technical Support Officer
Andrew Crawford	Area Conservation and Recreation Officer
Anne Dacey	Team Leader, Water Resources
John Davis	Environment Protection Officer
John Floyd	Tactical Planning Officer (waste)
Doug Freakley	Team Leader, Environment Protection
Janice Greenfield	Administration Assistant
Jonathan Jenkin	Team Leader, LEAPs
Rob Moore	Tactical Planning Officer (water)
David Othen	Team Leader, IPC/RAS
Andrew Pearson	Senior Hydrogeologist, Groundwater Protection
Chris Stanley	LEAPs Officer
Paul Swain	Team Leader, Planning Liaison

This is the second plan to involve the Upper Trent Area Environment Group, our local consultative panel for all aspects of Agency activity. The input from the West Midlands - Tame Sub-Group has been a valuable contribution to this report. The members of the Sub-Group are:

Dr Peter Bottomley	Regional Fisheries Advisory Committee
Ian Nichol	Groundwork Birmingham
Duncan Wemyss	British Secondary Metals Association
Michael White	CBI Midlands, IMI
Dr Helen Whitehouse	Inland Waterways Association

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A Vision for the West Midlands Tame Area

The Environment Agency's vision for the West Midlands - Tame area is:-

An improved and balanced relationship between human activity and the environment, so that neither causes harm to the other, and each may continue to benefit from the other.

It will be evident from reading this document that the impact of urban development and social and economic activities in the area has been considerable on the resources of air, land, water, wildlife and heritage. Development can have a negative effect on both the quality of the environment and the quantity left available for the other uses. Conversely, where the environment has been damaged by human activity it can have a negative effect on peoples health and well-being. Much of our built environment reflects our history and our cultural and industrial heritage and its loss may diminish the cultural-capital available to future generations, but we also have a duty to preserve our wildlife and our natural heritage. Ultimately, if we continue to harm the resources of air, water and land, then the air that we breathe, the water we drink and even the land on which we live, can and will in turn. cause us harm.

This is a situation that *need not be*. It is entirely possible to seek to minimise environmental damage, promote the diversity of life and reap the benefits of an improved quality of life. It is of course vitally important that the economic and social needs of the area are met, but at the same time the negative impacts of development on the environment must be minimised, and existing problems rectified. This is a challenge that can be achieved through integrated and sustainable environmental management.

This Local Environment Agency Plan aims to:

- o Educate and raise awareness of the local environment and environmental issues in the West Midlands;
- o Explain how human activities affect the environment, and how environmental events can impact upon people, property, and our wildlife and heritage;
- o Influence peoples' behaviour so that we all might act in a more environmentally responsible way;
- o Form partnerships with local people and organisations, to realise the potential of the area and encourage ownership of the West Midlands environment;
- o Create an improved urban environment, reducing the pressures for greenfield development and suburban living.

The Key Objectives for the Agency in this area are to realise the vision by:

- o Promoting and encouraging sustainable new development in the West Midlands;
- o Improving our knowledge of the quality of the air, particularly in the urban areas, so that we can better understand how and where to concentrate our efforts to improve air quality;
- o Encouraging the reduction, treatment and better management of the waste products of the West Midlands;
- o Minimising the harmful effects of urban run-off and contaminated land;
- o Targeting sites of unsatisfactory water quality, and consolidating improvements which have been made;
- o Promoting and encouraging better management of all our water resources in an environmentally sustainable way by balancing the needs of legitimate users with those of the environment;
- o Conserving and enhancing biodiversity through the protection and enhancement of green/river corridors, public open spaces, metropolitan open land and green belt;
- o Promoting the recreational and amenity value of river corridors, ponds and canals without prejudicing the diverse heritage of the West Midlands;
- o Protecting people, property, our wildlife and our heritage from short and long term harmful environmental events.

Most of these objectives complement each other, although some may require a degree of compromise between differing demands on the resources of the area. Realisation of our vision will be achieved through an integrated and balanced approach to all activities. Together, through commitment and enthusiastic co-operation our vision for the West Midlands - Tame can become a reality.



1 Oldbury

West Midlands Tame

Local Environment Agency Plan

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How to use this report

The consultation report is divided into four sections:-

Section 1 - Introduction

This section is an introduction to the Environment Agency and to the LEAP process it highlights the principal aim of the Agency, sustainable development, biodiversity, waste minimisation, and climate change.

Section 2 - Overview

This section provides a general description of the catchment and the resources of air, land, water, wildlife and heritage.

Section 3 - Issues and Options

Here we identify the issues and problems that we, the Agency, consider need to be addressed locally in the short to medium term and put forward a number of options for their resolution.

Section 4 - Protection through partnership

This section looks at partnerships, land use planning and education which can be used to address longer term issues and problems and raise the quality of the local environment.

The report is supported by three main appendices.

Appendix 1 - Pressures on the Environment

This appendix identifies those human activities that create pressure on the environment.

Appendix 2 - Environmental Management

This appendix looks at the management responses to the pressures on the environment.

Appendix 3 - The Current State of the Local Environment

This appendix provides information on the local environment of the West Midlands - Tame. Some of this information is set against standards and targets.



2 The entrance to Birmingham City Council House

Section 1 - Introduction

This is the first Local Environment Agency Plan (LEAP) for the West Midlands - Tame area. It builds on work achieved by the former National Rivers Authority in the *Blythe/Cole/Bourne* and *Tame* Catchment Management Plans (CMPs), which were integrated local plans for the water environment. LEAPs look at the physical environment of water, land and air and reflect a wider, more holistic view in keeping with the duties and responsibilities of the Environment Agency.

The Blythe/Cole/Bourne and Tame CMPs covered the entire catchment of the River Tame including the River Anker and River Sence, and the lower reaches of the River Tame through Tamworth to the River Trent at Alrewas outside the scope of this report. Annual Reviews of the CMPs will continue for these reaches until a LEAP covering this remaining area is produced in summer 1999. Some of the actions from relevant issues raised in the CMPs have been taken up here.

The LEAP consultation report and the subsequent action plan is the Agency's draft planning document and will influence much of our expenditure in the area over the next five years. It is also hoped that the LEAP will influence the policies and actions of local authorities, developers and others.

1.1 The Environment Agency

The Environment Agency of England and Wales was established on 1 April 1996 by the 1995 Environment Act. It is a "non-departmental public body" accountable to the Minister for Environment, Transport and the Regions and has taken over the functions of previous, separate environmental regulators: The National Rivers Authority (NRA) which had responsibility for the water environment; Her Majesty's Inspectorate of Pollution (HMIP) which had responsibility for regulating the largest and most potentially polluting industrial processes and regulated the use and disposal of radioactive material; and the 83 Waste Regulation Authorities which had responsibility for waste regulation in local authorities; and in addition a small number of technical sections from the Department of the Environment. This merger allowed for a more comprehensive and holistic approach to the protection and management of our environment and the Environment Act also gave the Agency new responsibilities and duties.

The Agency covers England and Wales (with separate organisations for Scotland and Northern Ireland) and is divided into eight regions and twenty six areas. The West Midlands - Tame catchment is one of four LEAP catchments in the Upper Trent Area of Midlands Region. Most of the Agency's work is undertaken at the Area level and this allows for an efficient and appropriate response to the delivery of our services.



Figure 1 - The eight regions of the Environment Agency

1.1.1 The Principal Aim of the Environment Agency

The principle aim of the Agency is to contribute to sustainable development. In doing so, the Agency must have regard to Ministerial guidance, and must take into account the likely costs and benefits.

The principle aim is defined under Section 4 of the Environment Act 1995 as:- *"In discharging its functions so to protect or enhance the environment, taken as a whole, as to make the contribution towards attaining the objective of achieving sustainable development that ministers consider appropriate"*.

Ministerial guidance was issued in November 1996. LEAPs are an important part of the Agency's contribution to sustainable development.

1.1.2 The Environment Agency's Vision

"A better environment in England and Wales for present and future generations".

The Environment Agency recently published *"An Environmental Strategy for the Millennium and Beyond"* which clearly sets out a new environmental approach to meet the Agency's Principle Aim and to achieve the Agency's Vision. The Strategy states the overall aims of the Environment Agency. These are:

- To achieve major and continuous improvements in the quality of air, land and water.
- To encourage the conservation of natural resources, animals and plants.
- To make the most of pollution control and river basin management.
- To provide effective defence and warning systems to protect people and property against flooding from rivers and the sea.
- To reduce the amount of waste by encouraging people to re-use and recycle their waste.
- To improve standards of waste disposal.
- To manage water resources to achieve the proper balance between the country's needs and the environment.
- To work with other organisations to reclaim contaminated land.
- To improve and develop salmon and freshwater fisheries.
- To conserve and improve river navigation.
- To tell people about environmental issues by educating and informing.
- To set priorities and work out solutions that society can afford.

1.1.3 Emergency Hotline telephone number

The majority of incidents that the Agency responds to are reported to us by the general public. In many ways the public are our "eyes" and "ears". To report any pollution incident to air, land or water, or to report river flooding, the Agency has an emergency 24 hour freephone number:

EMERGENCY FREEPHONE "HOTLINE"
0800 807060

For any other telephone enquiries, please call us on 01543 444141.

1.1.4 Responsibilities outside the remit of the Agency

The Agency's work and responsibilities do not cover all aspects of environmental legislation or services to the general public. There are other statutory and non statutory bodies who have responsibilities.

Table 1 summarises those environmental concerns for which the Agency generally has no responsibility.

Table 1 Environmental concerns which are generally the responsibility of regulatory bodies other than the Environment Agency

Environmental concern	Responsible party
Local planning issues	Local Authority
Health and hygiene issues	Local Authority
Noise	Local Authority
Litter	Local Authority
Smoke from bonfires	Local Authority
Smoke from domestic chimneys	Local Authority
Air pollution from traffic	Local Authority/Police
Air pollution from industry	Local Authority (or Environment Agency)
Contaminated land	Local Authority (or Environment Agency)
Strange taste, smell or colour of tap water	Severn Trent Water or South Staffordshire Water
Problem with water supply	Severn Trent Water or South Staffordshire Water
Burst water mains	Severn Trent Water or South Staffordshire Water
Flooding to property from foul sewer	Severn Trent Water
Navigation on canals	British Waterways

1.1.5 Regional Committees and Area Environment Groups

In order to support openness, objectivity and accountability, the Agency is required by law to consult committees on all aspects of its work. Membership of the regional committees consist of local people drawn from public life including industry, agriculture, local authorities and environmental groups. A third of the members are appointed from local authorities.

The Midlands Region is served by three committees:-

- o Regional Environment Protection Advisory Committee (REPAC)
- o Regional Flood Defence Committee (RFDC)
- o Regional Fisheries Advisory Committee (RFAC)
(this includes, conservation, recreation & navigation relating to the water environment)

REPAC and RFAC are advisory committees, while RFDC has executive powers relating to capital expenditure for flood defences.

The Upper Trent Area is served by its own Area Environment Group (AEG). Membership consists of local people who live or work in the area and who represent a range of interests. These include local authorities, industry, agriculture, conservation, amenity and recreational interests and riparian owners. The group advises the Agency on LEAPs, the delivery of local services and acts as a link between the local community, the Agency and its statutory committees. The Chairman of the Upper Trent Area AEG is Judith Ashworth who has worked on environmental issues in this area for some time. The AEG has set up sub-groups to consider all draft LEAP documents. The members of the sub-group involved with the development of this LEAP are detailed on page (vi).

1.1.6 The Agency's forward strategy

The Agency is currently producing a long-term corporate strategy covering all of its business activities including our goals and funding needs for the year 2000 and beyond. The corporate strategy will be underpinned by the long-term environmental strategy "*An Environmental Strategy for the Millennium and Beyond*" published in autumn 1997. This provides our approach to integrated management of the environment, from which key business objectives and priorities will follow. In addition, management plans, including Core-Functional Business Plans, Regional and Area Business Plans and Local Environment Agency Plans will translate our strategic goals into local objectives and targets. The corporate planning framework is summarised in figure 2.

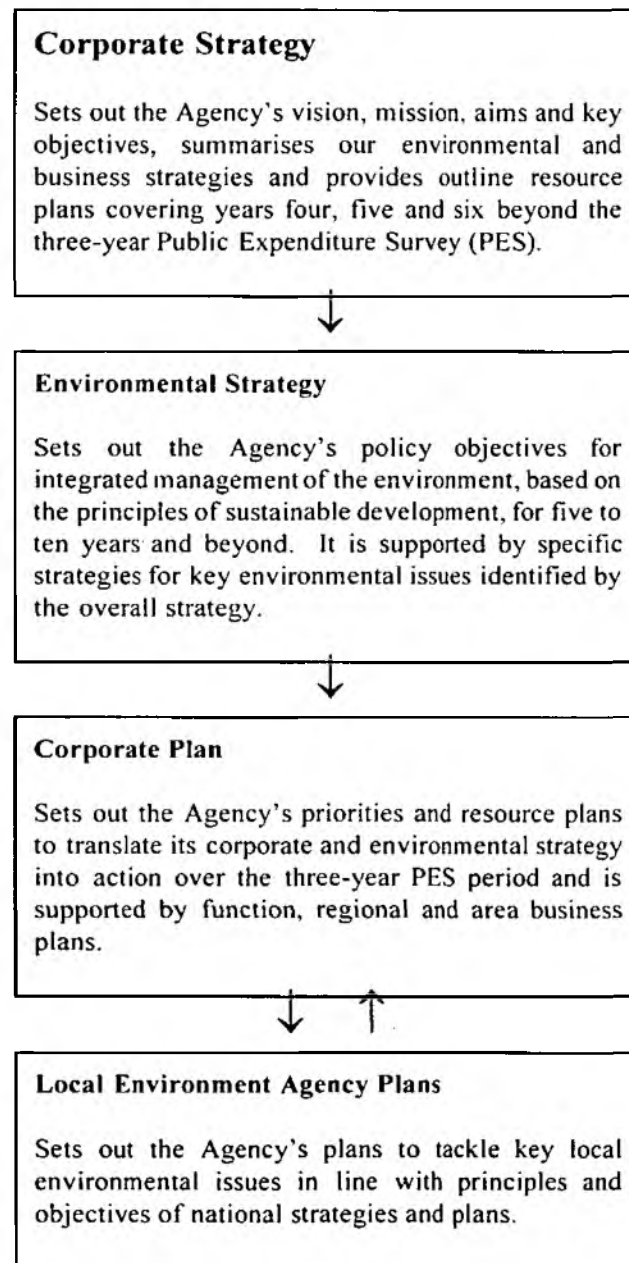


Figure 2 - The Agency's Planning Framework

1.2 Local Environment Agency Plans

The Agency is committed to delivering environmental improvement at the local level, and one of the ways to do this will be through Local Environment Agency Plans (LEAPs). The plans are non-statutory integrated action

plans based on river catchments. They provide a focus for those concerned with the future of the local area.

LEAPs help to fulfil the Agency's principal aim of contributing to sustainable development through integrated environmental management and improvement. They also play a role in:-

- promoting openness and accountability,
- developing closer links with public/community and other agencies,
- educating and informing the public on local environmental issues,
- prioritising the Agency's work through an action plan for managing and improving the local area over the next 5 years,
- realising the environmental potential of the area,
- forming joint actions and partnerships for environmental improvement.

1.2.1 The Consultation Report

This document, the Consultation Report is the first output from the LEAP process, and is not the final plan. To assist in the preparation of this report an informal consultation exercise was undertaken with a range of organisations and groups in July 1997. Of the 87 individuals and organisations contacted, we received 32 replies. Many thanks are due to those who provided information and comment. Those consulted are listed in Appendix 5.

The LEAP Process

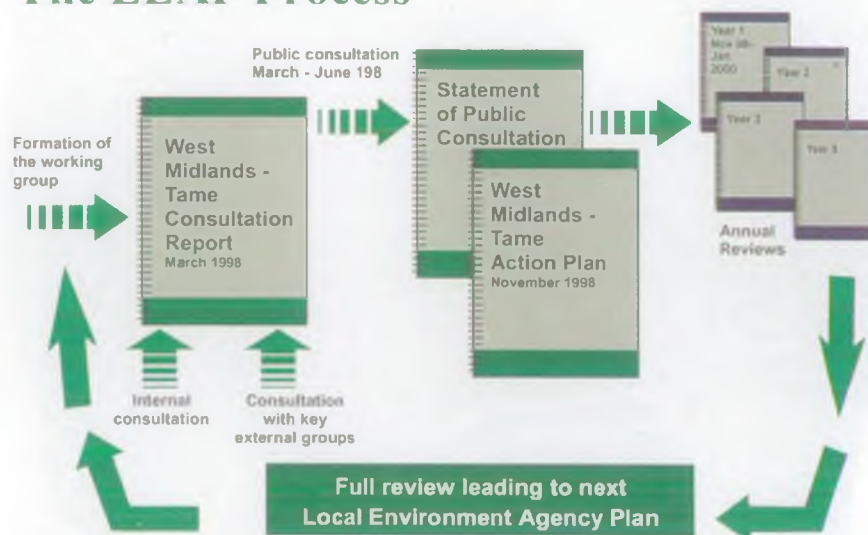


Figure 3 - The LEAP process and the main outputs in the five year cycle

1.2.2 The Consultation Period

The purpose of the three months consultation period is to enable the Agency and all interested parties to liaise and reach a consensus about the management of the area. It is your opportunity to influence the Action Plan that will be produced from this consultation report. **We need your views please by 25 June 1998**

1.2.3 The Action Plan

Through consultation a shared vision will be developed, along with a strategy for action. This will guide all Agency activities for the next five years and should influence the activities of other groups. Public participation is important as it increases environmental awareness and encourages greater involvement and ownership of the local environment.

The action plan will set out the vision, a costed action programme for environmental improvement and supporting policies and partnerships.

1.2.4 Annual Reviews

Regular monitoring and updating of the plan will be an integral part of the process. Annual review reports will be published leading to a full review and fresh consultation at the end of five years.

1.2.5 The National Programme

The West Midlands - Tame LEAP is part of a national programme to ensure LEAP coverage of England and Wales to consultation report stage by the 31 December 1999. In order to achieve this deadline, a timetable for LEAP production for the area has been developed. This should ensure that all consultation reports have been produced by August 1999.

Table 2 - Upper Trent Area LEAP programme

Catchment	Start	Consultation Starts	Issue Action Plan	1st Annual Review
Staffordshire Trent Valley	October 96	June 1997	February 1998	April 1999
West Midlands - Tame	May 1997	March 1998	November 1998	January 2000
Dove	February 1998	November 1998	August 1999	October 2000
Burton, Nuneaton & Tamworth	November 1998	August 1999	May 2000	July 2001

If you are reading this report after the consultation period has ended, we would still be interested in hearing your comments and your views, as they will be useful for future plans, and quite possibly for our current activities. The address for sending your comments is at the front of this report.

1.2.6 LEAPs and other plans

LEAPs should compliment and integrate with the plans and publications of local authorities and others, including Waste Local Plans, Local Air Quality Management Plans, Local Development Plans and Local Agenda 21 plans.

Town and Country Planning

The achievement of some of the Agency's objectives will depend upon town and country planning policies of county, borough, district and unitary councils. The Environment Agency is a statutory consultee in the formulation of planning policy. In Section 4, Protection through Partnership, draft planning guidance is included. This sets out policies and approaches that we think could help to address longer term problems and issues highlighted in this report. We particularly welcome feedback from planning authorities on the draft guidance found in the Protection through Partnership section which will affect the Agency's response to planning applications and development plans.

Strategic Waste Planning

The Agency can encourage and promote the means to achieve targets set out in the National Waste Strategy, but it has no powers to require businesses or the general public to reduce waste or develop more sustainable methods of waste management. However, by identifying and publishing these local issues it may bring the necessary pressure to bring those involved to work towards their achievement.

Strategic Air Quality Planning

Similarly, the National Air Quality Strategy also sets out targets that need to be met. The Agency has no powers to regulate emissions from motor vehicles, a major cause of air pollution, but by identifying the problem, pressure can be brought on the public and regulators alike.

1.3 Sustainable Development

1.3.1 Introduction

The Environment Agency is committed through its principal aim to the principles of sustainable development. The most commonly used working definition was provided in 1987 in the Brundtland Report "Our Common Future".

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

Rather than predicting ever increasing environmental decay and hardship in a world of ever decreasing resources, the report saw the *"possibility of a new era of economic growth, based on policies that sustain and expand the natural environmental resource base"*.

Sustainable development does not necessarily mean less economic development. One of the challenges is to promote ways of encouraging environmentally friendly economic activity, and of discouraging or controlling environmentally damaging activity.

Sustainable development requires a full consideration of environmental, social and economic issues during the decision making process. Where the full effects of a particular proposal or policy are not known, then the **"precautionary principle"** should be adopted whereby no action is undertaken until such a time as the potential impacts can be more clearly defined. The UK Government is firmly behind the principles of sustainable development and has published "Sustainable Development - The UK Strategy". Ecological criteria have a central role to play. This may mean considering the ability of a habitat or ecosystem to sustain a population of a particular species, sometimes described as the carrying capacity.

The total of human wealth cannot be measured only by man-made capital but must allow for **natural environmental capital** and other contributions to our quality of life. Natural capital consists of **renewable and non-renewable resources**. The challenge of sustainable development is to find ways of enhancing total wealth while using common natural resources prudently, so that renewable resources can be conserved and non-renewables used at a rate which considers the needs of future generations. In this it is particularly important to consider whether there is a risk of **irreversible** environmental change and, if so, how significant this may be.

Making judgements about the weight to be put on these factors when considering development will vary but we should make a proper allowance for the interests of future generations and for the pressures that society places on the global environment.

A lot of environmental pollution and resource depletion occurs because the people responsible do not bear the cost. It is important that policy is guided by the **"polluter pays"** principle which requires that when production processes threaten or cause damage to the environment, that the costs of environmental measures are borne by the producer and not society at large. This also provides an incentive to reduce pollution. In the case of historical pollution, where a responsible party cannot be identified, the cost inevitably has to be met by the public purse.

For sustainable development to be achieved, all stakeholders should contribute to decision making and implementation. It is important that dilemmas and problems are resolved in ways that take account of the views of those concerned, for without widespread support, little will be achieved.

Allied to sustainable development are a raft of other complimentary programmes on climate change, biodiversity, forestry and Local Agenda 21 developed from the United Nations Conference on Environment and Development at Rio in 1992.

1.3.2 Government Guidance to the Agency on Sustainable Development

In November 1996, guidance was given to the Agency by the Government on its contribution to sustainable development. The following summarises the guidance given:

- o Because the environment is shared, collective action is necessary;

- Decisions should be based on the best possible scientific information and analysis of risks;
- Ecological impacts must be considered, particularly where resources are non-renewable or effects may be irreversible;
- Cost implications should be brought home directly to the people responsible - the "polluter pays" principle;
- A holistic approach should be taken to environmental objectives, the Agency should make use of integrated catchment planning or other geographic planning tools;
- A long term perspective should be taken;
- Biodiversity should be conserved and enhanced and natural heritage protected;
- A contribution should be made to protecting the global atmosphere;
- The scope for reconciling the needs of the environment and those of development with regard to regulated organisations should be investigated;
- Close and responsive relationships with the public, local authorities, and other representatives of local communities should be developed; and
- High quality information and advice should be used by the Agency and provided to others.

LEAPs play an important part in the Agency's contribution and will help it to meet many of the objectives set by Ministers.

1.4 Biodiversity

1.4.1 Definition of Biodiversity

"Biodiversity" is a relatively new term meaning the variety of life. The importance of biodiversity conservation has been recognised internationally by the development of a Biodiversity Convention intended to ensure the conservation of the full range of existing plant and animal species.

1.4.2 The Biodiversity Convention and the Agency's Role

The UK Government signed the Biodiversity Convention at the Rio Earth Summit in June 1992 and a national action plan on biodiversity was published in January 1994. Amongst the proposals was the formation of a Biodiversity Steering Group.

The Steering Group reported in December 1995. It set out in general terms the importance of biodiversity conservation and ways of achieving it, including detailed costed action plans for 116 key species and 14 key habitats, many of them aquatic or wetland-related and therefore of particular interest to the Agency. It was also suggested that a further 286 species action plans would need to be prepared in the next few years, together with another 24 habitat action plans.

At the same time a consortium of voluntary conservation bodies published "Biodiversity Challenge", a report which covered similar ground and includes action plans for 44 species and 6 habitats, though of a slightly different selection to the Steering Group report. The Government responded to the Steering Group report endorsing the targets and action plans.

The Agency has significant responsibilities regarding implementation of the UK Biodiversity Action Plan and will be developing targets for species and habitats of conservation concern. These relate to the targets for key wetland species and habitats as identified in the UK Biodiversity Action Plan, and in this report we emphasise the contribution that the Midlands Region can make to national targets.

Nationally, the Agency is a "contact point" or co-ordinating body under the Action Plan for 12 species and for chalk river habitats. Chalk rivers are not found in this Region. The Agency has produced a Biodiversity Strategy for the Midland Region. This concentrates on aquatic and wetland species and habitats identified in the Steering Group Report which are found in this Region. Details are given in Appendix 3.

1.5 Climate Change

The Environment Agency must work in a wider context than simply the carrying out of the functions of its predecessor bodies, because it is now generally accepted that environmental changes are occurring on a global scale. Individual countries contribute to these changes, and respond to them in different ways. The Agency's

long-term strategy therefore has to reflect these global issues.

Perhaps the major international issue is that of climate change. Modelling climate change is difficult, and predictions of its effects vary. However, it is now increasingly accepted that temperatures appear to be rising globally, and that this warming may be linked to man's activities. The UK is a contributor to the emission of gases such as carbon dioxide into the atmosphere which are believed to contribute to long-term climate changes. The UK will also be affected in a complex way as and when the climate does change. The UK is therefore a signatory to the Framework Convention on Climate Change, as agreed at the Rio Summit in 1992, and, following the 1997 Kyoto summit, is taking an active part in international negotiations to obtain commitments for credible and achievable reductions of greenhouse gas emissions. The European Union's legally binding target as a result of the Kyoto summit is of an 8% reduction of greenhouse gases across the EU by 2008-2012, but any commitment to aim for a more ambitious target, or agreement of the relative contributions by each member state had not been reached at the time of writing this report.

For the Agency's part, we can help the Government to meet the greenhouse gas emission targets through regulation of emissions from major industrial processes, by developing methods to improve our estimates of the emission of methane into the atmosphere from landfill sites, by promoting and encouraging the reduction of energy production from burning fossil fuels, by research into measuring the effects of climate change and how to manage them, and of course by setting an example by reducing our own energy and fossil fuel consumption within the Agency. We can also help to mitigate the impacts of climate change through the development of plans to meet the country's water resource needs. Effective demand management of both energy and water resources is becoming increasingly important.



3 View across Sandwell Valley



4 Coventry Road

Section 2 - Overview

2.0 The Local Environment

Introduction

The 805 square kilometers of the West Midlands - Tame LEAP area covers the majority of the county of the West Midlands including Birmingham, Solihull, and much of the Black Country. Walsall and Sandwell lie within the area, although only the eastern parts of Wolverhampton and Dudley are included, as these Boroughs are built on the watershed draining east to the River Tame and west to the River Stour, with parts of Wolverhampton also draining north to the River Penk. The east and south of the LEAP area lies in the rural parts of Solihull, Warwickshire and skirts into the county of Hereford and Worcester. This is predominantly rural in character, and forms part of the green corridor or 'Meriden Gap' between the conurbations of Birmingham and the Black Country, and that of Coventry, Bedworth and Nuneaton. The population of the area is around 1.8 million people, the vast majority of whom live in the main conurbation. In recent years the area has seen an overall decline in population with a corresponding growth in nearby Tamworth, Lichfield, Nuneaton and Hinckley.

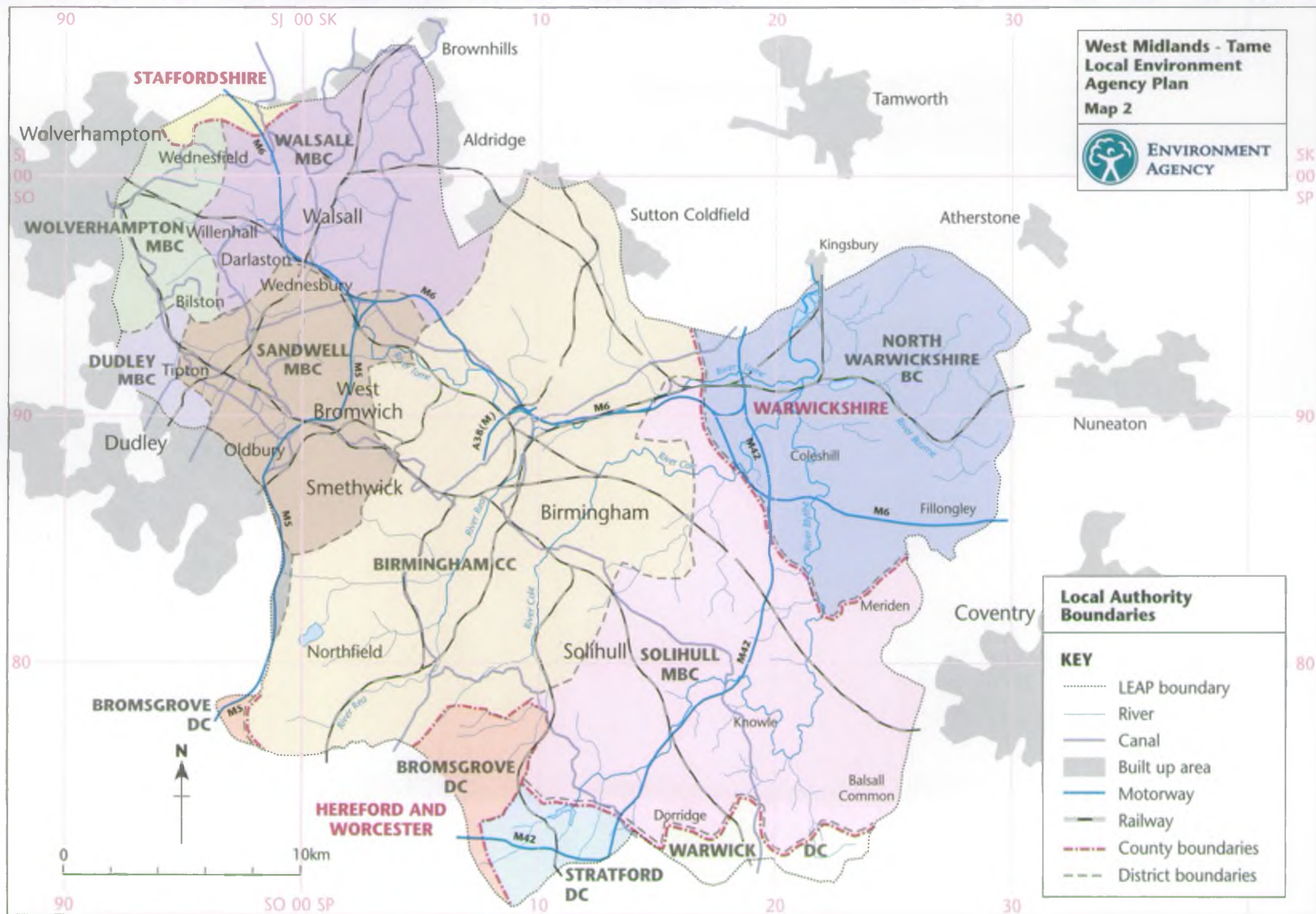
The area has been settled since prehistoric times, although until recent centuries settlement was sparse. In the medieval period, textiles and leather trades formed the basis of what little local industry there was, and it is likely that ironstone was worked at Dudley, Walsall and Wednesbury. Ironworking, using charcoal as fuel, spread across the area during the fourteenth century. By 1700, the growth of the mining and metalworking industries aided the development of new villages and small towns, however, the area was still predominantly rural, and it was only during the course of the eighteenth century that the mines, forges, furnaces and canals characteristic of the Black Country were developed.

By 1800 the landscape of the area was in a state of transition, the patterns of fields, lanes, farms and villages was being overwritten with the beginnings of major industrial development. The large quantities of mineral resources in the area enabled the development of such heavy industries as steel, iron, brick and glassworks, which in turn enabled the establishment of final assemblers, often based in Birmingham and Solihull. The population of the Black Country increased rapidly in the period 1800-1860 and the expanding towns were crammed with small workshops, foundries, forges, slag heaps, pit banks and slum housing.

After 1860 the Black Country began to decline in prosperity as the natural mineral resources were exhausted and light engineering with new technology gradually replaced the heavier industries. Birmingham, however, continued to grow as a manufacturing and financial centre and there was a period of rapid urban growth between the late 1940s and 1970s. The recession after 1979 badly affected the West Midlands and the conurbation saw a decrease in both industry and population. Today, the economy is more diverse with the growth of services, shops, offices and the growing leisure industry (for example the National Exhibition Centre, the International Conference Centre, and Birmingham International Airport). The principle industries in the area are engineering, metal finishing and vehicle manufacture, and Birmingham is a major administrative and financial centre and England's second city.

Since the early 1980's a lot of effort has gone into revitalising older industrial areas. The Black Country Development Corporation (BCDC) was formed in 1986 to operate for 10 years, and through public/private partnership sought to redevelop older, often heavily contaminated sites, with remedial measures to control pollution. BCDC is now closing down, as is the Birmingham Heartlands Development Corporation which was formed to redevelop parts of the older areas of the city. Both Development Corporations should be dissolved by Spring 1998.

Despite the largely urban nature of the area, there are 18 Sites of Special Scientific Interest (SSSI's) and two National Nature Reserves, Sutton Park in Sutton Coldfield, and the geologically important Wren's Nest in Dudley. The urban area has perhaps surprisingly become an important stronghold for water voles which are otherwise declining in numbers nationally. The area has a number of sites of archaeological interest, not least the vast industrial heritage of in the Black Country, and the largest canal network in Britain.



2.1 Land

Local Administration

Local administration is largely vested in two county councils, four district and borough councils and six unitary authorities. These are listed in table 3, and are shown on Map 2.

Table 3 - Administrative Details

West Midlands Region		
County Councils	Unitary Authorities	District/Borough Councils
Warwickshire CC Hereford & Worcester CC	Birmingham CC Solihull MBC Walsall MBC Wolverhampton MBC Dudley MBC Sandwell MBC	North Warwickshire BC Bromsgrove DC Stratford on Avon DC Warwick DC

Relief and Geology

The area of the West Midlands - Tame LEAP is generally relatively low lying (c70-270m OD) and is gently undulating. The lowest point is along the River Tame at Kingsbury in North Warwickshire (70m) and the highest points are near Beacon Hill (270m) in the Lickey Hills in the south west of the catchment and Barr Beacon (227m) to the east of Walsall.

The solid geology of the area ranges from the Carboniferous through to the Triassic era. Divisional boundaries run largely north/south. Triassic rocks of the Mercia Mudstone group (formerly Keuper Marl) are found in the centre of the region east of Birmingham and extending just east of the River Blythe. Immediately west of these sediments the geology passes to Triassic Sherwood Sandstone (a major aquifer) and Pebble Beds. Both east and west of the Triassic strata, Carboniferous sandstone and shales of the Middle and Lower Coal Measures are found, igneous rocks intrude into these Measures at Rowley Regis. Outcrops of Silurian Limestone are present in Dudley, Wolverhampton and Walsall. Reddish Till covers a tract of land west and south of Birmingham extending across the south of the LEAP area. Drift deposits of sand and gravels and boulder clay are locally present but are thin or absent across a significant part of the area, however, in the centre of the area around and east of Birmingham, Glacio-Fluvial deposits are extensive. River Terrace gravels are found along the rivers Tame, Cole and Blythe and their tributaries, and deposits of alluvium are found on their floodplains.

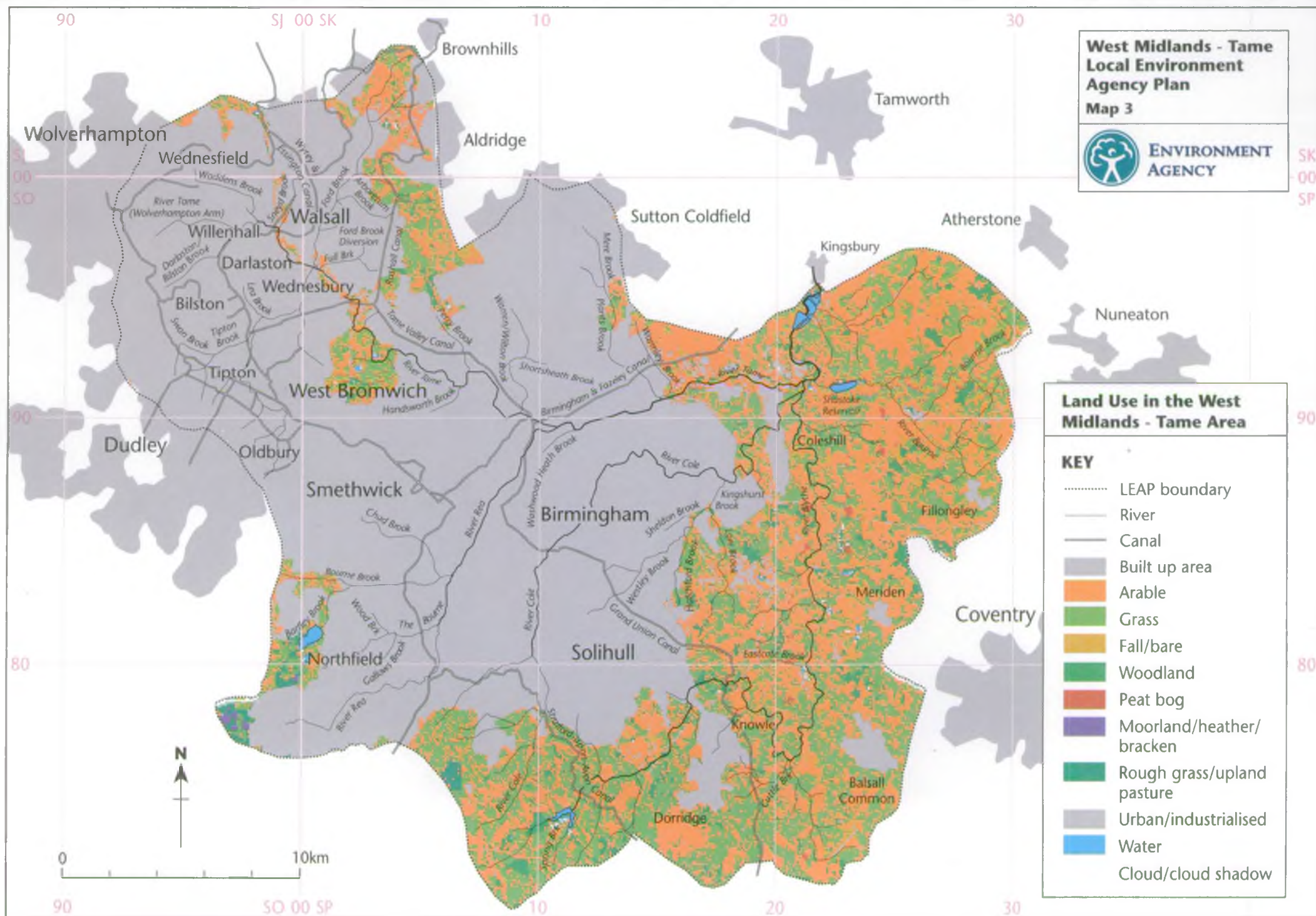
Land Use and Agricultural Land Quality

About half of the West Midlands - Tame LEAP area is covered by urban development, whilst the remaining area is made up of arable and grassland. Land use coverage based on information from the Landsat Thematic Mapper in 1990 is given in Map 3. The landsat map does however tend to underestimate the open areas of water, park and woodland within the urban area (for example much of Sutton Park and the Black Country Urban Forest).

The remaining land not covered by urban development is mostly in agricultural use, and is largely (38.5%) Grade 3 in land quality, with small areas of Grade 2 land (3.2%) found mostly in the northern area of Warwickshire, and Grade 4 land (3.3%) typically along the poorly drained river flood plains.

Contaminated Land

In Birmingham and the Black Country large amounts of land are contaminated to a greater or lesser extent by materials left by previous uses such as old waste tips, industrial sites and mineworkings. Such contamination can present a potential danger to human health as well as other animals and plants. It can and does affect the quality of both surface and groundwater, and it affects the potential for redevelopment of the land. Whilst the Agency will, in principle, support the redevelopment and remediation of contaminated land, care must always be taken that such work does not re-release the contaminants into the environment to do further damage. The problems of dealing with contaminated land in the area are addressed in issue 12.



Natural Radiation

We are all exposed to radiation all the time. Most people receive their greatest dose or exposure from natural radiation, mainly from radon. Radon is a natural radioactive gas. It comes from uranium that occurs naturally in all rocks and soils and is given off at the surface of the ground. We all breathe it throughout our lives. Out of doors, it disperses in air so levels are very low, but it can build up in enclosed spaces such as indoors where ventilation is poor.

The average radon level in homes in the West Midlands - Tame LEAP area is about 24 Bq m⁻³. This is very low and well below the "Action Level" dose of 200 Bq m⁻³ recommended in the National Radiological Protection Board's Control Strategy in 1990. It is not generally considered to be an issue of concern for this area.

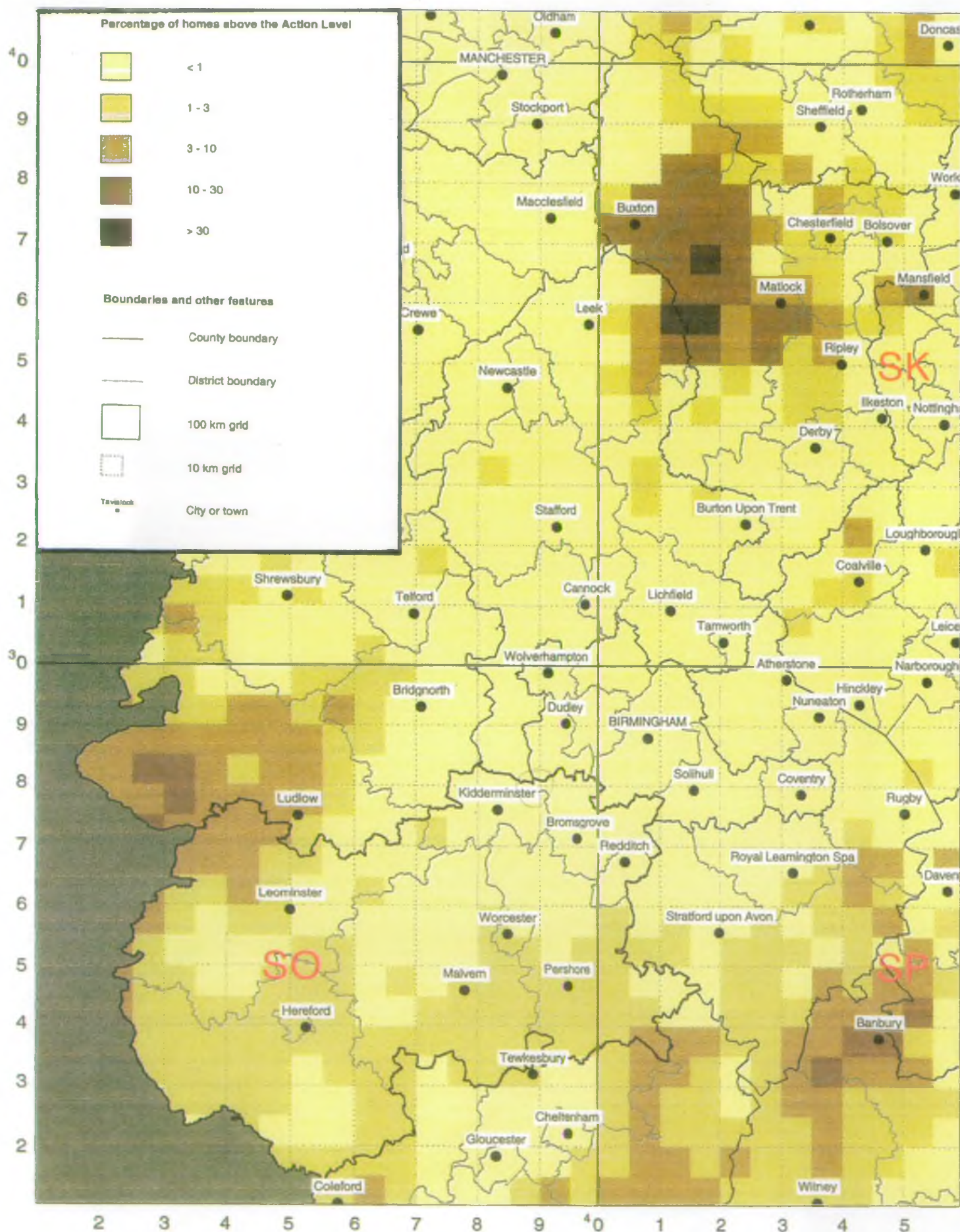


5 Bentley Mill Way, Walsall

2.2 Air

Air

The monitoring of air quality is undertaken by the government and by local authorities. The level of monitoring currently taking place is of concern to the Agency, but it is possible to make general assessments of air quality for the catchment from the West Midlands Atmospheric Emissions Inventory published by the London Research Centre in September 1996. Air quality over parts of the Birmingham/Black Country conurbation is sometimes poor, particularly over the road networks where traffic accounts for over 96% of emissions of carbon monoxide, benzene and 1-3 butadiene, 85% of emissions of oxides of nitrogen, and 75% of black smoke. The need for better monitoring is highlighted in issue 21, and specific air quality problems at Pleck and Sandwell are discussed in issues 22 and 23.



Map 4 Radon levels in the West Midlands
(from the Radon Atlas of England - NRPB-R290)

2.3 Water

The Surface Water Catchment

The River Tame rises in the Black Country with the Wolverhampton and Oldbury arms of the river joining at Bescot. From here, the river flows eastward to the north of Birmingham city centre. The River Rea rises around Northfield then runs northeast in a man-made channel from Canon Hill Park to join the River Tame close to the Gravelly Hill motorway junction. The Rivers Cole and Blythe rise close to one another south west of Earlswood. The Cole then leaves its rural beginnings and becomes essentially an urban river through south Birmingham, then runs through a corridor of public open space and into open countryside before joining the Blythe just north of Coleshill. The Blythe skirts the conurbation, but passes close to Solihull. The river provides drinking water from the public water supply abstraction at Whitacre. Shortly after joining with the Cole, the combined rivers flow into the River Tame at Hams Hall. Only 400 metres further downstream, the Tame is joined by the River Bourne which rises near Fillongley and flows in a north-westerly direction to the Tame confluence. The Bourne also supplies drinking water, with a public supply abstraction at Shustoke.

Treated sewage effluent is discharged to the River Tame, the River Blythe and the River Bourne. The artificial sources make up over 50% of the flow in the river at Lea Marston.

The River Tame was a high quality rural river until the Industrial Revolution had a disastrous effect on it. The industrial growth in the Black Country and Birmingham led to ever increasing land and water pollution, and major incidents in the 1860s and 1870s destroyed fisheries in the River Tame. By 1945 the River Tame was so polluted that it was devoid of all life. Survey work in 1946 showed that gas liquors were so toxic that sewage treatment works could not function, the sewerage system was overloaded and untreated effluent continuously flowed into the river. Since the 1950s, drainage and river authorities have worked to improve the quality of the River Tame and its tributaries. Major investment in the sewerage system started in the late 1960s and this, combined with the introduction of natural gas, the reduction in heavy industry, better pollution control and sewage treatment has led to vastly improved water quality. The Lea Marston Purification Lakes were constructed in the early 1980's and significantly improve the downstream water quality. However, urban run off and discharges from combined sewer overflows still have a significant deleterious impact of the water quality of the river, and these problems are highlighted in issue 4.

The River Blythe is a high quality rural river and is a public water supply source as well as a Site of Special Scientific Interest (SSSI) along much of its length. The Agency is concerned about the levels of development proposed around Solihull, and fears that further development may seriously threaten quality and the nature conservation value of the Blythe. These concerns are raised in issue 8.

Groundwater Quality

The quality of groundwater varies across the catchment dependent upon the type of aquifer and the use, and former use of the land. In the Black Country, natural minerals in the rocks dissolve in water to give elevated concentrations of metals and dissolved solids. Industrial activity has had its effect throughout the urban West Midlands reducing water quality through polluting discharges, waste disposal and poor site management. In the Triassic Sandstones under Birmingham, 80% of boreholes show evidence of solvent and heavy metal contamination in groundwater derived from historical industrial practices.

Canals

One of the distinctive features of the West Midlands - Tame area is the size of the canal network. The area includes most of the Birmingham Canal Navigations (BCN), which is the most extensive canal network of any urban area in Britain, and also sections of the Worcester and Birmingham Canal, the northern Stratford Canal and the Grand Union Canal.

Much of the Birmingham Canal Navigations suffer from poor water quality, inadequate dredging and a legacy of historic pollution. Many are classified as "remainder" canals by British Waterways with limited funding available for their continued maintenance and improvement. Nevertheless, the canal network accounts for major angling opportunities within the catchment and some canals (eg parts of the Wyrley and Essington Canal) support good fish and invertebrate populations.

Canals are also being used as a focus for regeneration, and Brindley Place and the Gas Street Basin in Birmingham are amongst some excellent examples of what can be achieved. The extensive network provides a system of waterside towpaths, some of which can be used by cyclists.

Fisheries

Still water coarse fisheries are widespread and there is good coarse fishing on the extensive canal network. These waters provide a variety of angling opportunities for coarse fishermen at all levels of interest and expertise, and probably provide more angling opportunities than the combined rivers in the catchment.

The catchment includes a valuable fisheries resource on the River Blythe. It is an excellent coarse fishery for much of its length with the middle reaches managed exclusively for trout.

The Rivers Bourne and Cole support only sparse coarse fish populations, insufficient to encourage serious angling.

In the River Tame (above Lea Marston Purification Lakes) and the River Rea there are no sustainable fish populations. Minor species, particularly sticklebacks, exist locally where refuges are available and some small populations of roach, derived from off line balancing lakes, survive temporarily. There is some movement of fish into the River Tame from the River Blythe during periods of improved water quality. These fish, mostly dace and chub, stimulate some local fishing interest, however, the stocks appear to have only a transient existence and there is little indication of reproduction. Downstream of the two effluent discharges from Minworth STW, the river is faster and deeper and difficult to survey, but few fish are observed, and fishing activity is extremely limited.

Flood Defence and Land Drainage

Flood defences have been constructed at several sites within the area to provide protection for property. These are generally either 'hard' defences (flood walls made of brick, concrete or sheet piling) or 'soft' defences (earth embankments). There are extensive flood banks on the River Tame at Witton, Hamstead, Bescot and Oldbury.

Other forms of flood protection have also been provided. On the River Tame, five flood balancing areas have been constructed at Ocker Hill, Sheepwash, Bescot, Sandwell, and Perry Hall Playing Fields. A number of surface water balancing systems have been installed on new developments on the River Blythe, downstream of Solihull, to overcome rapid high flows, although this could be creating problems further downstream (issue 25).

Water Resources

The area is not self sufficient in its water resources and receives up to 600Mld from the Elan Valley in mid Wales, and from groundwater sources north and east of the catchment. Existing resources under Birmingham and the Black Country are frequently contaminated, and reduction in the demand for local groundwater by industry may be responsible for rising groundwater levels in the area (issue 13). As might be expected in the conurbation most of the abstractions are for industrial purposes, and in the more rural east of the area most are for spray irrigation or livestock.

British Waterways have certain rights to abstract water from rivers, streams and groundwater to ensure that canal water levels are maintained. These rights are enshrined in Acts of Parliament laid down over 200 years ago and for this reason the provision of adequate water resources does not normally require the consent of the Agency. This has the potential to cause problems, particularly during long dry periods when water can be diverted to the canal system without necessarily having regard to the impact on surface waters (issues 14 and 15).

Most developed areas have large areas of hardstanding, including roads and pavements where rainfall is channelled directly to surface water sewers and then rivers. This urban run-off can cause serious problems to the rivers (issue 4) but also importantly reduces the amount of water soaking into the ground and replenishing groundwater, and subsequently river baseflow supplies. Planning Authorities are under continuing pressure to provide more housing and business opportunities, particularly in the more rural south and east of the area, thus creating further hardstanding areas and further reducing the ability of in particular the Blythe and Cole subcatchments to maintain base flows. Increased use of sustainable urban drainage methods may help to tackle this problem (see issue 5).

Droughts

One of the recent impacts upon the water resources of the catchment has been the succession of dry years during the 1990s culminating in the drought of 1995/96. Three of the four driest years since 1975 have occurred since 1990. Dry summers with high temperatures increase the demand for water from domestic, industrial and agricultural users, and water supplies become prominent news items in the media, especially when the water companies impose hosepipe bans. Although the summer of 1997 has not been particularly dry, it is the lack of critical winter rainfall in recent years that is giving greatest concern. This has a serious impact on groundwater levels, which are currently very low at water abstraction supply points

Recreation

The rivers of the West Midlands - Tame provide relatively few water based recreational facilities for such a large population. Poor water quality restricts angling opportunities while canoeing and other water sports do not normally take place on the urban river system because of health and safety risks. Apart from the River Blythe, angling and other water sports are frequently restricted to canals, ponds and lakes.

There are opportunities for birdwatching in the urban areas at Sandwell Valley and Sutton Park, and at some of the canal corridors, as well as in the more rural areas of the Rivers Blythe, Cole and Bourne.

Access to the riverbank, particularly in the urban areas is generally poor (see issue 2). The canal network in the area provided extensive recreational opportunities including canal boating, angling and other associated activities.



6 Birdwatching at Sandwell Valley

2.4 Wildlife

Wildlife

The heavily modified river corridors of some of the urban stretches of watercourse in the area are very hostile to wildlife both because of the artificial nature of the channels and the urban pollution loading. However, the West Midlands - Tame area still contains a number of conservation interests.

There are 18 Sites of Special Scientific Interest (SSSIs) within the West Midlands - Tame LEAP. Amongst these, the River Blythe is classified as a SSSI for most of its length as a fine example of a lowland river on clay, and Sutton Park SSSI on the north east edge of Birmingham, contains the largest and richest area of ancient woodland, heath and wetland in the West Midlands county area. Both have been identified as needing further protection and this is addressed further in issues 8 and 9.

Two of the SSSIs, Sutton Park and Wrens Nest, are National Nature Reserves. In addition to the SSSIs there are over 330 Sites of Importance to Nature Conservation (SINCs) of which many are of wetland interest. There are 9 Wildlife Trust Reserves and one RSPB reserve at Sandwell Valley.

Under the Biodiversity Convention the Agency is seeking to promote the creation of wetland habitats highlighted by the Biodiversity Steering Group for which Habitat Action Plans have been developed (see issue 1).

Heritage

There are many fine examples of various aspects of our heritage in the West Midlands - Tame area, from the internationally important geological/palaeontological site of Wren's Nest in Dudley to a rich variety of surviving archaeological sites, historic buildings and ancient landscapes covering all periods of human existence. There are 30 Scheduled Ancient Monuments (SAMs) and many other sites of archaeological interest to be found in the area including the very early indications of human activity provided by stone axes and flint tools in the river gravels of Birmingham, Bronze Age burnt mounds, Iron Age hill forts, Roman military sites, to the much more recent, but still internationally important relics of the industrial revolution found throughout the West Midlands conurbation. The canal network provides many significant examples of our industrial past.



7 Treated effluent from Minworth Sewage Treatment Works downstream of Pack Horse Bridge, Water Orton

Key Details

Area

805 sq km

Population

1.8 million (approximately)

Urban Population

Birmingham	961,050
Sandwell	294,700
*Wolverhampton	83,000
Walsall	263,000
*Dudley	34,700
Solihull	203,000

**Part of district lies outside of boundary*

Monitored Water Quality

Length of river in Grade (Km) 1996

Quality	Grade	Chemistry	Biology
Good	A	0	2
	B	49.7	34.7
Fair	C	60.6	34.8
	D	32.7	45.8
Poor	E	75.8	38
Bad	F	18.2	23.3

(Lengths measured for chemistry & biology differ slightly).

Fisheries

Length of designated rivers and canals (km)

Salmonid (salmon and trout)	0
Cyprinid (coarse fish) - river	41.7
Cyprinid - canal	41.2

Integrated Pollution Control (IPC)

IPC Authorised Sites 46

Radioactive substances (RAS)

Sites with Authorisations for accumulation and disposal of radioactive waste

14

Sites with Registrations to hold radioactive materials

59

Topography

Maximum Level

270m (AOD) Lickey Hills

Minimum Level

70m (AOD) Kingsbury

Conservation

Sites of Importance to Nature Conservation	330
Sites of Special Scientific Interest	18
Special Areas of Conservation	1
Local Nature Reserves	21
RSPB Reserves	1
Scheduled Ancient Monument	30
National Nature Reserves	2

Water Resources

Average annual rainfall	710mm (approx)
Total licensed abstraction	
- Surface water	32160Ml/annum
- Groundwater	35078Ml/annum

Number of abstractions, of which:

Surface	82
Groundwater	156

Waste Management

Landfill sites	34
Transfer Stations	90
Licensed scrap yards	109
Exempt scrap yards	107
Civic Amenity Sites	11
Waste Treatment Plants	14
Oil Treatment Plants	9
Incinerators	2
Sewage Treatment Works	19

Flood Defence

Length of "Main" river (km) 147.8

Length of defended river (km) 96.6



8 Canalised section of the River Rea, Digbeth

Section 3 - Issues and Options

This section provides a detailed description of the issues that the Agency considers need to be addressed. It picks up some of the concerns raised in Section 2. Tables are included which set out possible options or actions together with who is responsible and the benefits and constraints. Abbreviations used in the tables are set out below.

Wherever possible the individuals or organisations responsible for carrying out each option has been identified. In some cases these are individuals or organisations other than the Agency. The options as presented are intended to facilitate improvements to the environment for the benefit of all users and are put forward for discussion and consideration. The Action Plan that leads from this report sets out an agreed set of actions with detailed budget and timetable information.

The Issues have been identified by:-

- Using the knowledge of Agency staff.
- Informal consultation with a range of organisations and individuals and taking into account the representations received from key groups.
- Comparing the current state of the catchment (Appendix 3) with national and regional targets.

Your views and comments on the issues and options are requested, together with any new ideas and suggestions.

Broader policy and planning issues are considered in Section 4 - Protection through Partnership.

Abbreviations

BCC	Birmingham City Council
BTCV	British Trust for Conservation Volunteers
BW	British Waterways
DCs	District Councils
DETR	Department of Environment, Transport and the Regions
EN	English Nature
HA	Highways Authority
IDD	Internal Drainage District
LA(s)	Local Authorities
LPA(s)	Local Planning Authorities
LEA (s)	Local Education Authorities
MAFF	Ministry of Agriculture Fisheries and Foods
MBC	Metropolitan Borough Council
NFU	National Farmers Union
NWBC	North Warwickshire Borough Council
OFWAT	Office of Water Services
SCC	Staffordshire County Council
SSW	South Staffordshire Water
STW Ltd	Severn Trent Water Ltd
UWT	Urban Wildlife Trust

West Midlands - Tame Issues

The issues identified are not in priority order. There has been some grouping to reflect connections between functions or activities.

Issue 1	Biodiversity
Issue 2	Lack of public access routes along river banks
Issue 3	Enhancement of watercourse corridors in urban areas for wildlife and amenity
Issue 4	Urban run-off and deoxygenation of the River Tame
Issue 5	Sustainable Urban Drainage
Issue 6	Investment by Severn Trent Water Limited to improve water quality
Issue 7	Lea Marston Purification Lakes
Issue 8	River flows and water quality in the River Blythe
Issue 9	Excess nutrient levels in the Sutton Park Pools
Issue 10	The current quality of rivers and canals
Issue 11	The effect of the West Midlands - Tame catchment on downstream water quality
Issue 12	Contaminated land
Issue 13	The impact of rising groundwater beneath Birmingham
Issue 14	Baseflow contribution to the River Tame
Issue 15	Water resources development strategy for canals
Issue 16	Litter and the aesthetic pollution of rivers and canals
Issue 17	Enclosure of waste transfer activities
Issue 18	Packington Landfill Site
Issue 19	Flytipping
Issue 20	Sustainable Waste Management
Issue 21	Air quality monitoring
Issue 22	Industrial heavy metal pollution in Pleck, Walsall
Issue 23	Odour problems in Sandwell
Issue 24	Review of flood defences on the River Tame
Issue 25	The proliferation of surface water balancing systems in Solihull
Issue 26	The future management of Park Hall Farm

Issue 1 Biodiversity

Objective - To protect rare and endangered animal and plant species and to promote diversity of Flora and Fauna

The Agency is one of a number of organisations with responsibilities to implement the UK Biodiversity Action Plan and will be developing targets for both species and habitats. This issue looks at those species for which the Agency has some responsibilities. It also looks at the threat posed by invasive plants and highlights the need to protect ponds and areas of open water in the urban environment.

Species for which the Agency has responsibility include the otter, white clawed crayfish, water vole and great crested newt. There are many other species of animal and plant that are not included and the Agency in common with other organisations will be seeking to protect and encourage these species, through our own work and partnership with others. Information on the status of these species in the area is given in Appendix 3.

Japanese knotweed is a very vigorous perennial which overwhelms other vegetation. It spreads downstream by means of broken off root material and can damage river bank protection works, cause increased risk of flooding in summer and increased erosion in the winter (when it dies down leaving no ground cover). It is extensively distributed in the catchment. It is important to identify any areas where Japanese knotweed grows near watercourses and develop a programme of control.

Himalayan balsam is a vigorous annual which also overwhelms native vegetation and can cause erosion problems in winter when it dies down also leaving no ground cover. It is spread by seed so Agency flood defence maintenance programmes now include the cutting of Himalayan balsam wherever possible prior to seeding to reduce its spread. This work also needs to be undertaken by local authorities and riparian owners if control is to be effective.

The URGENT project "Biodiversity in Urban Habitat Patches" may be of relevance to this issue.

Objective - To protect rare and endangered animal and plant species and to promote diversity of flora and fauna.			
Options / Actions	Responsibility	Benefits	Constraints
Otters			
i) Monitor otter distribution on River Blythe	Environment Agency Wildlife Trusts	Protection and encouragement of an endangered species.	Support from landowners.
ii) Identify habitat improvement and holt creation sites.	Environment Agency Wildlife Trusts	Restoration of a more balanced ecosystem.	Maintenance of existing flood defences. Water quality. Needs of other endangered species.
iii) Improve habitat where appropriate.	Environment Agency Wildlife Trusts		Possible damage to historic environment.
Water Voles			
i) Identify areas for habitat creation and improvement.	Environment Agency Wildlife Trust	Protection and encouragement of an endangered species.	Support from landowners.
ii) Improve habitat where appropriate.	Environment Agency Wildlife Trust		Maintenance of existing flood defences. Requirements of other species.
			Possible damage to historic environment.

<p>Crayfish</p> <p>i) Survey appropriate areas not already covered by biological surveys.</p> <p>ii) Improve habitat and water quality where appropriate.</p>	<p>Environment Agency</p> <p>Environment Agency</p>	<p>Identification of limiting factors and remedial measures.</p> <p>Protection and encouragement of an endangered species.</p>	<p>Cost.</p> <p>Water quality. Support of landowners. Flood Defence maintenance. Crayfish plague.</p>
<p>Great Crested Newt</p> <p>Identify population and distribution.</p>	<p>EN Environment Agency UWT</p>	<p>Protection and management of an endangered species.</p>	<p>Cost.</p>
<p>Black Poplar</p> <p>i) Survey river banks.</p> <p>ii) Protect existing trees through Tree Preservation Orders.</p> <p>iii) Plant new trees.</p>	<p>Environment Agency UWT</p> <p>LAs</p> <p>Environment Agency Wildlife Trusts LAs New Deal, BTCV</p>	<p>Identify the existing population.</p> <p>Protects existing population.</p> <p>Strengthens existing population</p>	<p>Cost and manpower.</p> <p>LAs to agree. Problem of enforcement.</p> <p>Flood defence. Needs of other rare species. Possible damage to historic environment. Cost.</p>
<p>Control of Invasive Plants</p> <p>i) Identify areas colonised by Japanese knotweed and Himalayan balsam close to watercourses.</p> <p>ii) Co-ordinate a programme of spraying waterside areas of Japanese knotweed, starting at the top of the catchment.</p> <p>iii) Encourage cutting of Himalayan Balsam prior to seeding</p>	<p>Environment Agency New Deal BTCV</p> <p>Environment Agency LAs Landowners New Deal BTCV</p> <p>Environment Agency LAs Landowners New Deal, BTCV</p>	<p>Identify the scale of the problem. Environmental Education</p> <p>Improved biodiversity. Reduced flood risk. Reduced erosion.</p> <p>Improved biodiversity. Reduced erosion.</p>	<p>Cost, manpower, access</p> <p>Cost, manpower, access</p> <p>Cost, manpower, access</p>

See also issues 3, 7, 8, 9 and 11.

Issue 2 **Lack of public access routes along river banks**

Objective - To improve the public access for pedestrians and cyclists to and along river banks for transport and recreation.

There are currently both national and regional governmental transport strategies at the consultation stage. These strategies emphasise the importance of the opening up of public access routes, particularly in urban areas.

There is a desire for better access routes for both pedestrians and cyclists, not only for recreation but also for going to work and to school without the danger of using roads. River corridors often provide the opportunity to develop such routes. Improved access will also heighten the public awareness of litter and aesthetic pollution (Issue 16) and aid in the development of river corridors for wildlife and amenity purposes.

The Agency, the former NRA, and its predecessors have a long history of support for riverside paths particularly the Tame Walkway, along the River Tame.

In the urban parts of the catchment, river corridors provide some of the major linear open spaces. In many cases informal paths alongside rivers, form links between access points such as public open space and road bridges. Such paths are often illegally created by cutting through fences and are therefore very poor with access difficulties and an unmade and often muddy surface.

Objective - To improve the public access for pedestrians and cyclists to and along river banks for transport and recreation			
Options / Actions	Responsibility	Benefits	Constraints
Develop the Tameway Walkway (and where possible also as a cycleway) along the whole of the River Tame.	Environment Agency LAs Landowners CoCo Sustrans	Improved public access, greater awareness of the river and reduced danger from road traffic. Improved reporting of pollution.	Existing obstructions, lack of space, complex land ownership. Increased maintenance costs. Potential pedestrian/cyclist conflict. Potential damage to archaeological and historical features. Requires the co-operation of landowners.
Develop other footpaths, bridleways and cycleways adjacent to rivers and streams in the urban area.	Environment Agency LAs Landowners Sustrans	Improved public access, greater awareness of the river and reduced danger from road traffic. Improved reporting of pollution	Existing obstructions, lack of space, complex land ownership. Increased maintenance costs. Potential pedestrian/cyclist conflict. Potential damage to archaeological and historical features. Requires the co-operation of landowners.

Options / Actions	Responsibility	Benefits	Constraints
Develop links between riverside paths, other public rights of way, and canal towpaths and cycleways to form long distance routes.	Environment Agency LAs Landowners BW Sustrans	Improved public access, opportunity to link up a fragmented system.	Existing obstructions, lack of space, complex land ownership. Increased maintenance costs. Potential pedestrian/cyclist conflict. Potential damage to archaeological and historical features. Requires the co-operation of landowners.

See also issues 3 and 16.

Issue 3 Enhancement of watercourse river corridors in urban areas for wildlife and amenity

Objective - To improve the conservation and amenity value of urban watercourses and to develop their use as wildlife corridors.

Watercourses and their remaining floodplains often provide important open space in built up urban areas in the catchment. However, rivers and streams have been heavily modified in many areas to maximise the use of valuable land and to reduce the risk of flooding. In extreme cases the river channel has been canalised, culverted, covered over and rendered mostly lifeless. An example is the River Tame immediately downstream of Chester Road at Castle Bromwich where the channel is constructed of smooth concrete and is heavily shaded by the elevated M6 viaduct.

Channels have usually been modified by being deepened and resectioned to create as far as possible self cleansing channels, so that storm water will flow quickly and efficiently away. This leads to the virtual elimination of the transition zone between land and water, the most valuable area for riverside flora and fauna. Such channels are extremely hostile to aquatic organisms. The removal of trees and scrub has also reduced the value of the river corridor for terrestrial wildlife such as invertebrates and voles with consequent effects on predators such as bats and owls. Improvements to bankside vegetation and re-creation of the transition zone will create and improve habitats and promote biodiversity.

In addition, pollution has been so severe in the past that aquatic life was largely eliminated from all major rivers in the West Midlands conurbation and severely reduced in other urban areas. With lower pollution levels today flora and fauna have started to re-colonise but are hampered by poor channel structure, the hostile physical environment and the absence of upstream sources of colonisation. It is difficult for both plants and animals to colonise the river corridor moving upstream against the flow of the river under these conditions. The improvement of environmentally hostile river banks serves not only to improve the immediate habitat availability, but also provides links between upstream and downstream habitats. This "wildlife corridor" that is created as a consequence greatly improves the stability of the river ecosystem.

The Agency recognises that some past flood defence works have caused environmental deterioration and is now actively seeking to regenerate these river features where possible without affecting the amount of flood protection available. Regeneration works will have the potential to damage existing archaeological or historic features, and appropriate steps must be taken to avoid or minimise any such damage.

The URGENT projects "Modelling of river corridors: the scientific basis for rehabilitation of rivers" and "Biodiversity in urban habitat patches" may be of relevance to this issue.

Objective - To improve the conservation and amenity value of urban watercourses and to develop their potential as wildlife corridors			
Options / Actions	Responsibility	Benefits	Constraints
Create a continuous river corridor by setting back all new development from the river bank as part of a long term strategy.	Environment Agency LPAs Developers	Improved habitat. Protection of riverside archaeological features improved access for the public and for flood defence/pollution control monitoring purposes.	Loss of land available for development.
Normally resist further culverting and restore culverted watercourses to open channels where possible.	Environment Agency LPAs Landowners, Developers	Improved habitat, Pollution control and flood defence benefits. Improved aquifer recharge.	Loss of land available for development and cost.
Undertake a detailed survey of the river corridor.	Environment Agency	Highlight areas of opportunity. Optimise use of scarce resources.	Cost and manpower.
Regeneration of the river corridor:- i) Remove hard bank re-enforcement and replace with soft engineering works or create a transition zone in front of hard engineering works where possible. ii) Reprofile river banks and beds to create shallow margins, riffles, pools and shallows. iii) Tree and shrub planting along river corridors in urban areas where tree cover has been lost.	Environment Agency Developers LAs Environment Agency LAs Environment Agency LAs	Improved habitat. Improved habitat. Improved in stream diversity, increased fish holding. Improved amenity and habitat.	Increased maintenance costs. Need to ensure no increased flood risks. Potential damage to archaeological features. Cost. Need to ensure no increased flood risks. Potential damage to archaeological features. Cost and maintenance. Need to ensure no reduction in the effectiveness of flood defences. Potential damage to archaeological features.

See also issues 2 and 16.

Issue 4 Urban run-off and the deoxygenation of the River Tame

Objective - To reduce the harmful effects of urban run-off into the River Tame.

In this catchment, in common with all urban areas, rivers and streams rise quickly in response to rainfall. Little is absorbed in the ground and large volumes of water move quickly down the river system. Rainwater runs off roads, individual factory yards and roofs, industrial estates and other impermeable surfaces subject to atmospheric pollution, spillage and other contaminants.

Rainfall also has a significant impact on drainage systems, flushing accumulated solids from surface water sewers which may include sewage solids and other pollutants. Dilute, but untreated, sewage effluent may also discharge from foul water sewers where combined sewerage systems incorporate overflows.

Urban run-off discolours the receiving watercourse giving it, typically, a cloudy or grey appearance due to the level of suspended solids. These can settle on the bed of the watercourse, smothering plants and invertebrates. It's effect can also be toxic, or result in the depletion of oxygen present in the water because of chemical and biological processes which breakdown organic pollutants such as oil and sewage.

Low dissolved oxygen levels are a common feature in the River Tame following heavy, localised, summer rainfall. In July 1995 such an event led to the loss of over 90 percent of the fish stocks in the River Tame and only extensive remedial action prevented major losses further downstream on the River Trent. The former NRA and subsequently the Agency have since successfully deployed a monitoring and response system to mitigate the impact of such incidents. Further work is currently underway to design and implement a permanent, fully automatic facility to reintroduce oxygen into the river when necessary.

The provision of off line pools (ie pools connected to the river, but through which the river does not flow) can provide refuges for fish when the river is unfit for them to survive during severe intermittent pollutions. The Agency is planning a series of these on the line of small tributary streams.

The Agency seeks to regulate all existing discharges to control and minimise urban run-off. Possible adverse impacts on the water environment are controlled, in the first instance, by working with developers and local planning authorities. Sustainable urban drainage methods are encouraged as a means of protecting against flooding and to protect base flows, and can also include pollution prevention measures (see Issue 5). First-flush containment and subsequent disposal, as appropriate, can also be used to reduce any polluting impact.

The URGENT projects "Modelling of river corridors : the scientific basis for rehabilitation of urban rivers" and "Thermal climatology of the West Midlands" may be of relevance to this issue.

Objective - To reduce the harmful effects of urban run-off into the River Tame			
Options / Actions	Responsibility	Benefits	Constraints
<u>General</u>			
i) Assess the pollution load from urban run-off	Environment Agency	A better understanding of the nature and extent of the problem, and targeting of pollution prevention.	Complexity of the task, staff and time constraints.
ii) Design and implement, if appropriate, a fully automatic facility at Lea Marston	Environment Agency	Improved response which minimises the impact of low dissolved oxygen events.	Cost.
iii) Create off line refuges for fish.	Environment Agency Developers	Protect existing fish populations. Improved habitat diversity.	Loss of land for other use, obstruction to river bank maintenance. Cost, manpower.

Options / Actions	Responsibility	Benefits	Constraints
<u>Road Run Off</u>			
i) Review the maintenance and operation of existing treatment measures.	Environment Agency HA, LAs	Development of best practice.	Cost and the difficulty of assessing the effectiveness of measures in varying conditions.
ii) Provide additional pollution prevention and treatment systems on new and existing roads.	HA DETR LAs Other Road Builders	Improved water quality.	Cost. May have limited impact in the short term.
<u>Industrial Sites</u>			
i) Regular site visits and awareness campaigns.	Environment Agency STW Ltd	Reduction in number and frequency of pollution incidents.	Staff resources.
ii) Provide or improve pollution prevention measures eg bunds, interceptors and containment of first flush contaminated run off.	Site owners Site occupiers LPAs	Reduction in number of pollution incidents.	Cost of installation. Ongoing maintenance needed.
iii) All drainage to foul sewer.	Site owners STW Ltd	Pollution risk to watercourse reduced/removed.	Inadequate treatment facilities at Sewage Treatment Works (STW) - Storm Sewage Overflows may operate prematurely. Risk to STW process.
iv) Better site selection.	LPAs Site owners	Reduced risk of serious pollution.	Site availability.

Options / Actions	Responsibility	Benefits	Constraints
<u>Sewerage Systems</u>			
i) Improve the sewerage system under AMP2.	STW Ltd Environment Agency	Improved water quality.	Expenditure limited. Not all problems addressed.
ii) Identify the remaining problem sites and formulate remediation schemes under AMP3.	Environment Agency STW Ltd	Improved knowledge.	Resolution would be dependant on future resources under AMP3.
iii) Monitor surface water sewers for wrong connections and correct where found.	STW Ltd Environment Agency LAs	Reduced pollution.	Scale and complexity. Manpower and cost.
iv) Use of source control regimes.	LA's Environment Agency STW Ltd	Reduced pollution.	Limited experience. Institutional constraints.

See also issues 5, 6, 7 and 11.

Issue 5 Sustainable Urban Drainage

Objective - To encourage and promote the appropriate use of source control techniques to reduce the impact of urban run-off.

"Sustainable urban drainage", or "Source control" are the terms used to describe techniques that minimise the quantity of water collected as well as minimising the quantity of water discharged, thus reducing the polluting and damaging physical effects of the first flush of contaminated surface water after heavy rainfall. Such techniques include the use of soakaways, grass swales, wetlands, infiltration basins, porous attenuation ponds and porous pavements.

The URGENT projects "Modelling of river corridors: the scientific basis for rehabilitation of urban rivers" and "Using urban aquifers: sustainability at different space and time scales" may be relevant to this issue.

Adoption Issues relating to infiltration drainage

In order to address problems of urban surface water run off, various surface water source control techniques can be utilised. These systems do not necessarily depend on highly permeable ground conditions and have been successfully installed in other parts of Europe on heavy clays. One of the biggest issues in promoting the use of such methods is that of adoption, "who is going to undertake long term maintenance?".

If it is required such maintenance is relatively straightforward being of a landscaping nature and is not financially or physically onerous. A small commuted sum treated as a site infrastructure charge could be placed upon the developer with the maintenance responsibility being undertaken as part of the usual open space maintenance practice namely either by the local authority or the Landlord.

It is the policy of sewerage undertakers not to adopt infiltration systems. It is also difficult to persuade many Councils who have highway responsibilities to adopt highways that drain to infiltration systems although "soakaways" are included in the statutory definition of a drain. Adoption roads must have proper provision for drainage.

Until these policy attitudes are changed widespread use of source control is not popular with developers as source control for roof waters is not economic if a piped system is also required to drain roads for adoption. A single drainage system for both roofs and highways is more cost effective.

Production of Source Control Area Maps

The Environment Agency in its development control role actively promotes source control techniques that mimic natural drainage by allowing recharge of local groundwater and gradual seepage to watercourses. However, due regard needs to be made of the suitability of the location in question. Groundwater that is abstracted for public supply is usually of high quality and often requires little treatment prior to use, compared to surface waters. It is however vulnerable to contamination from both diffuse and point source pollutants from both direct discharges into groundwater and indirect discharge into or onto land. Infiltration methods (ie where surface drainage soaks into the ground) will therefore generally not be acceptable close to a groundwater source borehole.

The production of plans covering the LEAP area showing areas where source control techniques are, and are not suitable would be of significant help in determining appropriate drainage methods. In conjunction with production of a plan, supportive guidance needs to be given to local authority Building Control Officers whose role its to determine the suitability of a site with regard to ground hydraulic properties.

As a first step, Agency Development Control Staff propose to meet with Building Control Officers from local authorities in the West Midlands - Tame LEAP area to provide advice and promote the new CIRIA manual of good practice on "Infiltration Drainage". The Agency also hopes to promote changes in drainage practice with Highway Authorities, developers and architects.

Local authority planners also have an important part to play and the use of unilateral undertakings of Section 106 agreements may provide funding for the maintenance of source control structures. (see also section 4.3).

Objective - To encourage and promote the appropriate use of source control techniques to reduce the impact of urban run-off			
Options / Actions	Responsibility	Benefits	Constraints
Set up Workshop/Seminars with Agency/local authority/Water Companies to discuss adoption issues.	Environment Agency	More extensive use of source control. Improved quality of urban run-off. Improved groundwater recharge.	Fixed Policy attitudes of Highway and sewerage undertakers.
Dependent on above, develop pilot projects using source control techniques	LA's Environment Agency	More extensive use of source control. Impound quality of urban runoff. Improved groundwater recharge.	Cost. Manpower. Current policies.
Investigate the production of a source control suitability areas map.	Environment Agency	More extensive use of source control. Improved quality of urban run-off. Improved groundwater recharge.	Lack of data.
Promote use of CIRIA Manual of Good Practice on Infiltration Drainage with local authority Building Control Staff, and others.	Environment Agency	More extensive use of source control. Improved quality of urban run-off. Improved groundwater recharge.	Manpower Resources.

See also issues 4 and 24.

Issue 6 Investment by Severn Trent Water Ltd to improve water quality

Objective - Improvement of the sewerage system to reduce environmental pollution by regulation and through targeting future investment.

In July 1994 announcements were made by the Office of Water Services (OFWAT) about the overall funding arrangements of the private water companies for Asset Management Plan 2 (1995-2000) (AMP2). Asset Management Plans are strategic plans for programmed investment in the infrastructure of private water companies, so that they might meet obligations relating to water supply and sewage treatment. Top priority for expenditure under AMP2 was given to meeting present and future statutory obligations, both EC and domestic. These include the EC Directives for Freshwater Fisheries, Dangerous Substances and Urban Waste Water Treatment. Within the plan area such expenditure is restricted to the Barston and Walsall Wood Sewage Treatment Works (STWs) following the closure of the Oldbury Works with diversion of all flows to the Black Country Trunk Sewer. Improvement works are also proposed at Goscote STW following an earlier commitment under the previous Asset Management Plan (AMP1).

Lower priority has been given to schemes to achieve River Quality Objectives (RQOs) and these were referred to as discretionary schemes. In the Midlands region the agreed expenditure for such schemes was not sufficient to bring about all of the RQO improvements originally identified by the NRA. However, a significant proportion of this expenditure is taking place within the Tame catchment and improvements are planned at Minworth and Coleshill Sewage Treatment Plants, for completion by the year 2000.

A number of improvements to the sewerage system have already been completed, and others are planned including groups of combined sewer overflows (CSOs) discharging to both the high and low level Birmingham/Wolverhampton Canal in the Brasshouse and Londonderry Lane areas of Smethwick. A list of these improvement schemes and the timetable for implementation was contained in the Tame Action Plan of September 1996, although improvements at Barston STW (see Issue 8) and Bradbury Road Sewage Pumping Station, Olton were not within the area covered by that plan.

Discussions are already taking place between the Agency and Severn Trent Water Limited to identify and prioritise improvements necessary within the AMP3 (2000-2005) programme.

The URGENT project "Modelling river corridors: a scientific basis for rehabilitation of urban rivers" may be of relevance to this issue.

Objective - Improvement of the sewerage system to reduce environmental pollution by regulation, and through targeting future investment			
Options / Actions	Responsibility	Benefits	Constraints
Agree details and monitor implementation of remaining schemes in AMP2 programme.	Environment Agency STW Ltd	Improved water quality.	OFWAT Agreement.
Assess water quality benefits of completed schemes.	Environment Agency STW Ltd	Measure achievement and identify any further need.	Cost.
Prepare submissions for schemes to be considered by OFWAT under AMP3	Environment Agency STW Ltd	Target expenditure to achieve maximum environmental benefit.	Time.

See also issues 4, 5, 8, 9, 10 and 11.

Issue 7 Lea Marston Purification Lakes

Objective - To review the future operation of Lea Marston Purification Lakes.

The construction of Lea Marston Purification lakes has led to improved downstream water quality and reduced the impact of wet weather released pollution incidents which previously had adverse effects as far downstream as the River Trent.

In 1989 the ownership and management of the lakes was transferred to the NRA and then to the Agency in 1996. The lakes have continued to perform their design function by significantly contributing to improving water quality, most notably in dry weather, and have been successful in buffering the quality effect of storm flows on both the River Tame and River Trent.

Their role in improving water quality in the downstream River Tame and the River Trent downstream of the Tame confluence contributes to the achievement of a viable fish population in these two river reaches. They also pay an important part in contributing to the UK's commitment to reduce toxic metal inputs to the North Sea (agreed at the Third North Sea Conference in March 1990). The lakes reduce the levels of suspended solids, Biochemical Oxygen Demand and toxic metals in the river. However, there is a slight increase in ammonia levels downstream of the lakes and a project has recently been completed to look into options to control this if necessary.

The weirs at the downstream end of Lake 1 are impassable to fish and represent the upstream limit of the sustainable fish population. It is this downstream population that the Agency seeks to protect. Any fishery upstream of the lakes is adventitious and vulnerable to intermittent pollution (see Issues 4 and 5).

The extensive fish mortality in July 1995 following a sudden summer storm illustrates that the lakes cannot provide total protection against all extremes of upstream water quality. The performance of the lakes, under existing and predicted severe conditions, has been investigated with a view to evaluating their downstream environmental impact, and work is continuing to examine upstream water quality and make improvements where possible. A contingency plan exists which responds to incidences of oxygen depletion in the River Tame at Lea Marston and this is under continual review (see Issue 4).

The Lakes at Lea Marston form part of a chain of wetlands that extend along the Middle Tame Valley. This chain is of national importance for wintering wildfowl. A management plan for conservation of the Lea Marston Purification Lakes will be developed by the Agency, in conjunction with North Warwickshire Borough Council and Staffordshire County Council's Middle Tame Management Strategy.

Objective - To review the future operation of Lea Marston Purification Lakes			
Options / Actions	Responsibility	Benefits	Constraints
Continue to review current operations and practice at Lea Marston	Environment Agency	Identify potential improvements and cost savings.	
Continue to examine upstream water quality and secure improvement.	Environment Agency	Improvement of water quality through targeting of pollution prevention and enforcement.	
Prepare a Conservation and Recreation Management Plan for the Lea Marston Lakes site.	Environment Agency NWBC/SCC	Maximise the potential conservation value of the Lakes.	Cost.

See also issue 4 and 12.

Issue 8 River flows and water quality in the River Blythe

Objective - To protect and enhance a Site of Special Scientific Interest and safeguard an important source of public drinking water.

The River Blythe is approximately 45km long and is designated as a site of Special Scientific Interest (SSSI) along most of its length as a fine example of a lowland river on clay. The River Blythe forms one of the most important conservation resources in the area and is also the most important river fishery in the area. The river is subject to significant and diverse human influences including the provision of drinking water and the disposal of treated sewage effluent. Maintaining the ecology of the River Blythe therefore requires effective management of the complex and competing demands on the entire river system.

The headwaters of the River Blythe feed the lakes at Earlswood which supply water to the canal system. Following an issue raised in the Blythe/Cole/Bourne CMP (January 1994) concerning reduced baseflows (from the diversion of the Spring Brook into the lakes), and water quality from Earlswood Lakes to the River Blythe, a trial operating agreement with British Waterways was put in place to ensure that high quality baseflows were maintained. This operating agreement appears to be working well and should be continued. A Water Level Management Plan for the River Blythe is currently being prepared by consultants on behalf of the Agency. The plan, which is at the consultation stage, is expected to be completed by March 1998. The plan should recommend possible measures to safeguard the SSSI.

Under dry weather conditions, up to about 50% of the River Blythe downstream of Eastcote Brook is made up of treated sewage effluent from Barston sewage treatment works (STW) which serves Solihull. There must be sustainable improvement of effluent quality from Barston STW to reduce nitrate and ammonia concentrations in order to meet downstream river quality standards. A short term consent including an ammonia limit is in force and working well, this will last until 1998 when a new consent will be issued to meet the requirements of the Urban Wastewater Treatment Directive.

During Summer 1997, a survey of diatoms (a type of algae) in the River Blythe indicated that there may be elevated nutrient levels in the river. Macrophyte surveys carried out by English Nature in 1997 also indicated that changes in the vegetation consistent with those caused by elevated levels of nutrients were taking place. Work needs to be undertaken to consider these findings and to determine if and how much the River Blythe is under stress from raised nutrient levels. Phosphate levels from Barston STW will be reduced after 1998 as a requirement of the Urban Wastewater Treatment Directive.

Almost the whole of the flow of the River Blythe during prolonged dry weather is abstracted for public water supply at Whitacre, although immediately downstream of the abstraction point the flow is supported by the entry of the River Cole. Investigations by the Agency have indicated a widespread problem of low level pesticide pollution in the River Blythe. The pollution seems to be having little effect on the biology of the river, but the use of the River Blythe to supply drinking water requires that there is no (or as little as possible) pesticide contamination. At Whitacre water treatment works, pesticides are being removed using activated carbon, and supplies meet the EU Drinking Water Directive.

The Agency has proposed the river downstream of the Eastcote Brook as a Nitrate Vulnerable Zone under the EC Nitrates directive. This directive is concerned with the protection of drinking water sources from elevated levels of nitrates. A report has been sent to the DETR, and if the proposal is accepted there will be restrictions on the amounts of nitrate containing fertiliser that can be applied to land.

The largest single greenfield housing site in the West Midlands - Tame LEAP area is on land allocated in the Solihull MBC Development Plan, where 800 to 1000 houses covering about 40ha of open land are to be built at Dickens Heath on the headwaters of the River Blythe. Urbanisation, especially at the headwaters of a river, tends to cause a deterioration in the water quality and river flow, and sustainable urban drainage techniques need to be considered to minimise adverse impacts. Further discussion of this topic is made in Appendix 1.1 "Pressures on the Environment - New Development" and relevant draft development control guidance from the Agency to Local Planning Authorities is given in Section 4, "Protection through Partnership".

Objective - To protect and enhance a Site of Special Scientific Interest and safeguard an important source of public drinking water			
Options / Actions	Responsibility	Benefits	Constraints
More detailed monitoring of water quality for further contaminants in the River Blythe.	Environment Agency	Improved information, identifies possible sources of contamination. Better understanding of problems.	Time and resource commitment.
Review consent at Barston Sewage Treatment Works and negotiate with STW Ltd on any required changes to meet downstream objectives.	Environment Agency STW Ltd	Improved quality to meet objectives	Cost to STW Ltd
Negotiate with landowners and dischargers to reduce pesticides by changing work practices.	Environment Agency	To bring pesticide levels within EC limits.	Time and resources.
Investigate nutrient levels following diatom survey.	EN Environment Agency	Better understanding of potential problem.	Time and resources.
Continue agreement for water resource management at Earlswood Lakes with British Waterways	Environment Agency BW	Protection of SSSI.	Time and resources.
Implement recommendations of Water Level Management Plan.	Environment Agency BW EN	Protection of SSSI	Time and resources.

See also issues 5, 6, 10 and 25.

Issue 9 Excess nutrient levels in the Sutton Park Pools

Objective - To protect the water environment in Sutton Park Site of Special Scientific Interest and National Nature Reserve.

Sutton Park was designated as a Site of Special Scientific Interest (SSSI) because of the rich and diverse plant life to be found there. However, recent survey work has shown that several species of aquatic plants which are sensitive to high nutrient levels have become extinct, and that there is an increasing amount of blue-green algae to be found in the pools.

Sewer overflows and wrong connections have contributed extra nutrients to the system and these are now bound up in the silt at the bottom of the pools. Recent improvements to the sewerage system have resulted in the closure of two overflows which will reduce some of the potential for input of nutrients, but there are still problems to be addressed. Wrong connections from domestic properties to surface water sewers and emergency overflows from the foul sewer can still discharge into the pools. Blockages in sewers on the south side of the park have resulted in raw sewage overflowing from manholes and discharging to streams. Fish and livestock may also contribute nutrients and stir up the silt, releasing deposited nutrients back into the water and so continuing the problem of nutrient rich water.

An unknown level of nutrient input may come from the feeding of wildfowl (such as ducks and geese) by members of the public, and this may be a problem relevant to many other urban pools and lakes. Uneaten bread will decay whilst bread that is eaten still enters the water as faecal matter (guano). In addition, feeding tends to create artificially high populations which will then over-graze the local vegetation, thus adding to the deterioration of plant life.

Birmingham City Council have written a Water Management Plan for Sutton Park, which is welcomed, but a full Water Level Management Plan also needs to be written (with English Nature) to ensure the adequate protection of the Sutton Park water environment.

Objective - To protect the water environment in Sutton Park SSSI and National Nature Reserve			
Options / Actions	Responsibility	Benefits	Constraints
Review the results of a programme of chemical and sewage overflow event monitoring of watercourses upstream of Longmoor and Bracebridge Pools.	Environment Agency STW Ltd EN	Improved understanding of issue	Time and resources.
Identify need and review options improved for sewerage infrastructure if required along west and south side of park to reduce overflows. (Possible inclusion in AMP3).	STW Ltd Environment Agency	Best environmental use of available funding.	Time and resources.
Investigate fisheries status on the pools.	Environment Agency EN Birmingham CC	Knowledge of fishery nutrient inputs.	Time and resources.
Carry out feasibility study on construction of silt traps/settling pools on all surface water inflows to the park.	Environment Agency STW Ltd EN Birmingham CC	Available pollution prevention facilities if required.	Time and resources.
Investigate methods for nutrient removal from pools.	Environment Agency Birmingham CC EN	Improved knowledge for further action.	Time and resources.
Implement recommendations from existing Water Management Plan	Birmingham CC EN	Improved control. Improved habitat	Time and resources.
Write and implement Water Level Management Plan.	Birmingham CC EN	Improved understanding and control.	Time and resources.

See also issue 6.

Issue 10 The current quality of Rivers and Canals

Objective - To improve river water quality to meet strategic objectives and to make further water quality improvements

The Environment Agency and predecessor bodies set strategic targets called River Quality Objectives (RQOs) for rivers and canals. RQOs provide a basis for water quality management decisions and are based on a chemical classification scheme: The River Ecosystem classification scheme which comprises five quality classes that reflect the chemical quality requirements of different types of river ecosystems. There are also statutory targets for some rivers and canals called Water Quality Objectives (WQOs) for the purposes of implementing several EC Directives. The Directives involved include those concerned with Surface Water Abstracted for Potable Supply, Freshwater Fisheries and Dangerous Substances.

This issue addresses those river and canal stretches where water quality is poor and/or there has been a failure to comply with the objective. However, in some cases it will be possible at this stage to upgrade the long term RQO, this is where work has been undertaken by pollution control staff to secure improvements in water quality.

The canals in the area quite often show poor water quality according to the Rivers Ecosystem classification system despite maintaining healthy fish populations. Because of the slow moving nature of the water in canals, solids tend to settle out, and to a certain extent substances entering the canals tend to concentrate within them. Disturbance of these (potentially contaminated) sediments by passing boat traffic may adversely affect the apparent water quality. The slow moving nature of the canals also makes them susceptible to algal blooms. Nevertheless, the Agency has no plans at this time for a separate classification scheme.

The URGENT project "Modelling river corridors : the scientific basis for rehabilitation of urban rivers" may be of relevance to this issue.

Objective - To improve river water quality to meet strategic objectives and to make further water quality improvements.			
Options / Actions	Responsibility	Benefits	Constraints
Investigate and report the reasons for RQO non compliance and/or poor water quality. Take action to as appropriate.	Environment Agency	Improvements in water quality at sites failing the strategic quality target or currently having poor water quality.	Resources
Upgrade river or canal water quality objectives to protect water quality:	Environment Agency	This action will develop past improvements into a new planning baseline for future water quality decisions.	Concern to water companies.
To Reduce water pollution caused by Nitrates on the River Blythe and River Bourne catchments by designating as NVZs.	Environment Agency, ADAS	Compliance with the EC Surface Water Abstraction Directive and Nitrate Directive	Action programme due for implementation from December 1999.
Take appropriate action to reduce water pollution caused by dangerous substances.	Environment Agency, Factory Owners, Land Owners, STW Ltd.	Compliance with the relevant EC Directive and improved water quality.	Costs and resources.
Pilot projects to investigate effects of desilting on water quality.	British Waterways.	Potential improvements of canal water quality.	Costs and resources.

See also issues 6, 8, 11 and 12

Issue 11 The effect of the West Midlands - Tame catchment on downstream water quality

Objective - To ensure that the water quality from the catchment does not compromise downstream quality requirements

The River Tame is the largest tributary of the River Trent, and under normal circumstances, the flow of the River Tame exceeds that of the River Trent where they join.

In addition to the protection of local water quality for meeting targets within the catchment, it is important that a broader view of the overall water quality leaving the catchment is not overlooked. There are uses of the water environment outside of the West Midlands - Tame catchment which additionally demand tight control of potentially polluting activities within the catchment. Such strategic downstream uses include the presence of a good coarse fishery in the River Trent, the planned abstraction for public water supply at Shardlow, the planned transfer of water from the Trent at Torksey to the Anglian region via the Fossdyke Canal and even much further downstream at the Humber Estuary special protection area for birds (SPA) which is proposed as a site of European significance for conservation.

The Environment Agency has a duty to ensure that the surface water intended for abstraction for potable supply (*ie* for human consumption) meets the requirements of the Surface Water Abstraction Directive (75/440/EEC). This involves extensive monitoring and investigation of diffuse sources of pollution as well as consent reviews of the major discharges in the catchment. The Lower Trent Area of the Environment Agency will be responsible for the monitoring of the abstraction but it is possible that directive failures might arise from the catchment of the West Midlands Leap Area.

Similarly, with regard to the Humber Estuary SPA, the Agency is required to review and affirm, modify or revoke all existing licences, permits, consents and authorisations within the designated area, or which could have a significant impact on the designated area. The review must take place between 1998 and 2004.

Occurrences within the West Midlands - Tame catchment which might have a significant impact on downstream water quality include:-

- The potential quality of motorway (M6) run-off from its elevated sections during winter de-icing with urea.
- The disposal of "exotic" organic materials by waste disposal companies which are not removed by their own treatment plants or the subsequent sewage treatment process.
- Urban runoff, particularly from summer storms after a long dry period (see issue 4).
- Discharges from contaminated land (see issue 12).

The URGENT project "Modelling river corridors : the scientific basis for rehabilitation of urban rivers" may be of relevance to this issue.

Objective - To ensure that the water quality from the catchment does not compromise downstream quality requirements			
Options / Actions	Responsibility	Benefits	Constraints
Monitor downstream water quality	Environment Agency	Ensure compliance with EC directives	None (on going costs)
Review consents	Environment Agency	Ensure compliance with EC directives	Large number of consents
Investigate diffuse inputs	Environment Agency	Ensure compliance with EC directives	Vast catchment area

See also issues 4, 6, 10 and 12.

Issue 12 Contaminated Land

Objective - To remediate and minimise the impact of contaminated land on the environment and look towards its beneficial re-use.

The quality of our land affects the uses to which it can be put. Contaminated land can present risks to human health, surface and groundwater, ecosystems and man-made structures or services. As an environmental regulator the Agency already deals with many of the problems arising from land contamination, particularly where it is causing water pollution

Contaminated land has a significant effect on groundwater and surface water in the catchment. Pollution usually comes from individual sites but in certain areas it is more diffuse. The most widespread problems are in the West Midlands conurbation which has a legacy of contaminated land. A characteristic of the Black Country is the complexity of some of the sites which can include mine workings, tipping from past industries and occasionally old infilled canals or disused railway lines.

Redevelopment provides the opportunity to remediate contaminated sites and the Agency works closely with Local Planning Authorities, developers and other agencies to ensure that the water environment is enhanced by re-development. Major successes have been achieved by this mechanism in the past. Some sites are of particular concern, partly due to the lack of resources required to clean them up and partly because the historical nature of the contamination prevents legal redress to the polluter. Such sites include Slacky Lane and Bentley Mill Way in Walsall where toxic metal contaminated water from historical tipping discharges via old mine workings to the Rough Brook and the River Tame respectively. These sites have made a major contribution to heavy metals in the River Tame, and possibly downstream in the River Trent, and the Agency will support and contribute to the implementation of schemes that result in their remediation.

"Leaching" is the term used to describe the mobilisation of contaminants in the soil (typically by rainfall or groundwater movement). Tests to determine the leachability, and therefore the polluting potential of contaminated sites have recently been devised and "leachability triggers" have been agreed which indicate where the polluting potential of a contaminated site is particularly high. These agreed leachability triggers have been applied to all contaminated sites in the Black Country. These triggers help to ensure that land is remediated to an appropriate standard. More generally across the catchment the Agency, through planning liaison, and close co-operation with other public bodies will seek to ensure that all contaminated land is remediated to an appropriate standard.

New powers are expected to be implemented during 1999 to improve regulation and control of contaminated land by the Local Authorities and the Environment Agency. Together we will have access to legal means requiring the appropriate person to take remedial action to clean up contaminated sites, however the relevant legislative protocols between the Agency and the Local Authorities have yet to be agreed.

The URGENT projects "Modelling of river corridors : the scientific basis for rehabilitation of urban rivers" and "Using urban aquifers : sustainability at different space and time scales" may be of relevance to this issue.

Objective - To remediate and minimise the impact of contaminated land on the environment and look towards its beneficial re-use			
Options / Actions	Responsibility	Benefits	Constraints
Remediation of contaminated sites where appropriate.	Environment Agency Landowners LAs	Reduced pollution of groundwater and surface waters.	Determination of most appropriate solution. Cost. Application of new legislation.
Reinstatement of James Bridge Monitoring Station.	Environment Agency	Better monitoring of pollution loading.	Cost.
Agree protocols with local authorities to ensure effective arrangements are in place to provide appropriate advice where there are joint responsibilities.	LAs Environment Agency	Co-ordinated action on contaminated land problems.	Time. Need for full agreement and protocols.

See also issues 4, 7, 10 and 11.

Issue 13 The impact of rising groundwater beneath Birmingham

Objective - To identify the extent, risks and potential uses of rising groundwater beneath Birmingham

Groundwater levels beneath parts of Birmingham city centre continue to rise back towards their natural, pre-abstracted levels. Much of the area is located on the Sherwood Sandstone aquifer. The rise in groundwater levels can be attributed to the reduction in actual abstractions from boreholes into the aquifer and leakage from water mains and sewers.

Two recent studies by Birmingham City Council, the former NRA, CIRIA (Construction, Industry, Research and Information Association) and consultants have been completed. One report looked at what levels to which the groundwater was likely to rise indicating the potential problems to buildings in the city centre and close to the River Tame. The other discussed options for resolving the problem. The available resource was estimated to be 23Ml/d per year or 50Ml/d for a maximum pumping period of five months each year. This was highlighted in the Agency's National Water Resources strategy and consideration has been given to the possibilities of pumping water to the River Tame or moving water via canal systems to the south east for drinking water purposes. The long industrial legacy of the area has however, resulted in organic solvents, hydrocarbons, inorganic and metal contamination of the water. The long term quality of the groundwater, cannot be assured on the information available and it may be necessary to treat or blend water before use. In addition there are the problems of the water levels rising into contaminated land and remobilising pollutants already in the ground into the groundwater and surface water systems, resulting in deteriorating water quality.

The Agency has no responsibility in respect of the effect of rising water on residential dwellings, offices and factories, only it's effect on the water environment. Every assistance will be given to those who want to use this water as the secondary benefit to be attained from increasing abstraction are significant.

The URGENT project "Using urban aquifers : sustainability at different space and time scales" may be of relevance to this project.

Objective - To identify the extent, risks and potential uses of rising groundwater beneath Birmingham			
Options / Actions	Responsibility	Benefits	Constraints
Set up working group to pursue available options and to produce a contingency plan for the future.	Environment Agency Birmingham Council and other interested parties	Facilitate and encourage the best use of the available resource.	Cost, time.
Liaise and assist potential abstractors.	Environment Agency Abstractors	Ensure the best use of the available resource.	None.

See also issues 14 and 15

Issue 14 Baseflow contribution to the River Tame

Objective - To quantify the interaction between surface water and groundwaters in the Coal Measures aquifer of the West Midlands Tame

The Coal Measures which exist beneath the western edge of the catchment constitute a minor aquifer. The Agency's current licensing policy for this aquifer is to permit further development of the groundwater, subject to no adverse local impacts, because of the apparent overall surplus of resources. It is thought that the majority of this "surplus" resource discharges into surface watercourses, in particular the River Tame, as baseflow, which assists in the dilution of effluent. Over the years as the smaller sewage treatment plants have been closed, with the subsequent loss of their effluent discharges, the contribution of baseflow has become more significant. This has been most noticeable in the Oldbury Arm of the Tame with the recent closure of Oldbury Treatment Works. At the time of writing British Waterways are currently investigating the possibilities of obtaining additional groundwater resources from this part of the catchment. Pumping tests are currently on-going to assess the effects of this proposed abstraction.

The complex layered nature of the Coal Measures and the lack of information relating to the precise relationship between surface water and groundwaters mean that it is currently difficult to quantify the contribution of baseflow to the River Tame. In order to assess the contribution a more detailed understanding of the hydrogeological system is required. All new licences will be time limited until the results of this survey have been received.

The URGENT project "Using urban aquifers : sustainability at different space and time scales" may be of relevance to this issue.

Objective - To quantify the interaction between surface water and groundwaters in the Coal Measures aquifer of the West Midlands Tame.			
Options / Actions	Responsibility	Benefits	Constraints
Investigate possibility of drilling observation boreholes.	Environment Agency	Collection of data.	Cost.
Gauging survey to determine groundwater inputs to River Catchment.	Environment Agency	Collection of data.	Cost.
Reinstate James Bridge Gauging Station to measure flow in Wolverhampton Arm.	Environment Agency	Collection of data.	Cost.

See also issues 12, 13 and 15.

Issue 15 Water Resources Development Strategy for canals

Objective - To produce a water resources strategy to maintain sufficient and efficient supplies in the local canal systems

There are over two hundred kilometres of canals within this LEAP area. The successful operation of these canals throughout the year requires a substantial amount of water from a variety of sources. When a boat goes through a lock, the water moves down-hill. This water is used to supply the "downstream" parts of the canal system, although there is some back-pumping at strategic points. Water from the Birmingham Canal Navigations (BCN) is used to partially supply the Grand Union canal as far as Warwick, the Stratford canal as far as Stratford, and the Staffs and Worcs canal in both directions (to Stourport and Great Haywood). It joins the Trent and Mersey canal at Great Haywood and Fradley, and supplies the Dudley and Stourbridge canals. The use of locks creates the greatest demand on canal water resources, and this demand is compounded by the dominance of summer recreational boating traffic at a time when water resources are typically under the greatest pressure. In addition there are demands for water to service the locks and channel losses from seepage, leakage and evaporation.

The onset of the present drought, which started in Spring 1995, has raised a number of water management issues, which now require consideration in the long term. In light of the current situation British Waterways will therefore need to produce a long term strategic plan for the LEAP area, identifying in one document the current availability of water resources, the yield and security of existing sources, and the predicted demands within the canal system over the next few decades. Emphasis should be placed on ensuring that effective management arrangements for water resources within the canal system must be in place before claims are made on new sources in order to meet demands, and before new canals are built or restored.

The Agency recognises that any strategy which would involve restriction of canal usage during the peak holiday season would have a serious economic effect on the many hire-boat companies, and the long term viability of the network.

Objective - To produce a water resources strategy to maintain sufficient and efficient supplies in the local canal system			
Options / Actions	Responsibility	Benefits	Constraints
Production of Water Resource Development Strategy.	British Waterways	Establish a management plan for canal system. Ensure better use of water resources within the canal system. Highlight stressed reaches within the canal system.	No legal requirement. Existing Canal Acts. Constraints within the canal fabric. Cost and time.

See also issues 13 and 14.

Issue 16 Litter and the aesthetic pollution of rivers and canals

Objective - To reduce litter and improve the overall appearance of rivers and canals

In common with many urban catchments, stretches of the canal system and the River Tame and its tributaries suffer from litter, unauthorised tipping and other forms of aesthetic pollution.

The Agency has developed and is trialling an assessment scheme which measures aesthetic pollution in terms of the presence of litter, gross items (for example shopping trolleys), sewage debris, dog faeces, iron deposits, surface scums, oil, colour and odour. In this context aesthetic pollution does not include the wider visual appearance of the surroundings of the watercourse.

Litter can prove difficult to address as the polluter is usually hard to identify. Under common law riparian owners have responsibilities relating to the stretch of watercourse which falls within the boundaries of their

property. Both the Local Authority (who may also be the riparian owner) and the Agency have certain legal powers; to prevent flooding and to minimise the risks to public health by pollution. However, the complex nature of the legislation may result in no single organisation having an obvious responsibility. In the absence of a responsible party, the Local Authorities will usually take responsibility for the removal of rubbish.

Where possible the Agency seeks to reduce litter and unauthorised tipping through the co-operation of the general public rather than resorting to legal action, with its many difficulties and costs.

Objective - To reduce litter and improve the overall appearance of rivers and canals			
Options / Actions	Responsibility	Benefits	Constraints
Continued development of a pilot GQA aesthetics monitoring programme.	Environment Agency	Quantitative measure of problems at individual sites.	Time and manpower
Implement the GQA aesthetics monitoring programme if required.	Environment Agency	National measurement providing quantitative evidence on the aesthetic appearance of watercourses.	Cost.
<u>Promote clean up initiatives:-</u> i) Dispose of unauthorised tipped material and reduce its future re-appearance through site management. ii) Improve methods of waste disposal (including improved access) iii) Removal/prevention of sewage derived debris. iv) Education through Schools, Libraries, information to the general public and increased access to the waterside.	Riparian owners Environment Agency LAs BW LAs STW Ltd Environment Agency LEAs Product Manufacturers	Improved environment. Improved environment. Improved environment. Improved environment.	Cost and commitment of partners. Set up and service costs. Cost. Manpower and cost. Long term, requiring an on-going commitment.
The encouragement of stewardship by voluntary groups and others.	Environment Agency Tidy Britain Group Groundwork New Deal	Improved environment.	Cost and commitment of partners.

See also issues 2, 3 and 19

Issue 17 Enclosure of waste transfer activities

Objective - To reduce the nuisance associated with the operation of large commercial transfer stations.

Large quantities of household, commercial and industrial waste are generated each year throughout the urban area of this LEAP. These are often collected in skips and small vehicles, and taken to "transfer stations" where they are stored, mixed and loaded into large bulk vehicles for transportation to landfill sites, often outside the area. Although transfer stations can have significant environmental benefits such as the recovery of reclaimable materials and the efficient use of fuel in transporting waste, they can also cause problems. Sites where the activities are undertaken in the open and that are close to houses or commercial and industrial premises can generate nuisances such as dust, litter, odours and pests such as rodents and flies. Such sites may also have a particularly unattractive visual impact.

All such open sites require a waste management licence, but experience has shown that imposing suitable operating conditions on the licence does not always prevent the nuisance problem. In recent years the licences issued for the new larger sites have required that the waste handling activities are undertaken inside a building where the problems can be contained and controlled by suitable treatment. The Agency has worked with Sandwell MBC, the Black Country Development Corporation and one of the largest operators in the West Midlands (A. Smith and Sons) to redevelop an existing waste transfer station so that the waste is processed inside a purpose built structure. The Agency will review the licences of all other existing large commercial transfer stations in urban areas with the aim of enclosing waste handling activities to reduce the impact of such sites on the environment.

Objective - To reduce the nuisance associated with the operation of large commercial transfer stations			
Options / Actions	Responsibility	Benefits	Constraints
Review licences of existing large commercial transfer stations with a view to improving the enclosure of waste handling activities	Environment Agency Local Authorities Site operators	Reduced nuisance levels from site	Staff time Cost

See also issues 16, 19 and 20

Issue 18 Little Packington Landfill Site

Objective - To assess the impact of Packington Landfill site on nearby SSSI's

Packington Landfill site is operated by BFI Packington Limited. The site is located midway between Birmingham and Coventry some 2 miles south of Coleshill. It is bounded to the west by A446 Kenilworth Road and to the east by Packington Lane. The site is located within a predominantly rural location within green belt land. Adjacent to the site are the Coleshill and Bannerly Pools and River Blythe Sites of Special Scientific Interest (SSSI's).

Currently the site covers some 385 acres (155 hectares) and is located in old sand and gravel workings to the west of the River Blythe. Underlying these surface drift deposits are the Mercia Mudstone Group which comprise a succession of silty-clays and mudstones. The thickness, nature and extent of the drift deposits and Mercia Mudstones is highly variable. Groundwater flows eastwards beneath the site and is in continuity with the River Blythe and its tributaries.

The Environment Agency is responsible for regulating the activities at the site, the objective being to prevent pollution of the environment and harm to human health. The site is licensed by the Agency to accept up to 12,500 tonnes per day of domestic, commercial, industrial and construction wastes. (This includes certain difficult and special wastes). The wastes arise from a variety of sources predominantly in the West Midlands, Warwickshire and South Staffordshire. Based on current input rates it is anticipated that it will take between 5 and 10 years to fill the currently approved void.

The site is operated by cell tipping which encourages good waste compaction. The site is progressively restored. Restored areas are turned over to a variety of after uses, predominantly agriculture. Landfill gas generated at the site is collected and converted to electricity by a gas and/or steam turbine, and this generates up to 9 megawatts for the local electricity grid.

Little Packington Landfill is permitted to accept certain wastes which contain Polychlorinated Biphenyls (PCBs) as a low level incidental component. PCBs are mobile oily liquids which are very stable, a property that contributes to their long term harmful effects on the environment. The Waste Management Licence controls the inputs of PCBs to the site by imposing maximum concentrations and loading rates. Although some work has been undertaken, further investigations are required to ensure that any persistent and potentially harmful chemicals are not affecting the environment beyond the site boundary.

The inclusion of this issue does not infer any poor operational management at Packington Landfill Site, however it has been included as an issue due to its size, nature of waste accepted, its sensitive location and its long term potential to pollute.

Objective - To assess the impact of Packington Landfill Site on nearby SSSI's			
Options / Actions	Responsibility	Benefits	Constraints
Assess impact of site on River Blythe and Coleshill and Bannerly Pools SSSI's	Environment Agency EN BFI	Improved understanding. Protection of SSSI's.	Available information and research costs.
Assess impact of any future proposed extensions.	LPA Environment Agency	Protection of SSSI's	Appeal. Environmental Impact.
Assess impact and potential movement of PCB bearing wastes.	Environment Agency BFI	Improved understanding	Available information. Appeal

See also issues 19 and 20

Issue 19 Flytipping

Objective - To define responsibilities and to maximise limited resources to respond to this difficult problem

Flytipping is the illegal disposal of waste on land that is not licensed to receive waste, and is a problem throughout the West Midlands - Tame LEAP area. It can occur on both private and public land and may vary from a single black bag of domestic refuse, to skip loads of construction waste, to the well publicised event of bags of asbestos left at several different locations in Birmingham in 1997. The difference between littering and flytipping is not always clear cut, and whilst it is the local authorities responsibility to deal with litter in public places, the Agency is responsible for taking legal action against flytippers. If the party responsible for the flytipping cannot be found, the landowner has to bear the costs of the clean up and removal of the flytipped waste. The landowner is also responsible for the security of land under its ownership.

Both the Environment Agency and the local authorities have a shared responsibility to take enforcement action to control flytipping. A Memorandum of Understanding between the Environment Agency and local authorities of England and Wales has been established in order to promote a lasting framework for consultation and co-operation in order to make best use of limited resources. Some difficulties were met concerning the responsibilities regarding the severe problem in the West Midlands of the commercial flytipping associated with Travellers. Meetings between the Agency, Birmingham City Council and the Police have helped to address this matter, however, this shows that it is important that on a local basis, agreements between Agency areas and the local authorities are drawn up by negotiation and agreement in order to overcome difficulties of responsibility, and to ensure that the problem is dealt with effectively.

A campaign to educate the public and highlight the problems associated with flytipping may help to reduce some incidental flytipping and encourage the public to report incidents so that offenders may be caught, and effective action taken against them.

Objective - To define responsibilities and to maximise limited resources to respond to this difficult problem			
Options / Actions	Responsibility	Benefits	Constraints
Memorandum of Understand/Local Agreements with local authorities.	Environment Agency Local Authorities	Agreement/negotiation. Maximisation of resources.	Resources, difficulty of defecting tipping and identifying offenders.
Educate/advertising campaign to highlight problem of flytipping	Environment Agency Local Authorities	Improved public awareness. Less flytipping. Improved enforcement.	Cost. Manpower.

See also issue 20

Issue 20 Sustainable Waste Management

Objective - To reduce the amount of waste produced in the West Midlands - Tame area, to minimise the risks of immediate and future environmental pollution and harm to human health and to increase the proportion of waste managed through re-use, recycling and energy generation.

Approximately 7 million tonnes of controlled waste is generated in the West Midlands County per annum of which 5 million tonnes is disposed of at landfill, only 1 million tonnes at sites operating within the county's boundaries and 4 million tonnes at sites in neighbouring counties, notably Warwickshire, Staffordshire, Hereford and Worcester, and Shropshire. The remaining 2 million tonnes are either recycled, reused, recovered or treated prior to final disposal.

The White paper on waste "Making Waste Work" sets out a strategy for achieving more sustainable waste management. The main objectives are to reduce the amount of waste that is produced, to make best use of that which is produced and to adopt practices which minimise risks to the environment and to human health. The paper sets out targets for delivering these objectives. The strategy looks at each step of the waste hierarchy in turn, and considers the advantages and disadvantages of each waste management option with a view to sustainable waste management.

The targets set out in the strategy refer to the reduction of waste going to landfill, the recovery of value from municipal waste, the recycling and composting of household waste and many others. Progress towards achieving these objectives is slow but is accelerating in line with an increasing awareness from those charged with meeting the targets. Further improvements will necessitate close working relationships and cooperation with a number of organisations, the Agency will be expected to play a major role in ensuring that Government targets are met.

Objective - To reduce the amount of waste produced in the West Midlands - Tame area, to minimise the risks of immediate and future environmental pollution and harm to human health, and to increase the proportion of waste managed through re-use, recycling and energy generation.

Options / Actions	Responsibility	Benefits	Constraints
Reduction in waste production, both in terms of quantity and hazard.	Waste industry Waste producers Local authorities County councils Environment Agency	Reduction in the environmental and economic costs of raw materials and waste disposal.	The perception of waste, attitudes of waste producers, limited statutory duties.
Increase proportion of waste recycled, reused or from which value is recovered.	Waste industry Waste producers Local authorities County councils Environment Agency	Reduction in the environmental and economic costs of raw materials and waste disposal.	The perception of waste, attitudes of waste producers, limited statutory duties, markets for recycled products.
Reduction of the proportion of waste to landfill	Waste industry Waste producers Local authorities County councils Environment Agency	Minimising risks of land and water contamination. Reduction in the level of landfill gas production. Preserves limited landfill space.	Cost to and attitudes of waste producers, limited statutory duties.
Development of company environmental policies	Environment Agency Industry and commerce.	Encourage businesses to consider issues relating to sustainable waste management.	The perception of waste, attitudes of waste producers, limited statutory duties.

See also issues 18 and 19

Issue 21 Air quality monitoring

Objective - To establish the current level of air quality monitoring in the West Midlands - Tame LEAP area

The Environment Act 1995 requires the Secretary of State for the Environment to prepare and publish a national air quality strategy. This has now been issued and contains a proposed list of 8 airborne pollutants for which target ground level concentrations are set. At present monitoring of air quality within the catchment is very limited and does not allow a full assessment to be made against these standards, or the identification of likely problem areas.

The DoE established a national network of monitoring stations covering both urban and rural sites. The existing system of four urban sites in the Midlands and two rural sites was expanded in 1996 to eleven sites.

Whilst the network can provide useful information at a national level, it is of limited value locally. Additional information is available from local authorities but this is not necessarily compatible with the national network.

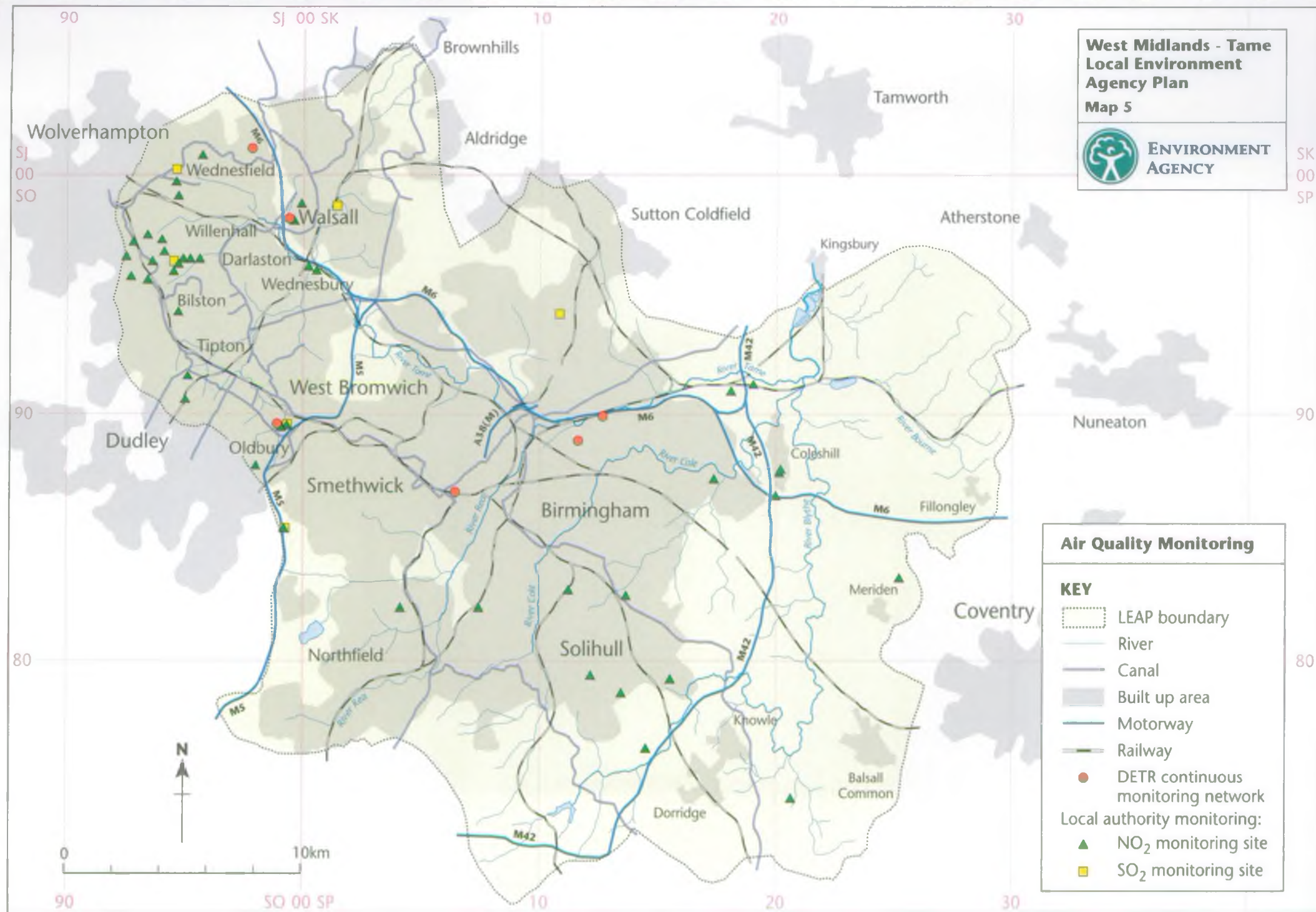


Table 4 - Objectives for local air quality management to be achieved by 2005

Pollutant	Standard	Objective
Benzene	5ppb (running annual mean)	100% compliance
1,3 Butadiene	1ppb (running annual mean)	100% compliance
Carbon Monoxide	10ppb (running 8 hour mean)	100% compliance
Lead	0.5 ug/m ³ (annual mean)	100% compliance
Nitrogen dioxide	150ppb (hourly mean)	100% compliance
	21 ppb (annual mean)	100% compliance
Ozone	50ppb (running 8 hourly mean)	97th percentile
Particles PM ₁₀	50ug/m ³ (running 24 hour)	99th percentile
Sulphur dioxide	100ppb (15 minute mean)	99.9th percentile

Two of the major contributors to poor air quality are nitrogen dioxide (NO₂) and sulphur dioxide (SO₂). Nitrogen dioxide is primarily from road traffic. The major source of (SO₂) is the combustion of coal and oil in power stations and industrial process.

Air quality is monitored by local authorities at a number of sites but this work is usually limited to three parameters, nitrogen dioxide, sulphur dioxide and black smoke.

Table 5 - Local air quality monitoring

Local Authority	Nitrogen Dioxide (NO ₂)	Sulphur Dioxide (SO ₂)	Black Smoke	Lead	PM ₁₀
Birmingham CC	✓	✓	✓	-	✓
Solihull MBC	✓	-	-	-	-
Walsall MBC	✓	✓	✓	✓	-
Sandwell MBC	✓	✓	✓	-	✓
Dudley MBC	✓	✓	-	-	-
Wolverhampton MBC	✓	✓	✓	-	-

Since some processes regulated by the Environment Agency are likely to have a significant impact on air quality it is proposed that work be carried out to assess the available air quality data, identify any gaps in this data and produce an estimate of the impact of IPC processes on air quality within and beyond the LEAP area.

The URGENT project "Observation, modelling and management of urban air pollution" may be of relevance to this issue.

Objective - To establish the current level of air quality monitoring in the West Midlands - Tame LEAP area			
Options / Actions	Responsibility	Benefits	Constraints
Work with Local Authorities to assess air quality monitoring needs for the area.	LAs Environment Agency	Assess air quality monitoring and direct resources to meet identified needs.	Cost, role of the Agency. Agreement of LAs
Agree common data sets.	Environment Agency LAs/DETR	Common base for information gathering and assessment.	Data must meet the needs of each organisation.
Estimate the impact of IPC process.	Environment Agency	Highlight problems on issues that affect air quality.	Cost. Agreement with operators.

See also issues 22 and 23

Issue 22 Industrial Heavy Metal Pollution in Pleck, Walsall

Objective - To assess the historical and on-going levels of heavy metal pollution in and around the Pleck area of Walsall in order to address public concerns and provide a sound basis for proportionate action by health and environmental authorities and industry

The James Bridge Copper Works operated by IMI Refiners Limited in Pleck, Walsall, is the sole remaining copper refinery in the UK. Copper bearing wastes and materials of all types are put through a series of fire-refining and electrochemical steps to produce high purity copper, in a process regulated by the Environment Agency under Integrated Pollution Control.

IMI Refiners have very substantially reduced the environmental releases from the process over recent years, and have a continuing Improvement Programme under their IPC Authorisation. However, the refinery continues to be a source of visible local pollution in the form of metallurgical fumes containing heavy metals, including lead and this has caused concern among local residents. The Department of Environment, Transport and the Regions has maintained monitoring stations in the local area for some years to check compliance with the current Air Quality Standard for lead in air of $2\mu\text{g}/\text{m}^3$. Although the area now meets this standard, there is some concern as to whether the new National Air Quality Objective of $0.5\mu\text{g}/\text{m}^3$ can be achieved.

Pollution from the works (and other local industry) was very much heavier in the past and there is a significant build up of lead and other heavy metals in the local soil, which in itself represents a potential and poorly quantified health issue. The current contribution to local pollution levels from sources other than IMI, notably the M6 motorway, is not well defined. There is a clear need for a detailed survey of heavy metal levels in soil and air in the local area, so that current sources of pollution can be clearly identified. Appropriate and proportionate strategies need to be adopted in tackling the health and environmental issues, including achieving the National Air Quality Objectives.

The URGENT project "Observation, modelling and management of urban air pollution" may be of relevance to this issue.

Objective - To assess the historical and on-going levels of heavy metal pollution in and around the Pleck area of Walsall in order to address public concerns and provide a sound basis for proportionate action by health and environmental authorities and industry			
Options / Actions	Responsibility	Benefits	Constraints
Directional Air Sampling	Environment Agency Walsall MBC	Identification of relative contribution of sources.	Resources; public perception; co-operation; co-operation from landowners/ householders.
Soil Sampling	Environment Agency Walsall MBC	Classification of health hazard.	
Local action plan - health issues	Health Authority Walsall MBC	Strategy to improve current situation.	Resources Public perception
Local action plan - environmental issues	Walsall MBC Environment Agency local companies	Strategy to improve current situation.	Resources Public perception

See also issue 21

Issue 23 Odour problems in Sandwell

Objective - To improve responses to complaints about odour problems from industry in the Sandwell area.

Much of the industry in and around Oldbury and West Bromwich is of a type that has the potential to produce offensive smells, and the area has a long history of odour problems. The frequency and persistence of the odours are such that many local residents hardly notice background levels which are noticeable to visitors to the area, and complaints are only made when the problem is particularly bad.

The Agency is responsible for the regulation of Integrated Pollution Control (Part A) processes (*ie* industrial processes which have the greatest polluting potential) and set legally enforceable limits on polluting releases through the use of BATNEEC (Best Available Technology Not Entailing Excessive Cost). Under BATNEEC the authorisations usually state that an offensive odour should not be present beyond the site boundary. A similar regime is applied by local authorities to control odour from Local Air Pollution Control (Part B) processes. One of the difficulties encountered is the subjectivity of the definition of an "offensive" odour.

Prior to the formation of the Environment Agency, a joint initiative between HMIP and Sandwell Environmental Health was established to identify and categorise sources of the odour problems, so that responses to complaints could be improved. The project was suspended due to lack of resources, but the need remains for an improved response to complaints and better control of the odour problems.

Objective - To improve responses to complaints regarding odour problems from industry in the Sandwell area.			
Options / Actions	Responsibility	Benefits	Constraints
Re-establish joint initiative to identify and categorise offensive odour sources	Environment Agency Sandwell MBC	Improved response to public complaints	Cost. Manpower.
Seek to reduce odour problems based on results of above study.	Environment Agency Sandwell MBC	Improved air quality.	Cost. Subjectivity of "offensive" odours.

See also issue 21

Issue 24 Review of Flood Defences on the River Tame

Objective - To review and improve flood defences on the River Tame

a) Flood Defences in Birmingham and the Black Country

The River Tame Improvement Scheme through the West Midlands conurbation completed in 1989 was the culmination of a comprehensive programme of flood alleviation measures on the River Tame and its major tributaries. A working party of Local Authority, Land Drainage Authorities and MAFF originally set up in 1971, had agreed a 1 in 50 year standard of protection for residential and commercial properties at risk in the flood plain. The Agency's current target standard of protection for flood defence for such land use is 1 in 100 years and accordingly the consequences of a 1 in 100 year design flood flow now needs to be assessed. Fifteen years of recorded data are now available to make better estimates of the design flow. A mathematical modelling exercise using this data will be required to determine 1 in 100 year flood levels for the River Tame from Curdworth to Bescot and up the Oldbury and Wolverhampton arms (to the head of Main River). A current modelling exercise is nearing completion downstream of Bescot and a new exercise upstream of Bescot needs to be instigated to cover the River Tame (Wolverhampton) and (Oldbury) Arms. The study may also identify ways in which maintenance procedures can be altered to benefit species such as water voles without prejudice to flood defence aspects.

b) Flood Defences downstream of Water Orton

A recent mathematical hydraulic model of the River Tame from Water Orton to the River Trent confluence has identified some reaches where possible flood protection works are required. Existing flood defences at Minworth, Water Orton and Whitacre Heath need to be checked in the light of the results of the exercise. The exercise needs to be extended to include modelling the reach of the river between the Minworth STW conduit outfall and Water Orton gauging station. Possible uprating works will be considered and in certain instances existing defences may need to be extended in length or raised.

c) Appraisal for Bescot controlled washland area

The four flood storage areas at Sheepwash, Bescot, Sandwell and Perry Hall are integral parts of the overall River Tame Improvement Scheme in the West Midlands. Their effectiveness depends upon their operation being triggered at the appropriate stage as flood levels rise. Each has a control structure called a flume which is a flow measuring device formed by a constriction in the river channel. A specific type of flume called a "critical-depth" flume has been used which produces a unique depth-flow relationship thus enabling the side weir inlet to the storage weir to cream off flood flows at a definite flood flow. At Sheepwash, Sandwell and Perry Hall a rectangular shaped flume was used which has proved to work as intended, but at Bescot a trapezoid shaped flume was used which has never operated effectively in flood times. Consequently the Bescot controlled washland area is not able to function as designed. An appraisal needs to be carried out and possible alterations to the flume considered.

It is important that short term objectives are balanced against our long term objectives of sustainable development. In this respect "soft" engineering options and Best Management Practice techniques should be employed whenever appropriate.

An asset survey of the Urban Tame Flood Defences is currently under preparation.

The URGENT project "Modelling river corridors : the scientific basis for rehabilitation of urban rivers" may be of relevance to this issue.

Objective - To review and improve flood defences on the River Tame			
Options / Actions	Responsibility	Benefits	Constraints
Predict river flood flows and flood levels on the River Tame Wolverhampton and Oldbury Arm.	Environment Agency	To define the extent of flood risk.	Cost (£40,000)
In the light of the results of above, check that existing flood defences are meeting an acceptable design standard and uprate them where necessary.	Environment Agency	Defences meet acceptable standards of flood risk.	Cost of improvement works. Environmental impact
Review maintenance regime required to satisfy the design conditions and take any opportunities for environmental enhancements as appropriate.	Environment Agency	Reduced maintenance costs. Improved habitat.	Need to ensure no reduction in effectiveness of flood defences.
Identify new flood defence works for inclusion in capital programme as required.	Environment Agency	Protection of life and property to agreed standards.	Costs. Environmental impact.
Investigate the effectiveness of Bescot Controlled Washlands Control Structure and consider modifications to existing control structure.	Environment Agency	Verification of design. Increase in existing available flood storage.	Cost
Reinstate James Bridge Gauging Station	Environment Agency	Provision of information.	Cost.

See also issues 3, 5 and 25.

Issue 25 The Proliferation of surface water balancing systems in Solihull

Objective - To assess the effects of the proliferation of surface water balancing systems in Solihull.

Although the River Blythe is predominantly rural, urbanisation and motorway run-off in the Solihull area have resulted in the principle watercourses responding very rapidly to rainfall, with artificially increased rates of flow. The Agency is working closely with Solihull MBC to promote source control and there are a number of surface water balancing systems which help smooth out the flashy response. However, the various flood balancing systems may cause the raising of flood levels downstream by the co-incidence of the delayed outflows from the balanced systems. This needs to be further investigated, and remedial measures taken if necessary.

Objective - To assess the effects of the proliferation of surface water balancing systems in Solihull.			
Options / Actions	Responsibility	Benefits	Constraints
Use the recently completed River Blythe mathematical model to assess the possible adverse effects of the various balancing systems on its tributaries.	Environment Agency	Better understanding of a potential problem	Cost (£20,000)
Undertake flood prevention work if necessary.	Environment Agency	Reduce potential flooding problems	Cost
Review flood warning arrangements for properties identified at risk.	Environment Agency	Reduce potential flooding damage costs.	Cost

See also issues 5 and 24.

Issue 26 The future management of Park Hall Farm

Objective - To review the future management of Park Hall Farm

Park Hall Farm is an area of land owned by the Agency and located in the River Tame valley on the eastern edge of the West Midlands conurbation between Castle Vale and Castle Bromwich. It is a long narrow site with an area of approximately 200ha and flanked by the M6 motorway and the River Tame. It is primarily wet flood plain meadow with ponds and wetlands and represents a major resource of these habitats in the area. Areas of woodland border the site.

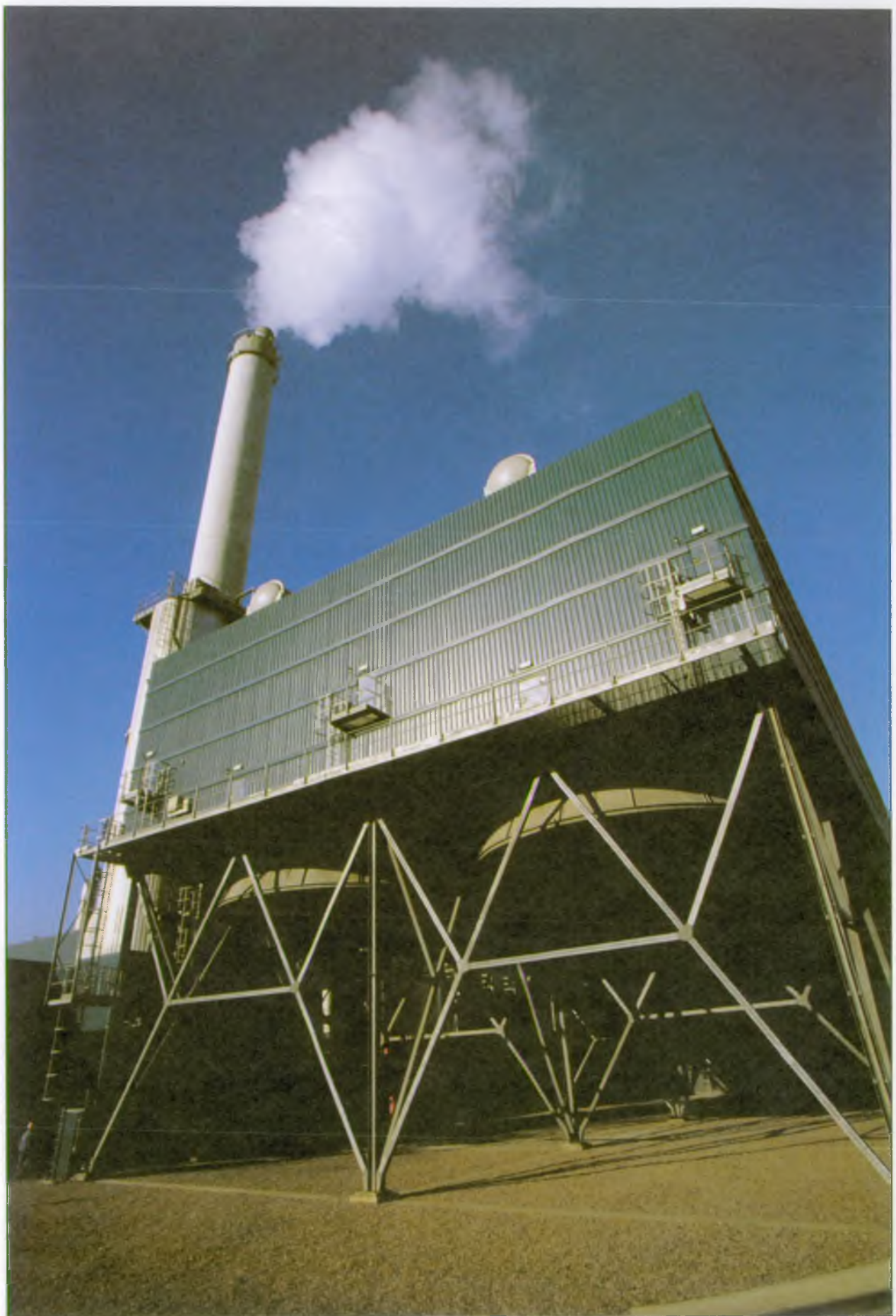
The land was originally bought for flood defence reasons but is no longer required for that use. It is currently let to a local farmer for horse and cattle grazing. Ecological, botanical and archaeological surveys were undertaken in 1992, prior to the installation of an underground pipeline crossing the site. Survey work was limited but highlighted the importance of the site particularly for birds and invertebrates. The ecological report also recommended that the site presented an excellent recreational resource and one that is currently underused. The limited access routes to the area will be affected by future plans to widen the adjacent M6 corridor.

It is proposed that the land remain in the ownership of the Agency, but consideration may be given to the possible transfer of the land to a conservation trust or charity if this could be seen to be in the best interests of the land.

The URGENT project "Biodiversity in urban habitat patches" may be of relevance to this issue.

Objective - To review the future management of Park Hall Farm			
Options / Actions	Responsibility	Benefits	Constraints
Retention of land in Agency ownership	Environment Agency MAFF	Existing conservation values maintained.	Does not further Agency operational objectives. Cost.
Transfer of land to external ownership.	Environment Agency Interested groups	Possible financial benefit to Agency. Potential for new environmental strategy for land.	Loss of control over maintaining existing conservation values.
Undertake detailed habitat and wildlife survey.	Environment Agency	Better understanding of the ecology and wildlife of the site. Prevention of damage during management	Cost and manpower.
Produce management strategy, to include possible development of the Tame Walkway along the river embankment.	Environment Agency EN, LEAs and other interested groups	Agreed priorities for the future use of the site. Completion of further section of River Tame Walkway.	Cost and manpower.
Following public consultation implement agreed management strategy.	Environment Agency and other partners	Improved habitats, better access and amenity for local residents.	Cost of new works and on-going maintenance. Potential M6 widening and access difficulties.

See also issues 1, 2 and 3.



9 Tyseley Incinerator

Section 4 - Protection through Partnership

This section highlights a number of partnership approaches between the Agency and others and puts forward policy guidance for local authority planners. It also looks at the role of education.

4.1 Introduction

Our natural environment is complex. Even where we do have a good understanding of a particular element of the environment, it is not always clear how it interacts with all other aspects of the local, regional, national and even global environment. The linkages between our society, economy and environment vary over time and the implications of change often remain difficult to predict and understand. Work is underway in the UK and across the world to define sustainable development indicators which can be used to assess environmental change.

It is the need for this kind of understanding that led to the Earth Summit in Rio in 1992 and the adoption of sustainable development principles with a commitment to manage the environment in an integrated way through partnership (see Section 1.3). In this plan it is partnerships that will enable the vision and the key objectives to be realised. Such partnerships provide accountability a means of attracting inward investment to improve the environment through (for example) EU funding, reduced duplication between agencies and provides the ability to pool scarce resources.

This Plan has raised a number of issues that will require a joint approach if they are to be solved. Partnerships will be developed in the short term to address many of the issues identified by Action Plan. Environmental management often requires a long term approach which can only be effective through the policies and practices of other interested groups.

The Agency is well placed to influence many activities affecting the environment through its own legislative powers, but these are limited in extent and do not necessarily confirm ownership or acceptance of the issues involved. The 1990 Government White Paper, *"This common Inheritance"* recognised the need for co-operation and joint working when discussing overlapping responsibilities of local authorities and other environmental enforcement agencies. Subsequent international agreements and government guidance has further established this principle. Education has also an important role in changing attitudes and work practices to promote sustainable development.

4.2 Partnerships in Environmental Protection and Improvement

4.2.1 Local Agenda 21

Agenda 21 was one of four main agreements signed at the Earth conference at Rio by representatives of 150 countries including the UK government. It is intended to be a *"Comprehensive programme of action needed throughout the world to achieve a sustainable pattern of development for the next century"*. Agenda 21 is an environmental action plan for the next century, which recognises the central role of local authorities and the value of partnerships and the local community in achieving sustainable development.

One of the most exciting aspects of Agenda 21 is that it recognises that action by national governments alone is not enough and that all groups - civic, community, business and industrial have to be involved to bring about change. It promotes the idea of thinking globally and acting locally, and all the local authorities in the West Midlands - Tame area have, or are undertaking a consultative process with local people to produce a Local Agenda 21 for their community. Anybody interested in Local Agenda 21 should contact their local authority, relevant contracts and the current stage of LA21, in each local authority is given in table 6 below.

As members of the Local Agenda 21 groups Agency representatives will advise, provide information and facilitate actions wherever practicable.

Table 6. Local Agenda 21 in the West Midlands - Tame LEAP area

Local Authority	Contact	Progress on LA21
Birmingham City Council	Jane Forshaw (0121) 421 9504 Nicola Boore (0121) 421 9535 Bal Billan (0121) 421 9505	Published LA21 Action Plan "Living Today with Tomorrow in Mind" prior to setting up 16 workgroups covering diverse topic areas. Most workgroups started up between August 1997 and early 1998.
Bromsgrove District Council	Phillipa Stanley (01572) 873232	Agreement to participate in County Action Plan rather than produce a separate one and to look at implementing the actions at a local level.
Dudley Metropolitan Borough Council	Clare Stephenson (01384) 814403	Published LA21 Action Plan "Towards a Sustainable Environment" in August 1997.
Hereford and Worcester County Council	Chris Carter/Fiona Narburgh (01905) 766745	LA21 Action Plan published in November 1996 and working groups have been established to implement the identified actions.
North Warwickshire Borough Council	Andrew Wright (01827) 715341	Reviewing arrangements for taking LA21 forward.
Sandwell Metropolitan Borough Council	Terry Jones (0121) 569 4054	Environmental forum and working groups set up to look at issues. Sandwell Volunteer Bureau employs a LA21 Officer and hosts a consortium of organisations in the area which are looking to produce Local Environmental Action Plans with the local community.
Solihull Metropolitan Borough Council	David Biss (0121 704 6874)	Published LA21 Action Plan in January 1998, set up working groups to identify issues.
Stratford on Avon District Council	David Barber (01789) 260117	Environmental forum set up and a range of initiatives instigated.
Walsall Metropolitan Borough Council	Peter Field (01922) 652473	Environment Assembly in November 1996 led to "Their Lives in your Hands" report and Environmental Action Plan meeting in November 1997.
Warwick District Council	Chris Elliott (01926) 884604	Environmental forum set up.
Wolverhampton Metropolitan Borough Council	Simon Lucas (01902) 555618	Seminar scheduled for March 1998 on LA21 to agree a way forward. Proposing to produce a document setting out the council's internal approach to LA21.

4.2.2 Waste Minimisation Clubs/Business Environment Clubs

Waste Minimisation/Business Clubs generally offer information, advice and support on systematic approaches to waste minimisation. They disseminate relevant information relating to all aspects of environmental best practice. The club may be a first point of contact for industry and companies will be signposted to appropriate organisations and groups for specific advice.

The objectives of waste minimisation clubs vary according to the partners involved, but are generally:-

Section 4 - Protection through Partnership

- To promote waste minimisation and sustainable waste management in industry and commerce.
- To build links between industries, the Agency, business groups and other interested parties.
- To share and expand existing and new waste minimisation initiatives, ideas and projects.
- To attract, encourage and interest companies that have not previously been involved in waste minimisation rather than concentrating on "preaching to the converted" companies.

The West Midlands Waste Minimisation (WMWM) Demonstration Project shows local businesses the gains that can be made from reducing waste at source. The project is sponsored by the DETR/DTI Environmental Best Practice Programme, Severn Trent Water, the Environment Agency, the BOC Foundation for the Environment, and is supported by local environmental clubs - the Midlands Environmental Business Club and the Black Country Business Environment Association. The WMWM project is managed by manufacturing management consultants Orr & Boss, and environmental consultants Entec.

Groundwork Black Country and the Environment Agency are amongst the partners in the Premier Business Park in Walsall which has won a national "Brightsite" award. The Agency is currently funding environmental consultants Entec to undertake a environmental risk assessment scheme of the different businesses on the park.

At Birmingham University, Dr Mary OhEocha of the Centre for Environmental Research and Training is working on schemes led by large manufacturers who want their supply chains to demonstrate positive environmental attitudes. An example is Rover plc who are looking to ensure that their panel beaters show good environmental credentials.

The Agency is currently funding the environmental consultancy ECA, in association with the University of Wolverhampton in initiating a new club to cover an area from Walsall up to Cannock and across to Tamworth. This area has been identified as having very little in the way of waste minimisation clubs. The Agency is also involved in waste minimisation with the University of Wolverhampton through Professor Colin Appleby, in the WEMNET Centre of Engineering Excellence.



10 Birmingham City Centre

4.2.3 Integrated Pollution Control Improvement Programmes

The system of IPC is a long term approach to environmental regulation. An IPC authorisation has two aspects:-

- Limits on the emission of pollutants.
- Improvement programmes for older processes to reduce emission levels to meet the standard of the best of today's technology.

Such programmes are developed locally and nationally, and are under continuous review to ensure that improvements in technology and our understanding of the environment are taken fully into account. Improvement programmes can be long term with high levels of capital expenditure. They cover activities such as the installation of new equipment, to reduce emissions, and the assessment of processes to determine whether changes can be made to reduce the generation of effluent, minimise the generation of waste etc. The Agency works closely with operators to identify the improvements required and to develop realistic targets for their implementation. Such programmes are developed locally and nationally.

National programmes include the reduction of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) emissions from oil and coal fired power stations in England and Wales. In March 1996 HMIP concluded its review of all large power stations and releases to air of oxides of nitrogen and sulphur dioxide will have to reduce substantially from current levels. An example of what has been achieved at local level from within the LEAP area is provided by the Trident Alloys (formally Britannia Alloys & Chemicals) site in Bloxwich, where an annual release of approximately 40 tonnes of zinc oxide to air has been largely eliminated under Integrated Pollution Control.

The detailed assessment of environmental management systems that is one aspect of IPC inspections can also be of value to the company, as was demonstrated in the recent large scale site audit by the Agency of Albright & Wilson's Oldbury works.

4.2.4 Conservation and Recreation Collaborative Projects

By their very nature, conservation initiatives tend to involve several interested parties such as landowners, local and national conservation groups, and local authorities or other statutory bodies. The UK Biodiversity Strategy has already caused new working groups to be set up, and this a trend that is only likely to continue.

The Agency has been involved with several joint ventures in the West Midlands - Tame area recently, and these include:

Warwickshire Biodiversity Audit

A project with all the local authorities, and English Nature to survey habitats in the whole of Warwickshire, Coventry and Solihull. The data is essential for the Agency to fulfil its statutory duties.

Handsworth Golf Course

In 1990 a "moat" was created by the former NRA to keep the public off the golf course and so allow the creation of 1.5km of footpath. In 1996 a new decorative "duck" gate was put into place to replace the ugly palisade gate.

Water Vole Survey of West Midlands Conurbation

The Agency commissioned the Urban Wildlife Trust to carry out survey work over the whole of the conurbation. This showed that water voles, which are declining in numbers nationally, are continuing to thrive within the West Midlands - Tame LEAP area.

Tame Walkway

As part of the continuing development of the Tame Walkway, while the rail bridge in Perry Park was being refurbished by Railtrack, an underpass was constructed by them and a contribution was made by the Agency. This removes one of the major obstacles on the Tame Walkway.

Hams Hall

Extended discussions with Powergen during the planning stage for redevelopment of this site led to major habitat improvements along the river, the creation of fish refuges and the construction of 4km of the Tame Walkway. Also involved were North Warwickshire Borough Council, and Warwickshire County Council.

Plants Brook Sutton

Negotiations with Birmingham City Council and the developer led to the opening up of the Plants Brook culvert in Sutton town centre. The new watercourse formed part of the landscaping for a car park.

Project Kingfisher

This project cares for much of the public open space in the Cole Valley on behalf of 2 local authorities, 2 wildlife trusts, the Agency, English Nature and Countryside Commission. As part of its support for the project, the Agency has removed all the sheet piling and concrete bank re-enforcement and created pools and wetlands, and built stepping stones across the River Cole.

Middle Tame Management Strategy

This project, run by North Warwickshire Borough Council and Staffordshire County Council, is supported by many other organisations including the Agency. It seeks to create a strategy for the management of the River Tame from the conurbation downstream to Tamworth.

4.2.5 Urban Regeneration Initiatives

Central and local government, bodies such as the Environment Agency and the private and voluntary sectors must combine their programmes, responsibilities, skills and resources to respond to local circumstances in order to achieve those urban regeneration objectives.

The Government believes it is important to mobilise a partnership based approach to local regeneration. The Government office for the West Midlands co-ordinates the spending programme (arising from various funding streams) for the Region. There are a number of initiatives to which the budget is directed. These are targeted in particular for areas within inner cities. These include the Black Country Development Corporation (established in 1987, to be dissolved in Spring 1998), Birmingham Heartland Development Corporation (to be dissolved in Spring 1998), City Challenge, Newtown/Ladywood Task Force and Castle Vale Housing Action Trust. Examples of other high profile urban regeneration initiatives operating in the West Midlands - Tame Area include:-

Urban Regeneration and the Environment (URGENT)

The Natural Environment Research Council (NERC) has initiated a major research programme to stimulate the regeneration of the urban environment through understanding the interaction of natural and man-made processes in the atmosphere, hydrological systems, the shallow subsurface and urban ecology. The University of Birmingham has been awarded five research projects:

- *Observation, modelling and management of urban air pollution.*

This work should deliver an urban air quality management model applicable to national and local government to predict the impact on air quality of specific control strategies. Field studies will measure a wide range of both long-lived and transient chemical species, such as hydrocarbons, carbonyl compounds and free radical species which play an important role in atmospheric chemistry. Many will be measured for the first time in a major UK conurbation.

- *Thermal climatology of the West Midlands.*

The programme aims to develop a thermal climatology of the West Midlands and is aimed at understanding the links between road surface temperatures and air temperatures in a complex urban environment. This should lead to better management of winter road maintenance which may in turn lead to a reduction in the use of road de-icers (*ie* salt and urea) with resultant environmental benefits as well as benefits to vehicle and infrastructure corrosion.

- *Modelling of river corridors: the scientific basis for rehabilitation of urban rivers.*

Studies on various aspects of the River Tame upstream of Water Orton will be used to develop a generic methodology appropriate for evaluating the relative influence of point and diffuse sources, flow variability and physical character on urban river ecosystems. It should also help in the determination of the cost effectiveness of various regeneration methodologies and programmes.

Section 4 - Protection through Partnership

- *Using urban aquifers: sustainability at different space and time scales.*

This should demonstrate how sensitive development may allow some remediation of past pollution, help with water supply needs and alleviate some of the problems caused by rising groundwater levels in an urban environment.

- *Biodiversity in urban habitat patches.*

This programme aims to analyse the extent to which flora and fauna utilise the 'urban greenways' both as wildlife corridors and as habitats in their own right, and to model and predict biodiversity in cities.

The URGENT project has the partnership and support of many different universities, institutes, businesses and authorities in the area, including the Agency.

Black Country Regeneration Framework

The Black Country Framework has been commissioned by the Black Country local authorities and Training and Enterprise Councils in order to demonstrate the unique interdependence felt amongst the economic development partners within the Black Country, as well as helping to support and enhance existing local strategies. The Agency is pleased to support the Environment working group which comprises of representatives of the four local authorities, CENTRO, British Waterways, Groundwork and a number of key business and voluntary sector environmental partners.

Renaissance

Renaissance is the British Waterways canal-based regeneration strategy for the years 1995-2000. The vision is that the historic canal system in the Midlands and also in the South West will be a sustainable, high quality, safe and internationally famous waterway network by the year 2000. The canal network should provide an attractive focus for waterside regeneration and development and it is hoped that it will act as a catalyst in influencing and encouraging further improvements in the region. The acclaimed canal-based regeneration such as Gas Street and Brindley Place in Birmingham demonstrate the potential for success of the initiative.



11 Canal-based regeneration at Brindley Place

The National Urban Forestry Unit

The National Urban Forestry Unit initiative started from the simple premise that trees and woodland can make a major improvement to the environment, the economic prospects and the amenity of an urban area. The Black Country Urban Forestry Unit, the first of its kind in the UK was established in 1990 to provide a focus for the (already existing) Urban Forestry Initiative, to develop the Black Country as a centre of excellence in urban forestry and to promote the concept of urban forestry more widely. The development strategy for the initiative was enthusiastically endorsed by the four Black Country local authorities and the Black Country Development Corporation. The success of the Black Country Urban Forestry Unit resulted in the formation of what is now the National Urban Forestry Unit.

4.2.6 The Fire Service

The Agency works closely with the Fire Services (comprising of the West Midlands Fire Service, Warwickshire Fire and Rescue Service, and Hereford and Worcester Fire Service in this LEAP area) in providing a first line pollution prevention service.

The Fire Services are normally first on the scene at road traffic accidents and other major industrial accidents including chemical spillages. This gives them a unique opportunity to deal with any potentially polluting spillages before they reach a watercourse. The Fire Services have agreed to undertake this role where practicable and the Agency has provided training and pollution prevention equipment such as oil absorbent materials and sealants.

The Fire Service immediately notifies the Agency of any potentially polluting spillages or significant fires so that Agency Environmental Protection staff can be on site to give advice when required and to deal with any necessary follow up actions.

4.3 Education

Education is a key objective for the Agency and plays a major role in its strategy for environmental protection and improvement. It is essential to the delivery of cleaner more sustainable environment in the long term. In many cases a lack of information and awareness is one of the factors which leads to environmental damage or neglect whether it be by accident or deliberate. There is a need for a greater level of educational involvement by the Agency and a need to raise awareness of environmental issues. The Agency has recently published its education strategy "Green Shoots" which considers environmental education into the next century.

Our educational goals are to:-

- Build positive partnerships through consultation, joint ventures and sponsorship.
- Help educate young people through teaching aids and other initiatives.
- Improve understanding of environmental issues, through links with education, work placements and an awards scheme.
- Work with industry and produce marketing campaigns to promote prevention of pollution rather than its remediation.
- Foster public awareness of environmental issues to encourage responsibility for the environment and its challenges.
- Build on established and create new, international relationships to further global sustainable development.

The Agency has produced a wide range of educational material and much of this information is free of charge. Please contact: Jo Elsy, Customer Services Officer Tel: (01543) 444141 Ex 4914.

4.3.1 Educational initiatives

The Agency undertakes a wide variety of pollution prevention, waste minimisation and education initiatives with local communities, business, local authorities and others.

Specific initiatives include:-

Water pollution prevention

- in excess of 100 pollution prevention site inspections a year in the catchment to business and agriculture.
- Distribution of leaflets to local authorities, schools, libraries etc.

Local authority liaison

- Planning roadshows to improve relationships between local planning authorities and the Agency.
- Promotion of sustainable surface water drainage techniques.

Waste Management

- The draft Producer Responsibilities (Packaging Waste) Regulations place an obligation on certain businesses to recover and recycle specific amounts of packaging waste. The Upper Trent Area office has a nominated "Customer Advisor" who has detailed knowledge of the developing framework and regulations. Area offices are capable of responding to queries from local businesses and provide advice and information.
- We are promoting waste minimisation through Waste Minimisation Clubs, our own activities and by partnership with local groups. In addition there will be promotion of best practice in waste management and special waste regulations.

Water demand management

- Education and information programs (eg road-shows, high street displays, schools guides, gardening tips, help lines)
- Promotion of water efficient appliances (eg low flush or dual flush WC's, water efficient washing machines and dishwashers, trigger-gun sprinklers, water butts)
- Promotion of low cost retrofit water saving devices (eg Hippo bags, low flow shower heads, sprinkler exchange schemes)
- Promotion of water re-cycling and reuse (eg grey water recycling systems, recirculation systems, water butts)

These, and other areas of activity (water audits, waste minimisation schemes and leakage reduction programmes) are coordinated by the Agency's Demand Management Centre at Worthing in conjunction with regional coordinators.

4.3.2. Schools education

The Agency is committed to improving its educational work with schools. The Agency is one of a number of organisations working with schools and there are opportunities for joint approaches. Information to schools will dovetail into the national curriculum.

Attention is being focused at key stages 2 and 3 and there is a commitment to provide information for 'A' level and university students. The Agency is developing its own national education strategy and work in the LEAP area will accord with that framework.

4.4 Land Use Planning

Land use is the single most important influence on the Environment. Where activities take place they can have both positive and negative impacts. Redevelopment and renewal can do a lot to repair the damage of the past, while controls on new development can protect sensitive habitats and biodiversity and can prevent increased emissions.

The Agency recognises that the Town and Country Planning System has a key role to play in protecting and enhancing the environment. Also, in the statutory guidance to the Environment Agency made under Section 4 of the Environment Act 1995, the Government has advised that one of the ways the Agency should contribute to sustainable development is through the land use planning system. The Agency's principal aim is to make a contribution towards achieving sustainable development and seeks to promote ways of encouraging environmentally compatible economic activity and ways of preventing, controlling or mitigating environmentally damaging activity.

4.4.1 Planning Liaison

The control of land use change is primarily the responsibility of local planning authorities (LPAs) through the implementation of the Town and Country Planning Acts. Development plans provide a framework for land use change and are key considerations in the determination of planning applications. Government planning guidance supports co-operation between LPAs and the Agency in relation to land use and the environment.

The Agency is a statutory consultee in respect of development plans and certain categories of planning application. This allows the Agency's views to be considered by the LPA prior to a planning application being decided or policies in a development plan being approved. Guidance on the types of planning applications the Agency would wish to see is contained in "The Environment Agency - Liaison with Local Planning Authorities", available free from your local Environment Agency office.

4.4.2 Development Control Guidance

The following is draft guidance to LPAs from the Agency on a number of areas of mutual interest. Town and Country Planning must support sustainable development and work towards meeting the country's commitments to biodiversity and global warming. Some of these policy approaches should be at the regional level, while others should be considered in a more local context. The Agency is particularly interested in comments from LPAs to this approach.

1 The Redevelopment or Urban Land

The Environment Agency is sponsoring Groundwork Birmingham to create guidelines for developers and the construction industry which will promote a more sustainable approach to the redevelopment of urban land. For this approach to be effective it requires the endorsement of the development industry and regulators alike. It requires a consistent approach across the conurbation by planners. The draft guidance will be out for consultation in May 1998 and will be accompanied by a seminar for local planners prior to its publication later in the year.

2 Transport and Infrastructure

Road traffic accounts for some 25% of the UK's contribution to global warming. Vehicle use also contributes towards acid rain through the production of sulphur dioxide and oxides of nitrogen, and results in the production of substances which can cause breathing problems, brain damage and cancer.

Seven volunteer local authorities throughout the UK, including Birmingham City Council are to be given powers to enforce vehicle emission standards at the roadside on a trial basis from 1998. This will augment the current programme of checks undertaken by the Vehicle Inspectorate, and the objective is to bring further reminders directed at motorists that their exhaust emissions should be checked regularly.

The Agency strongly supports policies that seek to minimise the need to travel. This can be achieved by locating as far as possible, homes, places of work and other facilities in reasonable proximity to each other. Such broad policies offer the basis for more detailed land-use policies. For example:

- A preference for new employment sites and retail developments to be sited close to good public transport networks;
- Policies to discourage out of town shopping;
- Mixed use areas where business and residential activities come together;
- Higher density developments, if well designed and targeted for suitable client groups;
- Development of new footpaths and cycleways;
- Development of school "safe routes"

Such an approach should also influence the Structure Plans and Part I Unitary Development Plans with respect to the distribution of new housing.

The pattern of urban development throughout the West Midlands - Tame area contributes to traffic congestion. Commitments outlined in the Local Agenda 21 action programmes of local authorities encourage:-

- Extending the provision for cyclists and for the safe movements of pedestrians;
- Promotion of public transport as an attractive substitution for car use;
- The reduction of energy consumption and pollution by unnecessary journeys to work, shops and leisure facilities

Policies should support existing town centres and the re-use of land adjoining such centres for housing and employment use. New forms of public transport including light rail and metro services are being encouraged (ie Midland Metro Line).

3 Energy

Although the Agency is responsible for the regulation of emissions to the environment from power stations it has little direct influence on the consumption of energy within the area, although we are in a position to help influence planning policy and its impact on energy use. Energy conservation is important to combat global warming and the long term sustainable use of non-renewable resources.

The 1997 Energy report (DETR, HMSO) highlights the challenges facing society on the use of energy, particularly fossil fuels, and the consequences of meeting the needs of the present generation without jeopardising the prospects for future generations. Although the UK is currently on target to meet the reduction of carbon dioxide emissions below the 1990 level by 2000, achieving longer term targets will be difficult and will probably require radical change in the way energy and its use is regarded.

Planning Policy Guidance Note 12 (PPG 12) states that structure plans should include policies for energy generation, including renewable energy. Structure plans and UDP Part I's should include policies and proposals for providing renewable energy in their area. Plans need to address the potential conflict within development areas for such installations and the protection of landscape and wildlife.

In addition to providing for renewable energy installations, development plans can affect energy conservation through development patterns. PPG 12 offers guidance to Local Authorities in this respect. The Council for the Protection of Rural England (CPRE) has produced a document. "Energy conscious planning", highlighting the integration of energy issues in land-use planning.

Section 4 - Protection through Partnership

Within Local Plans, energy related policies may be expected to provide a more specific framework for development control decisions which would apply not only to greenfield developments, but also to redevelopment and infilling within existing settlements.

Given this context, it is appropriate for local planning authorities to pursue policies which:-

- Discourage low density development
- Promote some degree of concentration of principal employment activities and community facilities
- Ensure that new development is well related to established or convenient public transport routes
- Encourage energy-sensitive siting, orientation and layout of new development, particularly in order to allow future energy saving technologies to be accommodated.

In addition to the planning departments, the building departments section of local authorities are also influential, for example in terms of energy efficient buildings.

4 Natural Habitats and Biodiversity

Whilst many species native to the UK are relatively common, between about 10 and 20% of native species are considered threatened (HMSO March 1996). A monitoring programme is being established under the Biodiversity Action Plan to measure changes in both the extent of habitats and their quality, in terms of the populations of characteristic flora and fauna found in them.

Ecological issues have traditionally been reflected as restraint policies in development plans. As a result of the growing strength of wildlife groups and the more widespread use of Environmental Assessments, a wider range of ecological matters can now be addressed in plans. Policies should be in place to promote ecological diversity.

As advised in PPG 1, although the principal use of a site may be for housing or other development, schemes should be designed to retain natural features on site and where none exist, to create new habitats or features to encourage wildlife. Local Plans offer the opportunity to incorporate policies to replace wildlife resources lost through development using Section 106 Agreements.

Policies should be offered along the lines of:

"All new development should preserve and enhance existing elements of nature conservation importance. New and existing development should offer the opportunity to create new areas of semi-natural habitat by the use of appropriate design and species in landscaping schemes and to incorporate features to attract wildlife".

As indicated, reclaimed open space offers greater potential for both increased habitat diversity, through large scale tree planting, wetland habitat promotion and the promotion of wildlife corridors.



12 Fish refuge at Hams Hall

Re-creation of river corridors

In Birmingham, Solihull, the Black Country and other urban areas the opportunity should be taken when sites are redeveloped to reinstate river corridors by setting development back from the river bank. Such corridors are important to wildlife but they also enhance the appearance and quality of an area, increasing the value and attractiveness for new business and for local residents.

River corridors can provide new means of access for pedestrians and cyclists. In combination and that with urban forestry and other initiatives these newly created green spaces can form an important part of urban regeneration. In creating such space, developers should orientate buildings and the landscaping of their sites towards the river. In most cases development should be set back at least 10m from the river bank.

De-culverting - opening up of rivers and streams

Within the West Midlands conurbation as land is redeveloped the opportunity should be taken to open up culverted streams and rivers. A culverted river or stream is little more than a surface water sewer. It provides little or no wildlife habitat. Culverts hide sources of pollution and make detection and, if necessary prosecution of polluters more difficult to achieve. Open watercourses can provide a focus for redevelopment and renewal. They can enhance the value and attractiveness of sites, provide new valuable wildlife habitats and cleaner rivers through the detection of pollution and its remediation.

Local Planning Authorities should support the opening up of rivers and streams as opportunities arise. In the creation of development briefs the existence of river or stream should be seen as an asset to be protected and enhanced. The culverting of existing rivers and streams should originally be strongly resisted and the Agency will support local authorities at appeal. In addition the Agency will not normally grant land drainage consent for culverting work, where this is a net increase in culverted watercourses across the site.

The River Blythe

Within the area of land that drains to the headwaters and the upper reaches of the River Blythe (see Map 6) the Agency is concerned about further development (new roads, houses and employment uses) and its impact on the River Blythe; a designated SSSI. The growth in the urban area around Solihull, the M42, the impact of new housing at Dickens Heath and development on land allocated for future housing have had and may cause further harm to the river. Within this area we recommend:-

- i) No further releases of Green Belt land for housing/industry.
- ii) New development allocated in the Solihull MBC Local Plan should employ sustainable surface water drainage techniques (source control) such as the use of swales, soakaways, retention ponds infiltration basins; as apposed to conventional surface water drainage systems which convey surface water directly to the nearest watercourse.
- iii) There should be no increase in surface water run off from sites subject to development.

5 Waste Management

The management of waste impacts on land use. The location of landfill sites and the operation of waste transfer stations affects the proposed use of land and the amenity of the surrounding areas.

The nature of much of the West Midlands - Tame area industrial past has resulted in a relatively widespread distribution of derelict, contaminated ground conditions.

The existence, or potential for, surface or sub-surface contamination, landfill gas and mineworkings should therefore be identified at the earliest stage of the planning process and evaluated as part of any development control. The presence of ground condition problems may impose immediate or long term hazards to human health, buildings and structures, amenities, plant life and construction operations.

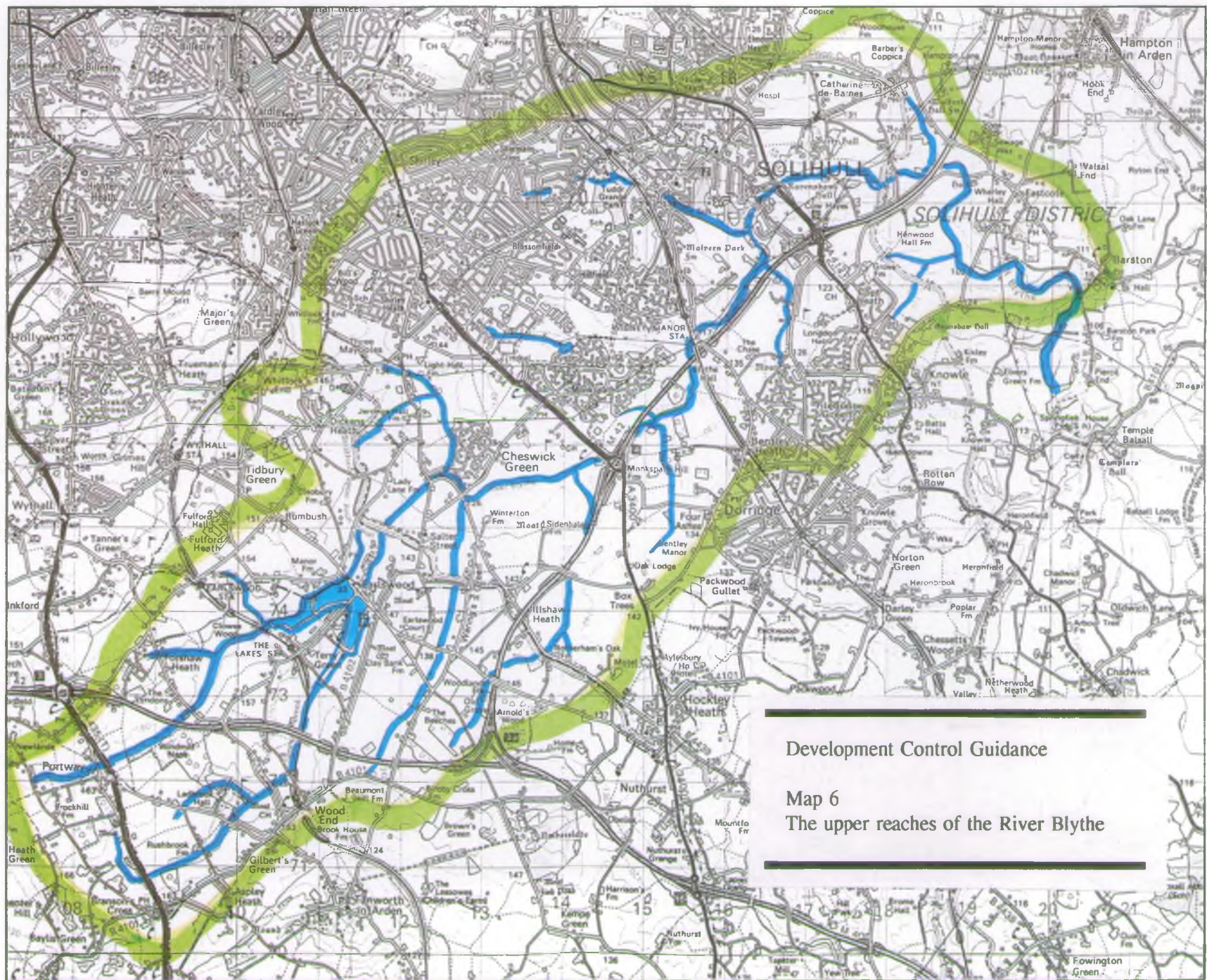
Regarding groundwater, local authorities in making their decision whether or not to grant permission for development on such sites are guided by various documents in Planning Policy Guidance (PPG 14) - "Development on Unstable Land", PPG 23 - Planning and Pollution Control, Circular 21/87 - "Development of Contaminated Land", Circular 17/89 - "Landfill Sites - Development Control", Waste management Paper No 27 - "The Control of Landfill Gas", and the Environment Agency's Groundwater Protection Policy Document.

Special caution should be given to development on or near former landfill sites. The migration of methane or carbon dioxide gas, sometimes generated as a result of landfilling activities, together with a deficiency of oxygen may give rise to a variety of hazards, particularly if allowed to accumulate in property or confined spaces. If generated in sufficient quantities, these gases may become toxic and explosive. If generated in sufficient quantities, these gases and leachate may migrate some distance away from its source.

It is the responsibility of the developer to determine the suitability of land for a particular purpose. The responsibility and subsequent liability for safe development and secure occupancy rests with the developer and/or landowner.

The Environment Agency welcomes and encourages pre-application consultation with developers/applicants in order that potential problems may be addressed.

Waste transfer stations can have an adverse impact on the amenity of nearby properties through dust, noise and smell and can cause considerable pollution to rivers and streams from run-off. Planning permission for waste transfer stations accepting over 100 tonnes of biodegradable waste a day should only be permitted if the sites are operated under cover except where waste is deposited into closed containers for prompt disposal elsewhere.



6 Flood defence and the control of surface water run-off

Importance of flood plain

River channels have a limited capacity and when this is exceeded, flooding of the adjoining land known as the flood plain occurs.

The need to protect flood plain has not always been recognised and they have sometimes been subjected to inappropriate development. Rivers and their flood plain are finite resources which need to be managed in accordance with the principles of sustainable development.

If flood risks to land and property are not to be increased and the ecological value of rivers and flood plain is to be safeguarded, then rivers and their flood plain need to be protected from activities, such as development, which may adversely affect them.

The impact of urban development and the control of surface water run-off

The urban development of a catchment can have the following major effects on the hydrological regime:-

- Increased volumes of storm water run-off
- Higher peak flow rates and flood water levels
- Lower base flows in rivers and streams
- Inundation of available storage in (and conveyance capacity of) river corridors
- Reduction in soil moisture recharge leading to a reduction of groundwater resources
- Increase in pollutant loads carried into sewers or surface waters

Urban run-off should be considered as a resource. The management of urban run-off to mitigate its adverse impact on the water environment is the concept of "source control" Best Management Practices which aims to identify local and more sustainable solutions for surface water management, without giving rise to detriment in groundwater quality.

Key Points:-

- Wherever appropriate surface water should be disposed of as near to the point of incident as possible. Site owners and occupiers will have to assume a greater responsibility for surface water management.
- Clean and contaminated surface water should be kept separate.
- The use of "softer" engineering structures such as swales, detention ponds, infiltration basins and porous surfaces should be encouraged as alternatives to conventional drainage where appropriate and practical. Ideally these techniques should be considered in preference to conventional drainage systems providing there are no adverse impacts on groundwater resources.
- When planning a development, surface water management should be considered as a fundamental part of the design and operation of the project. The retention of water on site for low grade usage such as landscape management and vehicle washing can also reduce the demand on the potable supply system giving further environmental benefits.
- The active promotion of surface water run-off disposal to infiltration basins may have an additional benefit as a means of artificial recharge to aquifers. The potential quality problems for groundwater where very polluted run-off could be involved may limit this option to surface waters draining non-industrial locations, but in any case full assessments will be needed.

- Infiltration drainage should be considered for developments proposed in areas where the existing combined sewer capacity is a limiting factor.
- Source control should apply to roads as well as buildings.

Adoption

If a source control system is to be incorporated into a road drainage system, for example by means of a soakaway system or reed bed, then such a system can become the responsibility of the highway authority. If the system is to be incorporated into an area of public open space, through a Section 106 Agreement or a unilateral understanding with the developer, then the local authority can adopt it. It is currently the policy of the Statutory Sewerage Undertakers in England and Wales not to adopt infiltration systems. We are working with local authorities and sewerage undertakers to change attitudes and make adoption more acceptable (see Issue 5).

Appendices

This part of the report provides background information that supports the Issues in Section 3 and the partnerships and policies in Section 4

Human activities exert *pressures* on the environment and change its *state* in terms of its quality and its stocks of natural resources. Society then *responds* to these changes through changes in behaviour, and through environmental management (for example, the treatment and disposal of sewage, and the control of industrial emissions to air). Society's response therefore alters both the state of the environment, and the pressures placed upon it. Also, the state of the environment itself will influence human activities and the type and level of environmental management practised. It is a dynamic system.

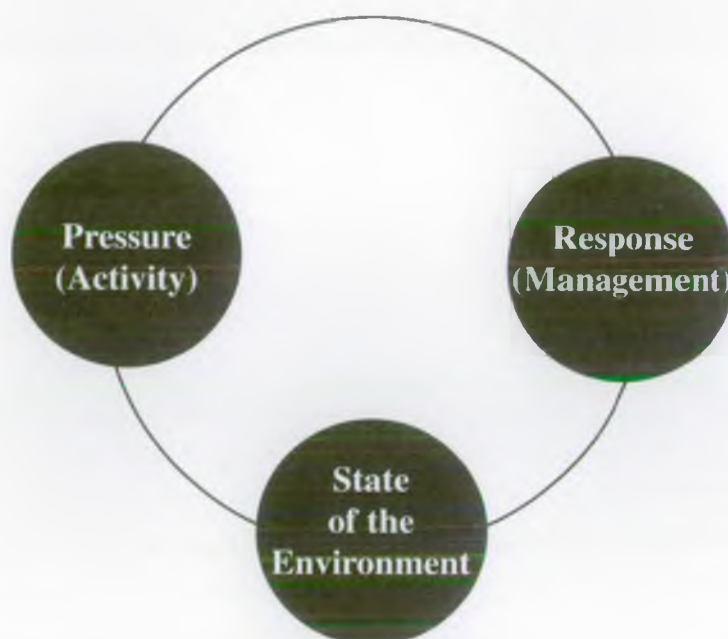


Figure 4 - The Pressure, State, Response model

The three main Appendices are set out to reflect this dynamic model;

Appendix 1 looks at activities which create *pressure* on the Environment,

Appendix 2 looks at society's *response*, and how we manage the impact of these pressures on the environment,

Appendix 3 looks at the current *state of the environment* and provides a lot of local environmental information from our monitoring and assessment of the local area. This information is set against standards and targets, from which some of the issues have been generated. This is not a "STATE OF THE ENVIRONMENT" report in its fullest technical sense, but the information should be of interest to a wide range of organisations and individuals.

There are a number of further technical appendices, including a glossary.



13 Contaminated land drainage at Bentley Mill Way, Walsall

APPENDIX 1 - PRESSURES ON THE ENVIRONMENT

Introduction

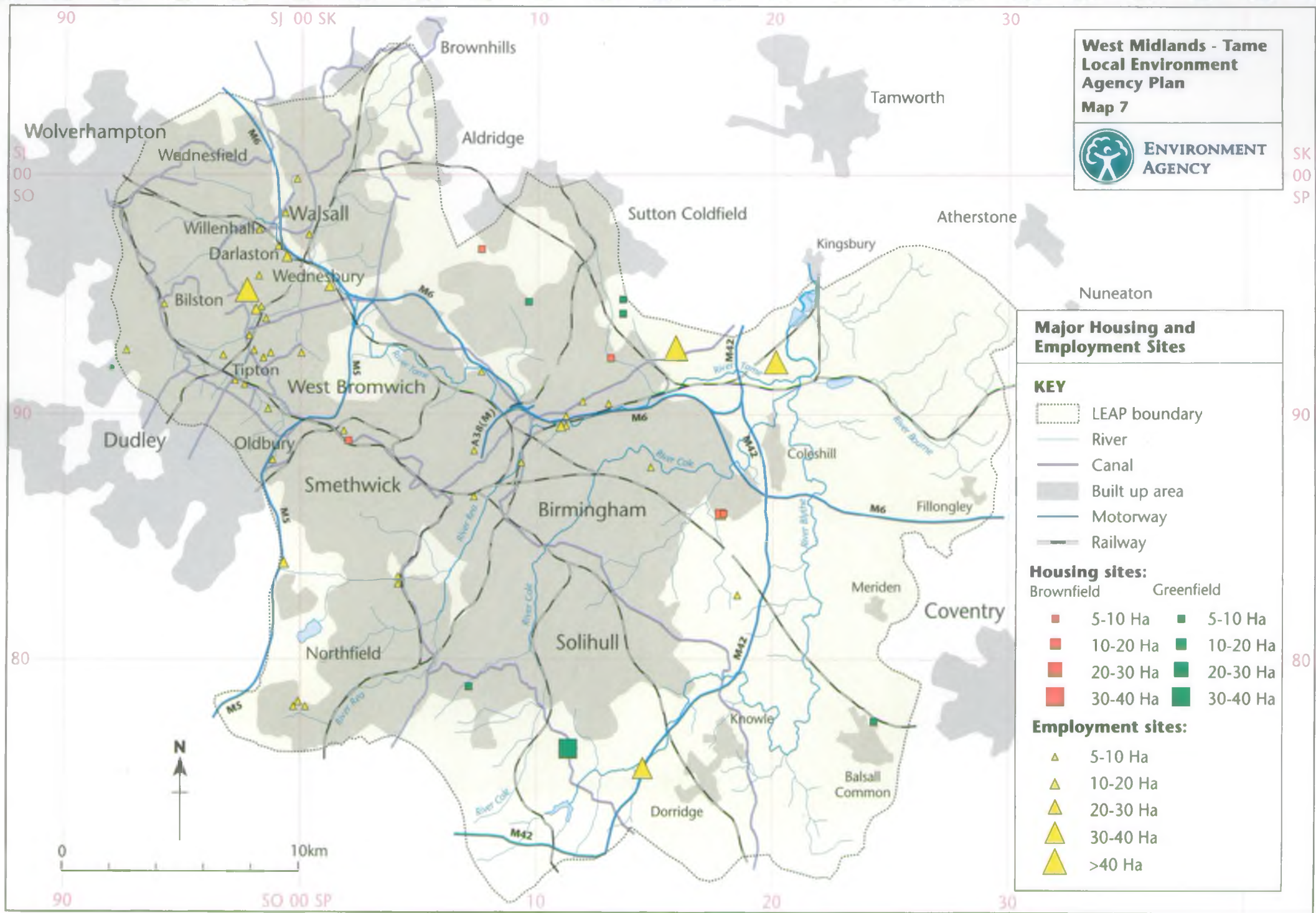
The West Midlands - Tame area is one of great diversity. The West Midlands Metropolitan area is the main centre of population and employment, located at the crossroads of the national motorway network and railway network. The metropolitan area is made up of distinctive parts. The City of Birmingham is a major international centre at the heart of the region and has attracted major facilities such as the International Convention Centre. The Black Country embraces traditional towns and villages to the west and north of Birmingham. It has a varied and interesting urban environment although its industrialised heritage has left it with significant problems and areas of derelict land. With around 1.8 million people concentrated in such a relatively small area immense pressure is put on the environment. All these people must have somewhere to live, they must have enough to eat and to drink, they want somewhere to work so that they can generate income to meet their needs and their wants for themselves for their dependants and for the area, they need somewhere to relax, and they need to be able to travel. Natural resources are needed for the raw materials and energy required to meet these needs, and these people, and their activities all create waste.

Pollution can be defined as "The introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity, or interference with legitimate uses of the environment".⁽¹⁾ In this respect it makes sense to regard pollution as a pressure on the environment. However, it is also possible to view pollution as a *consequence* of pressures caused by human activities, rather than a pressure in itself. Many of the activities described below contribute to pollution of the environment.

This appendix looks at the following activities which put pressure on the environment:

- 1.1 New Development
- 1.2 Existing Urban Development
- 1.3 Industry
- 1.4 Traffic and Transport
- 1.5 Power Generation
- 1.6 Mineral Workings
- 1.7 Recreation
- 1.8 Agriculture and Forestry

¹Holdgate, M.W (1979), *A perspective of environmental pollution*, Cambridge University Press, Cambridge



**West Midlands - Tame
Local Environment
Agency Plan
Map 7**



**ENVIRONMENT
AGENCY**

**Major Housing and
Employment Sites**

KEY

- LEAP boundary
- River
- Canal
- Built up area
- Motorway
- Railway

Housing sites:

- | Brownfield | Greenfield |
|------------|------------|
| 5-10 Ha | 5-10 Ha |
| 10-20 Ha | 10-20 Ha |
| 20-30 Ha | 20-30 Ha |
| 30-40 Ha | 30-40 Ha |

Employment sites:

- 5-10 Ha
- 10-20 Ha
- 20-30 Ha
- 30-40 Ha
- >40 Ha

1.1 New Development

Where new development attracts an increased residential and/or working population, then the pressures associated with that development will also increase. New building works, changes in land use, development of communications and the construction of new roads, sewers and other services can have a major impact on an area and uses of the environment.

The Agency has a responsibility to protect the environment, and to achieve this aim, it must work closely with Local Planning Authorities (LPAs).

Map 7 shows new and proposed major housing and employment sites for the West Midlands - Tame area. The housing allocation in the area (up to 2001) amounts to some 140ha, of which approximately 36ha is known to be brownfield (26% of total). Some 650ha of land has been allocated for employment areas, of which 270ha (42% of total) is known to be brownfield.

The largest single new housing site in the West Midlands - Tame LEAP area is on land allocated in the Solihull MBC Development Plan, where 800 to 1000 houses covering about 40ha of greenfield land are to be built at Dickens Heath on the headwaters of the River Blythe. Urbanisation, especially at the headwaters of a river, tends to cause a deterioration in the water quality and river flow. Further development on greenfield sites around a river as sensitive as the River Blythe is of great concern to the Agency, and in the Blythe/Cole/Bourne Catchment Management Plan one of the actions in issue 23 was to encourage LPA's not to release Green Belt land, and to support restraint policies in urban fringe areas. However, where such developments are planned (such as the Blythe Valley Business Park and other planned developments, notably around the M42 and A452) it is vital that robust measures to prevent pollution and control direct discharges along with strict water resource management methods (such as the use of source control techniques) are applied to protect water supply and wildlife, and to ensure compliance with water quality objectives.

Hams Hall

Currently, the largest employment proposal (170ha) in the area is at the site of the former Hams Hall Power Station, Warwickshire. In May 1994, the Secretary of State for the Environment granted planning permission for the development of a channel tunnel freight terminal, manufacturing and distribution park on this site. The site has ready access to the roads network is seen by the rail companies as the main freight terminal in the West Midlands for the Channel Tunnel. Much of the site was previously derelict land and the development of this site is providing opportunities to improve the existing environment with the creation of the Ladywalk Nature Reserve and new water meadows together with the creation of a new fish refuge and major habitat improvements along the banks of the River Tame. Redevelopment also provides a new link in the developing Tame Walkway.

The site is bounded by attractive and important woodlands in the north, and by areas of nature conservation importance in the east and south east. In addition, the Whitacre Heath Site of Special Scientific Interest (SSSI) lies immediately across the River Tame to the north east of the site. These areas are to be protected as part of the development brief.

Peddimore

In August 1997 John Prescott, the Secretary of State for the DETR granted planning permission in respect of an application made by the West Midlands Development Agency for use and development of land as a micro electronics plant on 56ha of land between the A38 Sutton Coldfield Bypass and Wishaw Lane, Minworth - currently agricultural land designated as green belt.

The Secretary of State accepted that the proposal was in conflict with the Birmingham Unitary Development Plan Policies for development in green belt and would constitute inappropriate and harmful development in the green belt. However, he concluded that the urgent need for major investment, lack of readily available alternative sites outside green belt and the economic benefits arising from such development amounted to special circumstances, justifying a granting of planning permission.

The Environment Agency will continue to be actively involved in the development at Peddimore, both as a consultee with regard to the design of the site, and as a regulator. Some processes associated with the

development may be subject to Integrated Pollution Control (IPC) procedures under the Environmental Protection Act 1990.

Birmingham Northern Relief Road (BNRR)

In July 1997 the Secretary of State, John Prescott authorised the construction of BNRR, a new 44km motorway around the north and east of the West Midlands Conurbation providing an alternative route to the M6 between Junctions 4 and 11.

The need for BNRR has been examined in the context of the Roads Review undertaken by the Government in July 1997. The Secretary of State acknowledges that BNRR would, amongst other things, affect some recreational facilities and designated sites of conservation interest, including the River Blythe Site of Special Scientific Interest.

The majority of the route itself will be outside the boundary of this LEAP, although it will meet the M6 at Packington in the north east of the LEAP catchment. When completed, the BNRR is expected to affect levels of traffic on the M6 and the M42 in the LEAP area. The relatively short stretch of the road in the catchment is not expected to have a major effect on the watercourses of the area as long as pollution prevention measures are implemented.

BNRR has been evaluated against the criteria of integration, accessibility, safety and economy and environmental impacts. The Government considers that the potential benefits of the scheme (in terms of access, safety and economy) outweigh its environmental disadvantages. Government opinion is that BNRR will be of strategic national importance in that it will better facilitate the movement of through traffic from Scotland and the North West through the West Midlands to the south east, the Channel Tunnel and ports.

1.2 Existing Urban Development

According to information derived from the 1990 Landsat Thematic Mapper over four hundred square kilometres of the West Midlands - Tame area is covered by existing urban development. This does not take into account much of the good deal of fragmented green open space in the conurbation, but nevertheless this is over half the area of the entire LEAP catchment.

An estimated 4.5 to 5 million tonnes of controlled waste is generated in the catchment area per annum of which approximately 800,000 tonnes is classified as household waste, and 3 million tonnes as commercial and industrial waste. The remainder is mostly generated by the activities of the construction and demolition industry. The vast majority of the waste arising is generated in Birmingham, Solihull, Sandwell, Walsall, Dudley and Wolverhampton. Without management for treatment and disposal, these vast amounts of waste would cause tremendous environmental and social problems.

An estimated three hundred million litres per day of untreated domestic sewage is produced in the Plan area. This is based on the standard sewage treatment assumption of an average amount of 180 litres per head per day. This quoted volume does not take into account the huge number of trade effluent discharges to sewer in the area. Without treatment, all this untreated effluent would discharge to land and water, the rivers would be devoid of life and would certainly pose a serious health risk to those who came in contact with them. Nevertheless, although the polluting potential of sewage is vastly reduced by treatment, it is not necessarily altogether removed. Treated effluent usually carries some organic loading and may contain elevated levels of dissolved metals or other components, depending upon the nature of the raw sewage entering the Sewage Treatment Works. Under dry conditions up to 90% of the surface water draining from the West Midlands - Tame catchment is made up of treated effluent.

Under conditions of heavy rainfall, foul sewers that also take surface water (known as combined sewers) may fill to capacity. When this happens dilute but untreated sewage is discharged to watercourses via sewer overflows. Under any weather conditions a blockage in a sewer may cause sewage to back up the system and prematurely discharge via the overflows until action is taken to clear the sewer and remove the blockage.

Large amounts of land in the Birmingham and Black Country are contaminated to a greater or lesser extent by materials left by previous uses such as old waste tips, industrial sites and mineworkings. Such contamination

presents potential hazards to human health, and the health of other animals and plants via contact with the land itself and contaminated drainage from it. Inevitably this also affects the potential for redevelopment of the land. The rain falling on roads, industrial and residential areas is normally drained to watercourses via surface water outfalls. These discharges are often thought of as being clean but in fact contain a wide range of contaminants including oil, organic matter and toxic metals. The contaminants in the discharges are a result of contamination and spillages on roads, drives and industrial yards; connection of foul drainage, (by accident or ignorance) to surface water drains, and ignorance of the destination of drains which can lead to oil and chemicals being poured down the nearest drain. The poor water quality of the water environment in the urban areas of this LEAP area can be directly attributed to urban runoff (see issue 4).

In addition to the problems caused by urban run-off, the impermeable surfaces and positive drainage of much of the urban environment reduces the amount of rainwater soaking into the ground. This can cause water resource problems where the 'recharge' of groundwater aquifers is restricted by the urban development. However, this is not a great problem in the main conurbation where the aquifer is not heavily used, which is at least partly attributable to contamination of the land from past use 80% of boreholes in the main aquifer under Birmingham show evidence of solvent and heavy metal contamination.

1.3 Industry

All industrial activities can impact on the environment. The Environment Agency is responsible for regulating emissions to land, water, and air from industrial processes which have the greatest potential to pollute, through their scale, their complexity, or the toxicity and persistence of the materials that could be released. These are the processes prescribed as "Part A" processes under the Integrated Pollution Control provisions of The Environmental Protection Act 1990. Local authorities regulate emissions to air from less potentially polluting industries ("Part B" processes), also under this Act.

Integrated Pollution Control (IPC) requires companies to use the best available techniques not entailing excessive cost (BATNEEC) to prevent, and where that is not possible, to minimise or render harmless the release of prescribed or other harmful substances to the environment. Where a process may involve the release of substances to more than one environmental medium (for example both air and water) the operator must have regard to the best practical environmental option (BPEO). This can be considered as the option which provides the most benefit or least damage to the environment as a whole, at an acceptable cost in the long term as well as the short term. The system requires companies to seek to improve their processes to minimise pollution and to take into account best available techniques. The Agency is therefore involved in joint improvement programmes with operators. Some examples are given in Section 4.2.3.

The area covered by the West Midlands - Tame LEAP contains the largest concentration of industry in the Upper Trent catchment. There are 76 IPC processes on 46 sites, mainly concentrated along the M6/M5 corridor. There are particular concentrations of chemical and non-ferrous metals processes in Oldbury, West Bromwich and Walsall, notably Albright & Wilson's multi-process chemical works in Oldbury and the UK's sole remaining copper refinery at IMI Refiners' James Bridge Copper Works in Walsall. However, most types of Part A process are represented in the Birmingham conurbation.

Waste products from industry vary widely according to the type of industry. Solid and liquid waste products may need removal and disposal off site, trade effluent and site drainage may discharge either directly, or after treatment, to a watercourse, and exhaust gases, fumes and particulates may be released to the air.

Past industry was often less environmentally aware and was considerably less regulated than it is today. Chemicals and other waste products disposed of by unregulated disposal to land are a significant contributor to the legacy of contaminated land in the West Midlands - Tame area.



14 Emissions to air, Oldbury

1.4 Traffic and Transport

Air pollution in the UK has traditionally been associated with industrial activity and the domestic burning of coal. However, as explained in Section 4, industrial emissions are reducing. The pollution associated with transport is, however, less straightforward. In recent decades transport emissions have grown to match or exceed other sources of many of the most important pollutants. In some areas, particularly in towns and cities they have now become the largest cause of air pollution. This is due to the large increase in road traffic over the period.

Table 7 - Emissions from road transport

	1995 Emissions (Ktonnes)	% of national emissions from road transport
Benzene*	39	67
1,3 Butadiene*	10	77
CO	5478	75
Lead	1.47	78
NOx	2295	46
Particulates - PM ₁₀	232	26
SO ₂	2365	2
VOCs	2337	29

* 1994 estimates used.

In a heavily congested city such as Birmingham, road transport emissions make up well over 90% of all Carbon Monoxide, Particulates and Volatile Organic Compounds. Poor air quality from traffic can affect human health by increasing the risk of cancer and causing respiratory problems. All motor vehicles powered by petrol and diesel also produce carbon dioxide, a major contributor to global warming.

Residues of oil, rubber and exhaust fumes all build up on the surface of roads until they are flushed away by rainfall. This road run-off usually discharges to the river environment and can be very polluting, particularly after a long dry spell of weather. Road run-off under these circumstances often contain high levels of complex organic chemicals and heavy metals such as lead and cadmium. Road run-off is a major contributor to the problem of urban run-off described in issue 4.



15 Spaghetti Junction, Birmingham

1.5 Power Generation

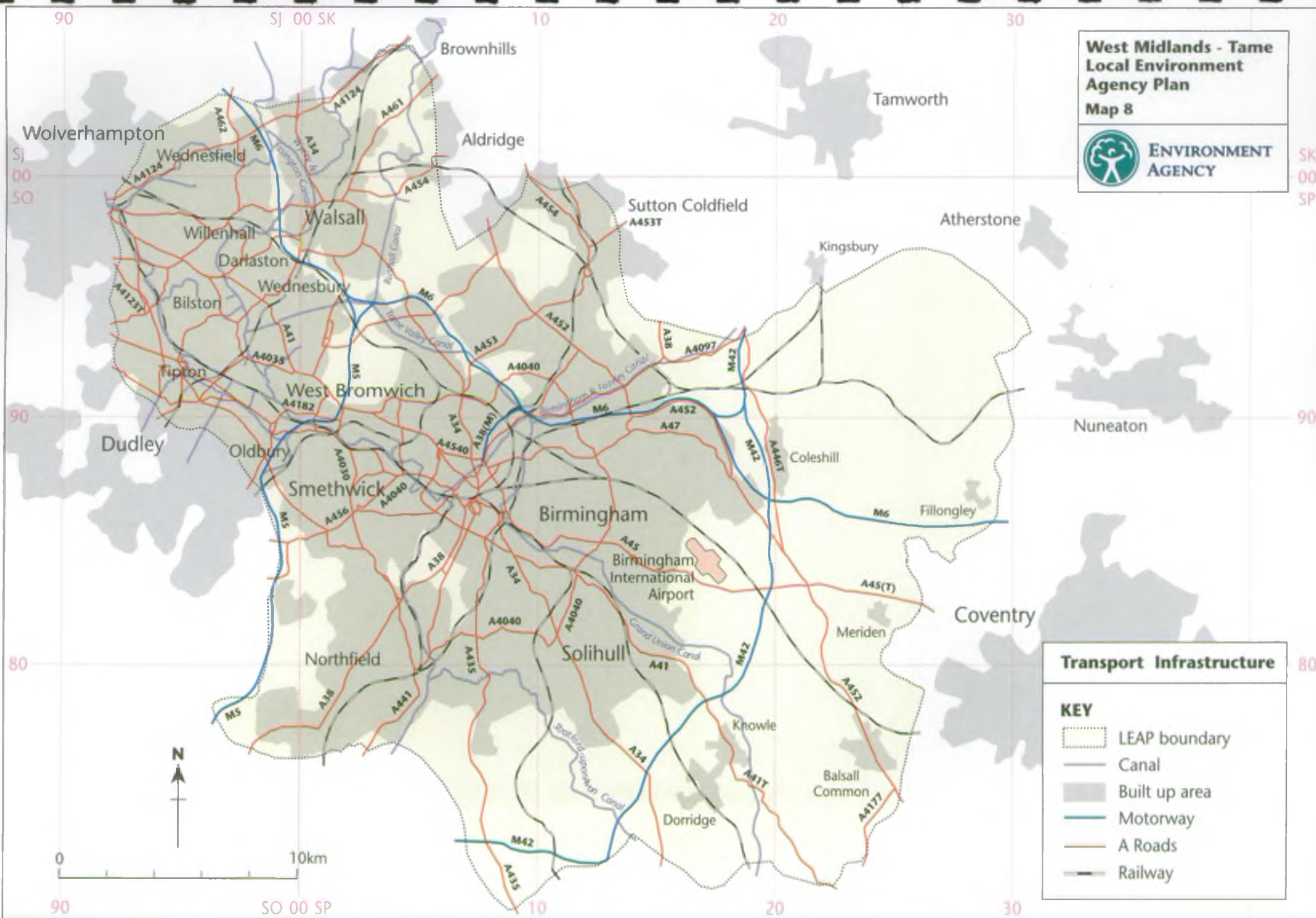
In the UK power is mostly generated by the combustion of fossil fuels, coal, oil and natural gas, and from nuclear power sources. Non nuclear processes capable of achieving a rated thermal input of 50 mega watts (MW) or more are regulated by the Agency.

The principal environmental impact from the combustion of fossil fuels is the release of pollutants into the atmosphere. From figures taken from "The United Kingdom National Air Quality Strategy" (Department of the Environment 1997), fossil fuel power stations accounted for 24% of nitrogen dioxide emissions, 15% of particulates and 65% of all sulphur dioxide (SO₂) emissions. Coal fired power stations accounted for 59% of all SO₂ emissions, with 6% being generated from oil fired stations. Oxides of Nitrogen and sulphur dioxide are acidic in nature and can cause environmental and health problems through dry deposition near to their source and contribute to acid rain, often far from their source.

There are no major power stations within the West Midlands - Tame LEAP area, but at least three stations (Ironbridge, Rugeley and Drakelow) are sufficiently close to influence air quality if wind direction and weather conditions permit, although fortunately this is rare. There are two small power stations within the area, at Ocker Hill and Fort Dunlop.

1.6 Mineral Workings

The area has been extensively mined and quarried for its mineral resources. The majority of this activity has now ceased and the area is a net importer of its mineral requirements. The area has been worked for limestone, coal, ironstone, clay, brickclay, sandstone and sand and gravel.



Apart from the obvious loss of non renewable resources, mineral workings can create other pressures on the environment. Mining and the transport of minerals tends to be energy intensive with the associated emissions to air, but can also leave a legacy of other potential problems. Methane is released from coal during mining handling and storage, and former coal mines (notably around Wolverhampton, Bilston, Tipton and Wednesbury) may still be a significant source of methane emissions in the West Midlands.

Some minerals such as limestone and sandstone can make up important aquifers, and the mining of these does not only remove a mineral resource, but also a water resource. Sands and gravels, which tend to occur along river corridors, often provide continuity between the river and groundwater. Extraction of these minerals (such as occurs along the Rivers Cole and Blythe) can reduce the natural recharge of water into the rivers, and contribute to low flows.

Probably the most frequently quoted environmental hazard as a result of mine working is the potential for pollution. Adits and mineshafts from the old coal workings which would have been constantly or regularly pumped during operation, can slowly fill with groundwater which can then become contaminated, particularly with metals. There are no serious examples of this occurring as yet in the LEAP area, although the pumped water from the Bradley borehole feeding the Bradley Loop of the Birmingham & Fazeley Canal has a very high dissolved iron content, which quickly oxidises and settles out in the canal.

1.7 Recreation

When there are a high concentration of people in a relatively small area (as in the area covered by this report), then their legitimate recreational uses of the environment may create conflicts and pressures both on the environment and also between the respective recreational activities. Examples of potential pressures on the environment are the erosion and compaction of areas used for walking and cycling, damage and disturbance to banksides caused by high levels of angling, and disturbance of wildlife by walking, cycling, boat traffic and angling. Conflicts can arise between pedestrians, cyclists and anglers on the bankside and between anglers and boat traffic (including canoeists).

1.8 Agriculture and Forestry

1.8.1 Agriculture

Despite the domination of the LEAP area by the urban environment, about 45% of the area is used for agricultural purposes, particularly in the east and south of the area.

Because agriculture is the major land user in the UK, its environmental effects can be very significant. The drive for increased food production since the Second World War has had a substantial effect on the rural environment and the appearance of the countryside. The high level of agricultural support under the Common Agricultural Policy (CAP) has stimulated the intensification of production, new technologies and greater consumer demand has led to the industry becoming increasingly mechanised and intensified, with consequent adverse effects on the environment, including habitat loss and problems of water pollution in some areas, particularly from nutrients, pesticides and farm wastes. In the dairy industry straw based cattle housing has given way to cubicle housing, producing animal slurry, while silage has replaced hay as the major cattle fodder so that silage effluent has to be contained and spread on the land. In arable farming, traditional pest control methods have been succeeded by the use of pesticides and herbicides.

Given the above, it is of little surprise that the industry can have a major impact on the environment. However, increased environmental awareness, both by government bodies and by the farming community itself, has led to better pollution prevention practices and the protection of water quality.

Well managed woodland in the right places does not harm the environment and will normally bring benefits. However, in certain circumstances forestry development and management can cause problems. Area of concern to the Agency include pesticide use, acidification, soil erosion, reduced water yield, increased flooding risk and damage to wildlife habitats.

The only major forestry initiative in this catchment is that of the Black Country Urban Forest. The Agency fully supports this initiative (described in Section 4.2.5) which is intended to improve the urban environment.



16 Packington Landfill Site

APPENDIX 2 - MANAGING THE ENVIRONMENT

Introduction

The pressures on the environment briefly discussed in the previous appendix are necessarily managed to reduce their impact on the environment and on human society. Usually, environmental management responses do not entirely negate, but *reduce* environmental pressures so that they are brought to what are considered to be more acceptable levels. There is often disagreement as to what constitute these "acceptable levels".

Management of environmental pressures is often (although not always) costly, sometimes extremely so, and in certain situations it may be argued that the benefits are outweighed by the cost although this very much depends upon the level or standard to which we seek to remediate. It is also sometimes the case that human activities may be geographically or temporally separated from the environmental pressures that they create. In those circumstances those involved (be they individuals or entire nations) may be unwilling to reduce or manage their activities solely to benefit their neighbours. The major European component of environmental legislation exists for this very reason, as do the agreements and protocols sought at world summits such as the recent Kyoto summit on Climate Change in 1997. A high degree of altruism, or stringently applied laws may be necessary to manage such activities.

Environmental management responses are varied and often operate on several different levels, this appendix looks at the following management responses:

- 2.1 Town and Country Planning
- 2.2 Management of Waste
- 2.3 Management of Water Quality
- 2.4 Management of Air Quality
- 2.5 Management of Radioactive Processes
- 2.6 Management of Mineral Resources
- 2.7 Management of Water Resources
- 2.8 Management against Flooding
- 2.9 Management of Fisheries
- 2.10 Conservation of Wildlife and Heritage
- 2.11 Management of Recreation
- 2.12 Management of Navigation
- 2.13 The Environment Agency's Emergency Responses and Legal Redress

A number of environmental management and improvement initiatives have also been described in Section 4 "Protection through Partnership".

2.1 Town and Country Planning

The Agency's Involvement

The Agency is a statutory consultee under planning legislation and advises local authorities on development proposals that can have an impact of matters relevant to the Agency. To facilitate this process, the Agency has produced a series of Guidance notes for local planning authorities.

The Agency operates at all levels of the planning system. At the national level there is direct liaison with the DETR and local authority associations, seeking to influence Planning Policy Guidance Notes (PPGs) Circulars and new legislation. At the regional level there is liaison with government offices and regional steering groups with the aim of influencing regional planning guidance. At the local level the Agency is consulted at all stages of structure and local plans, mineral local plans and waste plans to ensure our interests are protected and that development proposals have a positive or neutral impact on the environment.

The Agency also seeks to pursue its aims and policies regarding development through the planning consultation process for individual proposals. The Agency is a statutory consultee under Article 10 of the General Development Procedures Order (GDPO) 1995. Although the final decision on the planning matters rests with the LPA, government guidelines advise lpas on the need to consider the Agency's concerns when determining proposals.

Development Plans

The Regional Planning Guidance for the West Midlands (RPG11) was published in 1995. This guidance recognised the need to achieve sustainable development and aims to influence the policies of structure and local plans to achieve a coherent development strategy for the region.

Warwickshire County Council has also prepared a structure plan which provides a broad strategic framework for planning and development control in the county. The present status of all the statutory structure and local plans in the West Midlands - Tame area are shown in Table 8.

Table 8 Current Status of Development Plans within the West Midlands - Tame LEAP Area

Local Planning Authority	Development Plan Title	Status and Consultation Date	Comments
Birmingham CC	The Birmingham Plan	Adopted July 1993	Monitoring statement produced in 1997
Bromsgrove DC	Bromsgrove District Local Plan	Draft	The plan has been subjected to a local public inquiry
Dudley MBC	Dudley Unitary Development Plan 1991-2001	Adopted November 1993	
North Warwickshire BC	North Warwickshire Local Plan	Adopted May 1995	
Sandwell MBC	Sandwell Unitary Development Plan 1998-2001	Adopted 1995	
Solihull MBC	Solihull Unitary Development Plan	Adopted 1997	

Local Planning Authority	Development Plan Title	Status and Consultation Date	Comments
Stratford on Avon DC	Stratford on Avon District Local Plan 1989-2001	Deposit Draft	Plan has been subject to a public local inquiry
Walsall MBC	Walsall Unitary Development Plan	Adopted 1995	Monitoring Statement produced 1996
Warwickshire CC	Warwickshire Structure Plan 1996-2011	Draft for public consultation July 1997	
Wolverhampton MBC	Wolverhampton Unitary Development Plan	Adopted 1993	
<p>Notes:-</p> <p>The stages in the preparation of local plans prior to their adoption are as follows: consultees and member of the public may initially comment on a consultation draft of the local plan, a deposit draft is then available for a statutory six week period, after which all representations are considered. A public inquiry is then held at which objections to the plan are considered. Objectors can be represented in person and evidence cross examined. A Government Inspector considers all objections raised and produces a report to the local planning authority.</p> <p>The LPA then produces post enquiry modifications which reflect their acceptance or rejection of the Inspectors' recommendations. The post inquiry modifications are then usually submitted for public consultation before the plan is formally adopted.</p>			

Planning and Contaminated Land

The Agency is aware of a variety of potentially contaminated sites within the region. These include both open and closed landfills, old gasworks and a wide range of industrial sites, many of which are located in environmentally sensitive locations such as near to rivers or on aquifers. The positioning of sites close to water bodies or on aquifers is a historic relic of the need for water in the industrial process, a method of transport for raw materials and products, and the location of centres of population.

As part of the Agency response to planning applications, we will often request that a site investigation (SI) is undertaken either prior to determination or prior to redevelopment and that remedial works are undertaken should the SI indicate that they are required.

Where land is not subject to a planning application, but is known to be contaminated and is having an impact on the quality of controlled waters, the Agency will encourage the polluter/owner to undertake remedial works. Where pollution has occurred, the Agency encourages operators to provide information, so that agreed remedial action can be taken, based on the environmental risk at the site. Where operators do not inform the Agency and subsequently pollution of controlled waters is detected, prosecution under Section 85 of the Water Resources Act 1991 will be considered or remedial work can be required under Section 161 of the Act.

Existing contaminated land sites offer, once suitably remediated, an opportunity for redevelopment. It is often preferable to redevelop a contaminated site with less contaminating end uses and therefore a lower threat of pollution to water resources.

The General Development Procedures Order 1995 requires the Local Planning Authority to consult with the Environment Agency on any planning application for development on or within 250 metres of land which:-

- "(1) is or has at any time in the 30 years before the relevant application been used for the deposit of refuse or waste and*
- (2) has been notified to the local planning authority by the Waste Regulation Authority for the purposes of this provision".*

Special Contaminated Land Sites

Of the estimated 100,000 contaminated land sites throughout the UK, many will require some sort of remediation to make them suitable for a specific use or to eliminate a specific significant hazard to human health, the environment, or buildings. A significant number are believed to be located in the Midlands Region. Under the Environmental Protection Act 1990 and the Environment Act 1995, the Agency will have the primary responsibility for, and a number of duties to manage, "special contaminated land sites".

The Regulations and Statutory Guidance associated with the above Acts are only in draft form at present. The main responsibility for identifying contaminated land and ensuring its remediation will be with local authorities. The Agency will have a significant role in providing advice, liaison, and consultation to local authorities carrying out these duties. We will only have the primary role with "Special" sites, as defined in the Guidance, which are the most seriously contaminated.

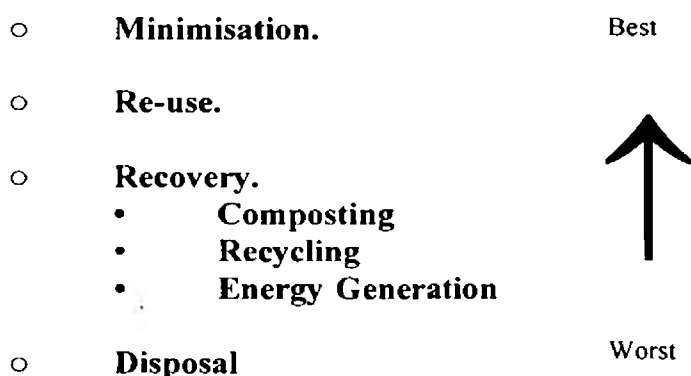
Local authorities and the Agency, where appropriate, will have the power to issue "Remediation Notices", to require adequate clean up of contaminated sites. Arbitration, if necessary, will rest with the Agency.

2.2 Management of Waste

2.2.1 Waste Minimisation

The key sustainable development objectives for waste and waste management is to minimise the amount of waste that is produced, to make best use of the waste that is produced and to minimise pollution from waste. The Government has defined a hierarchy of waste management options which are ranked to give a broad indication of their relative environmental impact.

Figure 5 - The Waste hierarchy:-



The best option is not to produce waste in the first place. Milk deliveries and milk bottles are a good example of re-use. Recycling includes bottle banks, newspaper banks etc, and requires additional energy along with the production of further wastes to make useful products. Energy generation covers incineration using waste as a fuel. The final option is disposal to landfill which is currently the main form of waste disposal in the UK. The Agency's objective is to move waste management further up the waste hierarchy while retaining the best practical environmental option. Clearly we all have a part to play in reducing the amount of waste produced and making the best use of the waste that is produced. Household waste can be reduced by individuals taking responsibility by re-using, re-cycling and composting and also by buying long life, reusable and environmentally friendly products with minimal packaging. According to the Department of the Environment approximately 50% of household waste is potentially recyclable. Local authorities have been set targets by the Government to recover up to 40% of household wastes in England and Wales by 2005.

Individuals and businesses should:-

- Support local waste minimisation and recycling initiatives.

- Support the extension of minimisation and recycling initiatives in their area (such as the provision of home composting bins).
- Reduce the amount of material thrown away.
- Respond to consumer demand to reduce unnecessary packaging and other forms of waste production.

"Making Waste Work" Targets

The targets for sustainable waste management have been set by the Government through the DoE White paper on waste - "Making Waste Work". The targets are:-

- (i) To stabilise the production of household waste at its 1995 level.
- (ii) To reduce the proportion of controlled waste going to landfill by 10% over the next 10 year period and to make a similar reduction in the following 10 years.
- (iii) To recycle 25% of household waste by the year 2000.
- (iv) 75% of companies with more than 200 employees to have published environmental policies covering waste issues by the end of 1999.
- (v) 50% of companies with more than 200 employees to have management systems in place to give effect to their environmental policies by the end of 1999.

In order to ensure that these targets are achieved the Agency will need to develop strong contacts with those responsible for waste production, waste disposal and collection authorities and the waste industry in general.

2.2.2 Waste Regulation

The treatment (including recovery), keeping and disposal of controlled waste is regulated by the Environment Agency through the waste management licensing system, under the Environmental Protection Act 1990. Controlled waste consists of household, industrial and commercial waste.

Agricultural waste, mines and quarry waste and sewage sludge are covered by other legislation.

Different types of waste management facilities include, landfill sites, transfer stations, household waste and recycling sites, treatment plants, incinerators, scrap yards and recycling process plants. Planning permission will normally be required for the development of a waste management facility. The siting of waste management facilities is decided through the land use planning system by local planning authorities under the Town and Country Planning Act 1990. Some sites are exempt from licensing and these mainly cover re-use and recovery operations such as recycling facilities.

The objective of the waste management licensing system is to provide a separate control system that ensures that waste management facilities:-

- do not cause pollution of the environment
- do not cause harm to human health
- do not become seriously detrimental to the amenities of the locality (only applicable if planning is not in force).

In assessing pollution, waste regulation should have regard to the wider environment. The Agency considers the impacts of emissions on global climate change and on local air, water, soil, flora and fauna.

2.2.3 Waste transfer, treatment and disposal

It is the duty of waste collection authority (usually a district, borough, or unitary council) to arrange for the collection of household waste in its area. Municipal waste is often used to describe waste collected by the local authorities, and includes domestic household and some industrial and commercial waste. Waste disposal authorities (usually county, metropolitan or unitary) have a duty to arrange for the disposal of household waste in its area. Local authorities are also required to provide household waste and recycling sites where members of the public can deposit waste free of charge.

The way that waste materials are collected and sorted often dictates which waste management option is

subsequently used, and whether materials recycling, biological treatment or energy recovery are economically feasible. The collection method will significantly influence the quality of recovered material or value.

The first priority for more sustainable waste management is to reduce the production of waste from all industrial processes. The manufacturing industry is in the best position to play a major role in developing the techniques for reducing resource use and ensuring that end of life products are reusable or recoverable.

Landfill remains the predominant route for the disposal of waste general within the area. The area itself has many landfill sites within its boundary, these sites received over 2.7 million tonnes of controlled waste during 1996/97, of which approximately 90% arose in the West Midlands. The largest site is Packington in North Warwickshire, which currently handles over 50% of the total waste landfilled the area. Less than 1 million tonnes was disposed of at sites operating in the West Midlands conurbation.

A small proportion of industrial and commercial waste requires treatment by specialised facilities prior to disposal or recovery. The catchment area has within its boundaries a network of specialised facilities which collectively process in the region of 400,000 - 500,000 tonnes per annum of the more hazardous industrial and commercial wastes, much of the waste processed at these facilities is classified as Special Waste as defined in The Special Waste Regulations Act 1996. The network has developed over a period of years and is now firmly established in an area in which there is significant local demand for such facilities, however over half of the waste processed by these facilities is imported from other areas in the UK. In many of these areas local demand is not sufficient to make it commercially viable for companies to develop facilities in the area, consequently large quantities of the more hazardous industrial and commercial wastes are being transported considerable distances to facilities operating within the West Midlands Tame Catchment Area for treatment.

During 1996/97, approximately 6000 tonnes of waste was imported from outside of the UK for disposal or recovery at waste management facilities operating in the area. Over 90% of the total was imported for recovery purposes and consisted largely of waste from the European based photographic industry from which precious metals such as silver and gold can be recovered.

The catchment area has within its boundary several incineration facilities that offer capacity for the disposal of municipal waste, clinical waste and waste tyres, these include Tyseley incinerator, Severn Trent's Colehill Incinerator, and Elm Energy tyre incinerator in Wolverhampton. Many of the municipal and clinical waste incinerators in the area have been or are in the process of being redeveloped in order to meet more stringent emissions standards that were required in the past.

In addition to landfill sites, treatment and incinerator plants, the catchment area encompasses a network of waste transfer stations and metal recovery facilities, which are heavily concentrated in the West Midlands.

2.2.4 Contaminated Land

Various techniques are available for the clean up of contaminated land. Traditionally, excavation of contaminated material and disposal to a licensed landfill site has been the most commonly chosen method of remediation. The removal of any contaminated materials from a site should only be undertaken by a registered carrier who follows a "Duty of Care" under the Environmental Protection Act 1990. The Agency will consider all alternative technologies (for example bioremediation) which are capable of cleaning a site to an acceptable standard. Where these methods represent a better environmental option to the "disposal" option, the Agency will encourage their use. The "suitable for use" principal is utilised within the Waste Management Licensing Regulations 1994. Schedule 3 of these regulations allows in suitable locations, the use of soils to help in the remediation of former industrial sites and also to construct, maintain and improve various facilities, without the need for a waste management licence. Much liaison between Local Authorities and private concerns is undertaken with the Agency to ensure any levels of contamination within such soils are acceptable so as not to harm the environment or cause any danger to human health.

2.2.5 Landfill Tax

On 1 October 1996 a tax was introduced on the disposal of waste in landfill sites throughout the United Kingdom. The aims of the new tax are two fold. First, it will make sure that, as far as practicable, the cost of landfill properly reflects the impact which it has upon the environment. Second, it will help to achieve the

targets for more sustainable waste management set out in the Government's White Paper, "Making Waste Work", by providing a fiscal incentive to reduce waste production, dispose of less waste to landfill and recover more value from waste that is produced.

The Government has decided that some of the tax that is raised can be used to support the environmental aims of the tax by allowing a credit of landfill tax to operators of landfill sites who make contributions to approved bodies for spending on certain environmental objectives. As only landfill site operators pay the tax, only they can claim a credit for contributions to environmental bodies. The tax credits are at the rate of 90%. Landfill operators have to contribute 10%.

Environmental bodies are non-profit distributing, private sector organisations which will fund a range of approved environmental regeneration schemes and promote sustainable waste management practices. Typical projects which would qualify are:-

- Reclamation of old landfill sites for new community uses, eg nature reserves.
- Creation of new community amenity resources in the vicinity of landfill sites, eg safe play areas for children, educational conservation areas, landscape improvements, public parks and other public amenities.
- School based education programmes raising awareness of waste and its management.
- Research and development of more sustainable waste management practices.
- Promoting and distributing information to business on waste management.

Landfill operators will be able to publicise their support for approved projects - by erecting signs or through recognition on literature. However, projects must be able to demonstrate real community benefit or benefit to the waste industry generally.

Direct benefit to individual landfill operators is excluded, eg landscape improvements to existing operating landfill sites or closed sites covered by formal restoration conditions.

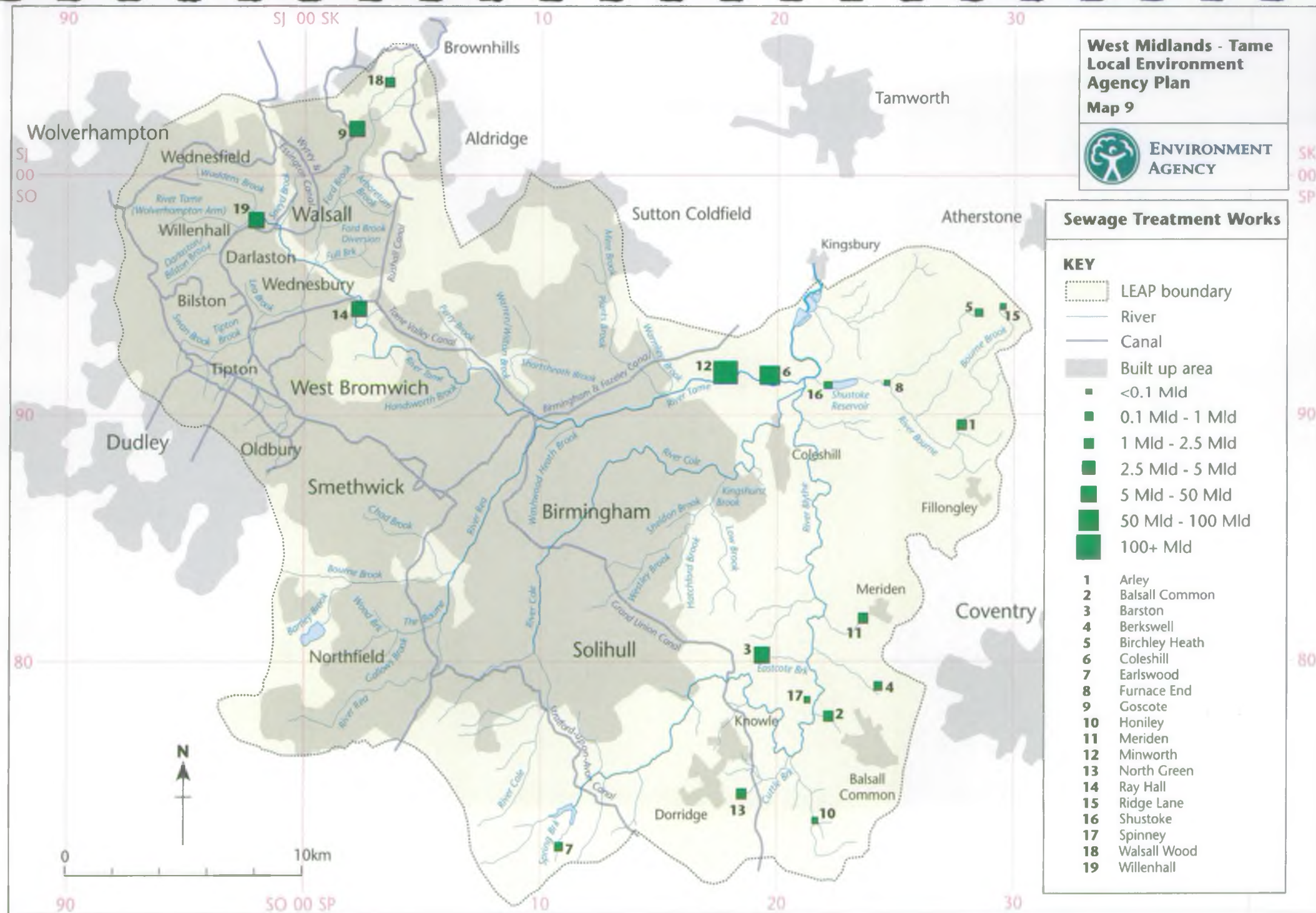
2.3 Management of Water Quality

The Agency's principal aim for surface water quality is to achieve a continuing overall improvement in the quality of rivers, estuaries and coastal waters through the prevention and control of pollution. In achieving this we aim to ensure that the polluter pays.

When an organic (non-toxic) polluting load is discharged into a river it is gradually eliminated by the activities of micro-organisms and by dilution, sedimentation and the effects of sunlight. As long as there is a sufficient concentration of oxygen in the river, complex organic molecules are broken down into simple inorganic molecules. This process is usually referred to as *self-purification*.



17 Gulls around Minworth Sewage Treatment Works Humus outlet, Hams Hall



2.3.1 Consents and authorisations

All discharges of sewage and industrial effluent to rivers and canals require a consent or authorisation from the Agency otherwise it is an illegal discharge. Continued investment to improve sewerage systems and sewage treatment is required to ensure that discharges are within the capacity of the watercourse to accept them without damage to the aquatic environment.

Consents or authorisations to discharge to a watercourse set limits on the quality and volume of effluent that can be discharged. These limits are set in accordance with two factors:-

- (i) The quality and quantity of the water at the point of discharge, ensuring that the effluent does not cause deterioration in watercourse quality.
- (ii) The downstream uses of the receiving waters, ensuring that the discharge does not compromise such uses and does not breach water quality standards.

Continuing investment in the sewerage infrastructure and sewage treatment is resulting in further improvement in water quality, notably under dry weather conditions.

2.3.2 Sewage Effluent Discharges

Until the last 200 years or so the deterioration of watercourses due to organic pollution was generally not a widespread problem because a relatively small human population lived in scattered communities and the natural self-purification properties of the watercourses were generally able to cope with the wastes that were discharged to them. By contrast, the effects of sewage effluent in open channels or emptied to ground in the populated areas were much more significant as the link between disease and pathogens transmitted by faecal contamination had not been made.

Water pollution became a severe problem with the onset of industrialisation, coupled with the rapid acceleration in population growth. Industrialisation led to urbanisation, with people leaving the land to work in new factories. Domestic wastes from the rapidly expanding towns, and wastes from industrial processes were often all poured untreated into the nearest river. In 1870 Birmingham's Sewage Enquiry Committee was charged with reporting to the town council its opinion on the best mode of dealing with the sewage. Its 300 page report reviewed the day's conflicting theories of sewage disposal. After a long debate and a narrow margin vote it was agreed to get rid of the 14,000 open middens and ashpits which drained directly into the sewers, and implement a new plan for sewage disposal.

Today most domestic and industrial effluent is discharged to a sewer which transports the raw sewage to a sewage treatment works where it is treated before it can be satisfactorily discharged into the local watercourse. Sewage treatment usually involves the separation and sedimentation of solids from the effluent followed by biological treatment where dissolved organic materials are oxidised in the presence of micro-organisms, a process that can be quite sophisticated but that follows basically the same principles as self-purification.

Some foul sewers also take surface water drainage, and these are commonly called *combined sewers*. These sewers usually have overflows built into them (Combined Sewer Overflows) so that at times of high rainfall and consequent high flow in the sewers, the effluent can overflow into watercourses. In theory the effluent in the sewer should be very dilute and should discharge into a full, fast flowing watercourse. Problems occur with this system when blockages in the sewer cause premature operation of the overflows, and as in the case of heavily urbanised rivers such as the River Tame when a large number of overflows operate simultaneously, even at times of high river flow, and contribute to the problems of urban run-off.

2.3.3 Trade Effluent Discharges

Where adopted sewerage systems exist within the catchment, Severn Trent Water Ltd exercise formal control over discharges of trade effluent to these systems. For a limited number of discharges, containing potentially more toxic compounds (red list substances), the Agency specifies appropriate limits for Severn Trent to include within its controls according to the Water Industries Act 1991.

The majority of difficult trade effluents pass to a sewage treatment works for further treatment before discharge. Direct discharges to rivers and streams routinely consist of either cooling water or uncontaminated surface water. The exception to this is the discharge of untreated trade effluents to a watercourse during the operation of a sewer overflow.

Within the Black Country the abundance of metal based industries leads to metal contaminated site drainage run-off. Where necessary the containment of the first flush of run-off after rain and its subsequent disposal to foul sewer is encouraged, although adequate sewer capacity is not always available. Similarly, elsewhere where contaminated surfacewater drainage requires biological treatment, for example run-off contaminated with de-icer at Birmingham Airport, surfacewater is drained to foul sewer.

Oil contaminated site drainage from industrial sites is also a significant problem throughout the catchment and is addressed by encouraging the application of pollution prevention measures and provision of on-site effluent treatment (eg oil interceptors). At a number of sites first flush disposal to foul sewer is required.

Illegal trade effluent discharges to surface water drainage systems from steam cleaning units are common within industrial areas and as with domestic wrong connections in heavy residential areas, they represent a significant pollution problem.

The catchment area also contains an extensive and complex canal system of variable water quality. There are no major direct sewage or trade effluent discharges to canals in the catchment although pollution due to historic contamination, illegal trade effluents, and to a lesser extent, domestic wrong connections, is significant within the more urbanised areas.

2.3.4 Lea Marston Purification Lakes

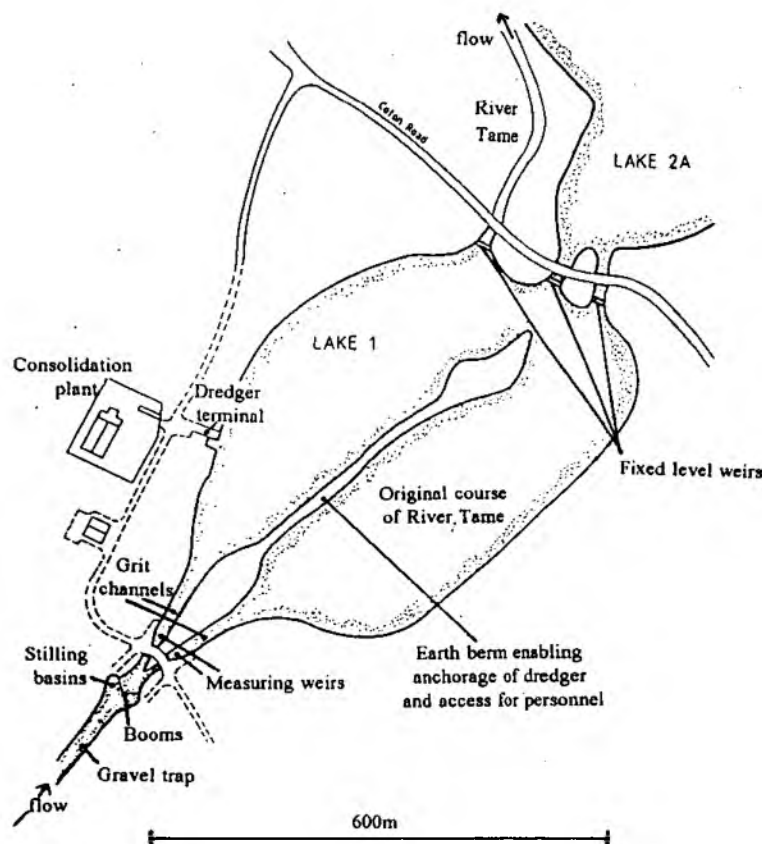


Figure 6 - Lea Marston Purification Lakes

The River Tame flows into the Lea Marston Purification Lakes on the River Tame at Kingsbury. The lakes allow contaminated solid material to settle out and are the only on-line river purification lakes in the country. They act as a buffer against pollution incidents upstream and minimises the impact of urban run-off. They have allowed the development of a viable coarse fishery downstream and protect the River Trent from pollution.

The Lakes form the boundary between the urban catchment of the Tame, with its poorer and more variable water quality, and the more rural downstream catchments. Further lakes were planned but have not been required.

The river flows into Lake 1 (Tame Lake) via a gravel trap and grit channels. The gravel trap is a large depression in the river bed which retains stones and other heavy objects carried along by the flow. Gravel is removed from the trap, and floating booms at the entrance to the grit channels act as a debris barrier. The V-shaped configuration of the booms deflects floating debris into two stilling basins (calm areas). After passing through the gravel trap the river divides and passes into two grit channels approximately 100 metres long. After grit removal, the flow enters Lake 1.

Lake 1 covers 25 hectares and is divided down the centre by a long thin island or "berm". As the flow in the river slows sediment is deposited. Eighty percent of the flow then passes into Lake 2A (Lake Lester) before returning to the river. The remaining 20% of the flow is directed into the river channel from Lake 1. The sediment in Lake 1 is removed using a suction dredger. The material is consolidated in a treatment plant on site and the consolidated sludge pumped to Severn Trent Water Ltd's Colehill STP, where it is dried prior to disposal at Dosthill tip site.



18 Weir downstream end of Lea Marston Lake 1

2.3.5 Water Quality Planning

Agency staff take samples of water on a monthly basis at routine sampling points on stretches of rivers and canals. River and canal "stretches" are specific lengths of the watercourse defined by their upstream and downstream limits. Physical features such as tributaries, weirs, or significant discharges often mark the ends of river stretches owing to their potential significant effects on water quality. The samples are sent to the Agency laboratory in Nottingham where they undergo routine chemical analysis as well as analysis for any other chemical or physical determinands specifically requested. The data from the analyses are used for general investigative purposes, for producing a "snapshot" of water quality at any one time using the General Quality Assessment (GQA) scheme (see *Appendix 3 - State of the Local Environment*), and for water quality planning using the Rivers Ecosystem (RE) classification system. The RE classification system classifies each stretch of water according to a number of different quality criteria (see table 9) whereas the GQA is a subset of the RE Scheme with a different statistical basis.

Table 9 - River Ecosystem classification : water quality criteria

Class	Dissolved Oxygen % saturation 10 percentile	BOD (ATU) mg/l 90 percentile	Total Ammonia mg N/l 90 percentile	Un-ionised Ammonia mg N/l 95 percentile	pH lower limit as 5 percentile; upper limit as 95 percentile	Hardness mg/l Ca CO ₃ 95 percentile	Dissolved Copper µg/l 95 percentile	Total Zinc µg/l 95 percentile
RE1	80	2.5	0.25	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500
RE2	70	4.0	0.6	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500
RE3	60	6.0	1.3	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1000 2000
RE4	50	8.0	2.5	-	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1000 2000
RE5	20	15.0	9.0	-	-	-	-	-

- Class RE 1: Water of very good quality (suitable for all fish species *).
 Class RE 2: Water of good quality (suitable for all fish species).
 Class RE 3: Water of fair quality (suitable for high class coarse fish populations).
 Class RE 4: Water of fair quality (suitable for coarse fish populations).
 Class RE 5: Water of poor quality (which is likely to limit coarse fish populations).
 Unclassified: Water of bad quality (in which fish are unlikely to be present), or insufficient data available by which to classify water quality (eg small streams not regularly sampled)

* The RE classification scheme is based on ecosystems in the river, the use of describing them according to their suitability for fish is primarily for the purpose of example.

Long Term River Quality Objectives are translations of the river quality objectives from the former National Water Council (NWC) classification scheme originally set by the Water Authorities. These objectives show the expected RE classes which are considered to be realistic, achievable and linked to planned expenditure and works within the catchment to maintain or improve water quality. As such, they should not be considered to be "visionary" objectives as they may simply indicate a standard that the Agency considers currently achievable under existing technical, political and economic constraints.

Current Rivers Ecosystem classes are compared to their long term RQO's on table 13 and map 20 in Appendix 3 - *State of the Local Environment*.

For a number of stretches current quality may be better than that required by the long term objective. Where it is established that the improvement is sustainable, the long term objective will be upgraded to reflect this. Potential stretches to be considered for upgrading in this area are highlighted in issue 10. Some of these apparent improvements may be considered not to be sustainable because of atypical results or where planned work has not been completed. If current quality is sustained in the future the decision on whether to upgrade these stretches will be reviewed.

Details of the RQOs assigned to river stretches and compliance with RQOs including the monitoring data upon which compliance assessment is based is included on the Public Register.

Some consents for water company sewage treatment works are based on historical performance rather than target river quality and the targets can only be met by improvements in effluent quality. The Agency has submitted

a programme of improvements with the DETR, water companies and the Water Industry Regulator OFWAT under the terms of Asset Management Plans (AMP).

2.3.6 EC Directive Reporting

Several EC Directives apply to the quality of surface water. These include the Freshwater Fisheries Directive (78/659/EEC) which sets standards to support fish life, the Surface Water Abstraction Directive (75/440/EEC) which controls the quality of surface water for potable supply (drinking water) and the Dangerous Substances Directive which sets standards for the control of toxic and persistent substances in industrial discharges. Additionally the Agency is involved in the implementation of the Urban Waste Water Treatment Directive (91/271/EEC) and also the Nitrate Directive (91/676/EEC) which controls the pollution of waters by nitrate from agricultural land.

2.3.7 Protection of Groundwater Quality

The Agency's "Policy and Practice for the Protection of Groundwater" provides advice on the management and protection of groundwater on a sustainable basis. This policy deals with the concepts of vulnerability and risk to groundwater from a range of human activities. It considers both source and resource protection, i.e. protection for the area which drains to the abstraction point (source) and protection for the total area of the aquifer irrespective of abstractions (resource).

It deals in particular with:-

- Control of groundwater abstractions.
- Physical disturbance of aquifers and groundwater flow.
- Discharges to underground strata.
- Waste disposal to land.
- Disposal of slurries and sludge to land.
- Contaminated land.
- Diffuse pollution.
- Unacceptable activities in high risk areas

The implementation of the policy relies in part on the construction of a series of maps showing groundwater vulnerability (resource protection). In addition, source protection zones are being modelled to define the catchments of abstractions to ensure source protection.

In respect to resource protection the policy recognises three types of aquifer:-

Major Aquifers are highly permeable formations usually with a known or provable presence of significant fracturing. They may yield large quantities of water for public supply and other purposes.

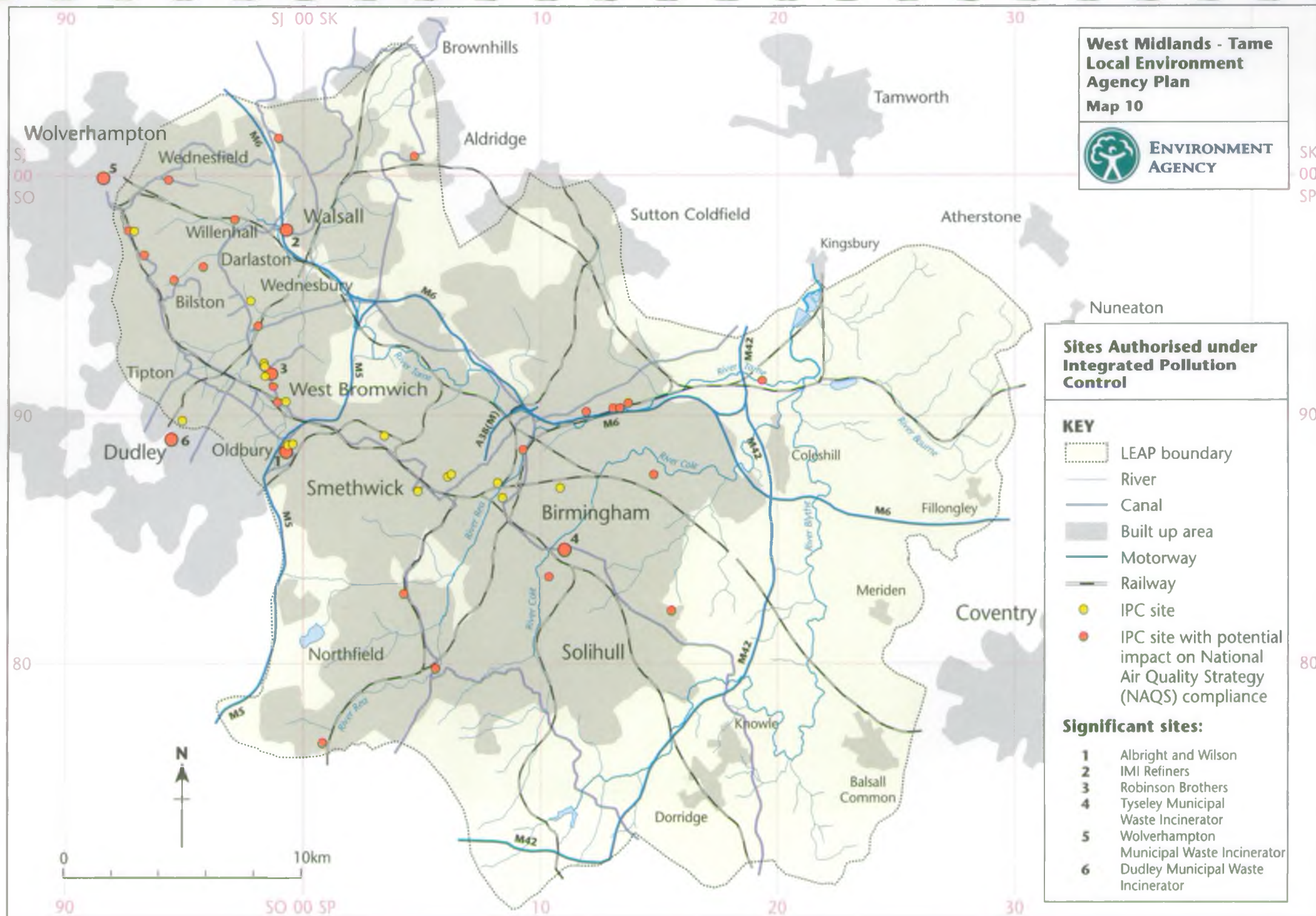
Minor Aquifers can be fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability. Although these aquifers will seldom yield large quantities of water for abstractions, they are important for local supplies and in supplying base flows for rivers.

Non-Aquifers are formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities.

These different aquifer types relate to the vulnerability of the groundwater resources to pollution and are used in conjunction with other information in the development of the groundwater vulnerability maps being published by the Agency.

The policy recognises three source protection zones:-

Zone I (Inner Source Protection): Immediately adjacent to the source area defined by a 50 day travel time from any point below the water table to the source (based on biological contaminant decay).



Zone II (Outer Source Protection): Area defined by 400 day travel time (based on the delay and attenuation of slowly degrading pollutants).

Zone III (Source Catchment): The complete catchment area of groundwater source.

The controls to be exerted on a given activity will be more stringent, the more vulnerable the resource and the nearer the source. These protection zones apply to major aquifers and to minor aquifers where the aquifer provides a critical resource.

2.4 Management of Air Quality

The Government has recently established a framework for improving air quality and set this out in the Environment Act 1995. This resulted in the "The United Kingdom National Air Quality Strategy" published in 1997. The strategy explains the roles of local authorities, industry and the Agency in achieving the Government's air quality targets. These targets are set out in Issue 21 and must be complied with by the year 2005.

According to the document "Quantification of the Effects of Air Pollution on Health in the UK", by the Committee on the Medical Effects of Air Pollutants published at the beginning of 1998, up to 24,000 people die prematurely each year in the UK, and a similar number are admitted to hospital, following short-term air pollution episodes. This is the first official quantitative estimate of the health effects of air pollution in the UK and one of the first in Europe. It suggests that the impact is far larger than previously thought.

The lead role in air quality management rests with local authorities. The Agency plays its part through the collation and review of air quality information, and the regulation and control of emissions from Part A processes.

Air Pollution from Industry

The process of Authorisation of Part A processes under IPC includes the setting of legally-enforceable limits on polluting releases. These are set through consideration of what the process is able to achieve through the use of BATNEEC, and the pre-existing environmental levels of the pollutants concerned, in order to ensure that compliance with the limits will lead to no significant environmental harm, either locally or more widely.

Companies are required to demonstrate their compliance with the limits by monitoring their releases and submitting the results to the Agency for publication on the Public Registers. The Agency also carries out its own independent check monitoring, and companies are subject to periodic inspection to ensure that they are operating their processes in compliance with the conditions of the Authorisation.

A similar regime is applied by Local Authorities to the control of air pollution from Part B processes, using statutory guidance on release limits from the Secretary of State for the Environment.

Air Pollution from Road Transport

The Government has set out a strategy for achieving reductions in air pollution from road transport by:-

- Addressing vehicle and fuel technology.
- Tighter emission controls on existing vehicles.
- The development of environmental standards for fleet operators and the public.
- Changes to planning and transport policies to reduce the need to travel and rely on the car.

Although the Environment Agency has no direct role to play in controlling pollution from transport, it will ensure that its own transport policies are in line with the Government's approach.

**West Midlands - Tame
Local Environment
Agency Plan
Map 11**

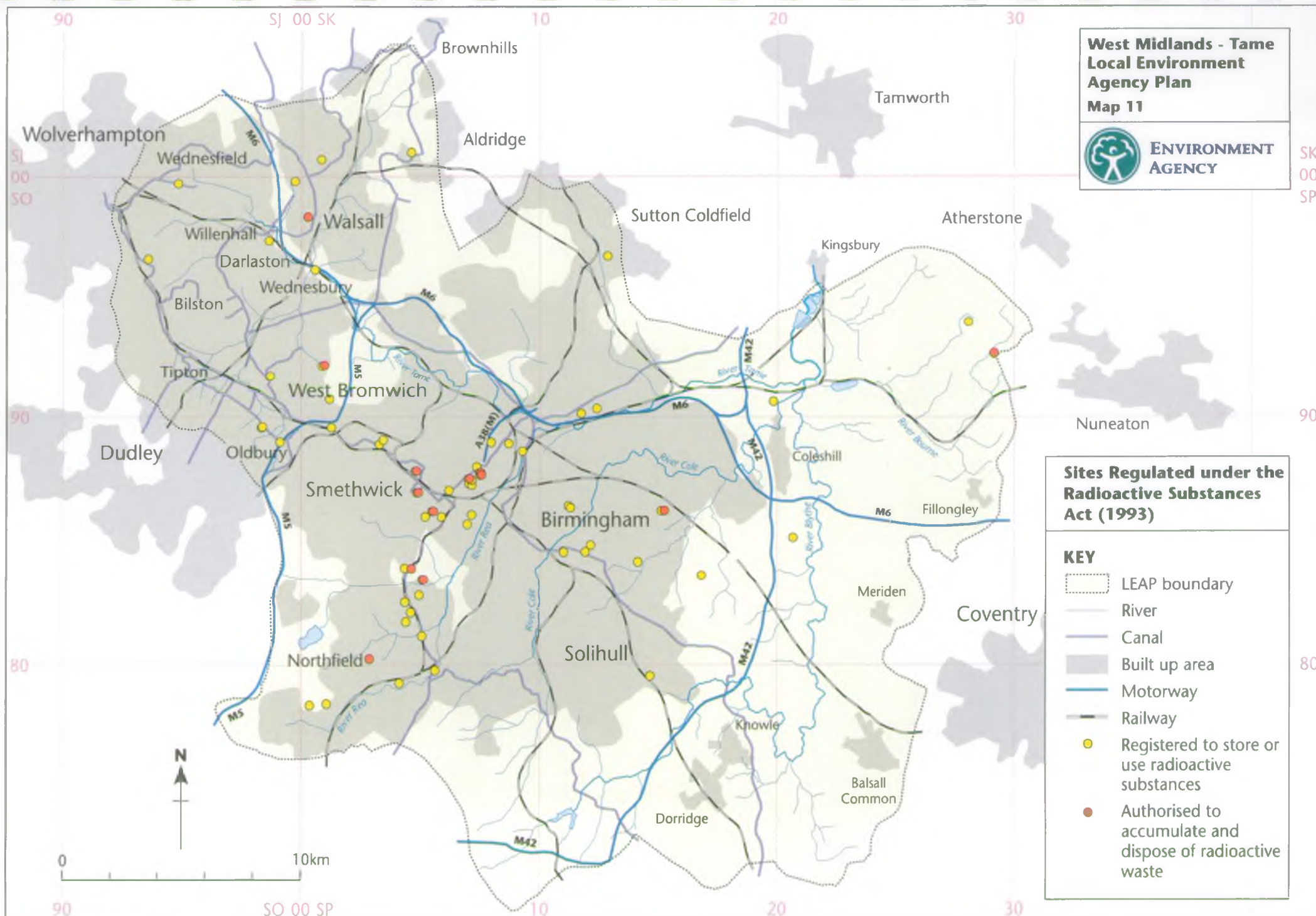


**ENVIRONMENT
AGENCY**

**Sites Regulated under the
Radioactive Substances
Act (1993)**

KEY

- LEAP boundary
- River
- Canal
- Built up area
- Motorway
- Railway
- Registered to store or use radioactive substances
- Authorised to accumulate and dispose of radioactive waste



2.5 Management of Radioactive Processes

All keeping and use of radioactive materials other than in quantities considered to pose no significant risk to human health or the environment is subject to registration by the Agency. The majority of such registrations are for the use of "closed" sources, where the radioactive material is immobilised as a solid piece of material or within a sealed container. Such uses include industrial process control, thickness measurement, smoke detectors, analytical instruments etc.

Radioactive material which is not so immobilised ("open" sources) are more stringently controlled because of the increased risk of contamination. The use of open sources almost always involves the generation of radioactive waste. The accumulation and disposal of radioactive waste requires an authorisation from the Agency, which will not be granted unless a radiological hazard assessment has demonstrated that the risk involved to human health and the environment is not significant.

Premises in the West Midlands - Tame LEAP area which are authorised to accumulate and dispose of radioactive waste are mainly hospitals and universities. There are no nuclear licensed sites in the West Midlands - Tame LEAP Area.

2.6 Management of Mineral Resources

Current or former mineral workings can pose a threat to ground and surface waters by exposing polluting spoil or veins of potentially polluting minerals to the weathering process. As a result, run-off and discharges from quarries and mines can contain contamination and suspended material that is harmful to aquatic life. Discharges from active sites are subject to normal discharge consent procedures. However, discharges from abandoned mines are not adequately controlled by law and may cause locally severe problems.

The exploitation of minerals can have a major impact on water resources by altering groundwater flows and hence streamflows. The removal of material from above the water table reduces the opportunity for natural filtering and attenuation of pollutants, which will consequently enter the groundwater more readily. The dewatering of mineral workings is exempt from the need for an abstraction licence but a conservation notice may be needed to minimise the impact of such operations on the water environment. Restoration with impermeable material will increase run-off and reduce the recharge of groundwaters, whilst the use of mineral extraction sites for landfill can also threaten groundwater quality and is not encouraged by the Agency in all locations.

Gravel extraction may take place from the river channel or floodplain and is controlled by planning law. It may also require a land drainage consent and a discharge consent from the Agency. If extraction works are not properly managed, the river channel can be seriously damaged. There can also be serious implications for fish spawning sites.

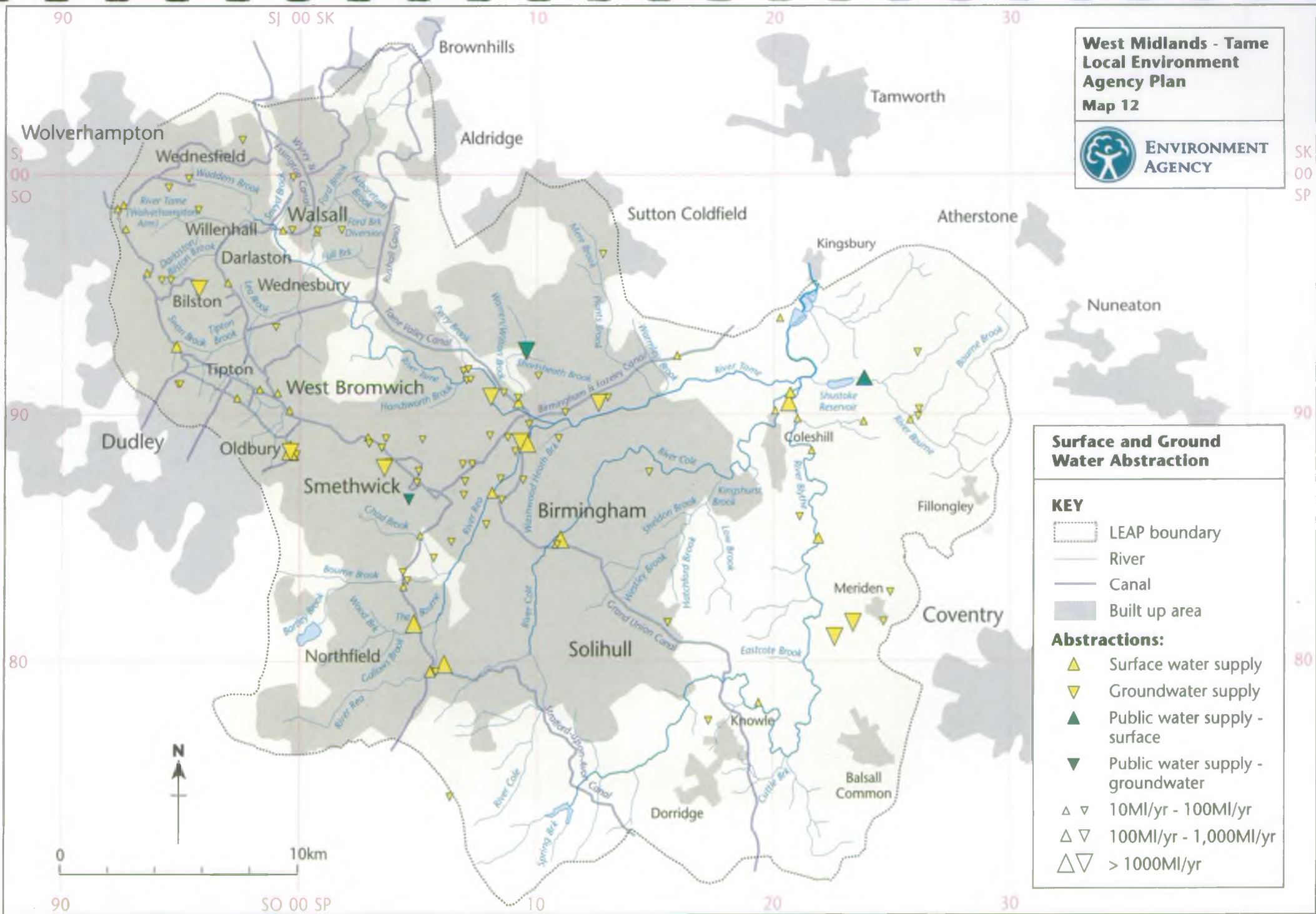
All mineral workings are subject to general planning controls. The Agency is a consultee on such applications, and the final planning consent should contain conditions which control the operations in order to satisfy the Agency's requirements. Both the impact of the mineral working and its restoration need to be considered.

Opportunities exist for river restoration works and habitat improvements either during mineral extraction or as part of the site restoration. An example of this can be seen where gravel working has taken place at Coleshill.

Renewable Energy

An essential part of the Government's environmental strategy is the reduction in emissions produced as a result of burning fossil fuels.

The government's policy is to encourage the exploitation and development of renewable energy where there is the prospect of it being economically attractive and environmentally acceptable. The Agency is keen to support this policy through the application of its powers and duties. The government supports renewable energy schemes through the non-fossil fuel obligation (NFFO).



Renewable energy sources include water (hydropower, wave and tidal), wind solar and geothermal power and energy derived from waste treatment. Some renewable energy sources, such as hydropower have traditionally been used for power generation particularly in Scotland and Wales. Others such as wind power are receiving fairly widespread commercial exploitation especially in Wales and the south west of England. Guidance about planning aspects of renewable energy has been published by the Department of the Environment in Planning Policy Guidance Note 22.

Hydropower is a very traditional means of generating power. Water power fuelled the agricultural revolution of the 17th and 18th centuries and was an important part of the industrial revolution. Many rivers and streams were modified and adapted with mills and mill streams, weirs etc. Many of these structures are no longer used and many have been removed. New schemes requiring the abstraction of water from a river, diversion of flows or impounding requires consent from the Agency. Schemes can affect riverflows, impact on other abstractors and can create obstructions to fish migration.

Windpower can have adverse impacts on landscape character and construction works can fragment and disrupt habitats and ecosystems. Wind farms require an Environmental Assessment under Schedule 2 of the Town and Country Planning (Assessment of Environmental Effects) (Amendment) Regulations 1988 to be undertaken prior to a planning application being submitted.

2.7 Management of Water resources

The removal of water from streams, rivers and groundwaters (abstraction) to meet human needs is controlled by licences granted under the Water Resources Act 1991. Licences are issued by the Agency and it has statutory duties under Section 19 of the Act to:-

- Conserve, redistribute or otherwise augment water resources in England and Wales.
- Secure the proper use of water resources in England and Wales.

Under the Environment Act the Environment Agency has general duties relating to the conservation and enhancement of natural beauty and amenity of inland and coastal waters and land associated with such waters, the conservation of flora and fauna dependant on the aquatic environment and the use of waters for recreation which are without prejudice to its water resources duties.

The Agency is therefore developing a sustainable water resources strategy that seeks to:-

- Optimise the use of existing water resources.
- Ensure that water demands are met in an environmentally acceptable manner.
- Protect current resources and future reserves from threat.
- Ensure that the use of water does not exceed that which can be replaced or recovered.
- Ensure that water resource users are considered in an equitable manner while recognising the special needs of public.

In order to balance demand with resources, the Agency supports demand management including measures to control demand for water through conservation and metering.

Abstraction licences have been in force since 1965 with the enactment of the Water Resources Act 1963. Abstraction licences specify maximum volumes that the licence holder may take, and many contain conditions to protect the environment and other water users rights. The exceptions are "Licences of Right" (up to 1965), or "Licences of Entitlement" (up to 1990) where the legislation did not permit the former NRA and its predecessors to restrict pre-existing abstractions. In considering applications for new licences, the Agency must ensure that there is no derogation of existing abstractors without their agreement, and that the aquatic environment and associated habitats are properly safeguarded. The Agency does not guarantee that the authorised volume will be available, nor that water will be fit for the purpose for which it will be used.

In this Region surface water licences are often subject to conditions prohibiting or reducing abstraction when river flows fall. The more recent the licence, the more restrictive the flow condition resulting in licences being restricted earlier in the season for longer periods. These restrictions help to ensure that adequate flows are maintained in the summer months.

When considering new proposals to abstract water, the Agency must ensure that reasonable needs are met whenever possible. There are however, constraints, and when determining any licence application the Agency will:

- ensure the abstraction will not be in excess of the renewable resources;
- consider the effects on other abstractors and will not allow abstractions which derogate existing licence rights and other protected rights to abstract unless suitable arrangements are agreed;
- consider the impact on river flows, especially ensuring flows are not reduced to unacceptably low levels;
- consider the potential effect on wetlands and pools, and not allow abstractions which would be damaging or otherwise unacceptably affect them."

To ensure these criteria are met, the Midlands region has adopted the following practices for licensing resources:

- Prescribed flows at appropriate Agency river flow gauging stations have been determined for most of the region's medium and larger rivers such as the River Tame.
- Initially licences were tied to a base threshold designed to protect the rivers regime, but as more licences were tied to a particular gauge, the restriction or threshold in many catchments were progressively raised to protect the rights of existing users.
- On smaller watercourses it is often considered more appropriate for the licence holder to install a weir or other such measuring device. The prescribed flow is then measured at the actual point of abstraction.
- The use of water from rivers and other surface waters is restricted in dry summer months when flows fall below agreed thresholds. These thresholds are part of the licences that are granted and are tied to an appropriate control point.
- Exemptions to the requirement for licensing includes private supplies to a single household, of less than 20 cubic metres a day. There are also a number of specific types of abstraction, eg fire fighting, which are exempt from the need for a licence.

Public water supplies are provided by private water companies (water undertakers). The Agency's responsibilities and duties do not relieve any water undertaker of the obligation to develop water resources as part of its general duty to maintain the water supply system. Private water supplies are generally derived from springs, wells and boreholes, and their quality is monitored by the Environmental Health Department of the local authority. The Agency does not guarantee the quality of the raw water or of the treated water. However, it does have a duty to protect water quality and specifies protection zones around groundwater sources to seek control over certain potentially polluting activities. The Policy and Practice for Protection of Groundwater forms the basis for the Agency's activities in this area.

The Agency has analysed information on water use and has prepared a Regional Water Resource Strategy. Forecasts of future demands will be reviewed to try and anticipate needs for water resources and to consider ways of meeting these future demands.

2.8 Management against Flooding

The river network acts as a conveyor of surplus water from the land to the sea. Natural watercourses have limited capacity and when this is exceeded flooding occurs. The severity of a flood is generally described in terms of its frequency of occurrence. This is often expressed as a return period in years, for example, 1 in 50 years (ie. a flood of this severity would, on average, be expected to occur once in a 50 year period).

Floods flow onto the floodplain, which is as much a part of the river as the channel which carries normal flows. These natural floodplains provide 'on line' storage of flood water. If significant areas of floodplain are embanked, tipped or built upon, the lost storage volume leads to higher river levels elsewhere. For this reason it is not possible to alleviate flooding in all areas, nor is it always desirable from an environmental viewpoint. The Agency normally objects to new development in flood risk areas in it's role as a statutory consultee in considering planning applications and development plans.

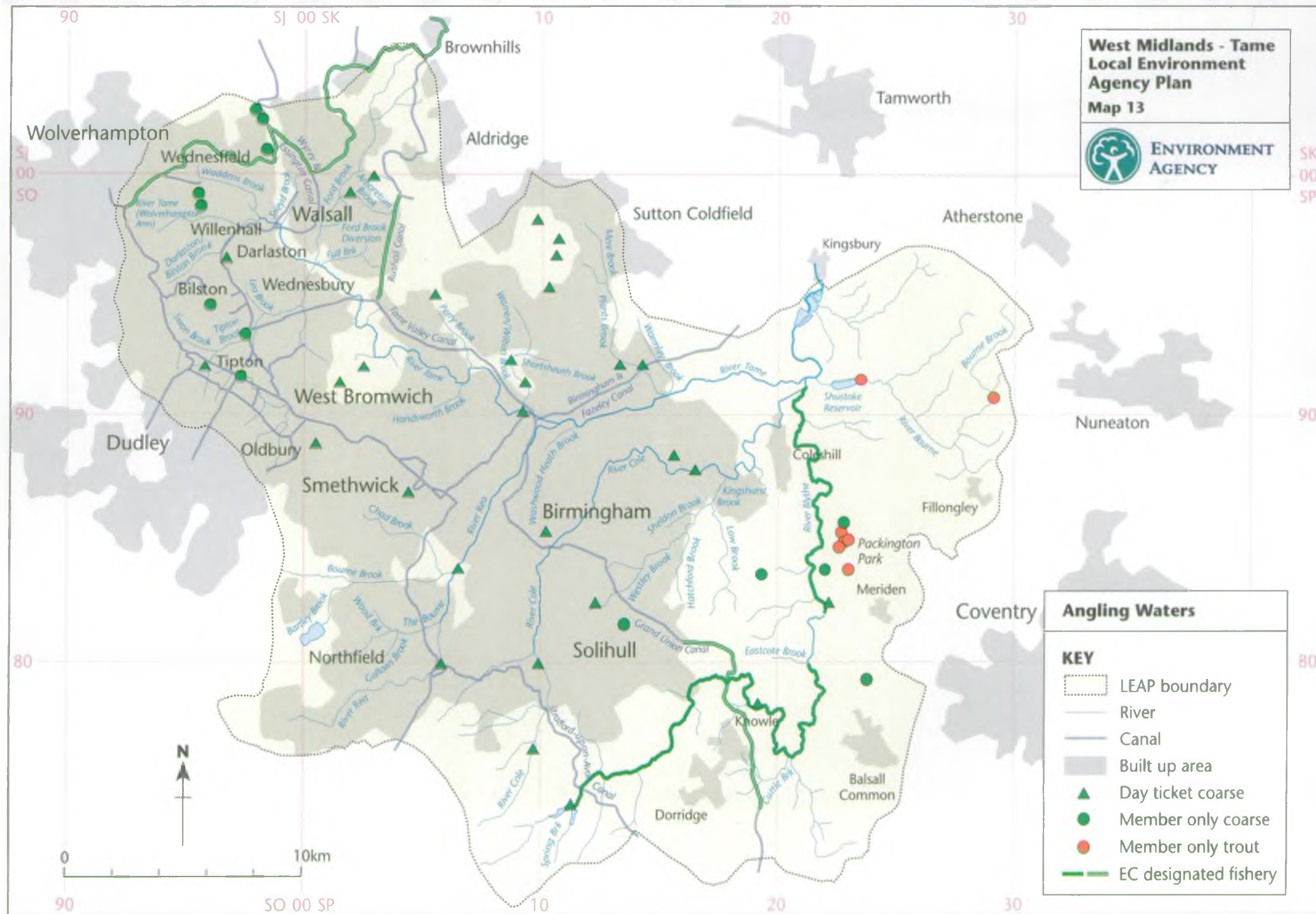
Flood defences are designed to protect an area against a flood of a particular return period. Different types of land use (for example urban and rural areas) are protected against different sizes of flood, as measured by the return period.

The Agency's strategic objectives for flood water storage and flood defence are:-

- To provide effective flood defences on main rivers to reduce the risk of flooding to people and the developed environment to a standard appropriate to the land use.
- To provide an adequate flood forecasting and flood warning service and to respond to flood events.
- To ensure that any works in rivers do not create undue restrictions to flood flows.
- To ensure where possible that the effectiveness of the floodplain to store and convey flood waters is not impaired.



19 Flood Defence works on the River Tame at Perry Barr



2.9 Management of Fisheries

The Agency has duties to maintain, improve and develop fisheries. Fish populations are affected by the quality and quantity of water as well as by the availability of suitable physical habitat features. Fish are therefore important indicators of the overall health of the river. The Agency is committed to the maintenance of breeding populations of salmonid (salmon and trout) and cyprinid (coarse) fish, including safeguarding migration between the river and the sea. We have developed fisheries strategies for all appropriate river reaches.

The majority of the Agency's powers to regulate and protect fisheries are defined in the Salmon and Freshwater Fisheries Act 1975, supplemented by the Salmon Act 1986. The Agency can issue stocking consents to control the introduction of fish. To assist enforcement, the Agency can appoint "water bailiffs" who, in addition to having specific powers, also have many of the powers, liabilities and responsibilities of a police constable as defined in the Police Act 1964 and the Police and Criminal Evidence Act 1984.

The objectives for the Agency are:-

- To sustain a natural fish population appropriate to the catchment.
- To maintain, improve and develop fisheries.
- To safeguard the quality and quantity of water sufficient for this resource.

To meet these objectives we:-

- Control illegal fishing by use of a bailiff force.
- Maintain an abundance of juvenile fish (where they presently exist) which is related, where possible, to the carrying capacity of the catchment based upon habitat characteristics.
- Maintain existing high quality fish habitats in the catchment and where possible restore damaged fish habitats.
- Maintain a monitoring programme which quantifies accurately stock abundance.

2.10 Conservation of Wildlife and Heritage

Under the Environment Act 1995 the Agency has duties to:-

- Protect and enhance the environment as a whole.
- To further conservation in any proposals relating to any functions of the Agency other than pollution control functions.
- To take account of conservation in proposals relating to pollution control functions.
- To have regard to the desirability of protecting and conserving buildings, sites and objects of archaeological, architectural, engineering or historic interest. To take into account any effect which its proposals would have on the beauty or amenity of any rural or urban area or on any flora, fauna, building sites or objects; and to have regard to any effect which the proposals would have on the economic and social well being of local communities in rural areas.

In pursuant of these general duties, the Agency is developing a number of strategic objectives which include:-

- To promote and further the conservation interests of the water environment and to safeguard the conservation interests of designated sites.
- To seek to maintain river corridors in as natural a state as possible in order to maintain ecological diversity.
- To protect the landscape, archaeological, architectural, engineering and historical features associated with rivers and wetlands in the catchment.
- To safeguard designated sites and, where appropriate, access to these sites.
- To assess the environmental impact of all Agency activities and ensure that any adverse impacts are mitigated.
- To safeguard the quality and quantity of water sufficient for this use.

Whilst the Agency has these developing strategic objectives for wildlife and heritage, it is difficult to apply specific conservation targets when there are no statutory objectives. However in this catchment we have set draft objectives, which include:-

- The protection of the ecology of wetlands and baseflows to rivers and streams through the efficient and proper use of water resources.
- The renewal of river corridors to improve water quality, wildlife habitats, access and to re-create a more natural river regime.
- To protect rare and threatened species.

2.11 Management of Recreation

Recreation is a key factor in the health of the nation and makes a major contribution to the quality of life for many people. Although many of the responsibilities for the various different aspects of recreation fall outside the remit of the Environment Agency, the Environment Act 1995 contains duties for the Agency which protect and promote water-related recreation.

Principally these are:-

- To protect existing uses and create opportunities for recreation in the course of the Agency's work.
- To make the best use of the Agency's sites for recreation and to develop and demonstrate best site management practices.
- To promote the use of water and associated land for recreation.

General

When carrying out Flood Defence works, opportunities may arise to improve recreation facilities. For example, improvements in flood protection can create the right circumstances to improve river access or provide footpaths and cycleways. The Agency places special emphasis on incorporating facilities for disabled people in schemes it designs and constructs in an effort to create greater choice for all recreation users.

Not only does the Agency ensure an integrated approach within the organisation, it also works to improve recreational facilities and promote opportunities in partnership with other organisations including the Countryside Commission, Sports Council and local authorities. Working with others offers many advantages. Combining resources, enthusiasm and expertise creates real environmental improvements which are valued by the community. A number of these recent collaborative projects were listed earlier in Section 4, "Protection through Partnership".

The Agency supports improved public access to the river bank with the agreement of landowners (see issue 2). The Tame Walkway Project is an ongoing project to increase access to the Tame "corridor". Redevelopment and renewal offers many opportunities for improved access. Increased use of the river bank should also increase the reporting of pollution incidents and therefore improve the overall health of the river system, although care must be taken not to disrupt or destroy important archaeological sites associated with the river edges.

Angling

The Environment Agency has formal responsibility towards angling and issues rod licences that are a legal requirement for fishing for any freshwater fish.

The Agency's strategic objectives for angling are:

- To provide suitable conditions for successful angling.
- To improve angling by implementing measures to increase fish stocks where possible without adversely affecting water quality or nature conservation interests.

Angling is a major recreational activity in the catchment and this is reflected in the number of facilities available.

Swimming

The Agency does not encourage swimming in rivers and lakes because the risk of drowning and the possibility of swimmers catching water-borne diseases.

2.12 Management of Navigation

Navigation in the catchment covers only the canal network. None of the rivers in the catchment have navigation rights although they are informally used by canoeists.

British Waterways are responsible for canal navigations and for the associated reservoirs and surface water abstractions that support the system. The Agency has responsibilities for water quality and fisheries. The strategic objective for the Agency is to safeguard the quality and quantities sufficient for the purposes of navigation and fisheries and to promote the proper use of existing water resources.

2.13 The Environment Agency's emergency responses and legal redress

Most of the environmental management responses discussed in this section have been proactive, controlling and reducing the pressures on the environment at source, or at as early a stage as possible. However, it is not always possible to be proactive, and an effective response mechanism to environmentally damaging incidents is most important. Such incidents may be caused as a result of accident, negligence, ignorance or deliberate action. The Environment Agency is a regulatory body with powers to investigate or take action where our requirements are not met and where environmental damage takes place, and will not hesitate to use these powers when it is appropriate to do so.

The emergency services are usually the first on the scene of an environmental incident and contact the Agency when appropriate. The Agency has a Memorandum of Understanding with both the Police and Fire Service, and the latter provide a first line pollution control service with training and equipment from the Agency.

Water pollution

It is a criminal offence under the Water Resources Act 1991 to cause or knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters. Any discharge other than clean, uncontaminated surface drainage to a watercourse may be an illegal discharge unless it has a consent or authorisation from the Agency. Such licences have conditions attached to them which clearly define limits on the discharge. If the limits are breached, or if other polluting substances are present, then these discharges are also operating illegally.

Conspicuous pollution incidents are usually reported to the Environment Agency by members of the public, whereas less obvious incidents are more likely to be discovered in the course of routine river or discharge monitoring. When an incident is reported, Environment Protection Officers make a preliminary assessment of the situation and deal with it within two, four or twenty four hours dependent upon their assessment. Most incidents are dealt with within two hours. Upon responding to an incident, the Environment Protection Officers gauge the seriousness of the pollution, attempt to trace the source and instigate clean-up procedures where necessary. When the source has been traced, the responsible party is usually charged with costs incurred, and, depending upon the circumstances and the assessment of the Officer, may be liable for prosecution.

If the pollution incident is a result of bad practice at a site authorised under Integrated Pollution Control (IPC), then the polluter may also be liable to prosecution under the Environmental Protection Act 1990.

Illegal Abstractions

When a report of illegal abstraction is made, or it is found that the amount of water abstracted from a surface or groundwater resource exceeds the amount permitted by the license, the Agency investigates and assesses the situation, and depending upon the severity of the circumstances may decide to take legal action against the abstractor under the Water Resources Act 1991

Waste enforcement

When a complaint is received which relates to a Licensed waste management facility, the details are taken down and the complaint is then passed to an appropriate Environment Protection Officer to action. The Officer will assess the details of the complaint and will respond accordingly. The Environment Agency's Customer Charter dictates that in an emergency an Officer will attend within two hours of the details being reported during normal working hours and within four hours at all other times. Less urgent complaints will receive an appropriate response within twenty four hours.

The procedure is similar for incidents at unlicensed facilities and illegal activities. When necessary Environment Protection Officers will work closely with local authorities and the police in seizing evidence, and in following up evidence to prosecute offenders if and when appropriate.

Air pollution

Most air pollution incidents (for example black smoke from the burning of rubbish, or low air quality from traffic exhaust fumes) are outside of the remit of the Environment Agency to deal with, and anybody concerned with such events should contact their local council Environmental Health Department.

Air pollution incidents from sites authorised under Integrated Pollution Control (IPC) are investigated by Agency IPC Inspectors, although if there are health implications then the emergency services and local authorities will also be involved. The IPC Inspectors assess the situation and if appropriate, the Agency will take enforcement action under the Environmental Protection Act 1990. Under IPC, the emphasis for routine monitoring is placed on the operator, however, this system is auditable and operators found to be in breach of their authorisations are again liable to enforcement action. Enforcement action under IPC is principally aimed at protecting the environment through securing compliance with the Authorisation, which may involve the operator in significant expenditure; however, where breaches are persistent or severe and it is appropriate to do so the Agency can and does prosecute the offender.

The storage and use of radioactive substances (RAS) is also subject to licence and in the event of an incident, or use or storage of radioactive substances outside of the conditions laid down in the licence, the Agency may take enforcement action and if appropriate can prosecute under the Radioactive Substances Act 1993.

Fisheries Incidents

If the Agency is notified of a fish kill, or of fish obviously in distress, the event is investigated by Agency Fisheries Officers, along with Environmental Protection Officers if the incident appears to be a result of pollution. Action may be taken to rescue the fish and this may involve the aeration of the watercourse if oxygen levels are low. Depending upon the circumstances, the Agency may undertake to restock with fish. If the incident is found to be the result of a pollution incident, and a responsible party is identified, then they may be charged for costs incurred.

It is an offence to fish inland waters without a current rod licence, and Fisheries Officers and Bailiffs make regular checks. Anglers found to be fishing without a current rod licence may be prosecuted under the Salmon and Freshwater Fisheries Act 1975. Anybody caught poaching fish may be prosecuted under the Theft Act 1968.

Flooding and Control of Development in Flood Plains

In the event of flooding where rivers burst their banks (as opposed to domestic water supply bursts), Agency flood defence operatives work with the emergency services to protect life and property and may attempt to prevent further damage by the construction of temporary flood defence works (such as sandbagging, and the removal of obstructions to flow etc).

Any works affecting flows in rivers, works in river floodplains and any works liable to affect existing flood defences may contribute to flooding problems and constitute an offence under either the Water Resources Act 1991 or the Land Drainage Act 1991 unless they are consented by the Agency. The Agency has powers to effect remedial works and recharge the responsible party if such works have been undertaken.



20 Fly tipping at Bentley Mill Way, Walsall



21 Sutton Park

APPENDIX 3 - STATE OF THE LOCAL ENVIRONMENT

Introduction

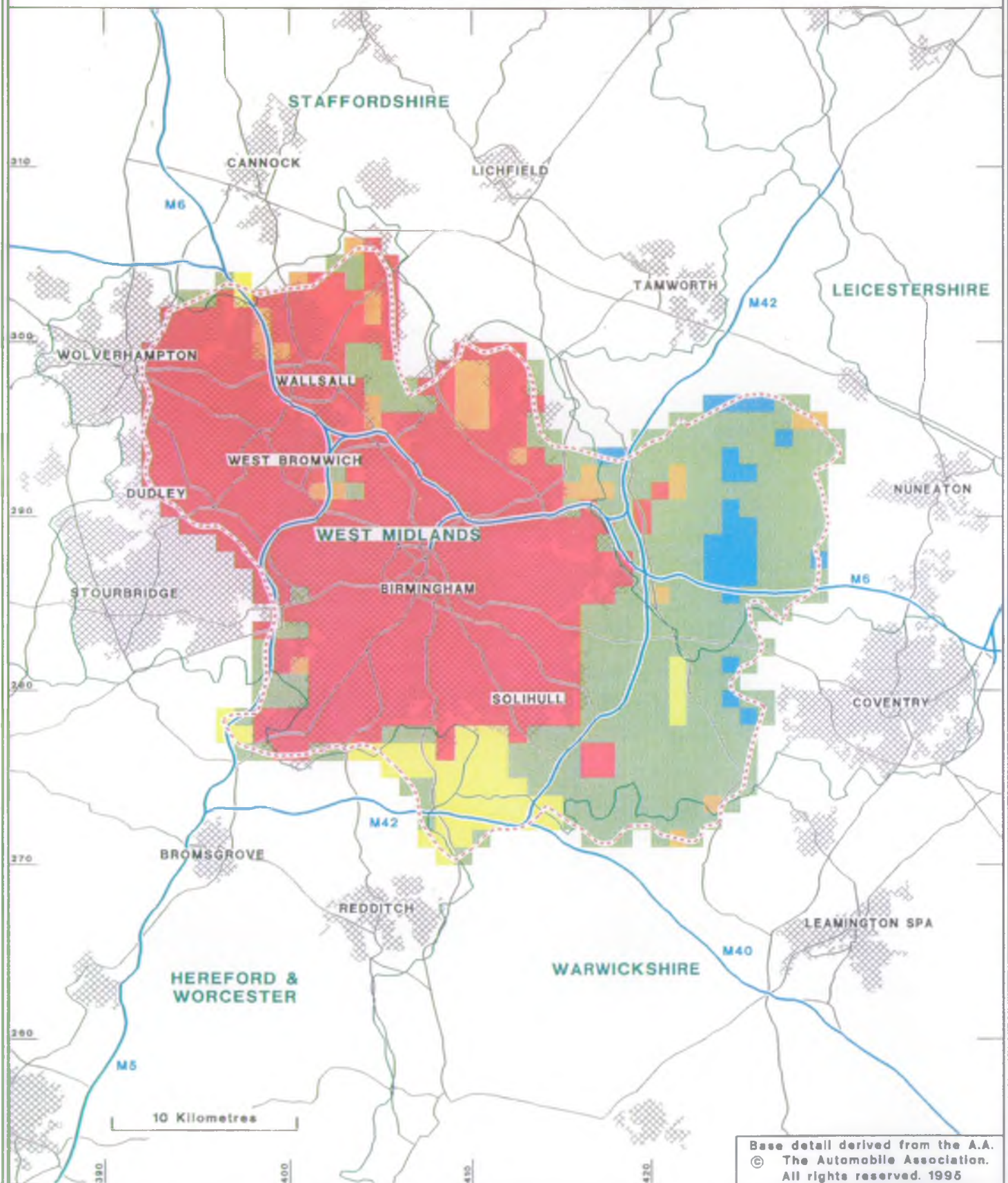
The previous appendices have described the pressures on the environment, and the management responses employed to limit the impact of the pressures. This appendix provides environmental information on the state of the local environment in terms of land, water, wildlife and heritage, from information provided by partners, and from our monitoring and assessment of the local area. The information is often set against standards and targets, from which some of the issues have been generated. These targets are generally the standards considered necessary in order to enable the well-being of natural resources, eco-systems and public health to be maintained and where appropriate enhanced. These targets can be local, national or international, statutory or policy based and may be numerical, descriptive or perceptive. It should be recognised that this is not a "State of the Environment Report" in its fullest technical sense, but the information should still be of interest to a wide range of organisations and individuals.

This appendix is divided into the following sections:

- 3.1 Land
- 3.2 Air
- 3.3 Water
- 3.4 Fisheries, Wildlife and Heritage
- 3.5 Recreation

Map 14

AGRICULTURAL LAND CLASSIFICATION TAME LOCAL ENVIRONMENT AGENCY PLAN



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Agricultural Land

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5

Non-Agricultural Land

- Land predominantly in urban use
- Other land primarily in non-agricultural use

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3.1 Land

3.1.1 Land Use and Agricultural Land Quality

About half of the West Midlands - Tame LEAP area is covered by urban development, whilst the remaining area is made up of arable and grassland. Relative proportions of dominant land use are given in Figure 7 from information shown on map 17.

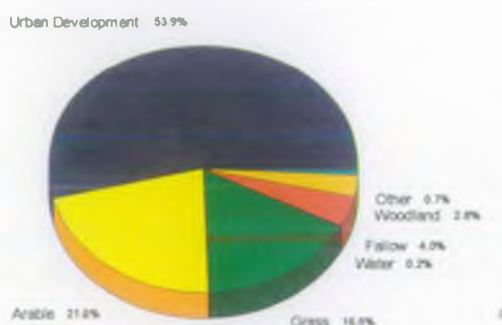


Figure 7 - Land Use in the West Midlands - Tame Area

The agricultural land is largely (38.5%) Grade 3 in land quality, with small areas of Grade 2 land (3.2%) found mostly in the northern area of Warwickshire, and Grade 4 land (3.3%) typically along the poorly drained river flood plains. The relative proportions of agricultural land classification are given in Figure 8 from information shown on map 15.

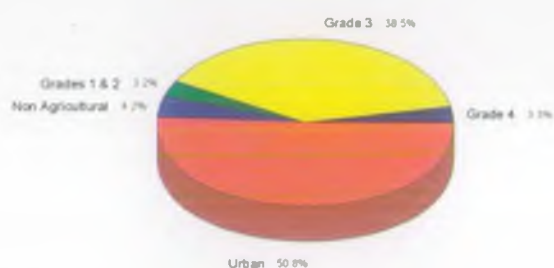


Figure 8 - Agricultural Land Classification for the West Midlands - Tame Area

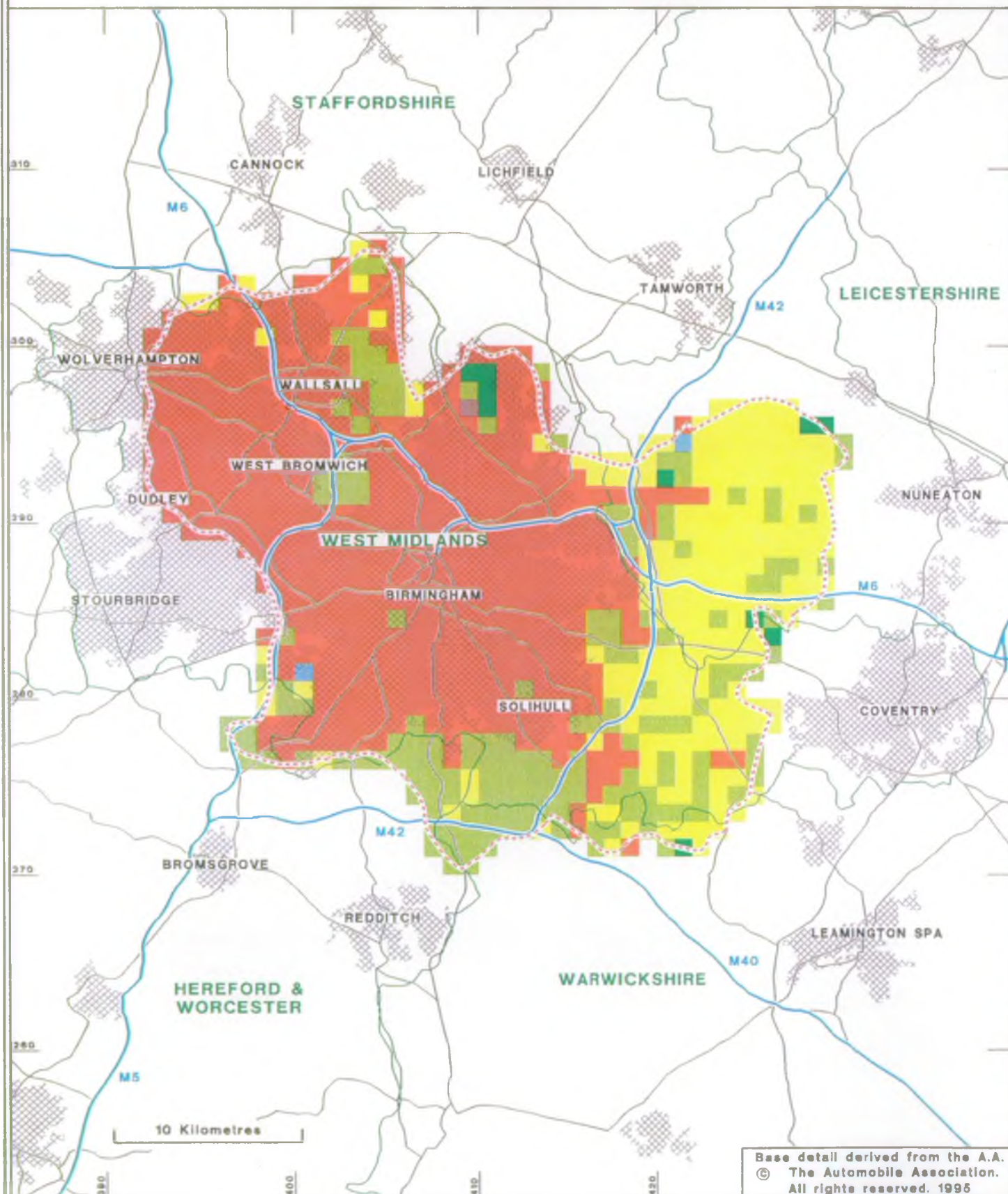
3.1.2 Mineral Workings

Historically Silurian Limestone in the Dudley, Walsall and Wolverhampton areas was mined in large quantities. Such mining has now ceased and parts of the old mines are being infilled to prevent ground subsidence.

The Coal Mining industry has been important in parts of the area, particularly the Black Country where the coal outcrops at the surface, and also in the east of the area where coal is mined at depth. The deep mining of coal has now ceased with one notable exception, Daw Mill, which continues to mine the area around Meriden. Opencast coal operations are sometimes approved in the Black Country, but due to the highly developed nature of the area, tend to be restricted to large redevelopment schemes such as at Leabrook/Wednesbury and Bowmans Harbour.

Map 15

DOMINANT LAND COVER BY 1 KILOMETRE SQUARE TAME LOCAL ENVIRONMENT AGENCY PLAN



LAND COVER

	Grassland		Urban \ Bare Ground
	Moorland \ Heath		Woodland
	Arable		Open Water

(Data Source: ITE Land Cover)

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Appendix 3 - State of the Local Environment

Roadstone has been quarried from the basalt quarries in Sandwell. Edwin Richards quarry is an example of an existing large hardrock quarry. A number of similar quarries have now been backfilled.

Clay has been extracted from a large number of sites throughout the area, the principle remaining quarries are located to the north east of Walsall. Clay and ironstone have both been quarried often in association with coal extraction

At present, sand and gravel extraction is confined to the deposits along the Rivers Cole and Blythe. The sand and gravel deposits have been worked for many years, but their variable depth is generally not suited to large scale extraction except in the Meriden, Lower Blythe and Lower Cole areas.

3.1.3 Soils

Soils are influenced by the underlying geology. On the Reddish Till and across the Carboniferous Coal Measures the soils are largely slowly permeable and seasonally waterlogged with loamy over clayey textures, and from an agricultural point of view, these soils are generally under grass and cereal production. In the east of the area across the Carboniferous Sandstones and Shales the soils are also loamy over clayey, but variably drained. Of these the better drained soils are easily worked and under arable cultivation, whilst the poorer soils suffer slight waterlogging and are likely to be under cereal and grass. Well drained coarse loamy soils occur on the River Terraces and across the areas of Glacio Fluvial drift. Along the flood plains on the alluvium, clayey soils are poorly drained and liable to flooding.

Soil has unique properties:-

- It is a living, dynamic complex of organic matter and minerals.
- It contains considerable biodiversity and supports all terrestrial plant and animal communities.
- It controls the storage of natural and man made substances and their release to the environment.
- It supports agriculture and underwrites capital wealth; its contamination or degradation is material to the valuation of land.

The sustainable management of soil resources is vital to the national well-being but in the UK is largely ignored in the setting of policies for the protection of the environment.

Soil quality and processes influence the state of the atmosphere and of water and biological resources and need to be considered in order to achieve objectives to protect the environment. Soil determines the flow of rainwater to rivers, streams and underground waters and the contamination of the water environment from non point sources of pollution. The nature and type of soils determines the capacity of the land to receive and remediate waste and to deal with the affects of atmospheric and water bourne pollution. Soils therefore affect land use, the location of development and the protection of the environment.

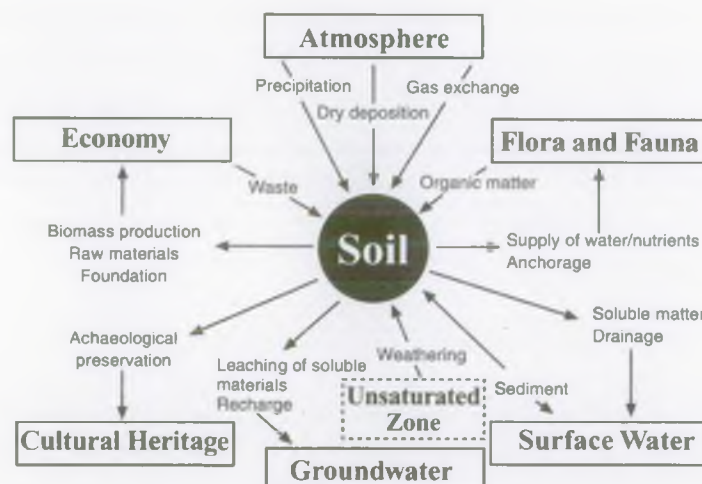


Figure 9 - Soils

Soil protection and sustainable land use are issues for the Environment Agency, local authorities and others. Whilst the Agency recognises the importance of soils, current arrangements between the Agency and the Soil Survey and Land Research Centre (the UK's main reference centre on soils) does not allow for the inclusion of detailed information on soils on a catchment by catchment basis. It is hoped that this information will be available for inclusion in later publications.



22 Coleshill

3.1.4 Waste

In the past, Waste Regulation Authorities have produced Waste Management Plans which consider all technical issues relating to waste management and conclude by establishing strategy objectives. The plans were a statutory requirement of Section 50 of the Environment Protection Act 1990 but this requirement was repealed by the Environment Act 1995. Waste Management Plans whether in draft form or having been finalised provide a useful source of information, however, whilst the location of waste management sites can be determined to fall either within or outside a catchment area, the waste arisings statistics contained in the plans are detailed on a district or county basis. In terms of waste arisings there are at present no meaningful statistics relating specifically to the West Midlands - Tame plan area. It is envisaged that future surveys of waste arising will produce information not only on a district and county basis but also in a format that will enable more accurate information to be detailed in terms of catchment areas.

3.1.4.1 Waste Arisings

An estimated 7 million tonnes of controlled waste is generated in the West Midlands region per year of which approximately 1 million tonnes is classified as household waste, 4.45 million tonnes as commercial and industrial waste, and the remainder is mainly generated by the activities of the construction and demolition industry. However, because of the difference in size between the area of the West Midlands - Tame LEAP and the entire "West Midlands conurbation" the quantity of waste produced in the LEAP area is likely to be significantly less.

Household Waste

The term household waste includes that waste collected from domestic premises by district council contractors by agreement, waste arising at public waste disposal sites, and wastes deposited by the public at local authority operated recycling centres. Research into household waste has indicated that the composition of household waste has changed and reflects changes in lifestyle, standards of living, purchasing habits and product marketing. The figure below shows a typical analysis of household waste:

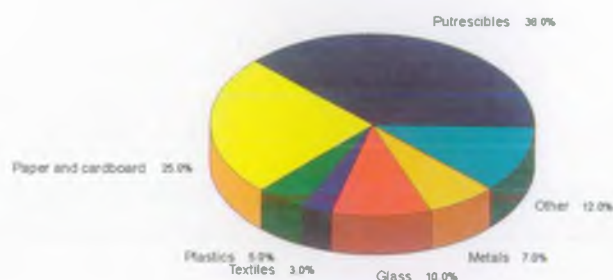


Figure 10 - Composition of Household Waste in the West Midlands

The West Midlands Waste Management Plan indicates that the overall recycling rate for household waste in the West Midlands during 1994/95 was around 3.7%. A further 60% was landfilled and the remainder was disposed of at incinerator plants operating in the county. A breakdown of the recycled materials is shown in the below.

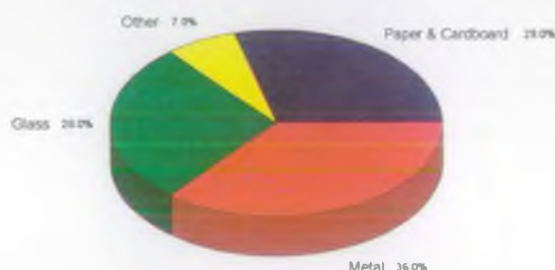


Figure 11 - Percentage of recycled material in the West Midlands

The proportion of household waste being recycled is still small but increasing as collection authorities strive to achieve government targets. Most authorities have had established systems to cover materials such as ferrous metal, glass, paper and cardboard from the household waste stream for a considerable period. In a bid to recycle the organic element of household waste, districts are increasingly looking at composting schemes, both home and centralised schemes, as a means of reducing the quantity of household waste requiring disposal.

Commercial & Industrial Waste

The Waste Management Plan for the West Midlands County, indicates that approximately 30% of commercial and 25% of industrial waste generated in the West Midlands are either recycled or recovered.

**West Midlands - Tame
Local Environment
Agency Plan
Map 16**



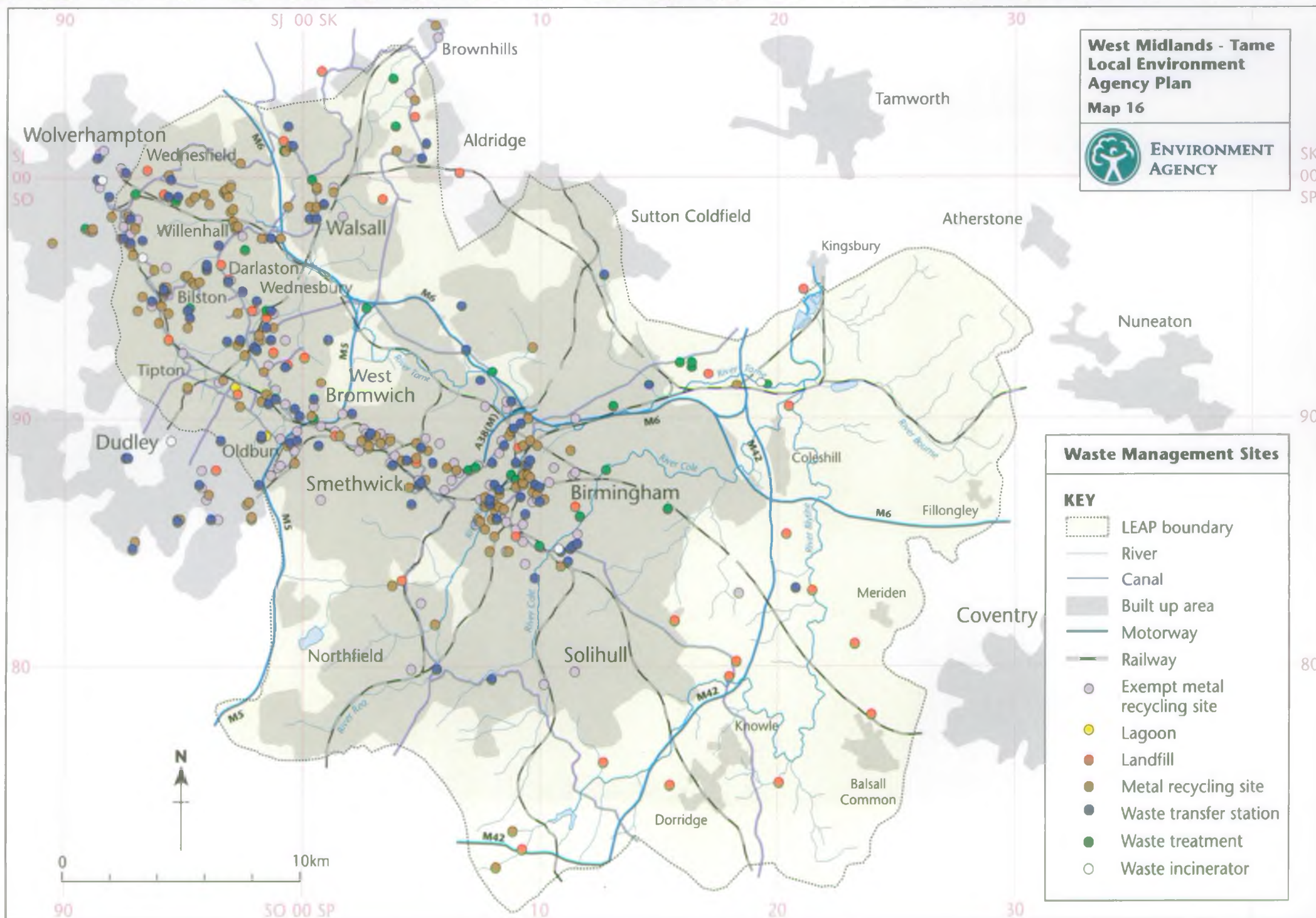
**ENVIRONMENT
AGENCY**

Waste Management Sites

KEY

- LEAP boundary
- River
- Canal
- Built up area
- Motorway
- Railway

- Exempt metal recycling site
- Lagoon
- Landfill
- Metal recycling site
- Waste transfer station
- Waste treatment
- Waste incinerator



Appendix 3 - State of the Local Environment

In terms of commerce some 90% of the total waste reclaimed each year is reclaimed by commercial companies within 4 commercial classes, namely wholesale and retail distribution, hotels and catering and public administration. The main materials reclaimed by this sector include scrap ferrous metal, polymeric materials, waste paper, cardboard and glass. The plan indicates that fuel, oil and greases, interceptor wastes, tars, paint, dyes and pigments are also reclaimed by the commercial sector.

Industry on the other hand reclaims significant quantities of elemental metal waste, ferrous and non ferrous scrap, waste timber, waste paper, cardboard and glass. In addition fuel, oil and greases are actively reclaimed by the industrial sector. Over 85% of the total quantity reclaimed occurs within companies operating in the following industrial classes; metal manufacturing, manufacture of non metallic mineral products, metal goods manufacturing, mechanical, electrical and electronic engineering, food, drink and tobacco manufacturing and the timber and wooden furniture industries.

The producer responsibility initiative will further induce companies to take measures to recover some of the waste they produce. The initiative is designed to ensure that industry assumes an increased share of the responsibility for the waste arising from the disposal of its products. The first of several initiatives to be introduced, came into force in March 1997. The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 places an obligation on companies satisfying certain criteria to meet targets for the recovery and recycling of packaging materials. Further details are available from this office (address given at the start of this report).

Construction & Demolition Waste

These wastes are generated by commercial, industrial and private housing construction projects, quantities arising being dependant upon the levels of activity. Construction and demolition waste is a controlled waste under the Environmental Protection Act (1990) and has been designated a priority waste stream by the EC. Estimates of the quantities of these wastes generated within a defined area are available. Information relating to the arisings of these wastes is limited.

The Department of the Environment report "Managing Demolition & Construction Waste", published in 1994, suggests that the composition of construction and demolition waste landfilled comprised of materials as shown in figure 12.

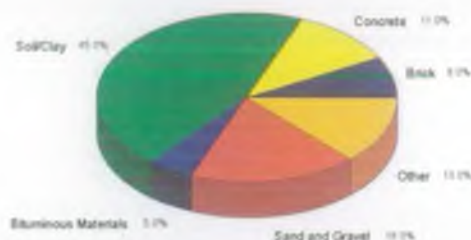


Figure 12 - Composition of landfilled construction and demolition waste

According to a report from Howard Humphreys and Partners, 63% of construction and demolition waste is recycled. In practice the majority of this recycled element is roughly broken up for low grade uses, approximately 4% of the waste is subject to high level processing to meet the standard required for use as primary aggregates.

3.1.4.2 Waste Management Facilities

There are 273 licensed waste management facilities within the West Midlands - Tame catchment. This figure comprises 34 landfill sites, 14 treatment plants, 9 oil treatment plants, 109 licensed scrap yards, 90 transfer facilities (incorporating 5 clinical waste transfer facilities), 3 hospital incinerators (waste storage), 2 lagoons, 1 mineshaft and 11 public waste disposal facilities. There are 107 exempt scrap yards. This distribution of these facilities are shown on Map 16.

There are a number of sites of particular note regulated through Waste Management Licensing. These include:

Biffa Waste Services, Potters Lane, Wednesbury

The purpose of the waste transfer station facility is to provide an interim store for difficult and special waste material, prior to on site disposal through the treatment plant or bulking up for transportation for recovery or disposal elsewhere. The purpose of the treatment plant is to treat hazardous and non hazardous, difficult and special wastes, primarily in liquid or pumpable sludge form. The by-products of treatment are a solid waste suitable for disposal in landfill and a liquid effluent which is disposed of via the foul sewer. Inputs of waste are regulated by an appropriate maximum daily input for each waste category.

Caird Environmental Limited, Forge Lane, Minworth

The purpose of the waste transfer station facility is to provide an interim store for difficult and special waste material prior to on site disposal through the treatment plant or bulking up for transportation for recovery or disposal elsewhere. The purpose of the treatment plant is to treat hazardous and non hazardous, difficult and special wastes, primarily in liquid or pumpable sludge form. The by products of treatment are a solid waste suitable for disposal in landfill and a liquid effluent which is disposed of via the foul sewer. Waste inputs to transfer station is limited by storage capacity and waste segregation requirements. Waste inputs to the treatment plant are limited to 74,500 tonnes/year.

Whelan Environmental Limited, Hanley Street, Birmingham

The treatment plant is designed to treat hazardous and non hazardous, difficult and special wastes, primarily in liquid and pumpable sludge form. The wastes are delivered to the site in road tankers or containers. The by products of treatment is a solid fitter cake suitable for disposal to co-disposal landfill and a liquid effluent discharged to foul sewer. Waste inputs are limited by the operational and storage capacity of the plant.

Haz Waste Services Limited, Bullock Street, West Bromwich

This waste management facility operates primarily as a transfer facility for a wide range of difficult, special and clinical wastes. Bulking up of compatible waste and drum crushing on site improve the efficiency of the operation. The facility is also licensed to crush fluorescent light tubes. The site is licensed to receive a maximum of 100 tonnes per day, up to a maximum of 20,000 tonnes per year.

Hopkins and Sons, Bullock Street, West Bromwich

This waste management facility operates a drum crushing and recovery and reconditioning plant and a waste transfer station for a wide range of difficult and special wastes. Bulking up of compatible wastes is also carried out to improve the efficiency of the operation. The waste throughput at the site is regulated by its operational storage capacity.

Greenways Landfill, Edwin Richards Landfill, Rowley Regis

The landfill operation takes place within an active hard rock quarry. The site is licensed for the disposal of household, industrial and commercial wastes and the co-disposal of a range of difficult and special wastes. The site incorporates a full specification mineral liner, active gas control, leachate and groundwater monitoring. The site is licensed to accept a maximum of 12,000 tonnes per week.

BFI, Packington Limited, Little Packington, Meriden

The landfill operation takes place in shallow glacial sand and gravel workings, the majority of the landfill is above ground. The site is licensed for the disposal of household, industrial and commercial waste and the co-disposal of a range of difficult and special wastes. The site incorporates an active gas control system. Monitoring of leachate, groundwater and gas is carried out. The in situ clay base is re-worked and a composite liner system incorporated in recent phases. The site is enclosed by a bentonite cut off barrier, keyed in to in situ clay base. The site is licensed to accept a maximum of 12,500 tonnes per day.

Appendix 3 - State of the Local Environment

Vigo/Utopia Quarry, Coppice Lane, Walsall Wood

The landfill operation takes place in a large marl quarry. The site is licensed for the final disposal of a selected range of industrial and commercial wastes. The site incorporates a composite side wall liner and mineral lined base. The site incorporates an active gas control system, gas leachate and groundwater monitoring. The site is licensed to accept a maximum of 14,000 tonnes per week.

Polymeric Treatments Limited, Stubbers Green Road, Aldridge

This waste management facility has 3 licences that permit the treatment and limited transfer of a wide range of difficult and special wastes. The first licence regulates a specialised cyanide treatment plant which operates on the principle of oxidation and precipitation. Treated cyanide slurry if suitable is taken to the acid/sludge neutralisation which is controlled by a second licence. This plant is used to treat a wide range of difficult and special wastes in liquid and pumpable sludge form. A third licence controls the operation of an oil/water treatment plant and permits the transfer of P.C.Bs. The maximum throughputs of waste to all three plants is limited by its own operational storage capacity.

BVH Limited, Alma Crescent, Nechells

This waste management facility is licensed to permit the transfer and treatment of an extensive suite of difficult and special wastes. Recovery and recycling of certain waste materials is also practised where possible. The maximum throughputs of waste is limited by its operational storage capacity.

Frost and Sons (Moxley) Limited, Holyhead Road, Moxley, Walsall

The site is licensed to permit the disposal to mineshaft of treated hydrochloric acid liquors and quenchwater liquors, arising as a bi-product of the licence holders own on site activities. The licence requires routine monitoring of pH, levels within the mineshaft and volumes discharged. The discharge is limited to a maximum of 25,000 tonnes per year.

Albright and Wilson, Rattlechain Lagoon, Tividale, Sandwell

Licence permits the deposit of effluent treatment sludge, solid waste contaminated with elemental phosphorous and water contaminated with elemental phosphorous or phosphoric acid to a settlement lagoon. These wastes arise from Albright and Wilson's own manufacturing activities. Solids are permitted to settle in the lagoon. The licence holder has consent to discharge effluent from the lagoon to the nearby Birmingham canal within the parameters of its consent. The site may accept a maximum of 1160 tonnes/year of solid waste and a maximum of 1000 gallons/year of liquid waste.

T.I Accles and Pollock, Rounds Green Lane, Oldbury, Sandwell

Licence permits the discharge of Inorganic acid wastes, acid and alkali swill waters, regeneration wastes, derust, alkaline cleaners, vanderite and soap to a lagoon. All wastes originate from the licence holders adjacent manufacturing facility. The pH of the lagoon is maintained within the range 7 to 11. Precipitation and neutralisation occur within the lagoon. Effluent flows via a weir system to foul sewer. The site may discharge a maximum of 890 tonnes/day to the lagoon.

The following waste management facilities are all licensed oil/water recovery and treatment plants of varying capacities.

UK Waste Oils, Dollman Street, Nechells, Birmingham
Arrow Waste Oils, Kelvin Way, West Bromwich
Central Waste Oils, Harvills Hawthorne, West Bromwich
Elimpic Oils, Purdey Road, Tipton
Oil Inventions Limited, Leamore Close, Walsall
Whelan J., Brewery Street, Birmingham
Processed Oils, Withy Road, Wolverhampton

3.1.4.3 Landfill

Landfill remains the predominant route for the disposal of waste generated within the area. The area itself has many landfill sites operating within its boundary, these sites accepted over 2.7 million tonnes of controlled waste during 1996/97, of which approximately 90% arose in the West Midlands. The largest site is at Packington in North Warwickshire, which currently handles over 50% of the total waste landfilled within the catchment area (Issue 18). Less than 1 million tonnes was disposed of at sites operating in the West Midlands County.

3.1.4.4 Waste to Energy

Methane is a major greenhouse gas and 46% of UK emissions come from landfill sites. Of this, only about 5% is recovered and used. In the catchment there are three landfill sites that currently extract methane to produce electrical energy. Greenways Landfill, Edwin Richards Quarry, Rowley Regis has a maximum potential capacity of 2MW and is likely to be contracted to operate for at least the next 15 years. The gas generation plant at BFI Packington Limited, Little Packington, Meriden currently has a maximum capacity of 9MW comprising of a 4MW gas turbine and a 5MW steam turbine operating in series. There is currently no available estimate for the lifespan of this plant but is likely to exceed 20 years. The old Birmingham City Council landfill site at Queslett has a small electricity generation plant with a maximum capacity of 1.8MW. This plant is currently operating at 1.2MW and has an estimated operation life of 5 years.

3.1.5 Contaminated Land

Contaminated land is a serious problem in the upper and middle, more urban parts of the catchment due to the long history of industrial development and the legacy which remains.

Much of the derelict land has been redeveloped in recent years, partly through the two development corporations; the Black Country Development Corporation and Heartlands Development Corporation. Several major projects including the Black Country Spine Route, the Black Country Route and the Heartlands Spine Road have used or provided good access to previously derelict land, a large proportion of which was contaminated. A characteristic of Black Country development sites is that there are usually a number of problems to contend with, such as mine shafts and underground workings, wastes from past industries and occasionally infilled canal basins.

The majority of groundwater in the area discharges as baseflow into the River Tame and much of it is contaminated either from source or as it passes through layers of contaminated material. Surface water quality tends to be affected by general seepages into the sides and base of the channel as opposed to direct discharges.

In Birmingham, the closure of many industries over the last 50 years or so has led to a reduction in abstractions from groundwater and a rise in groundwater levels particularly along the Tame Valley. The concern long term, is that as water rises into previously contaminated ground, contaminants will be remobilised and discharged into surface water.

There is widespread contamination by organic solvents throughout the Birmingham Triassic Sandstone aquifer. The sources of pollution are numerous and historical such that much of the aquifer is affected to some degree.

A number of high profile contaminated sites within the catchment have been cleaned up within the "suitable for use" principle, several of which required a Waste Management Licence:-

Bowmans Harbour, Wednesfield, Wolverhampton

Prior to the reclamation of this site the area had been subject to uncontrolled tipping of domestic and industrial wastes. This material was used to infill areas between colliery spoil heaps. The reclamation was achieved in two discrete developments. A fully engineered permanent repository for all contaminated and biodegradable wastes. This repository incorporates permanent leachate and gas monitoring and control schemes. Outside of the permanent repository "clean" suitable engineering fill was emplaced to form a development site for new industrial and commercial premises and the construction of the Wednesfield Way. The site was partially funded by the removal of the coal deposits prior to its reclamation.

Appendix 3 - State of the Local Environment

Leabrook Road Reclamation, Wednesbury, Sandwell

This site suffered from contamination from a wide range of industrial land use typical of this area and both licensed and indiscriminate tipping. The reclamation was achieved in two discrete developments. Firstly, a fully engineered repository was constructed for all contaminated and degradable wastes. This repository incorporates permanent landfill gas and leachate monitoring and control measures. The repository will be restored as public open space. Secondly, a development area has been constructed by backfilling the created void with clean suitable engineering fill. This land has been used as part of the route for the new Black Country Spine Road and associated developments.

Swan Farm, Great Bridge, Sandwell

This land was contaminated by various land uses including use as a scrap yard, railway sidings and unregulated landfilling. The reclamation scheme consisted of the excavation of existing materials to a depth of 6m. Contaminated material was stockpiled until finally disposed of off-site. Other, clean suitable materials were re-worked on site along with other suitable imported materials to produce a final landform for construction of a highway, industrial premises and public open space.

Toll End Sewage Works Eagle Lane, Tipton

This sewage works was made redundant by the construction of the Black Country Foul Sewer in 1988. All sewage sludge and contaminated materials were stockpiled prior to permanent disposal in the Leabrook Road repository. The resultant void was backfilled with clean, suitable engineering fill. The site has an end use for the construction of a highway, industrial premises and public open space.

Many more reclamation schemes have been and are being undertaken without the need for a Waste Management Licence.

Bentley Mill Way and Slacky Lane

Both sites are characterised by site histories of copper refining and by high levels of metal contamination which have caused significant pollutions to the upper reaches of the River Tame. The sites were identified as in need of further investigation and where appropriate remediation by the Tame Catchment Management Plan in 1995. Site investigation of Slacky Lane has commenced in partnership with Walsall MBC and Supplementary Credit Approval (SCA) money may be available for remediation of the site. A report incorporating a costed remediation strategy was due to be published in February 1998.

The Agency will fund investigative work at Bentley Mill in 1998. However, as the Agency does not have a partner for this project SCA funding is unlikely to be available.

3.1.6 Radioactivity

Every person is exposed to radioactivity. This exposure is mainly caused by natural sources, such as radon gas, gamma radiation from elements within the earth's crust, cosmic radiation and from other minor sources that contains small quantities of naturally occurring radioactive isotopes. Exposure is also caused by man made sources from medical procedures, fall out from the nuclear weapons testing programme of the 1950s and 1960s and emissions from nuclear power programmes. Man made additions to the overall level of radioactivity are generally low accounting for only a small fraction of the total exposure level. The annual average level of exposure for UK citizens is around 2,600 microsieverts. Exposure from current man-made radioactive discharges accounts for 390 microsieverts per year.

Table 10 - Sources of radiation (provided by National Radiological Protection Board)

	Annual average (Micro-sievert)
Natural	
Cosmic radiation	260
Gamma radiation	350
Ingestion inhalation	300
Radon	1,300
Man-Made	
Medical treatment/diagnosis	370
Occupational exposure	7
Nuclear fall out (weapons testing)	5
Discharges	4
Products	4
Total	2,600

Radon levels are very low in the West Midlands and the overall level of radiation in the catchment is low. The dose limit for members of the public from man-made sources is 1,000 micro-sieverts per year. This is equivalent to increasing cancer risk to 1:20,000. Discharges from man's activities are predominantly (in the UK) from the civil nuclear fuels industry, with British Nuclear fuels at Sellafield in Cumbria being the principal source. There are no nuclear power generators in the West Midlands - Tame Area.

3.2 Air

Air quality is an important indication of environmental quality. Nationally there have been significant improvements in air quality since the infamous London smogs of 1951 which caused over 4,000 premature deaths. Levels of sulphur dioxide (SO₂) and Black Smoke have fallen considerably. Other pollutants, however have increased in significance as road traffic has increased, particularly in urban areas. High levels of oxides of nitrogen (NO_x), fine particulates (PM₁₀) and Volatile Organic Compounds (VOCs) can be present at times of high traffic flows.

The monitoring of air quality is undertaken by the government and by local authorities. The level of monitoring currently taking place is of concern to the Agency (Issue 21), but it is possible to make general assessments of air quality for the catchment from the West Midlands Atmospheric Emissions Inventory published by the London Research Centre in September 1996. Air quality over parts of the Birmingham/Black Country conurbation is sometimes poor.

According to the West Midlands Atmospheric Emissions Inventory Database the single most significant source of atmospheric pollutants in the West Midlands is road traffic accounting for over 96% of emissions of carbon monoxide, benzene and 1,3 - butadiene; 85% of emissions of oxides of nitrogen and 75% of black smoke. Sulphur dioxide emissions have been reduced very substantially over the past 30 years, nevertheless, industrial combustion remains the principle source of sulphur dioxide emissions in the West Midlands. High ozone concentrations can occur at ground level, particularly in rural areas. These are caused by complex interactions between organic compounds and nitrogen dioxide in the presence of ultra violet light.

Map 10 highlights those Part A processes, both inside and outside the area, which could potentially contribute to breaches of the National Air Quality Standards (NAQS) objectives in the West Midlands - Tame LEAP Area.

3.3 Water

3.3.1 Surface Water Quality

The River Tame catchment is dominated by the Birmingham/Black Country conurbation which is located on the headwaters of the Tame. It affects most of the river system and has a serious impact on water quality. The Rivers Blythe and Bourne drain the primarily rural land to the east and south of the area, and are less affected by the conurbation.

Water quality in the upper urbanised parts of the catchment remains generally poor. The River Tame contains a high proportion of treated sewage and industrial effluent. At Lea Marston the average flow in the river consists of 55% treated sewage effluent and industrial waste. In dry weather this can rise to 90%. Pollution from contaminated land continues to affect the river quality and under storm conditions the river also receives large amounts of polluted run-off from land, roads, yards, buildings etc. Water quality improves significantly downstream of the Lea Marston Purification Lakes and allows a viable fish population to live in the main river.

The Rivers Blythe and Bourne are both sources of public water supply and show generally good water quality, although monitoring of both rivers has shown evidence of low level pesticide contamination.

Major Sewage Effluent Discharges

The catchment contains relatively few smaller sewage treatment plants and is drained within the urban areas by an extensive sewerage system to larger works.

The construction of the Black Country Trunk Sewer in the early 1970's allowed the closure of many former, unsatisfactory, small Black Country sewage works. In December 1995 Oldbury Sewage Works closed in completion of this long term strategy, concentrating sewage treatment for the majority of the urban catchment at number of key sites with relatively few works remaining on the upper reaches of the Tame.

The Wolverhampton Arm of the River Tame, however, continues to consist mainly of treated sewage effluent from Willenhall Sewage Treatment Works (STW) in dry weather. The Ford Brook at Bescot also contains a significant proportion of sewage effluent from Goscote STW and the much smaller Walsall Wood STW.

Below Bescot, there is a further major sewage effluent discharge into the River Tame from Ray Hall STW, before it is joined under the M6 Motorway by the River Rea. Between Birmingham and Lea Marston, the River Tame receives large amounts of sewage effluent from Minworth STW and Coleshill STW. Minworth STW represents one of the largest inland discharges of its kind in the British Isles. The volume of the river in dry conditions increases by nearly half at this point.

During prolonged dry weather almost the whole of the flow in the River Blythe is abstracted for public water supply. There are 10 sewage treatment works that discharge to the River Blythe above the abstraction point, with a large number of much smaller sewage plants. The largest input into the River Blythe is from Barston STW via the Eastcote Brook which is currently adversely affecting water quality. The River Blythe is designated a Sensitive Area liable to possible eutrophication along the stretch of river from Hampton in Arden to Whitacre under the EC Urban Waste Water Treatment Directive (97/221/EEC) This works will need phosphate removal to meet Directive standards by the end of 1998.

A major scheme has begun on the Black Country Trunk Sewer through to the Saltley/Minworth link sewer, and this is expected to result in improvements to a large number of major combined sewer overflows (CSOs). The improved infrastructure will either reduce the need for many of the CSOs or will reduce the frequency of their operation. Other schemes include improvements to a number of CSOs discharging to the Rough Brook in the Goscote and Pelsall areas, two CSOs to the Ford Brook in Walsall and individual schemes in Stubbers Green, Aldridge and Willenhall.

Recent improvements to a number of storm sewage overflows, together with the planned construction of an additional length within the Black Country Trunk Sewer, represent significant improvements to the sewerage system reducing the impact of sewer overflows in storm conditions. Despite these infrastructure improvements, wrong domestic sewer connections where effluent is incorrectly piped to surface water sewers result in widespread and significant pollution problems in nearly all urban areas.

General Quality Assessment (GQA) Chemical Assessment

Assessments using the GQA (Chemical) scheme have been made based on measurements taken since 1988. Samples of water are taken on a monthly basis at routine sampling points on rivers and canals. The chemical scheme - to provide continuity with previous schemes - is based on Dissolved Oxygen (DO), BOD, and ammonia, with stretches classified into six bands; Good (grades A and B), Fair (grades C and D), Poor (grade E) and Bad (grade F). The grade of a specific stretch is calculated in a standard way across all of the regions, using the combined results for three consecutive years in order to ensure that there are sufficient data to provide a reliable assessment.

Table 11 - GQA chemical grading for rivers and canals

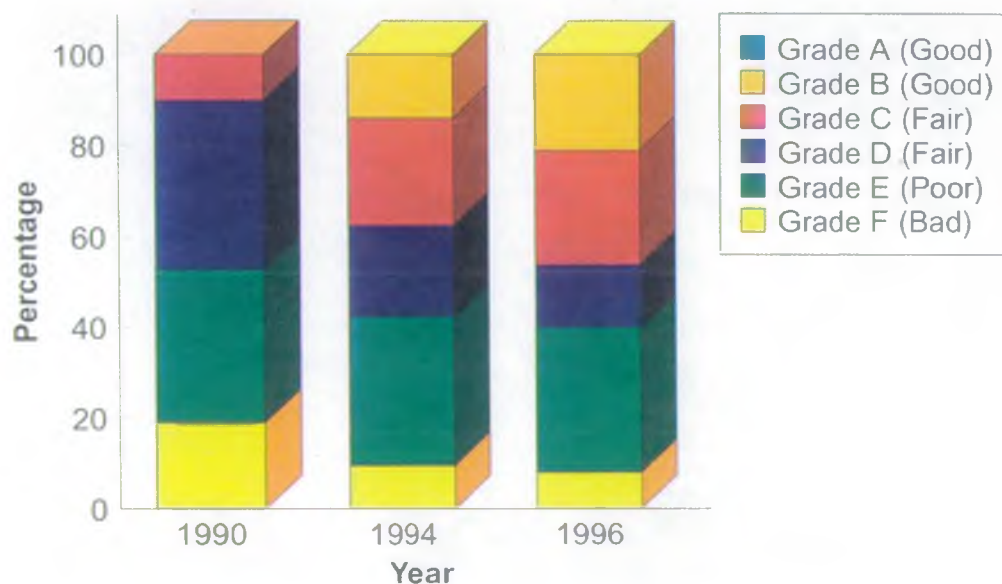
Water Quality	Grade	Dissolved Oxygen	Biochemical Oxygen Demand (ATU) ⁽¹⁾	Ammonia
		(% Saturation) 10 - percentile	(mg/l) 90 - percentile	(mgN/l)
Very Good	A	80	2.5	0.25
Good	B	70	4	0.6
Fair	C	60	6	1.3
Moderate	D	50	8	2.5
Poor	E	20	15	9.0
Bad ⁽²⁾	F	-	-	-

(1) as suppressed by adding allyl thiourea.

(2) water quality which does not meet the requirements of grade E in respect of one or more determinands.

Water quality varies naturally to some extent and there is always a statistical chance that individual stretches will be re-classified wrongly from one year to another, simply because the grading is based on the analyses of 36 separate, instantaneously taken, samples of water. From one assessment to another therefore, some stretches of water can be up-graded and others can be down-graded.

Figure 13 - River quality in the West Midlands - Tame area according to the General Quality Assessment (GQA) scheme (1990 - 1996)



BUSINESS REPLY SERVICE

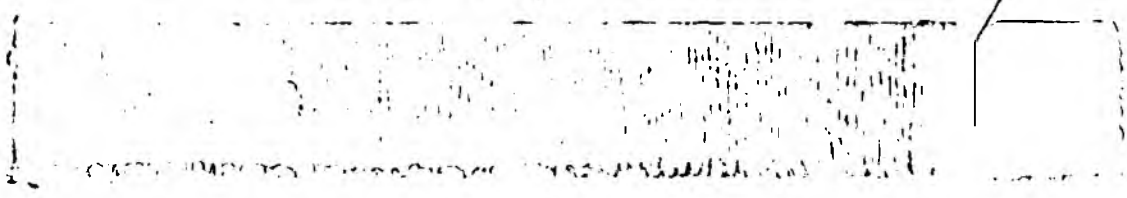
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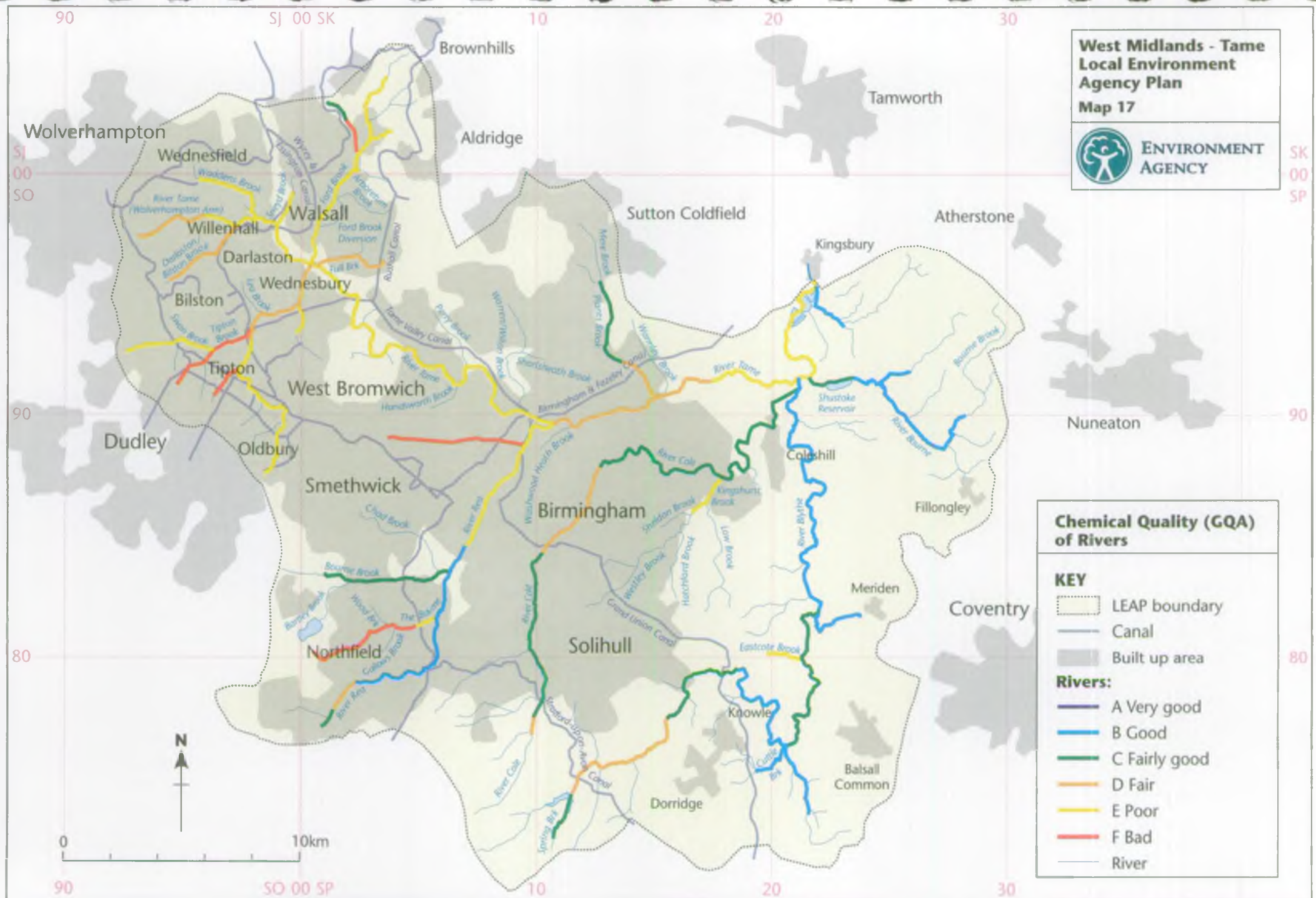
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**West Midlands - Tame
Local Environment
Agency Plan
Map 18**



**ENVIRONMENT
AGENCY**

**Chemical Quality (GQA)
of Canals**

KEY

LEAP boundary

River

Built up area

Canals:

A Very good

B Good

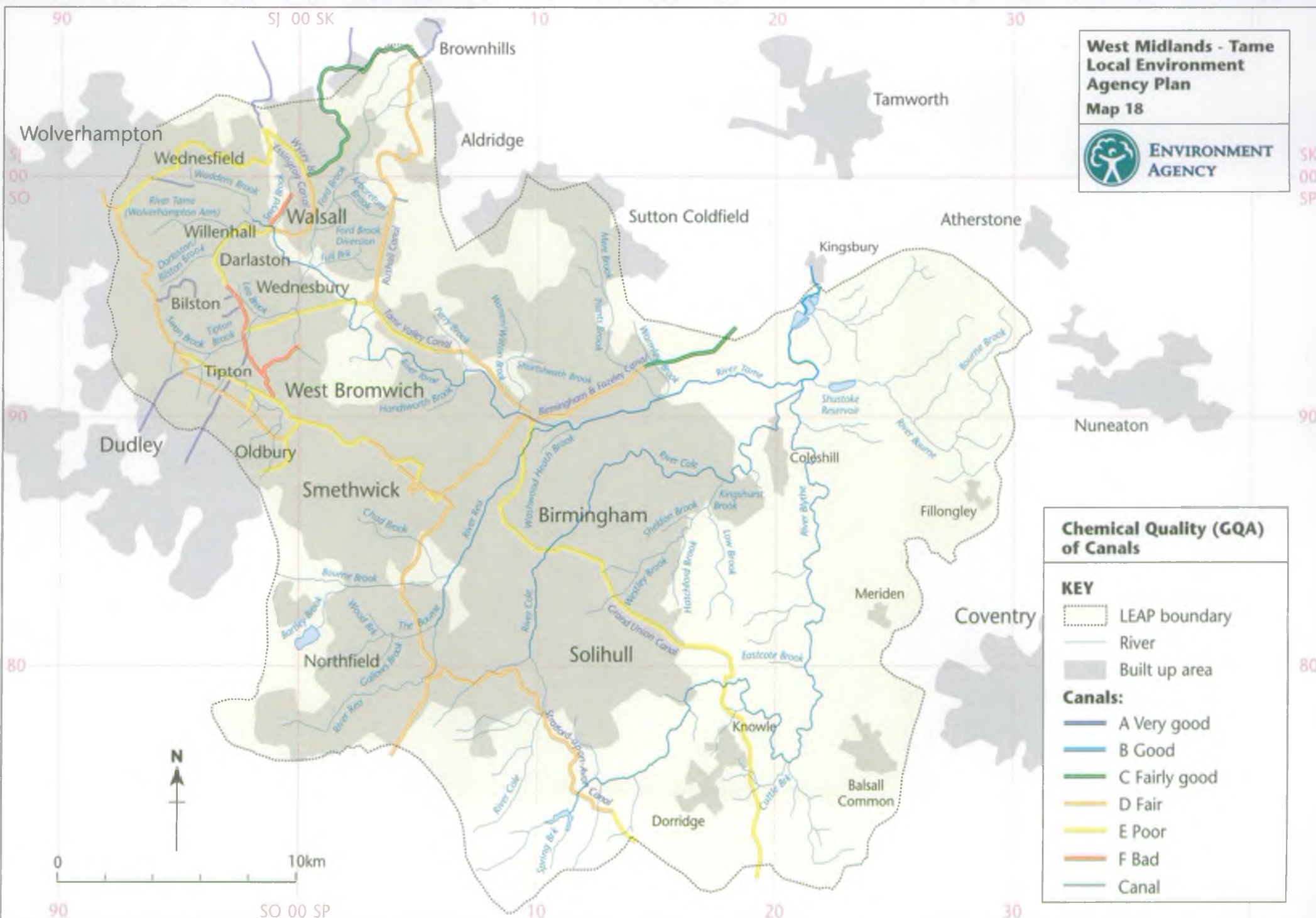
C Fairly good

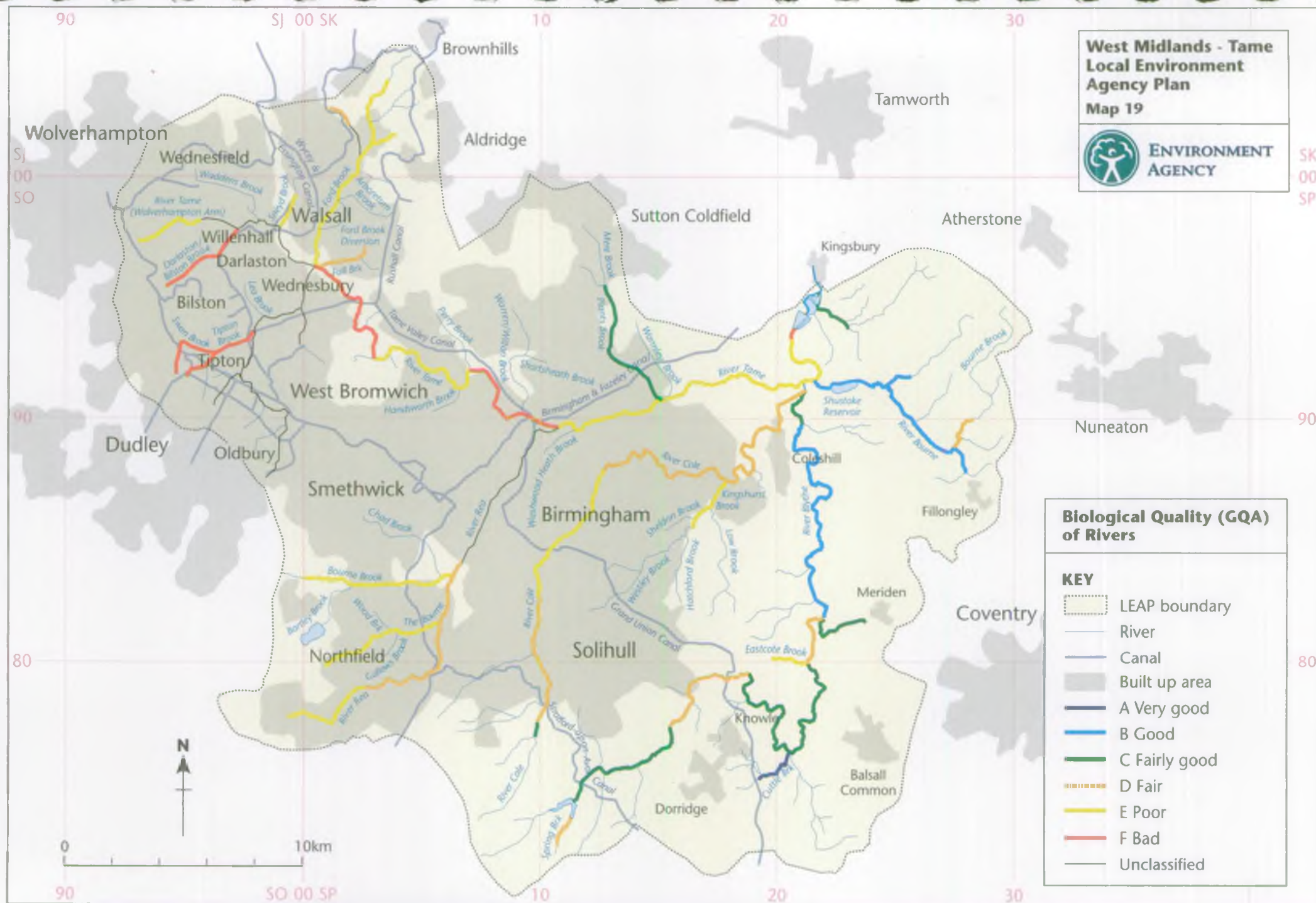
D Fair

E Poor

F Bad

Canal





The West Midlands - Tame catchment shows a trend of improving water quality since 1990. However, the apparent improvements seen in Figure 13 may be slightly exaggerated by the more recent inclusion of higher quality stretches (mostly in the River Blythe and Bourne catchments) which were previously unclassified. Nevertheless, the improvement and expansion of the sampling programme has also included new stretches or poorer water quality (mostly in the upper reaches of the River Tame), and so the overall trend does reflect what appears to be a genuine although gradual improvement in overall water quality.

GQA Biological Assessment

The GQA biological scheme was first introduced in 1995 but is based on long standing techniques used to monitor freshwater quality.

It is based on the groups (known as taxa) of macroinvertebrates (small animals, eg mayfly nymphs, snails, shrimps and worms) that are found on the river bed. Macroinvertebrates are used because they do not move far, have reasonably long life cycles, and respond to the physical and chemical characteristics of the river. They can be affected by pollutants which occur only infrequently and which are missed by the spot-sampling procedure used in the chemical GQA scheme.

For Biological GQA assessment, the macroinvertebrates found at each site are identified and then given a score according to the well established British Monitoring Working Party (BMWP) scoring system. Those species that can withstand pollution receive a low score whilst those that cannot tolerate pollution receive a high score. The scores for each group of macroinvertebrates are then added up. The higher the overall score, the better the quality of the water. Sometimes the average score for each site gives a better indication of quality, for example when physical factors rather than pollution reduce the number and type of species living there.

By comparing taxa found in the sample with those you would expect to find if the river were pristine, rivers are classified into one of six grades as shown in Table 12.

Table 12 - GQA scheme for biology

GRADE	OUTLINE DESCRIPTION
A- VERY GOOD	Biology similar (or better) than expected. High diversity of taxa, usually with several species in each. Dominance of one taxon rare.
B- GOOD	Biology falls a little short of that expected. Small reduction in pollution sensitive taxa. Moderate increase in individual species in pollution tolerant taxa.
C- FAIRLY GOOD	Biology worse than expected. Many sensitive taxa absent, or number of individual species reduced. Marked rise in individual species in pollution tolerant taxa present, some with high numbers of individual species.
D- FAIR	Biology worse than expected. Sensitive taxa scarce. Pollution tolerant taxa present, some with high numbers of individual species.
E- POOR	Biology restricted to pollution tolerant species with some taxa dominant in terms of the numbers of individual species. Sensitive taxa will be rare or absent.
F- BAD	Biology limited to small number of very pollution tolerant taxa, often only worms, midge larvae, leeches and the water hoglouse. These may be present in very high numbers. In the worst case, no life present.

Biological Quality in West Midlands - Tame

The upper sections of the River Tame and its tributaries within the industrial areas of the West Midlands are of poor biological quality with a typical fauna of tubificid worms, chironomids, *Asellus*, Lymnaea snails and leeches. The area is subject to industrial pollution, seepages from contaminated land, sewage works effluents and polluted surface water drainage at times of heavy rainfall. Plants Brook which arises in Sutton Park is an exception with good to fairly good quality supporting shrimps, mayflies and caddis fly larvae.

Appendix 3 - State of the Local Environment

The River Rea is of poor/fair quality in much of the southern area of Birmingham but improves slightly to fair quality upstream of Canon Hill Park, where *Gammarus* and *Baetis* are common to abundant. The section from near the Bourn Brook confluence to the River Tame confluence is contained within a brick culvert and is unsuitable for biological sampling. The upper section of Griffins Brook at Bournville, flowing through urban parkland, is of poor quality with *Hydropsyche* and *Simulium* common to abundant and dependent upon suspended algae from upstream reservoirs. The Bourn Brook from Harbourne to Edgbaston is biologically of fairly good quality.

The middle section of the River Tame receives effluents from Minworth and Coleshill STWs and is joined by the River Cole and River Blythe. It remains in a poor biological state although downstream of the Lea Marston Purification Lakes some improvement is evident.

The River Cole shows fairly good biological quality in the upper reaches with a diverse fauna. This rapidly deteriorates in the urban area particularly in the Haybarnes Bridge to Stechford reach which suffers from the effects of combined sewer overflows and urban run off, the fauna consist of pollution tolerant worms and *Asellus*. Two small tributaries in this area, the Spark and The Tyseley Brooks are very poor quality watercourses. Biological quality gradually improves downstream by self-purification of the river so that by Coleshill a fair quality is attained. The Hatchford Brook which drains Birmingham Airport joins the River Cole at Chelmsley Wood and is of poor biological quality.

The River Blythe is a Site of Special Scientific Interest designated for its aquatic flora and is a source for drinking water. Biologically the river is generally of good to fair quality. There are some quality problems in the headwaters from small treatment plants and also problems associated with urban run-off from the Solihull area via the Cran and Alders Brooks. Occasional pesticide problems have also been detected by biological monitoring. The major discharge of sewage effluent from Barston causes an enrichment of the watercourse to the detriment of the plant communities. Designation under the Urban Waste Water Treatment (UWWT) directive means that from 1998 phosphate stripping will be required at this works to control the eutrophication of the watercourse. Macrophytes and diatoms are monitored to detect changes that should occur.

The River Bourne is a small rural watercourse draining and intensively farmed area the biological quality is generally good. The one remaining colliery in this area drains to the river at Daw Mill. Water is abstracted into Shustoke Reservoir for drinking water, because of the high nutrient content blue-green algal problems can occur which are controlled by iron-dosing.

Water Quality Objectives

The GQA provides information on the current quality of rivers and canals and can show statistically sound trends over time. However, the Agency has water quality objectives known as "River Quality Objectives" (RQOs) for all rivers and canals which are planned using a slightly different classification scheme than the GQA system called the Rivers Ecosystem (RE) classification system (See Appendix 2.3.5). The RE system has more criteria than the GQA system (see table 11) and the classes are calculated by a different statistical mechanism.

Map 20 Shows how the current water quality of rivers and canals compares to planned water qualities according to their long term objectives. Three categories are shown, *compliant*, *marginal failure* and *significant failure*. This categorisation allows problems to be identified and quantified.

Table 13 identifies the river stretches covered by the plan and assigns the appropriate River Ecosystem (RE) classes to them. The column headed "Current Quality" describes the actual quality of the river over the last three years (1994 -1996) in terms of an RE class. The column entitled "Long Term Objective", is the objective beyond the plan period and is a translation of the original river quality objective from the former NWC classification scheme.

Table 13 to show River Quality Objectives and current quality according to the Rivers Ecosystem classification scheme

Abbreviations:-

BOD Biochemical Oxygen Demand
DO Dissolved Oxygen
RQO River Quality Objective
RE Rivers Ecosystem Class

RE1 Water of very good quality
RE2 Water of good quality
RE3 Water of fair quality
RE4 Water of moderate quality
RE5 Water of poor quality
>RE5 Water of bad quality

River	Stretch Description	River Quality Objectives		Comments
		Current Quality (1996)	Long Term RQO	
River Tame	Junction of arms, Bescot to Sandwell Park (6km)	RE5	RE5	
River Tame	Sandwell Park to Pack Horse bridge (6km)	RE5	RE5	
River Tame	Pack Horse Bridge, Perry Barr to River Rea (5km)	RE5	RE5	
River Tame	River Rea to Water Orton Bridge (7.5km)	RE4	RE5	
River Tame	Water Orton Bridge to Coleshill STW outfall	RE5	RE5	
River Tame	Coleshill STW to Lea Marston (5km)	RE5	RE5	
River Tame	Lea Marston to Coton Bridge (1.2km)	RE5	RE4	Failure on BOD & Ammonia
River Tame	Coton Bridge to Kingsbury Brook (2.3km)	RE5	RE4	Failure on BOD, DO & Ammonia
River Tame (W'hampton arm)	A41 Stow Heath to Waddens Brook (5.5km)	RE4	RE4	
River Tame (W'hampton arm)	Waddens Brook to Westacre, Willenhall	RE4	RE4	
River Tame (W'hampton arm)	Westacre, Willenhall to Ford Brook (3.7km)	RE5	RE5	
River Tame (W'hampton arm)	Ford Brook to Oldbury arm Bescot (0.5km)	RE5	RE5	
River Tame (Oldbury arm)	Ashes Road to downstream Union Road (5km)	RE5	RE5	
River Tame (Oldbury arm)	Downstream Union Road to Eagle Lane, Tipton (2km)	RE5	RE5	

Appendix 3 - State of the Local Environment

River	Stretch Description	River Quality Objectives		Comments
		Current Quality (1996)	Long Term RQO	
River Tame (Oldbury arm)	Tipton to Wolverhampton arm, Bescot (4.4km)	RE4	RE5	Possible upgrade to long term RQO of RE4
Waddens Brook	Wednesfield to Wolverhampton arm (2km)	RE5	RE5	
Darlaston Brook	Coseley to Wolverhampton arm (6km)	RE4	RE5	Possible upgrade to long term RQO of RE4
Sneyd Brook	Pouk Hill to W'hampton arm (1.5km)	RE5	RE5	
Groveland Brook	Tividale Road to Oldbury arm (1.2km)	>RE5	RE5	Failure on BOD
Tipton Brook	Castle Mill, Dudley to Swan Brook (2.5km)	>RE5	RE5	Failure on BOD
Tipton Brook	Swan Brook to Oldbury arm (1.4km)	>RE5	RE5	Failure on BOD
Swan Brook	Woodsetton to Tipton Brook (3km)	RE5	RE5	
Hobnail Brook	Hateley Heath to Oldbury arm (1.1km)	RE5	RE5	
Ford Brook	Walsall Wood STW to Rough Brook (4.1km)	RE5	RE5	
Ford Brook	Rough Brook to Cartbridge Lane, Walsall (0.3km)	RE5	RE5	
Ford Brook	Cartbridge lane Walsall to River Tame (5km)	RE5	RE5	
Stubbers Green Brook	"The Swag" Stubbers Green to Ford Brook (1.5km)	RE5	RE4	Marginal failure on DO
Rough Brook	A4124 road bridge to Slacky Lane Bridge (1.3km)	RE3	RE4	
Rough Brook	Slacky Lane Bridge to Ford Brook (1.7km)	>RE5	RE5	Marginal failure on BOD & Ammonia
Full Brook	A34 road bridge, Walsall to River Tame (2.6km)	RE5	RE4	Marginal failure on BOD
River Rea	Bristol Road South bridge to Longbridge (0.6km)	RE3	RE4	Possible upgrade to long term RQO of RE3
River Rea	Longbridge to West Heath Road, Northfield (2km)	RE4	RE4	

Appendix 3 - State of the Local Environment

River	Stretch Description	River Quality Objectives		Comments
		Current Quality (1996)	Long Term RQO	
River Rea	Northfield to B4217 Cannon Hill (8km)	RE2	RE3	
River Rea	B4217 Cannon Hill to River Tame (9.7km)	RE4	RE4	Marginal failure on BOD
Griffins Brook	Frankley Waterworks to Bournville (5km)	>RE5	RE2	Failure on BOD
Griffins Brook	Bournville to River Rea (1.1km)	RE5	RE2	Failure on BOD
Bourn Brook	Ditch from California to River Rea (5.5km)	RE3	RE2	Failure on BOD
Hockley Brook	Alexandra Road Handsworth to River Rea	>RE5	RE5	Marginal failure on BOD
Dunlop Conduit	Works access road bridge to River Tame (3km)	RE5	RE5	
Plants Brook	Maney to Eachelhurst Road Bridge (4.5km)	RE3	RE2	Failure on BOD
Plants Brook	Eachelhurst Road Bridge to River Tame (2km)	RE4	RE4	
Spring Brook	M42 to Earlswood Reservoir (2km)	RE3	RE4	Possible upgrade to long term RQO of RE3
River Blythe	Earlswood reservoir to Cran Brook (7km)	RE3	RE2	Failure on BOD
River Blythe	Cran Brook to M42 Bridge (4.5km)	RE3	RE2	Failure on BOD & DO
River Blythe	M42 Bridge to Cuttle Brook (6km)	RE2	RE2	
River Blythe	Cuttle Brook to Eastcote Brook (6.7km)	RE3	RE2	Marginal failure on BOD
River Blythe	Eastcote Brook to Horn Brook (2.5km)	RE3	RE2	Marginal failure on BOD & Ammonia
River Blythe	Horn Brook to Blythe Bridge (15km)	RE2	RE2	
River Blythe	Blythe Bridge to River Tame (3km)	RE2	RE2	
Cuttle Brook	A41 road bridge to River Blythe (2km)	RE2	RE2	

Appendix 3 - State of the Local Environment

River	Stretch Description	River Quality Objectives		Comments
		Current Quality (1996)	Long Term RQO	
Temple Balsall Brook	Upstream Honiley STW To River Blythe (3km)	RE2	RE2	
Eastcote Brook	Barston STW to River Blythe (2.5km)	RE5	RE4	Failure on BOD, DO & Ammonia
Horn Brook	Meriden STW to River Blythe (3.1km)	RE2	RE3	
River Cole	Houndsfield Lane Wythall to Majors Green (1km)	RE4	RE2	Marginal failure on DO
River Cole	Majors Green to Trittiford Mill Park (3km)	RE3	RE2	Marginal failure on BOD & DO
River Cole	Trittiford Mill Park to Stratford Road (2.5km)	RE3	RE3	
River Cole	Stratford Road to A41 Warwick Road Greet (1km)	RE3	RE4	Possible upgrade to long term RQO of RE3
River Cole	Greet to 100m downstream Haybarnes Bridge (1km)	RE4	RE4	
River Cole	Haybarnes Bridge to Stechford Bridge (3km)	RE4	RE4	
River Cole	Stechford Bridge to River Blythe (7.5km)	RE3	RE3	
Hatchford Brook	Bell Lane to River Cole (2km)	RE5	RE3	Failure on BOD
River Bourne	Spring Hill to B4098 road bridge (1.9km)	RE2	RE2	
River Bourne	B4098 road bridge to Whitacre Brook (4.5km)	RE2	RE2	
River Bourne	Whitacre Brook to upstream Shustoke Reservoir (1.5km)	RE2	RE2	
River Bourne	Upstream Shustoke Reservoir to River Tame	RE3	RE2	Marginal failure on BOD
Didgeley Brook	B4102 Fillongley to River Bourne (2km)	RE3	RE2	Marginal failure on BOD
Whitacre Brook	Footbridge at Hall Farm to River Bourne (1.7km)	RE2	RE2	
Dog Lane Brook	Dog Lane to River Tame (2.5km)	RE2	RE2	

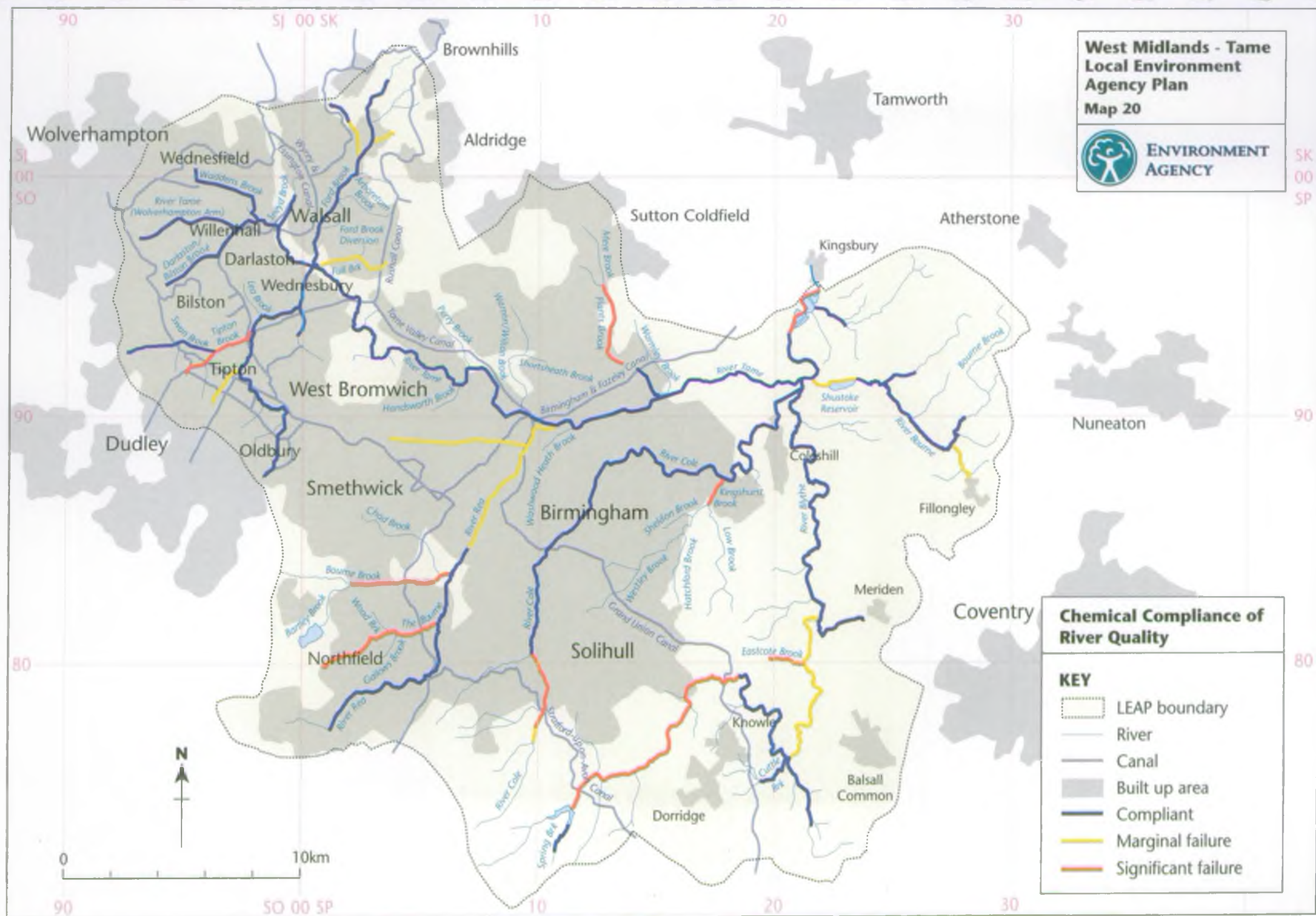
Appendix 3 - State of the Local Environment

Canal	Stretch Description	River Quality Objectives		Comments
		Current Quality (1996)	Long Term RQO	
Grand Union Canal	Camp Hill to Bir & Fazeley Canal (48km)	RE5	RE4	Marginal failure on BOD
Birmingham & Fazeley Canal	Fazeley to Minworth (12km)	RE3	RE3	
Birmingham & Fazeley Canal	Minworth to Salford Jct (7km)	RE4	RE4	
Birmingham & Fazeley Canal	Salford Jct to Farmers Br. (5.2km)	RE4	RE5	
Birmingham & Wolverhampton	Worcester Bar to Smethwick Jct (3.9km)	RE4	RE5	
Birmingham Level	Smethwick Jct to Galton Tunnel (1.1km)	RE5	RE5	
Birmingham Level	Galton Tun. to Walsall Canal (3km)	RE5	RE5	
Birmingham Level	Walsall Canal to Factory Locks (4km)	RE5	RE5	
Wolverhampton Level	Smethwick Jct to Summit Tun. (2km)	RE5	RE5	
Wolverhampton Level	Summit Tun. to Seven Stars Road (2.1km)	RE5	RE5	
Wolverhampton Level	Seven Stars Road to Tipton (6km)	RE4	RE5	
Birmingham & Wolverhampton	Tipton to Staffs and Worc Canal (7km)	RE4	RE4	
Oozells Street Loop	St Vincent St to Energy Centre (0.5km)	RE5	RE4	Marginal failure on BOD
Icknield Port Loop	Icknield Sq to Wiggin St (0.4km)	RE4	RE4	
Soho Loop	Cop St to Clinton St (1.9km)	RE5	RE4	Failure on BOD
Gower Branch Canal	Birmingham Level to Wolverhampton Level	RE5	RE5	
Titford Canal	Wolverhampton Level to Causeway Green (2.8km)	RE5	RE4	Failure on BOD & DO
Wryley & Essington Canal	Horsley Fields to Walsall Canal (12.3km)	RE5	RE4	Marginal failure on DO

Appendix 3 - State of the Local Environment

Canal	Stretch Description	River Quality Objectives		Comments
		Current Quality (1996)	Long Term RQO	
Wryley & Essington Canal	Walsall Canal to Anglesey Branch (12.8km)	RE3	RE2	Marginal failure on BOD & DO
Anglesey Branch Canal	Chasewater to Wryley & Essington (2.5km)	RE3	RE2	Failure on BOD
Daw End Branch Canal	Wyrley & Essington to Longwood Br (8.1km)	RE4	RE2	Failure on BOD
Rushall Canal	Tame Valley Cnl to Longwood Br (4.5km)	RE4	RE2	Failure on BOD
Tame Valley Canal	Walsall Canal to Rushall Canal (5.2km)	RE5	RE2	Failures on BOD, DO & Ammonia
Tame Valley Canal	Rushall Canal to Tame Valley (4km)	RE5	RE2	Failure on BOD
Tame Valley Canal	Tame Valley to Salford Junction (5.2km)	RE4	RE2	Failure on BOD & Ammonia
Walsall Canal	Wryley & Essington to Anson Branch (4km)	RE4	RE4	
Walsall Canal	Anson Branch to Moxley (4.3km)	RE5	RE4	Failure on BOD
Walsall Canal	Moxley to Tame Valley Canal (2.2km)	>RE5	RE4	Failure on BOD & DO
Walsall Canal	Tame Valley Canal to Pudding Lane (3.3km)	>RE5	RE4	Failure on BOD, DO & Ammonia
Anson Branch Canal	Park Hill to Walsall Canal (2.3km)	>RE5	RE5	Marginal failure on BOD
Ridgeacre Branch Canal	Black Lane to Walsall Canal (2.3km)	>RE5	RE4	Failure on BOD
Worcester & Birmingham Canal	A38 to Stratford Canal (3.8km)	RE4	RE4	
Stratford on Avon Canal	Worcester & Birmingham Canal to Ilshaw Heath	RE4	RE4	
Stratford on Avon Canal	Ilshaw Heath to Lapworth (5.2km)	RE5	RE2	Failure on BOD

See Issues 4, 6, 8, 10, 11 & 12.



Freshwater Fisheries Directive

The Directive sets out water quality criteria for the protection of freshwater fisheries as previously designated. Of those sites designated in the Area The Grand Union canal - Knowle to Camp Hill Bottom Lock failed to comply with these criteria. This stretch of the canal failed the Directives limit for dissolved oxygen. The problem is believed to be due to the effects of eutrophication which causes large swings in the level of dissolved oxygen during the spring and summer months. It is a common water quality problem affecting canals in the Area.

Surface Water Abstraction Directive (SWAD)/Nitrate Directive

There are two (SWAD) Directives which are both concerned to protect public health when surface waters are used as sources of potable supply. One sets water quality criteria which are to be complied with at the water treatment works and the other is concerned with analytical methods. Whitacre Water Treatment Works abstracts water from the River Blythe and the River Bourne. The Directives limit for nitrate before treatment was breached in 1996. The failure could have been from the River Bourne or the River Blythe. The two rivers have been proposed as Nitrate Vulnerable Zones (NVZ) under the EC Nitrates Directive, reports have been compiled and a decision is awaited from ADAS. If accepted as NVZs limits on the amount of nitrate fertilizer applied to land will come into force to protect potable supplies.

Dangerous Substances Directive

Dangerous substances relate to a wide range of materials that are harmful to the aquatic environment, including heavy metals, pesticides and organic solvents. The Directive sets a framework for the elimination or reduction of pollution of inland, coastal and territorial waters. The annex has two lists, List I and List II. List I, sometimes called the black list, are substances selected on the basis of their toxicity, persistence and bioaccumulation. List II (the grey list) have a deleterious effect and include zinc, copper and lead compounds, cyanide and ammonia.

Consents are not granted to allow discharge of List I substances, but may be granted for List II substances at levels so that the river downstream will comply with very tight Environmental Quality Standards (EQS). Monitoring points are located on rivers and canals downstream of known discharge points. Toxic metal standards are related to the hardness of water and the sensitivity of the aquatic life being protected.

Table 14 - Failures of the EC Dangerous Substance Directive in 1996

River	Stretch	Reason
River Tame	Wolverhampton Arm at Bescot	Failed because of high copper and nickel levels from known contaminated land sites.
River Tame	Oldbury Arm Downstream of Brassways	Failed because of high zinc and iron levels, at this time the cause is not known.
River Tame	Downstream of Minworth STW. This is a re-recording of the upstream failure and reflects a change in water hardness associated with the STW.	Failed because of high copper levels believed to be from contaminated land upstream.
Ford Brook	Downstream of Potters Clay	pH failure because of localised construction work. Is not expected to reoccur.

Appendix 3 - State of the Local Environment

River	Stretch	Reason
Sneyd Brook	Anson Bridge	Failed because of high iron levels, action is being taken to resolve this problem.
Walsall canal	Pleck Road	Failed because of high zinc and iron levels associated with canal improvement work during the removal of silt.

Water Pollution Incidents

Any substantiated pollution incident can fall into one of three categories.

Category 1

A **major** incident involving one or more of the following:-

- Potential or actual persistent effect on water quality or aquatic life greater than 1 week.
- Closure of potable water, industrial or agricultural abstraction necessary.
- Extensive fish kill (more than 100 fish).
- Excessive breaches of consent conditions and environmental impact.
- Extensive remedial measures necessary.
- Major effect on amenity value.
- Effect on conservation value.

Category 2

A **significant** pollution which involves one or more of the following:-

- Notification to abstractors necessary.
- Significant fish kill (10 - 100 fish).
- Readily observable effect on invertebrate life.
- Water judged unfit for stock.
- Bed of watercourse contaminated.
- Amenity value to the public, owners or users reduced.

Category 3

A **minor** pollution which involves one or more of the following:-

- Notification of abstractors not necessary.
- Fish kill (<10).
- No observable effect on invertebrate life.
- Suitable for stock watering.
- Stream bed locally contaminated (at discharge point).
- Minimum environmental impact.

Total Number of Incidents

There were 592 pollution incidents reported in the catchment in 1996 and these are shown in Table 15. The largest number of incidents took place in the upper reaches of the River Tame which serves most of the Black Country and the north west of Birmingham. However, the more rural River Blythe suffered 75 pollution incidents, only 13 less than the River Cole, and 16 less than the River Rea, both of which have a much more heavily urbanised catchment.

Appendix 3 - State of the Local Environment

The main types of pollution were oil and sewage, both of which amounted to over 150 incidents. Over 89% of the incidents reported were of a minor nature.

Not included in the table is the pollution from urban run-off which occurred after a summer storm in June 1996. Although the source of the pollution was in the LEAP catchment, the main pollution was recorded downstream of the lakes.

Table 15 - Pollution Incidents in 1996

Sub-catchment	Oil			Sewage			Chemical			Organic Waste			Other			Totals
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
River Tame to River Rea	-	16	75	-	5	36	1	9	38	-	1	8	1	4	70	264
Tame from Rea to Blythe	-	1	15	1	6	14	-	1	5	-	-	2	-	-	16	61
River Rea	-	1	16	-	-	39	-	1	9	-	-	1	-	-	24	91
River Blythe	-	-	18	2	3	24	1	-	10	1	-	3	-	-	13	75
River Cole	-	-	22	-	-	27	1	5	8	-	-	-	-	1	24	88
River Bourne	-	1	1	-	-	5	-	-	2	-	-	3	-	-	1	13
TOTAL	-	19	147	3	14	145	3	16	72	1	1	17	1	5	148	592

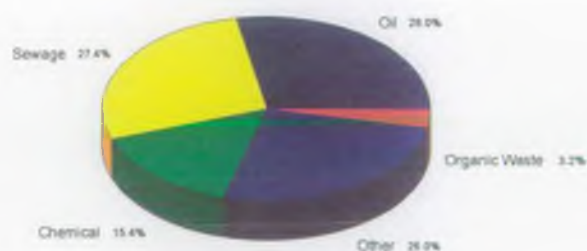


Figure 14 - Proportion of total pollution incidents in the West Midlands - Tame area 1996



23 Contaminated land drainage at Bentley Mill Way, Walsall

3.3.2 Groundwater Quality

The quality of groundwater varies across the catchment dependent upon the type of aquifer and the use, and former use of the land. In the Black Country, natural minerals in the rocks dissolve in water to give elevated concentrations of metals and dissolved solids. Industrial activity has had its effect throughout the urban West Midlands reducing water quality through polluting discharges, waste disposal and poor site management. In the Triassic Sandstones under Birmingham, 80% of boreholes show evidence of solvent and heavy metal contamination in groundwater derived from historical industrial practices.

3.3.3 Surface Water Resources

The natural flow regime of a river can be affected by:

- Abstractions
- Discharges
- Reservoirs and Impoundments
- Land Use Changes
- Flood defence and land drainage works

Within the West Midlands - Tame LEAP area there are currently 82 surface water abstraction licences, tied to a prescribed flow and 156 groundwater licences, and 2 licences for both surface and groundwater.

Across the catchment there are in general sufficient resources to grant new abstraction licences (both surface water and groundwater) subject to there being no local derogation problems. To ensure the protection of existing licences and the aquatic environment, new surface water licences resulting in a net loss, are subject to flow restriction conditions. New groundwater licences, with the exception of the Meriden and Sutton areas, can be granted subject to local constraints.

At the present time the Meriden and Sutton aquifers are closed for further groundwater development. The resources of the Meriden aquifer are extremely limited, the aquifer supplies baseflow to the River Blythe. Whilst no new licences can be considered in the Sutton aquifer until the appraisal of the two South Staffs Public Water Supply sources near Sutton Park is completed.

Most of the abstractions within the West Midlands conurbation are for industrial purposes, although there are several abstractions for irrigation of golf courses such as Edgbaston and Great Barr Golf Clubs. There is however, potential for further groundwater development from the Birmingham aquifer (issue 13). The main constraint on the use of this resources is the unknown quality of water. Severn Trent Water have recently obtained licences for boreholes at Edgbaston and Short Heath. The possibility of utilising these sources for public water supply is currently being evaluated by the company.

The Rivers Blythe, Cole and Bourne in the south east area of the West Midlands - Tame flow mainly through rural areas and abstraction reflects this, with the majority being for agricultural (mainly spray irrigation) purposes. Towards the bottom end of the Blythe and the Bourne water is abstracted for public supply by Severn Trent Water. This water is transferred into Whitacre and Shustoke reservoirs before entering the supply system. Severn Trent have recently agreed for this licence to be derogated, so that some new licences can be granted upstream.

Throughout the area a major use of surface water is for canal operation and impoundments and abstractions are made at a number of locations for this purpose. Under present legislation such impoundments and abstractions do not require a licence from the Agency. Several of the reservoirs in the area are owned and operated by British Waterways to maintain canal water levels. The canals themselves, however, support abstractions and British Waterways apply for licences in the normal way.

All new abstractions resulting in a net loss of resources are subject to a flow restriction. This means that when flows fall below the threshold, abstraction must cease or reduce depending on the particular condition on the licence. These thresholds or prescribed flows protect watercourses from drying up or reducing to such a level that fauna or flora are adversely affected.

Appendix 3 - State of the Local Environment

The following summaries the existing surface water licensing policies the Agency uses in this LEAP area when dealing with new applications.

All new licences (for abstractions greater than 20m³/d) are issued subject to a prescribed flow level based on the flow in the River Trent at Colwick. If flows in the River Trent fall below the prescribed flow then abstraction must cease.

In addition licences which abstract from the following rivers will also include conditions which prohibit abstraction when flow falls below a particular threshold restriction at an appropriate gauging station.

- Abstractions from Bourne Brook are currently subject to a Tertiary Threshold level at the Hints Hall Gauging Station.
- Abstractions from River Blythe are currently subject to a Primary Threshold level at the Whitacre Gauging Station.
- Abstractions from River Cole are currently subject to a Primary Threshold level at the Coleshill (Bacon's End) Gauging Station.

Where it is not appropriate to link a licence to a threshold level at a nearby gauging station, local prescribed flows are applied to licences. This usually applies to small catchments or minor tributaries.

3.3.4 Groundwater Resources

The aquifers of the Midlands Regions are divided into a number of areas or groundwater units, for the purpose of assessing resources and relating those to licensed abstractions.

The Agency categorises these groundwater units (aquifers) on the basis of their available resources and the environmental needs of wetlands and watercourses to sustain water levels during periods of dry weather.

The classification is:-

- A No resource available.
- B Special study required, with a presumption against large licences.
- C Special study required, but no presumption.
- D Resources available.

Generally in groundwater units where resources are available further licensing of new abstractions may be possible, but the objective is to ensure this is not beyond a sustainable limit for the environment.

In addition to the above classifications the availability of groundwater resources is subject to other constraints such as local derogation, local aquifer properties and groundwater quality. When an application is made the Agency will not guarantee the groundwater quality nor the quantity abstracted from a source.

The current state of the main aquifer units within the catchment is summarised below. The boundaries of groundwater units are defined on geological and hydrogeological criteria and do not always coincide with surface water catchment boundaries. This is true of a number of aquifer units within the Birmingham Tame catchment area, but for simplicity the comments which follow relate to the general policy for each unit as whole. The groundwater resources, the licensed abstractions and the actual abstractions, for each of the groundwater units contained completely within this area are tabulated at the end of this section.

Sutton (F5.3) - Category A

In theory, there are resources available for licensing within this unit, with current licences totalling only 6.13MI/d from an assessed recharge of 17.2MI/d. However, 5MI/d of the licensed volume relates to two public supply sources (Wheatmoor Farm and St George's Barracks). The licences were issued in 1993 and time limited for 7 years in order to appraise the effect of long term pumping on groundwater levels in the vicinity of Sutton Park SSSI. Until this appraisal has been concluded, no further licences can be considered.

Birmingham (F5.4) - Category D

This unit is over licensed, with licensed volumes exceeding the assessed recharge by 11%. However, the uptake of these licences is low (35%), largely due to reduced abstractions for industrial processes. As a consequence, groundwater levels beneath the city have risen significantly over the past 20 years, and this situation is enhanced by leakage from water mains and sewers. Yields from this aquifer are invariably good but the quality is extremely variable with some contamination of groundwaters resulting from industrial processes.

Meriden (5.5) - Category A

Little is known about the yields and groundwater quality in this small unit. The unit does supply a limited amount of baseflow to the tributaries of the River Blythe, which is a public water supply river and must be protected. Therefore no new licences can be considered no matter how small.

Longbridge (F8.8) - Category D

This small area has a relatively low long term recharge rate of 5.47MI/d. Less than 40% of this is currently licensed, and in principle there are no objections to new licence applications. However, little is known about borehole yields or groundwater quality.

Elsewhere in the Catchment

Where Minor Carboniferous and Permo-Carboniferous aquifers such as Arley D0.1, West Bromwich D3.1, Cannock D4.2 and Meriden D9.4 are encountered, each application for groundwater abstraction is considered on a case by case base. The presumption is that provided there are no local derogations or environmental concerns new licences are permitted

Table 16 - Groundwater Resource Availability in the West Midlands - Tame Area

Groundwater Unit No	Groundwater Unit Name	Groundwater Resources (MI/d)	Abstractions 1996 (MI/d)	
			Licensed	Actual
Sherwood Sandstones				
F5.3	Sutton	17.20	6.13	3.57
F5.4	Birmingham	34.98	38.88	12.30
F5.5	Meriden	2.22	0.01	0.01
F8.8	Longbridge	5.47	2.15	1.85
Carboniferous Strata				
D0.1	Arley	-	0.40	0.34
D4.2 (part of)	Cannock	-	5.92	3.44
D5.1	West Bromwich	-	2.25	0.49
Permo-carboniferous				
D9.4	Meriden	21.70	5.79	5.36

3.3.5 Flood Defences

River Tame

The upper reaches of the River Tame run through the West Midlands conurbation and their natural hydrological and hydraulic features were already modified in the pre-industrial revolution days by well over 50 water mill sites. The river was drastically changed by the Industrial Revolution and subsequent urbanisation. This has resulted in a very rapid run-off response to rainfall and considerable encroachment into the floodplain by development with consequent reduction in the rivers' natural flood storage capacity.

Appendix 3 - State of the Local Environment

Serious flooding in 1969 highlighted the inadequacy of land drainage in the conurbation and promoted the setting up of a working party consisting of local authorities, the Trent River Authority and the Ministry of Agriculture, Fisheries and Food. The working party reviewed the situation and formulated a programme of improvement works for the middle and upper reaches of the river.

The working party reported in 1971, setting out a scheme for enlarging the river system substantially, to convey along the channel all of the maximum flood flows arising from a 1 in 50 year storm event. Works commenced quickly following the 1971 Report, but in 1977 the scheme was revised by Severn Trent Water Authority (as successor to the Trent River Authority) with agreement by MAFF. This introduced the concept of retaining a part of the flood flows in a series of specially created storage lakes on the River Tame. The introduction of storage meant that smaller channels were required which reduced the impact of the works on the environment, achieved a considerable saving in cost, and created opportunities for the development of water related environmental and leisure interests.

The revised proposals for the Middle Tame and Oldbury Arm required the construction of five flood balancing areas and approximately 18 miles of river channel improvement, including modifications to many of the 26 road, 9 canal and 14 railway crossings along the route. Construction work on these two reaches of the river started in 1978. The last contract was completed in 1991 by the National Rivers Authority as successor to Severn Trent Water Authority. The current cost of the completed works is £20 million.

River Rea

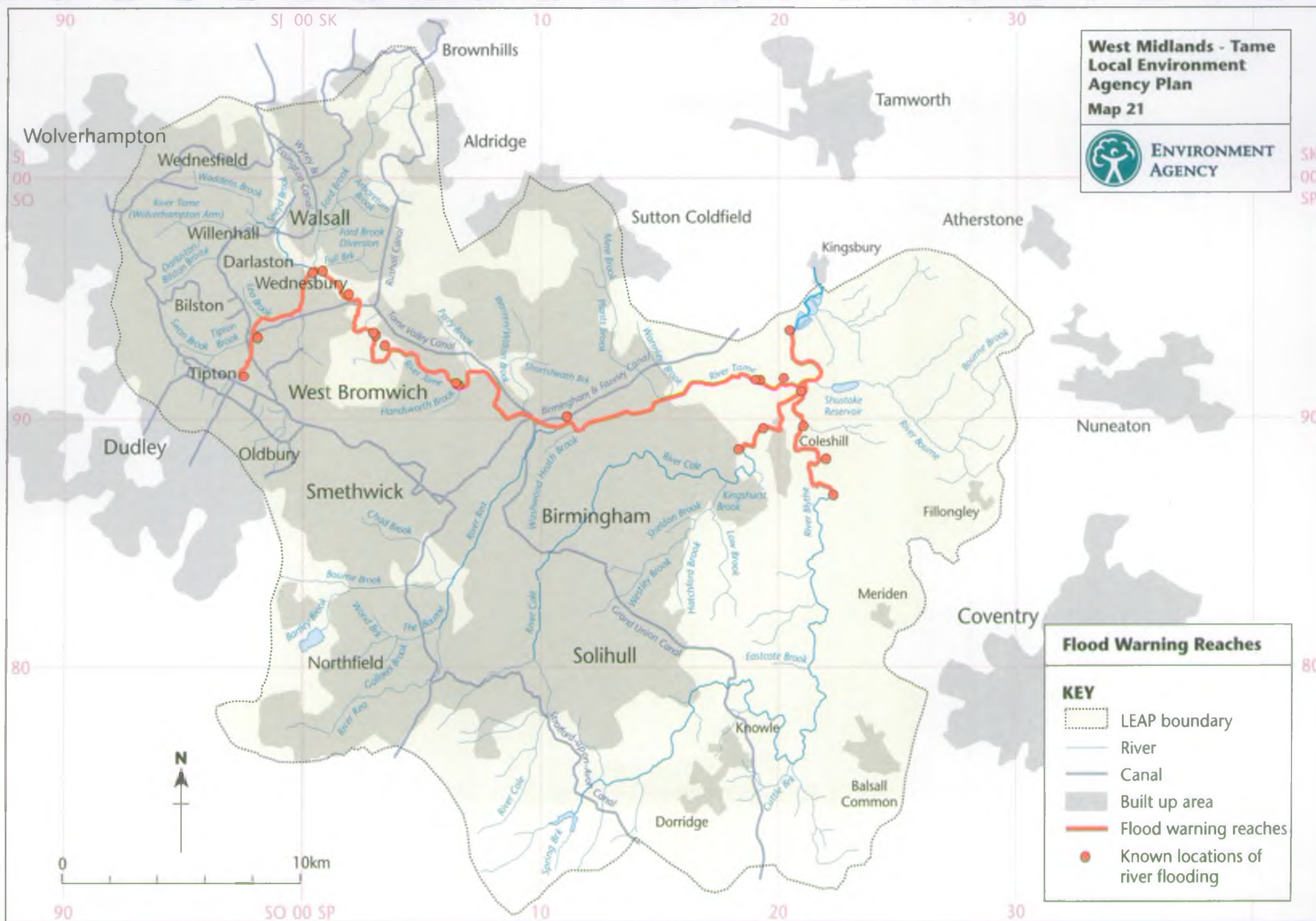
The Rea is the major watercourse draining the central and south western Birmingham area. It is extensively urbanised but has large tracts of natural catchment open space areas at Bourneville and Edgbaston where it skirts the famous Edgbaston Cricket Ground. Birmingham Council completed in the early 1990's flood alleviation works in the Stirchley area whilst in the 1930's the Council implemented a flood alleviation of major proportions to "put an end to flooding for ever" on the Rea. A huge brick lined rectangular open channel was constructed from the River Tame confluence at Nechells to Calthorpe Park.

River Blythe

The subcatchment is predominantly rural and has an altitude range of 70 to 160 metres. Urbanisation and motorway run-off in the Solihull area have resulted in the principal watercourses responding very rapidly to rainfall, with artificially increased rates of flow. There are a number of surface water balancing systems which help smooth out the flashy response but the overall effect of the present and proposed urbanisation is to significantly alter the flow regime of the river at the upper end of the subcatchment. The natural river valley floor forming the floodplain is generally unaltered with relatively few occurrences of building encroachment. A capital scheme for agricultural improvement was carried out on the River Blythe between Castle Farm and the M6 and between Barston and Temple Balsall in the 1980's. This scheme on the Blythe which is a SSSI was a pioneer scheme in the country in tailoring the traditional land drainage scheme at the time to be sympathetic with nature conservation requirements.

River Cole

This subcatchment is extensively urbanised. The Cole drains the eastern area of the Birmingham/Solihull conurbation. The river and its principal tributaries in the Birmingham area of the West Midlands Conurbation, with numerous surface water piped connections, respond very rapidly to rainfall with artificially increased rates of flow. There have been specific localised developments in the Cole floodplain but generally a corridor in the conurbation has been left, preserving the natural floodplain. There is a small amount of artificial surface water balancing throughout the subcatchment. The principal tributary is the Hatchford Brook which drains an area including Birmingham International Airport. Run-off from the M42 drains to the head of the subcatchment.



Appendix 3 - State of the Local Environment

River Bourne

This subcatchment is essentially natural with only a very limited amount of urban development in the form of small village settlements. There is little encroachment into the floodplain with the exception of the off-line Shustoke Reservoir immediately upstream of the confluence with the Tame. Discharge to the subcatchment due to rainfall is increased by run-off from the M6 which drains to the Didgley Brook. Mining subsidence between Furnace End and the railway upstream of Shustoke Reservoir has marginally lowered the bed of the watercourse in this location.

Flooding Problems

Map 21 shows the locations of flooding problems caused by river flooding. The table below indicates, by local authority, the number of riverine flooding problems split between main river, where the Agency is empowered to undertake remedial works, and ordinary watercourse where the local authority has similar powers.



24 Coleshill Flood alleviation scheme

Table 17 - Flooding Problems in the West Midlands - Tame Area (1990 Survey)

Local Authority	Total	Main Rivers	Ordinary Watercourses
North Warwickshire Borough Council	9	2	7
Birmingham City Council	13	1	14
Sandwell Metropolitan Borough Council	7	-	7
Solihull Metropolitan Borough Council	4	2	2

**West Midlands - Tame
Local Environment
Agency Plan
Map 22**

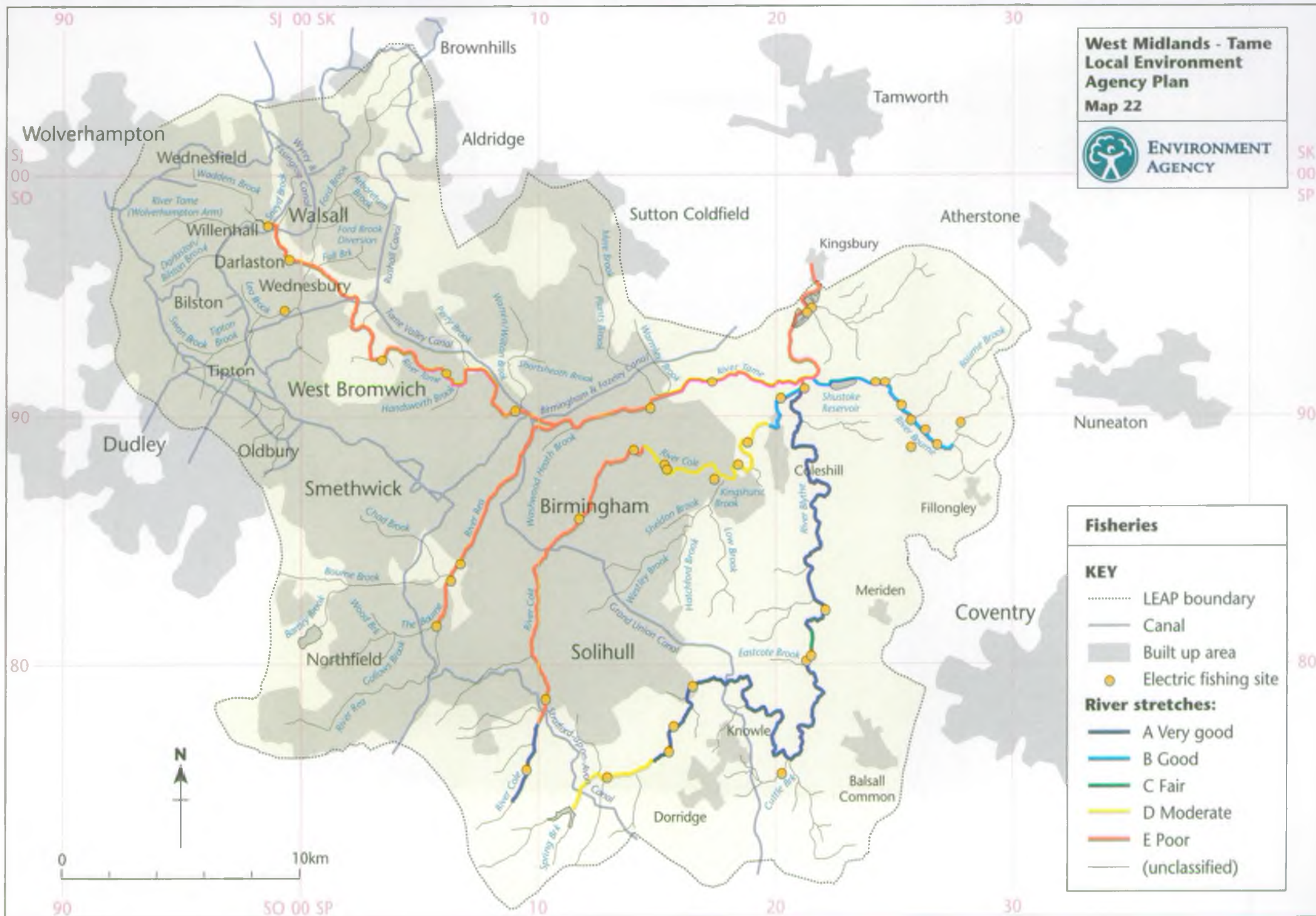


**ENVIRONMENT
AGENCY**

Fisheries

KEY

- LEAP boundary
- Canal
- Built up area
- Electric fishing site
- River stretches:**
- A Very good
- B Good
- C Fair
- D Moderate
- E Poor
- (unclassified)



3.4 Fisheries Wildlife and Heritage

3.4.1 Fisheries

The Agency has duties to maintain, improve and develop fisheries. Fish populations are affected by the quality and quantity of water as well as by the availability of suitable physical habitat features. Fish are therefore important indicators of the overall health of the river.

River Tame

Fish populations in the Upper Tame remain extremely sparse. Although minor species, particularly sticklebacks, are present, or even abundant, locally, major species have been unable to establish sustainable populations. Periodically small communities of coarse fish are found in the river, originating from either the River Blythe or from off-line balancing lakes. They have a transient existence, being susceptible to sudden deteriorations in water quality, often following summer storms, and to the flashy nature of the flow regime, from which the poor instream habitat affords little protection.

The severe local storm in July 1995 caused extensive fish mortalities throughout the River Tame but in particular destroyed the population of roach which had developed in the vicinity of Forge Mill Lane. Since then a small number of roach and gudgeon, almost certainly derived from the Blythe, have been recorded at Water Orton but they represent the only accumulation of coarse fish in the Upper Tame evident during the 1997 surveys.

It is difficult to envisage the elimination of extreme fluctuations in water quality in view of the nature of the catchment. The best hope for future development of fish populations lies in improvements in instream habitats and in particular the provision of off-line refuges as "safe havens" in which fish could escape from intermittent plugs of polluted water. Such refuges would also provide the "seed" populations for subsequent recolonisation of the river.

The River Rea suffers similar and probably more exaggerated problems since large sections are either canalised or culverted. The only fish stocks comprise minor species and occasional gudgeon.

River Cole

The Cole is predominantly an urban river and experiences variable water quality as a result of sewage and industrial discharges and surface water run-off. Consequently fish distribution is restricted and largely confined to the lower reaches downstream of Babbs Mill Lake and the headwaters which extend south of the conurbation. The lake contributes some stocks to the river via its overflow but these populations, mostly roach, perch and gudgeon are generally unstable and fluctuate widely. Sustainable populations of dace, chub and roach have been present in the vicinity of Coleshill, however, for several decades. The storm in July 1995 was responsible for completely destroying these stocks, leaving the lower reaches fishless. Recent surveys provide good evidence of a rapid repopulation by migration from the River Blythe. There is evidence also of a recent release of juvenile roach to the river, probably from Babb's Mill Lake, and these fish have become widely distributed through the lower reaches. As a result fish biomass has increased slightly but perceptibly although this change marks a small, natural development in the chub population. Upstream movement has long been prevented by two weirs at Cook's Lane and Moorend Avenue. Cooks Lane weir has now been overcome by conversion to a "rock chute" but the gauging weir further upstream remains a barrier.

The headwaters of the river enjoy good water quality conditions but fish stocks have remained impoverished because of restricted access through the polluted middle reaches. In recent years the fishery status of the upper reaches has been improved by restocking with dace, chub and brown trout by the Environment Agency.

River Blythe

Skirting the conurbation, the Blythe is rural in character and water quality is generally high. The river supports prolific populations of coarse fish throughout most of its length, the dominant species being dace and chub. Over parts of the middle reaches, particularly within the Packington Estate, coarse fish are cropped periodically to facilitate the operation of put and take trout fisheries which involve the annual introduction of both rainbow and, increasingly, brown trout.

Appendix 3 - State of the Local Environment

One major effluent, from Barston STW, enters the river via the Eastcote Brook and the resultant deterioration in water quality is reflected in a significant decline in fish density and biomass. Prior to 1994 the upstream distribution of fish stocks was restricted by the impassable weir at Brueton Park. This has now been converted to a "rock chute" pass and recent investigations reveal a marked improvement in fishery status in the upper reaches.

Abstraction to Whitacre WTW downstream of Blythe Bridge causes a reduction in flow as far as the Cole confluence. These conditions favour the presence of slow and still water species such as bream, tench and carp producing a significant increase in diversity.

Major sections of the Blythe, between Earlswood Lakes and the Eastcote Brook and between the Horn Brook and the Cole confluence are designated cyprinid fisheries under the EC Directive (78/659/EEC).

River Bourne

The Bourne is formed from a large number of small headwater tributaries and flows entirely through a rural landscape. Available fisheries habitat is restricted by its small size and by an unstable sandy bed. Fish stocks have long been extremely sparse and largely confined to downstream of Furnace End. Towards the Tame confluence water levels can fluctuate widely as a result of abstraction to Shustoke Reservoir and recolonisation from the Tame is prevented by a series of weirs. In order to improve the fisheries status a programme of restocking was instigated by the NRA (and continued by the Agency). Initial efforts failed to establish any sustainable populations but a more concerted and extensive programme implemented in 1994 has produced a significant improvement in abundance and diversity throughout a large proportion of the river.

Canals

Almost all of the network of canals in the area support coarse fish to a greater or lesser extent and everywhere roach are the dominant species. Some sections, particularly the Tame Valley Canal, Rushall Canal and the Soho Loop of the Birmingham Canal are intensively fished and provide a wide range of still water species including carp and tench.

Sections of the Wyrley and Essington Canal, Grand Union Canal and Stratford Canal and the whole of the Rushall Canal are designated as cyprinid fishery under the EC Directive.

Classification of Fisheries

The Environment Agency scheme allows river sites to be classified on the basis of the density and diversity of their fisheries, as indicated by electric fishing. The classification may be expressed in absolute terms ie against all other fisheries in the database or in relative terms, taking into account differences in river width. Large rivers cannot be accurately classified, because of difficulties in electric fishing a large river.

All electric fishing sites within the LEAP area have been classified and the relative values averaged over appropriate river reaches. The results are shown in Map 22 and clearly illustrate the dismal fishery status of the Upper Tame and Rea. Also evident is the impoverished state of the Cole fishery with the obvious exception of the two extremities. The Blythe and Bourne in stark contrast support excellent fisheries, the Blythe status being long established while the Bourne has witnessed a remarkable recovery as a result of restocking. The classification process highlights effectively the impact of Barston STW effluent on the middle reaches of the Blythe and the isolation of the headwaters of the Bourne above the weir at Fillongley Lodge.

Barriers to Migration

The overflow weirs from Lea Marston present an effective barrier to fish moving from the Lower Tame into the upper reaches. Some of the major obstacles to upstream movement within the catchment have been overcome by conversion to rock chutes for example at Brueton Park on the Blythe, and Cooks Lane on the Cole. However the gauging weir at Moored Avenue cannot be changed in this way and remains problematic. Significant barriers exist on the Bourne including a gauging weir at Shustoke Reservoir and two small but effective weirs on the headwaters of the main river. One of these is at Sandy's Farm and the other upstream of Fillongley Lodge (sluice gates). The failure of fish to transcend the latter has left the extremities apparently poor in terms of fishery status compared with most of the rest of the river.



25 Woodland at Earlswood Lakes

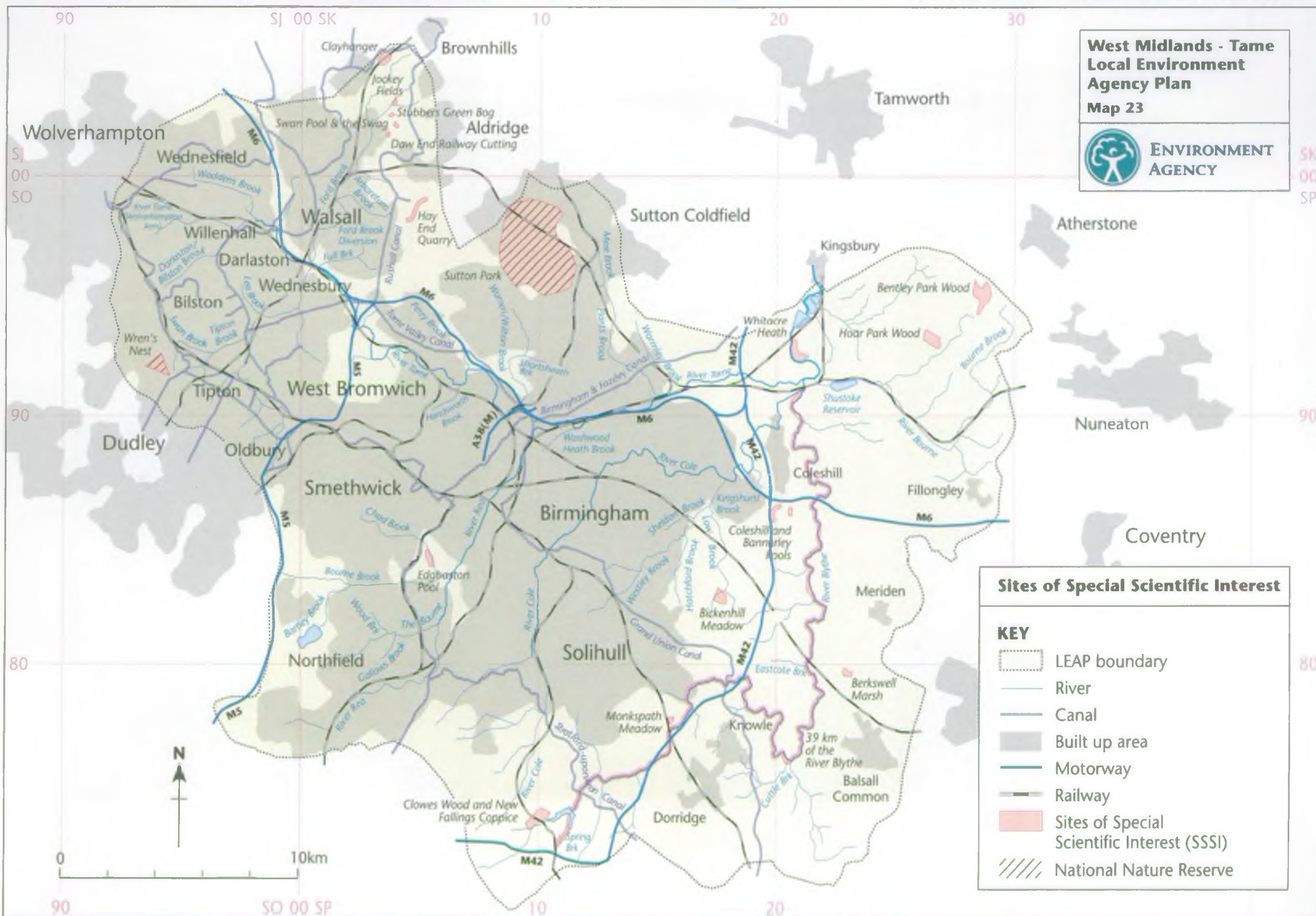
3.4.2 Wildlife

The heavily modified river corridors of some of the urban stretches of watercourse in the area are very hostile to wildlife both because of the artificial nature of the channels and the urban pollution loading. However, the West Midlands - Tame area still contains a number of conservation interests.

There are 18 Sites of Special Scientific Interest (SSSIs) within the West Midlands - Tame LEAP area. Amongst these, the River Blythe is classified as a SSSI for most of its length as a fine example of a lowland river on clay, and Sutton Park SSSI on the north east edge of Birmingham, contains the largest and richest area of ancient woodland, heath and wetland in the West Midlands county area. Both have been identified as needing further protection and this is addressed further in issues 8 and 9.

In addition to the SSSIs there are over 330 Sites of Importance to Nature Conservation (SINCs) of which many are of wetland interest. Sutton Park and Wrens Nest are both National Nature Reserves, Sandwell Valley is a RSPB Reserve, and there are 9 Wildlife Trust Reserves.

Under the Biodiversity Convention the Agency is looking to promote the creation of wetland habitats highlighted by the Biodiversity Steering Group and for which Habitat Action Plans have been developed (see issue 1). In addition, some species listed by the Biodiversity Steering Group occur in the West Midlands - Tame area:-



Otters

It is unlikely that otters will colonise the urban part of the River Tame, although signs of otters have been recorded in the River Blythe. It is possible that this only represents a visit by a single individual, but the River Blythe may in future become a link between the expanding populations on the River Avon (in Warwickshire) and those on the Rivers Sow, Penk and Trent in Staffordshire. Provision of improved habitat for otters on all the most heavily urbanised rivers is therefore desirable. The poor fish populations and high level of human disturbance is likely to limit the future colonisation of the catchment by otters.

Water Voles

Following the survey commissioned by the Environment Agency and carried out by the Urban Wildlife Trust during Summer 1997, water voles are known to be widely distributed within the catchment. They are an important bankside species which is now under threat from predation by mink and loss of habitat. However, the population of water voles in the urban areas of Birmingham and the Black Country does not reflect the dramatic downward trend seen nationally, therefore it is important to maintain this population.

Crayfish

Crayfish are known to occur in parts of the Blythe catchment and in Sutton Park and isolated groups may occur elsewhere. Native (white clawed) crayfish numbers have been devastated in recent years by crayfish plague from introduced species and by competition from these species which are known to be present in the area. Water quality on the River Tame is below that required by crayfish so any populations within the catchment are likely to be isolated.

Great Crested Newts

These are known to occur across the catchment but exact distribution, population and therefore population changes are unknown. Urban development poses threats by destroying breeding ponds and hibernating sites and the introduction of fish leads to breeding failure and thus extinction in the long term.

Black Poplar

There are known to be a small number of black poplar trees in the catchment. This is a very rare species and the pool of genetic material is very small, expansion of the species into the area by planting should be considered.

Invasive Plants

Invasive plants such as Japanese knotweed and Himalayan balsam are reducing biodiversity by pushing out a wide variety of plant species and by undermining river banks and exacerbating erosion.

3.4.3 Heritage

Many sites of archaeological interest have become increasingly recognised as of high public value for education, leisure and recreational purposes, as well as for research. Individual sites can contribute widely to the character and history of an area, and may represent important elements contributing to a sense-of-place and giving a focus to local identity. Archaeological sites, historic buildings and ancient landscapes are by their very nature a unique and non-renewable resource.

The West Midlands region is covered by a network of County based Sites and Monuments Records. These hold information covering the location, status, nature, form condition and history of all known archaeological sites, monuments and findspots, and are continually updated with new information.

There are 30 Scheduled Ancient Monuments in the West Midlands - Tame area, and many more sites of archaeological interest. The area has a rich variety of surviving sites from Stone Age finds to examples of our recent industrial heritage. The river gravels of the Tame have yielded Palaeolithic stone axes and other tools from the Mesolithic and Neolithic periods, (all before about 2500BC), river corridors are often oases of surviving archaeology within an otherwise urban environment (for example medieval earthworks on the River Rea at

Frankley) and often have exceptional survival of organic remains because of waterlogging. Urban open spaces often have archaeological sites of all types and periods, examples include prehistoric burnt mounds and historic landscapes preserved in Sandwell Valley and Sutton Park.

The West Midlands Tame area is of particular note for its industrial heritage, industries in the area included mining, metalworking, processing animal products, brick and tile manufacture and glassmaking. Survey work within the conurbation is helping to identify surviving industrial sites and relict industrial landscapes. The canals of the area are of course major historic landscape features in themselves as they formed the arteries for the development of our internationally important industry in the later post medieval period and individually or collectively they could be regarded as of possibly international importance. Canal structures are generally more robust than most archaeological features and monuments, and as such are more appropriate for development as educational and leisure resources than other sites.

3.5 Recreation

Angling

Angling interest in the riverine environment is clearly related to the current status of fish stocks and the physical size of the rivers. Generally poor and variable water quality and limited instream habitat in the urban rivers Tame and Cole has meant that fish populations are sparse or absent. Consequently fishing activity is practically non-existent. Until recently the river Bourne, though rural in character, held only poor stocks and is too small particularly in the summer to attract much interest. Organised angling activity is confined, therefore, to the river Blythe and most effort is concentrated downstream of the village of Barston. From this point all the water is held in tenancy by clubs or syndicates and provides a mixture of coarse and trout fishing opportunities. Only a limited amount is available on day tickets. Several sections of the upper reaches are stocked annually with trout with an increasing shift in emphasis from rainbow to brown trout.

In contrast there are many still water coarse fisheries throughout the catchment, both within and outside the West Midlands/Birmingham conurbation. A number of urban park pools are operated as day ticket fisheries by the local councils eg at Trittiford Mill, Babbs Mill and Brookvale. Several of the pools within Sutton Park are also available for coarse fishing and the British Waterways feeder reservoirs at Edgbaston and Earlswood are popular day ticket fisheries. Coarse fishing generally predominates and although opportunities are limited there is still water trout fishing at Packington, Maxstoke and at Shustoke Reservoir.

The network of canals which criss-cross the area provide a wealth of angling opportunities for both the casual and competitive fisherman. Within the city of Birmingham fish populations are patchy in distribution but elsewhere there are good stocks dominated everywhere by roach. The canals are particularly suited to match fishing and this is a popular activity. Much of the water is leased to clubs or syndicates but day tickets are widely available.



26 Angling at Sutton Park

Appendix 4 - Organisations consulted prior to the publication of this Report

In July 1997 all unitary, county and district councils in the West Midlands - Tame Plan area were contacted together with other organisations with a known interest in the local environment. Some organisations, those with a number of departments or offices were contacted separately.

This pre-consultation exercise was designed to focus on groups/organisations that could provide information about the area and who may be involved in some of the environmental problems the area faces. Twenty three organisations responded. Overall the comments were supportive of the process and we are grateful for the additional information that was received. Some additional issues and options did arise from the consultation and where appropriate have been incorporated into this report.

List of Organisations contacted

A E Goetze Automotive	Midlands Environment Business Club
Albright and Wilson	Midlands Power
Association of Parish and Town Councils	National Trust
Association of Birmingham Conservation Groups	National Farmers Union
Birmingham Anglers Association	National Association of Boat Owners
Birmingham Heartlands Development Corporation	National Urban Forestry Unit
Birmingham City Council	National Federation of Anglers
Black Country Housing Association Ltd. (Green Futures)	Norman Chamberlain Playing Fields (Project Kingfisher)
Black Country Energy Advice Centre	North Warwickshire Borough Council
Black Country Development Corporation	Packington Estate Enterprises Ltd
British Canoe Union	Railtrack Midlands
British Trust for Conservation Volunteers (BTCV)	Rhone Poulenc Chemicals
British Waterways	Rover Longbridge
British Business Parks Ltd	RSNC
British Waterways	RSPB
British Aluminium Plate (Alcan)	Sandwell Metropolitan Borough Council
British Canoe Union	Severn-Trent Water Ltd
Bromsgrove District Council	Smith Stone & Knight
Brookside Metal Company	Soil Survey and Land Research Centre
Centro	Solihull Metropolitan Borough Council
Confederation of British Industry (CBI) West Midlands	South Staffordshire Water Plc
Council for the Protection of Rural England	SP Tyres
Country Landowners Association (CLA)	Sports Council
Countryside Commission	Stratford upon Avon District Council
Dudley Metropolitan Borough Council	The Forestry Authority
Earlswood and Forshaw Heath Residents Association	The Ramblers Association
Elm Energy and Recycling	Tidbury Green Residents Association
English Heritage	Tidy Britain Group
English Nature	Tyseley Waste Disposal Plant
English Partnerships	Urban Wildlife Trust
Farming and Rural Conservation Association (FRCA)	Walsall Metropolitan Borough Council
Friends of the Earth (Birmingham) Ltd	Warwick District Council
Government Office for the West Midlands	Warwickshire Wildlife Trust
Groundwork Black Country	Warwickshire Farming and Wildlife Advisory Group
Hepworth Minerals and Chemicals	Warwickshire Wildlife Trust
Hereford and Worcester County Council	Warwickshire County Council
Highways Agency	West Midlands Conservancy
Holden Surface Coatings	West Midlands Joint Data Team
IMI Refiners	West Midland Bird Club
Inland Waterways Association	Wm Canning Ltd
Jaguar Cars	Wolverhampton Metropolitan Borough Council
Lucas Yuasa	Wolverhampton Waste Incinerator
Merevale and Blythe Estates	
Microponents	
Midland Expressway Limited	

Appendix 4 - Organisations consulted prior to the publication of this Report

West Midlands - Tame LEAP responses received from;

Association of Town and Parish Councils
Association of Birmingham Conservation Groups
Birmingham City Council
Black Country Housing Association Ltd (Green Futures)
Black Country Development Corporation
British Waterways
Centro
Countryside Commision
CPRE
Dudley Metropolitan Borough Council
English Nature
Friends of the Earth Birmingham
Hereford and Worcester County Council
Inland Waterways Association
Merevale and Blythe Estates
National Urban Forestry Unit
National Farmers Union
North Warwickshire Borough Council
Packington Estate Enterprises Ltd
Solihull Metropolitan Borough Council
South Staffordshire Water Plc
Stratford on Avon District Council
The Ramblers' Association
The Forestry Authority
The National Trust
Urban Wildlife Trust
Walsall Metropolitan Borough Council
Warwickshire Wildlife Trust
Warwickshire County Council
West Midland Bird Club
West Midlands Joint Data Team
Wolverhampton Metropolitan Borough Council

Appendix 5 - Glossary

Abstraction	The removal of water from any source, either permanently or temporarily.
Abstraction Licence	An authorisation granted by the Agency to allow the removal of water from a source of supply. Statutory; section 38 Water Resources Act 1991.
Agenda 21	A comprehensive programme of worldwide action to achieve a more sustainable pattern of development for the next century. UK Government adopted the declaration at the UN Conference on Environment and Development (the Earth Summit) held in Rio de Janeiro in 1992.
ADAS	Agricultural Development and Advisory Service
Algae	Microscopic (sometimes larger) plants, which may be floating or attached. Algae occur in still and flowing water.
Algal blooms	Rapid growth of phytoplankton in marine and freshwater which may colour the water and may accumulate on the surface as a green scum. Decomposing dead cells consume large quantities of oxygen in the water which may result in the waters becoming anaerobic. Some blooms (such as certain species of blue-green algae) may produce poisons.
Ameliorate	Cause something to become better.
Ammonia	A chemical compound found in water often as a result of pollution by sewage and farm effluents. It is widely used to determine water quality. Ammonia can be toxic to fish.
AOD	Above Ordnance Datum. Land levels are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as "Ordnance Datum". Contours on Ordnance Survey maps of the UK show heights in metres above Ordnance Datum.
AONB	Area of Outstanding Natural Beauty.
Aquatic	Pertaining to the water environment.
Aquifer	A water bearing-stratum situated below ground level. The water contained in aquifers is known as groundwater.
Asset Management Plan	Water Companies Strategic Business Plans - initiated (eg AMP2) by OFWAT as part of the periodic review of water company charges.
Attenuation	Dilute or slow the spread of contamination or the speed of flow.
Augmentation	The addition of water to a watercourse under artificial control. Usually to "top up" low flows in summer by either groundwater pumping or via reservoir release.
Base Flow	The flow of a river derived from groundwater sources.
Benthic	Living on the bed of a river.
Benzene	Air pollutant from fossil fuels released by vehicular traffic and by industry, carcinogenic. A target pollutant in the UK National Air Quality Strategy.
BOD	Biochemical Oxygen Demand. A measure of the amount of oxygen consumed in water (over 5 days), usually by organic pollution. Oxygen is vital for life so the measurement of the BOD tests whether pollution could affect aquatic animals.

BOD (ATU)	Biochemical Oxygen Demand measured in the presence of allylthiourea. The allylthiourea suppresses the oxidation of ammonia so the oxygen demand reflects the level of carbon based oxidation.
Biodiversity	Diversity of animal and plant life.
Biomass	Total quantity or weight of organisms in a given area or volume.
Borehole	A well sunk into a water bearing rock from which water will be pumped.
Brownfield	A designation used by planning authorities to describe land that has previously been used for development. It does not necessarily imply that the land is contaminated.
Buffer Zone	Strip of land 10-100m wide, alongside rivers which is removed from agricultural use, managed to provide appropriate habitat types and to reduce levels of nitrates and pesticides in water.
1,3 Butadiene	A gas derived mainly from the combustion of petrol and other materials. A carcinogen and a target pollutant in the UK National Air Quality Strategy.
Cadmium	A very toxic heavy metal with a wide variety of uses.
Carbon dioxide (CO₂)	Gas present in the atmosphere and formed during respiration, the decomposition and combustion of organic compounds (eg fossil fuels, wood etc). A greenhouse gas.
Carbon monoxide (CO)	A gas formed by the incomplete combustion of carbon fuels. At very high exposures prolonged exposure to CO can be life threatening. A target pollutant in the UK National Air Quality Strategy.
Catchment	The total area from which a single river collects surface run-off.
CFCs	Chloroflouorocarbons. Volatile but inert (without active chemical or other properties) compounds of carbon and (mainly) chlorine and fluorine. Important greenhouse gases and ozone layer depleters.
Coarse Fish	Freshwater fish other than salmon and trout.
Confluence	The point at which two rivers meet.
Controlled Waters	All rivers, canals, lakes, groundwaters, estuaries and coastal waters to 3 nautical miles from the shore, including bed and channel which may for the time being be dry.
CSO	Combined Sewer Overflow.
Culvert	Channel carrying water across or under a road, canal etc.
Cyprinid Fish	Coarse fish belonging to the carp family, like roach, dace and bream.
Dangerous Substances	Substances defined by the European Commission as in need of special control because of their toxicity, bio-accumulation and persistence. The substances are classified as List I or List II according to the Dangerous Substances Directive.
Demand Management	The management of the total quantity of water abstracted from a source of supply using measures to control waste and consumption.

Derogate	To depreciate or diminish - used in abstraction licensing where a proposed new licence would reduce resources to an existing authorised abstraction.
DETR	Department of the Environment, Transport and the Regions (Formerly DoE and DoT).
Diatom	Microscopic, unicellular algae characterised by an often ornate siliceous covering.
Diffuse Pollution	Pollution from widespread activities with no one discrete source.
Discharge Consent	A licence granted by the Agency to discharge effluent of specified quality and volume. Statutory; Schedule 10 Water Resources Act 1991.
DO	Dissolved Oxygen. The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important test of the health of a river.
DoE	Department of the Environment (Predecessor to DETR)
DoT	Department of Transport (Predecessor to DETR)
Dry Weather Flow	<p>For sewage works, this is calculated by adding estimates of the domestic sewage discharge (which is the population multiplied by the per capita consumption) plus any industrial discharges plus infiltration into the sewer.</p> <p>For rivers, this is calculated as the average of flows during the driest seven consecutive days in each year for the period of record.</p>
EC/EU Directive	A type of legislation issued by the European Union which is binding on Member States in terms of the results to be achieved but which leaves to Member States the choice of methods.
Ecosystem	A functioning, interacting system composed of one or more living organisms and their effective environment, in a biological, chemical and physical sense.
Effluent	Liquid waste from industrial, agricultural or sewage plants.
EH	English Heritage
EN	English Nature
EQS	Environmental Quality Standard. That concentration of a substance which must not be exceeded if a specific use of the aquatic environment is to be maintained.
Eutrophication	The biological effects of an increase in plant nutrients - nitrates and phosphates - on aquatic ecosystems.
Evapotranspiration	Water lost by evaporation and water taken up and lost by plants.
Fauna	Animal life
Floodplain	Land adjacent to a watercourse that is subject to flooding.
Flora	Plant life.
Fluvial	Land pertaining to the river itself.
Gauging Station	A site where the flow of a river is measured.

Greenbelt	A designation used by planning authorities on land adjacent to towns or cities, defined for the purpose of restricting the outward expansion of the urban area and to protect the countryside.
GQA	General Quality Assessment. A national water quality assessment scheme.
Groundwater	Water which saturates a porous soil or rock substratum (or aquifer). Water held in storage below ground level.
Groundwater Units	Administrative sub-divisions of aquifers, defined on geological and hydrological criteria, which form the basis for groundwater resource management and licensing policy decisions.
Habitat	The locality or environment in which a plant or animal species lives.
HA	Highways Agency
Hard Engineering	River bank re-profiling for flood defence purposes using concrete, stone, metal and other hard materials.
HE	House Equivalent. Allocated a value in terms of numbers of houses.
HSE	Health and Safety Executive
HMIP	Formerly Her Majesty's Inspectorate of Pollution (now part of the Environment Agency).
Hydraulic Continuity	The degree of interconnection between two potential sources of water eg. a river and an aquifer or two clearly defined aquifers.
Hydrology	The study of water on or below the earth's surface.
Hydrometry	The measurement of water.
Hydrogeology	Branch of geology concerned with water within the earth's crust.
Insecticide	Substances used to destroy or repel insects.
IDB	Internal Drainage Board.
Invertebrate fauna	Animals which lack a back bone - used for biological classification. Especially macro-invertebrates (animals of sufficient size to be retained in a net with a specified mesh size).
IPC Integrated Pollution	An approach to pollution control in the UK which recognises the need to look at the environment as a whole, so that solutions to particular pollution problems take account of potential effects upon all environmental media. Relates to industrial and commercial processes with a significant pollution potential. Controlled by the Agency defined under the Environmental Protection Act 1990 (Part A).
Landfill	Site used for waste disposal into/onto land.
Leachate	Liquid formed when water reacts with, or leaches from, waste material.
Leachability Triggers	Standards set by the Agency to ensure that land from a contaminated site is remediated to an appropriate standard.

Leaching	Removal of soluble substances by action of water percolating through soil, waste or rock.
Lead	The world's most widely used non-ferrous metal. Used also as a petrol additive but its use is now in decline. It has adverse effects on human health. A target pollutant in the UK National Air Quality Strategy.
LPA	Local Planning Authority.
MAFF	Ministry of Agriculture, Fisheries and Food.
Main River	The watercourse shown on the statutory 'Main River maps' held by Environment Agency and MAFF. The Agency has permissive powers to carry out works of maintenance and improvement on these rivers.
Natural Succession	The evolution of an environment from water to dry land that can naturally take place.
Nitrate Sensitive Areas (NSA)	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding the limit of 50mg/l laid down in the 1980 EC Drinking Water Directive, and where voluntary, compensated agricultural measures were introduced in 1990 as a means of reducing those levels.
Nitrate Vulnerable Zones (NVZ)	An area where nitrate concentrations in sources of public drinking water exceed, or at risk of exceeding the limit of 50 mg/l laid down in the 1980 EC Nitrate Directive, where farmers are required to limit the application of nitrates to levels laid down in the Code of Good Agricultural Practice (MAFF).
Nitrogen dioxide (NO₂) Nitric oxide (NO) Oxides of nitrogen (NO_x)	NO ₂ and NO are both oxides of nitrogen (NO _x) produced by traffic and industry. NO ₂ can have an adverse effect on human health, increasing the symptoms associated with respiratory illness. NO ₂ is a target pollutant in the UK National Air Quality Strategy.
Nutrient	A chemical essential for life.
NRA	National Rivers Authority (now part of the Environment Agency).
Objective 2	European funding with the aim to facilitate the redevelopment of urban areas.
OFWAT	Office of Water Industry's Regulator of Water Service Companies.
Ordinary watercourse	A watercourse that does not form part of a Main River.
Ozone	Caused by a chemical reaction in sunlight, at lower levels in the atmosphere by oxides of nitrogen and volatile organic compounds reacting to form ozone. The reactions can take days and maximum concentrations occur downwind of urban areas. Affects the respiratory system. A target pollutant in the UK National Air Quality Strategy.
Particulates and PM₁₀	Small particles of matter released from a number of sources. The Clean Air Acts led to a tenfold decrease in black smoke but new research has shown very small particles can affect the respiratory and cardiovascular systems. PM ₁₀ - particulates below 10µm (a target pollutant in the UK National Air Quality Strategy).
Percolation	The movement of water through soil pores and rock crevices.

Perennial Flow	River flow present through the entire year.
Permeability	The ease with which liquids (or gases) can pass through rocks or a layer of soil.
Permissive powers	Powers which confer on the Agency the right to do things but not the duty to do them.
Pesticides	Substances used to kill pests, weeds, insects, fungi, rodents etc which can have significant harmful environmental effects.
Piscivorous	Feeding on fish.
Porosity	The volume of water which can be held within a rock or soil, expressed as the ratio of the volume of the voids to the total volume of the material.
Potable Water	Water of a quality suitable for drinking.
Prescribed Flow	A flow set to protect lawful downstream users and the aquatic environment.
RAMSAR	Wetland site of International Importance that is designated under the Ramsar* convention (*a town in Iran where the international convention originally agreed in 1975 to stem the progressive encroachment on, and loss of, wetland).
Raw Water	Water in its natural state; before treatment.
Raw Water Transfer	The transfer of water from one resource to another in order to meet or anticipate demand. It is usually part of a scheme such as a reservoir or pipeline.
RE	River Ecosystem. Classification used to measure water quality.
Reach	A length of river.
Recharge	Water which percolates downward from the surface into groundwater.
Red Data Book Species	The most threatened species in Great Britain.
Renewable Energy	Energy produced from resources which are unlimited or can be rapidly replenished eg. Wind, water, sunlight, wave power or waste.
Residual Flow	The flow remaining in a watercourse after abstractions have taken place.
Revetment	A retaining wall.
Riparian	Of, or on, land adjacent to the river.
River Corridor	A stretch of river, its banks, and a varying amount of adjacent land that is affected by the presence of the river.
RQO	River Quality Objective.
Salmonid Fish	Game fish of the Salmon family, for example, trout and salmon.
SAC	Special Area of Conservation. This designation will protect important species and habitats, as defined under the EC Directive on Conservation of Habitats and Species.

SAM	Scheduled Ancient Monument. The key sites nationally for archaeology, designated by the Secretary of State for national Heritage, through English Heritage and CADW. Statutory; designated under the Ancient Monuments and Archaeological Areas Act 1979.
Septic Tank	A tank used for the treatment of sewage from properties without mains drainage. The sewage is settled and some bacterial treatment occurs. Discharge of effluent is usually to a soakaway system.
Sewage	Liquid waste from homes, businesses etc which is normally collected and conveyed in sewers for treatment and/or discharge to the environment.
Sewerage	Means of conveying foul or surface water.
SINC	Site of Importance for Nature Conservation. These are non statutory nature conservation sites of county or regional importance. Designated by County Wildlife Trusts and in some cases EN and Local Authorities.
Siltation	At low velocities water will deposit the material being carried in suspension. The slower the velocity the finer the material deposited. A deposit of clays and silt is very difficult to remove naturally as it required turbulent and high velocities.
Sludge	The accumulation of solids from treatment processes. Sludge can be incinerated or spread on farm land.
Slurry	Animal waste in liquid form.
Soakaway	System for allowing water or effluent to soak into ground, commonly used in conjunction with septic tanks.
Soft Engineering (Rivers)	River bank works using earth, grass, tree planting, reeds and other natural (soft) materials.
SoS	Standards of Service.
SPA	Special Protection Areas. Areas of importance for birds.
Spray Irrigation	The watering of crops by spraying. Can have a high impact on water resources.
SSSI	Site of Special Scientific Interest. The best examples of the national heritage of wildlife habitats, geological features and landforms, designated by English nature and the Countryside Council for Wales. Statutory; notified under the Wildlife and Countryside Act 1981.
SSW	South Staffordshire Water
STP	Sewage Treatment Plant (operated by non utility companies).
STW	Sewage Treatment Works (operated by utility companies).
STW Ltd	Severn Trent Water Ltd.
Sulphur dioxide (SO₂)	A gas which dissolves in water to give an acidic solution. It is an irritant when inhaled and may cause breathing difficulties. Emissions of SO ₂ can lead to acid rain, affecting ecosystems and water quality. A target pollutant in the UK National Air Quality Strategy.
Surface Water	Water which flows or is stored on the ground surface.

Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.	
Telemetry	River levels, rainfall, temperatures and wind run are recorded on data loggers connected to the telephone network. Information from the recording sites can be automatically accessed from a central point.	
Trade Effluent	Any effluent, except domestic sewage produced in the course of trade or industry, including agriculture, horticulture and research. Surface water run-off which is significantly contaminated by site activities constitutes trade effluent.	
Transfer Station	Waste disposal facility where waste is collected prior to transport to final disposal point.	
Underground Strata	A term used to signify geology under the surface soil layer. If groundwater exists, or if water is being discharged to the ground, the geology underneath the soil layer is known in the various Acts of Parliament as underground strata.	
UWWTD	Urban Wastewater Treatment Directive.	
Water Table	The natural level of underground water.	
Wetland	An area of low lying land where the water table is at or near the surface for most of the time, leading to characteristic habitats.	
Winter Storage Reservoir	Reservoirs built by farmers to store water during the winter months when it is "plentiful" for re-use during the summer.	
1:10 Year Drought/Flood	A drought/flood event with a statistical probability of occurring once in a ten year period (other periods may be specified in a similar way).	
UNITS	ppb µg/m ³	parts per billion micro (10 ⁻⁶) grammes per cubic metre
Length	10mm 100cm 1,000m	= 1cm (equivalent to 0.394 inches) = 1m (equivalent to 39.37 inches) = 1km (equivalent to 0.621 miles)
Area	10,000m ²	= 1ha (equivalent to 2.47 acres)
Flow	1,000l/s 1,000m ³ /d	= 1m ³ /s = 1MI/d

MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

0645 333 111

The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

ENVIRONMENT AGENCY EMERGENCY HOTLINE

0800 80 70 60



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