

EA, ANGLIA

ENVIRONMENT AGENCY BOARD

ENGLISH NATURE COUNCIL



VISITS TO CLEY-NEXT-THE SEA &
SALTHOUSE SEA DEFENCES,
KING'S LYNN SEWAGE
TREATMENT WORKS

WEDNESDAY, 17 MARCH 1999

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**PROGRAMME FOR ENVIRONMENT AGENCY BOARD / ENGLISH NATURE
COUNCIL VISIT TO NORTH NORFOLK. WEDNESDAY 17 MARCH 1999**

Coach to depart Duke's Head Hotel, King's Lynn	08 30
Opportunity for information dissemination about issues relating to Cley/Salthouse.	
Arrive Salthouse Beach Car Park	09 45
Party to inspect Sea Defences, press interview and photo opportunities.	
Depart Salthouse Beach Car Park	10 15
Arrive Dun Cow P.H.	10 30
Coffee; Presentation by Professor John Pethick on Brancaster.	
Depart Dun Cow P.H.	11 00
Further discussion opportunities; Information dissemination relating to King's Lynn Sewage Treatment Works (if appropriate).	
Arrive King's Lynn Sewage Treatment Works	12 15
Tour of Works, led by Anglian Water personnel, press interview and photo opportunities (subject to agreement by Anglian Water).	
Depart King's Lynn Sewage Treatment Works	12 45
Arrive Duke's Head Hotel, King's Lynn	13 00
Lunch.	

SALTHOUSE



SHINGLE RIDGE



SEA DEFENCES FOR THE NORTH NORFOLK VILLAGES OF

SALTHOUSE AND CLEY-NEXT-THE-SEA

BACKGROUND AND PROBLEM

The shoreline of the North Norfolk coast between Sheringham and Blakeney Point is characterised by a natural upper shingle ridge beach. Between Sheringham and Kelling Hard the beach is backed by glacial cliffs, but to the west of Kelling Hard the single ridge fronts an area of freshwater marshes which were progressively reclaimed from saltmarshes in the 17th and 18th centuries.

These coastal marshlands are separated from the rising ground of the Cromer Ridge to the south by the A149 coast road and the settlements of Cley and Salthouse. The river Glaven runs by Cley on its route to the sea, but is then deflected westwards for 6 kilometres by the presence of the sand and shingle spit leading to Blakeney Point. The whole of the coastal plain and lower reaches of the Glaven valley are below the 5.0 metre contour, and therefore within the tidal flood risk area.

A capital scheme for improving the standard of defence for most of Cley village and the valley of the River Glaven was completed in 1995. This comprised the construction of a new clay 'ring' embankment with a tidal gate structure where it crosses the Glaven estuary.

However, the only means of protection against tidal flooding for the area of low lying land between Cley and Kelling Hard remains a 5.5 kilometres quasi-natural shingle ridge. The area at risk includes 35 properties located at the eastern edge of Cley and in Salthouse village, the A149 coast road and 300 hectares of freshwater marshes.

The major conservation interest of the marshes is the internationally and nationally important numbers of breeding and wintering birds. The ornithological importance lies in the vast numbers of birds which use the area as well as the presence of rare species such as bittern, bearded tit, and marsh harrier within the reedbeds. The area is a major tourist attraction, with birdwatching a particular feature (the Norfolk Wildlife Trust's Cley Reserve attracting over 100,000 visitors each year).

This shingle ridge is vulnerable to damage during periods when high tides are accompanied by strong onshore gales and heavy wave action. It has been overtopped and partially breached on a number of occasions, most recently in February 1996 when the resulting tidal inundation caused severe traffic disruption and substantial damage to the area's unique freshwater habitats.

The volume of shingle in the ridge is reducing and there is widespread agreement that the current management practice of taking material from the foreshore to maintain a high crest level is becoming unsustainable. It is therefore important to agree upon an effective sea defence strategy for this frontage which will meet the criteria of social and environmental acceptability, economic feasibility and engineering soundness.

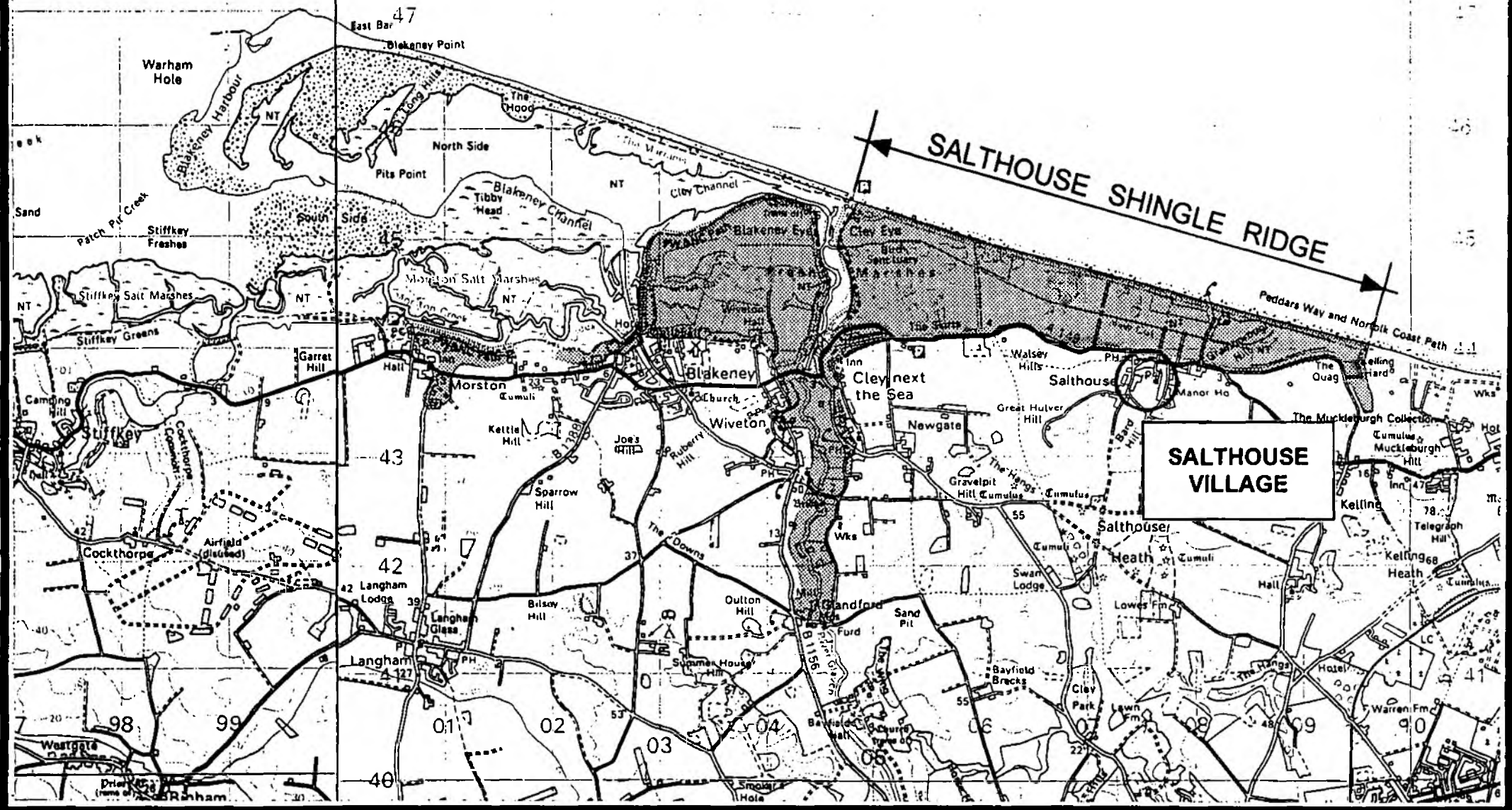
PROPOSED STRATEGY

Investigations and consultations have been undertaken in order to make a comparison of the relative merits of different strategic options of the future management of the defences along this frontage. These can be summarised as follows:-

48



FLOOD PROTECTION ZONE

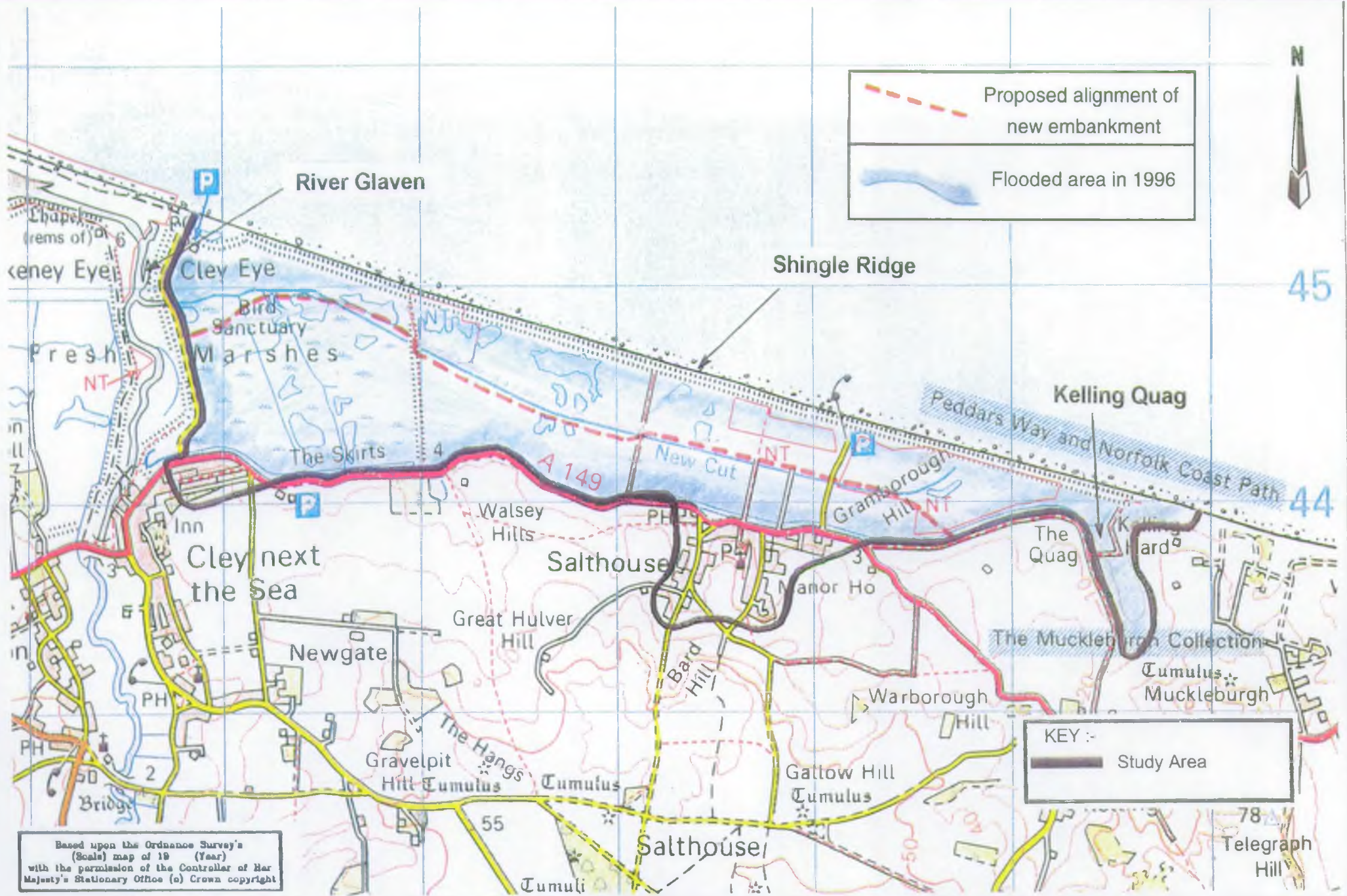




View of Cley Village and Marshes showing 'Ring Bank' defence in foreground



Salthouse - Reinstating storm damaged Shingle Ridge



Drawn by IC

Checked by LB



ENVIRONMENT AGENCY (ANGLIAN REGION)

Cley To Kelling

Date

Jan-98

Scale

1 : 25,000

HALCROW
CONSULTING ENGINEERS

Sir William Halcrow & Partners Ltd
Peterborough
Peterborough PE1 1SA
Tel. (01733) 554031

**ENVIRONMENT AGENCY - ANGLIAN REGION
NORFOLK SUB CATCHMENT**



Two aerial views of tidal flooding between Cley-next-the-Sea and Salthouse, February 1996, showing breaches in the shingle bank and the village of Salthouse.



ENVIRONMENT AGENCY - ANGLIAN REGION
NORFOLK SUB CATCHMENT



Two aerial views of tidal flooding at Cley-next-the-Sea, February 1996. The upper picture shows the village and inundated flood compartment; the lower view shows the road towards Salthouse.



(i) **Do Nothing**

If no further work was to be carried out on the sea defences then the shingle ridge would be breached and properties in Salthouse and the eastern end of Cley would be at increased risk of flooding. There would be total loss of the freshwater habitat and this option is only included because it provides the yardstick for assessing the other options.

(ii) **Continue Re-profiling Shingle Ridge and Repair Breaches**

It is considered that this policy is not sustainable in the medium to long term because there is insufficient shingle available to maintain the ridge to an adequate profile and crest elevation. The ridge will become increasingly permeable and unstable during storm events, thereby reducing its efficiency as a flood defence structure.

(iii) **Large Scale Shingle Nourishment**

There are very few economically or environmentally viable sources of suitable material and this would be a very costly option. There could be significant environmental impact on any donor site.

(iv) **Provide Ring Banks to enclose Salthouse and East Clay (Full Scale Retreat)**

This would lead to the loss of freshwater marshes and the coast road would be subject to periodic flooding. Any embankment substantial enough to provide effective protection against major surge tides would have a significant impact on the visual amenity of the area.

(v) **Partial Set Back of the Sea Defence Line**

This option allows for the construction of a new secondary embankment landward of the shingle ridge extending the full length of the frontage. The embankment would be designed to withstand overtopping in extreme conditions, although the residual shingle ridge would act as a primary wavebreak. Future maintenance of the ridge would be restricted to the repair of breaches.

The whole of the area under consideration is covered by international conservation designations in the form of SPA/Ramsar and candidate SAC status. The measures set out in the EU Habitats and Birds Directives have far reaching implications for the selection of sustainable coastal defence options where such designated sites are likely to be affected. Legal advice is that there is an obligation on the UK Government to provide compensatory habitat if there is a negative impact, even if the change in the ecological balance is a result of natural processes.

The Agency has adopted a fully open, participatory approach in its consultations with local councils, conservation bodies and residents which has included the setting up of an informal liaison group. A comprehensive Environmental Assessment has been undertaken by our consultants, Halcrow, and the Environmental Statement was placed in the public domain in April 1998.

From consideration of the physical processes and the potential environmental impacts, and taking into account the views of the consultees, the construction of a secondary defence on a retired line (Option (v)) has emerged as the preferred option.



The inundated flood compartment at Salthouse, 14 February 1996.
It will be seen that the coast road at this point was flooded.

THE CURRENT SITUATION

A plan is appended showing the proposed alignment for the new embankment. The approximate embankment profile would be at a height of 3.5 metres with a 3-metre crest width. The embankment will have a grass-covered crest and side slopes of a 1 in 3 gradient. Approximately 300,000 cubic metres of clay will be required for the construction, and it is hoped to source the majority of this from selected locations on the marshes by creating new areas of reedbed and open water. Associated works will include improvements to the existing marsh drainage system, including a new outfall to the Glaven Estuary. It is estimated that the total cost will be in the order of £3.5 million.

By the established criteria which MAFF use when determining applications for grant aid on flood defence schemes the justification for these works is, at best, marginal. However, the Government announced in July last year that these usual arrangements would be adjusted, where necessary, to accommodate funding measures necessary to protect internationally important wildlife sites. There are no details yet on how this new mechanism will operate but it is clearly essential, if the Salthouse scheme is to qualify for Ministry grant, that the proposals are fully compliant with the requirements in the EU Directives. This will also be a pre-requisite to a successful application for planning permission.

As a result of responses to the Environmental Statement received from consultees, the following actions have been taken:

- Consultants have been instructed to prepare a Water Level Management Plan to investigate the potential for enhancing the breeding and wintering bird interest of the freshwater habitats.
- A management plan has been commissioned covering the shingle ridge and beach which will set out guidelines for any future maintenance under the new sea defence strategy.
- A study has commenced to assess potential for on-site re-creation of brackish lagoons (a priority habitat) by excavating clay borrow pits landwards of the predicted 50 year roll-back position of the ridge.
- In conjunction with English Nature, a North Norfolk Management Plan overview is being prepared which will address the important issue of habitat re-creation in the wider context of the North Norfolk Coast over a 50-year period.

These additional studies are quite time-consuming and the scheme has now had to be deferred one year in the LFDC's capital programme. It will take two years from the time work starts on site before an effective secondary defence is in place and, in the meantime, the standard of protection provided by the shingle ridge will continue to reduce.

The source of the supply of shingle to the ridge is fossil in origin and there is little or no modern-day input to the system. Further attempts at mechanical reprofiling with insufficient material available will be counter-productive, in that there will be a loss of fine material and by forming an artificially steep slope there is a risk of accelerating the rate of beach erosion.

SUMMARY OF THE PROJECT

Living with the sea: Managing Natura 2000 sites on dynamic coastlines

Climate change and sea-level rise are posing ever greater challenges for the sustainable management of dynamic coastal areas designated as Natura 2000 sites. The forces driving coastal change are so powerful that it is not sustainable to resist them, and they do not recognise artificial boundaries. Further pressures arise from human activity and development.

English Nature and the Environment Agency have assessed the implications of implementing strategic coastal flood defence policies (contained in Shoreline Management Plans) for the Natura 2000 network. The main impact identified is the loss of habitat due to "coastal squeeze", where fixed coastal assets or natural topography prevent landward rollback of intertidal and littoral habitats. Saline lagoons and freshwater wetlands may be lost where rollback does take place. Change must therefore be managed. Losses from "coastal squeeze" should be offset by habitat restoration or re-creation. This project develops a strategic approach to integrate management of flood risk, and ecological requirements of the Natura 2000 network.

Ensuring that the ecological requirements of Natura 2000 sites are maintained in the medium to long term requires that losses are made good by gains elsewhere, often through the restoration or re-creation of new areas of habitat. Managing for loss within the confines of designated site boundaries may further compromise other interests of European importance. Therefore, to allow for dynamic coastal change, future habitat re-creation is likely to be necessary next to existing SPAs and SACs. This project will deliver an integrated package with wide ranging application for addressing dynamic change and impact on Natura 2000 sites. The principal elements are:

- The development of a framework for the production of Coastal Habitat Management Plans (CHAMPs). These will provide 50 year strategies for the maintenance of the ecological integrity of European importance on dynamic coasts, through which future actions will be implemented. CHAMPs will build on a Management Plan Overview previously developed by the project partners for a rapidly eroding section of the UK coast.
- The re-creation of Annex I coastal habitats within a candidate SAC as part of a scheme that implements the Management Plan Overview and provides an opportunity to inform the development of CHAMPs.
- The production of CHAMPs for six coastal areas where research has identified that significant habitat change is expected to occur in the next 50 years. Each plan will provide an assessment of habitat change likely to occur in response to coastal processes and the implementation of strategic coastal defence policies. Suitable locations for habitat replacement and restoration will be identified. Consultation with relevant organisations, stakeholders and awareness raising will be an integral part of plan development. Predictions of coastal habitat change will be refined by output from the UK's FORCE research programme.
- Starting to implement the completed plans by taking forward a number of habitat re-creation/restoration projects, selected from amongst those specified in the CHAMPs, as demonstration projects. These projects will show the value of habitat re-creation/restoration in maintaining the ecological requirements of European sites on dynamic coasts.
- The production of best practice guidance on the re-creation and restoration of coastal habitats.
- Development of a framework for maintaining features of European importance in dynamic coastal situations.

The project partners are well placed to develop and implement approaches to managing these issues on dynamic coastlines. The findings and recommendations will be directly relevant to policy and decision makers facing similar issues in other Member States.

ANGLIAN WATER SERVICES LTD

KING'S LYNN SEWAGE TREATMENT WORKS EXTENSIONS

1. Background

King's Lynn STW has a Population Equivalent (PE) of 150 - 200K (depending on the seasonal trade effluent) and is located to the North of the town on the West bank of the Great Ouse River (TF 604222).

2. History

Prior to the recent extensions the STW provided screening, grit removal and primary settlement to domestic and trade effluent from the King's Lynn area. The effluent was then held in 3 balancing tanks for discharge into the River Great Ouse on the outgoing tide only.

The extension scheme was an AMP1 project driven by the River Needs Quality of the Great Ouse, the quality of The Wash and the Urban Waste Water Treatment Directive (UWWTD). As Kings Lynn discharges into estuarine waters secondary treatment was required under the UWWTD by 31/12/00. The project has provided this and additional UV disinfection, improving the effluent quality to ensure compliance with the UWWTD ahead of the deadline. This also serves to improve the marine environment for local shellfisheries.

3. Scheme Details

3.1. Operational Parameters

Determinant	Previous consent	Current consent
Suspended solids (SS)	250 mg/l LUT	100 mg/l LUT
Biological Oxygen Demand (BOD)	None	50 mg/l LUT 100 mg/l upper tier

LUT : Look Up Table

Average dry weather flow 23,000 m³/day with peak flows of up to 950 l/s, biological loads vary between 5 - 17 tonnes per day (seasonal trade effluent, food industry),

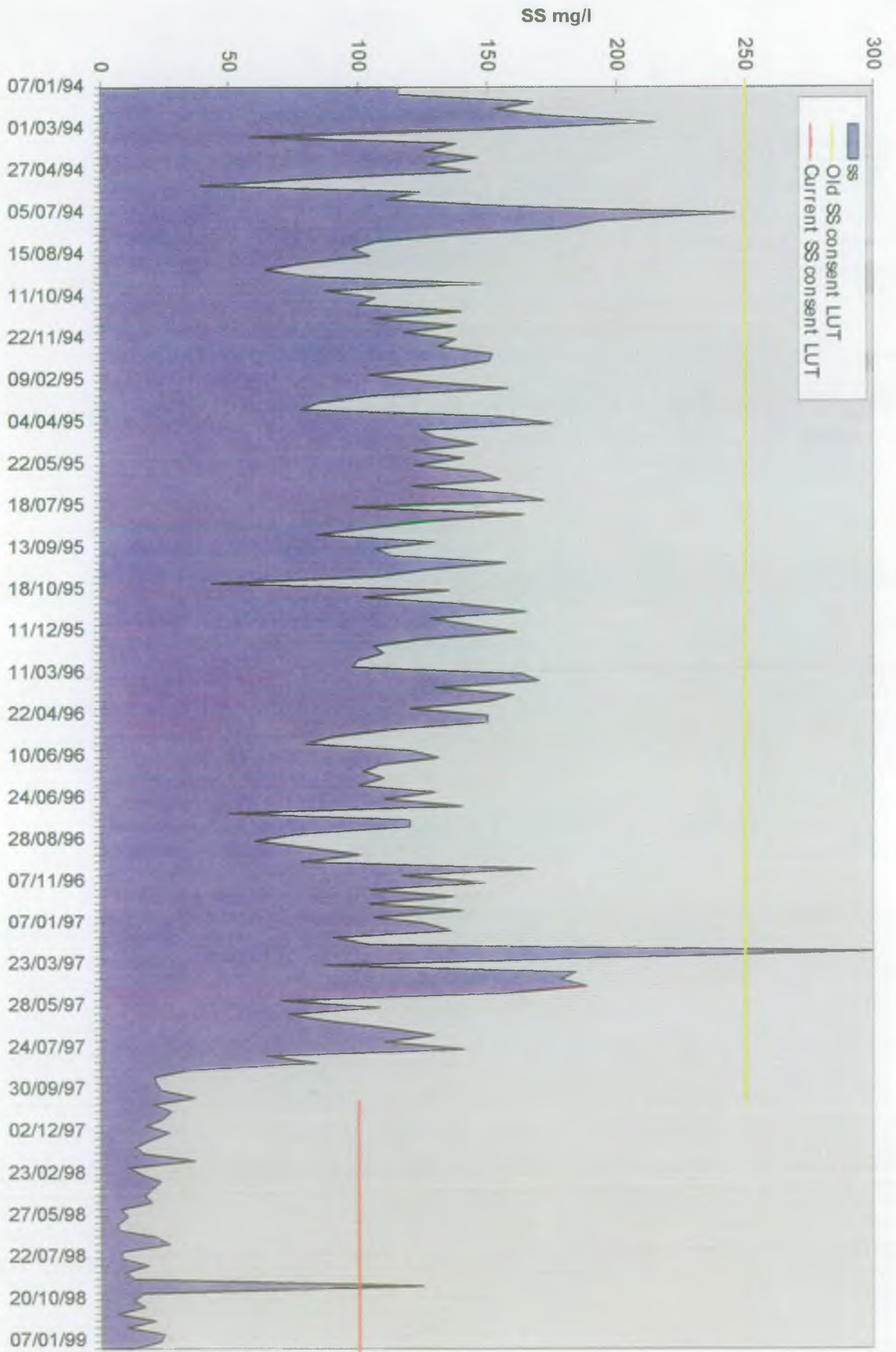
PE; Domestic 85,000
Industrial equivalent population 65,000 to 115,000

3.2. Description of Scheme

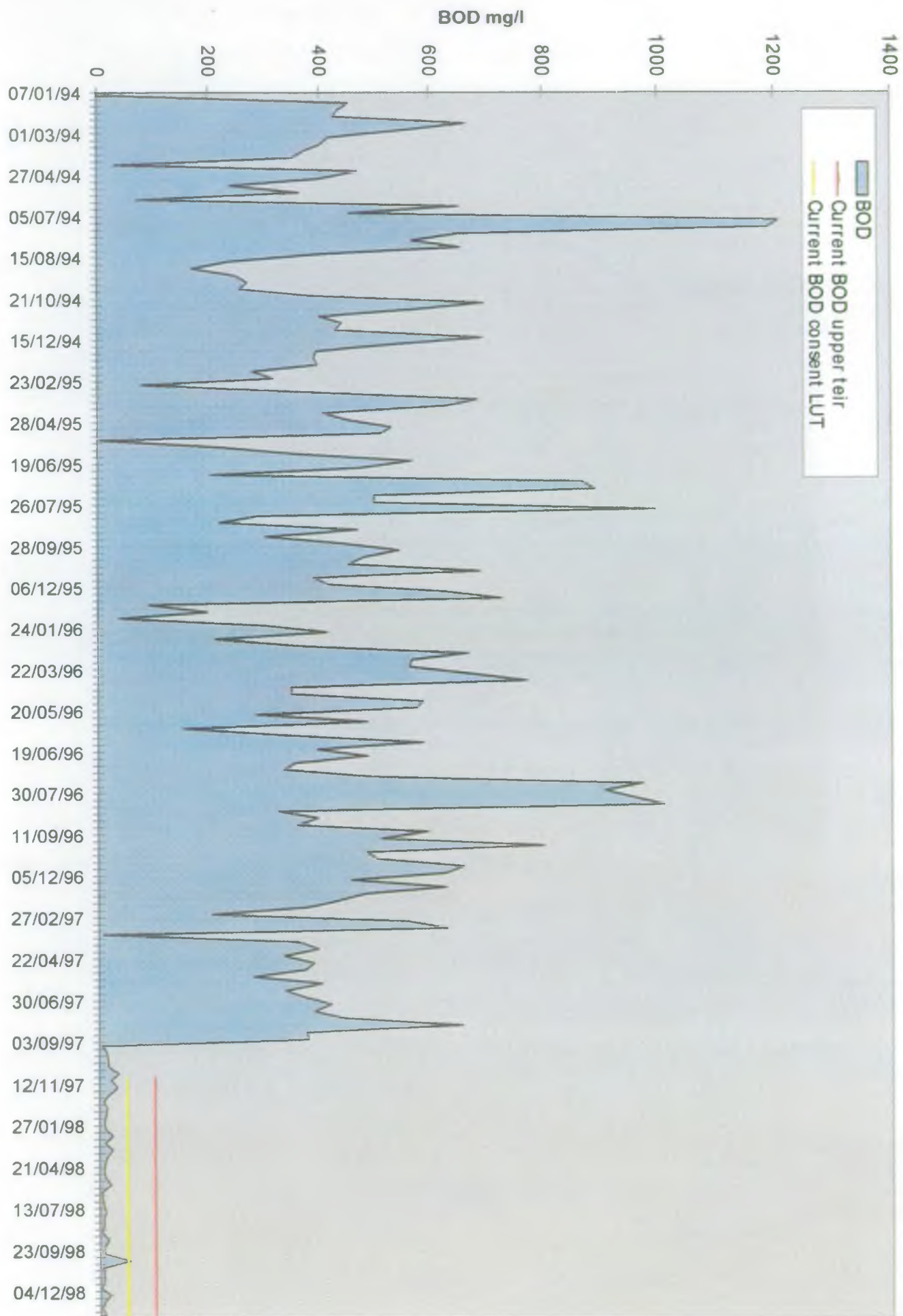
The existing Inlet Works and Primary Settlement Tanks were retained. Two of the Balancing Tanks were utilised to allow balancing of the flows to secondary treatment. The third tank was converted to a Storm Tank. Picket Fence Sludge Thickeners have been integrated into the new scheme. Preliminary contracts were let to refurbish the existing Mechanical and Electrical equipment.

The biological treatment is carried out by a two stage aeration system. The first quarter of the total aeration volume is allocated to high rate jet aeration, which can deal with the fluctuations in the strong trade effluent loads. The remainder of the tank volume is for tapered fine bubble diffused air aeration to plug flows. Final Settlement is provided by four 35 m diameter tanks with full bridge rotating scrapers.

Suspended Solids (SS) Monitoring



Biological Oxygen Demand (BOD) monitoring



A flow balancing Pumping Station (PS) transfers flow from the balancing tanks to the aeration process and a return activated sludge PS transfers settled activated sludge from the Final Settlement Tanks (FSTs) to the head of the aeration process. Surplus activated sludge is transferred to the belt sludge thickening process by another PS. The final effluent PS transfers final effluent from the FSTs through the enclosed UV treatment system and then to the river.

Two pre-cast concrete tanks, of 1800 m³ volume have been provided to give 10 day sludge storage separately to primary and secondary sludge. An additional overall 10 day storage is provided by a lined earth bunded lagoon. Before and after schematics have been attached.

A dual 11 kV electricity supply to the STW has been provided ensuring security of supply. One of the cables was brought under the river through a polyethylene duct.

As the surplus excavated material was alluvial silt an agreement was reached with an adjacent farmer allowing it to be spread onto his fields. This recycling greatly reduced the traffic movements on the public roads and was seen as a more sustainable use than landfill.

3.3. Environmental Enhancements

Prior to construction a temporary haul road, approximately 1 kilometre in length was constructed to bypass Jubilee Bank Road and carry the construction traffic. A permanent 600m bypass, including a major bridge crossing of the West Lynn Drain and passing bays, was also constructed and adopted by the Highway Authority. Further work included permanent passing bays and maintenance work on the remaining approach road and improvements to the villages existing road system to accommodate the anticipated increases in the final sludge tanker traffic.

Large-scale landscaping works have also been carried out on the formed earth bunds to the South and West of the FSTs and to the Lagoon bunds involving in excess 5000 trees and shrubs. Hedging has been planted to the exposed West side of the site, where space was limited. Grass seeding has been carried out to the majority of the remaining open areas (Gravel has only been used in the restricted areas between structures). The contract for this includes a three year maintenance period.

4. Project Timing and Cost

Total project cost £16M,

Work on site commenced in September 1995,

Flows through the new works were commenced in June 1997,

UV Treatment was brought on line between September and December 1997,

Commissioning of the process control systems continued and was completed March 1998.

5. Compliance

The two graphs attached were created using EA monitoring data and show the changes in SS and BOD levels since commissioning of the new plant.

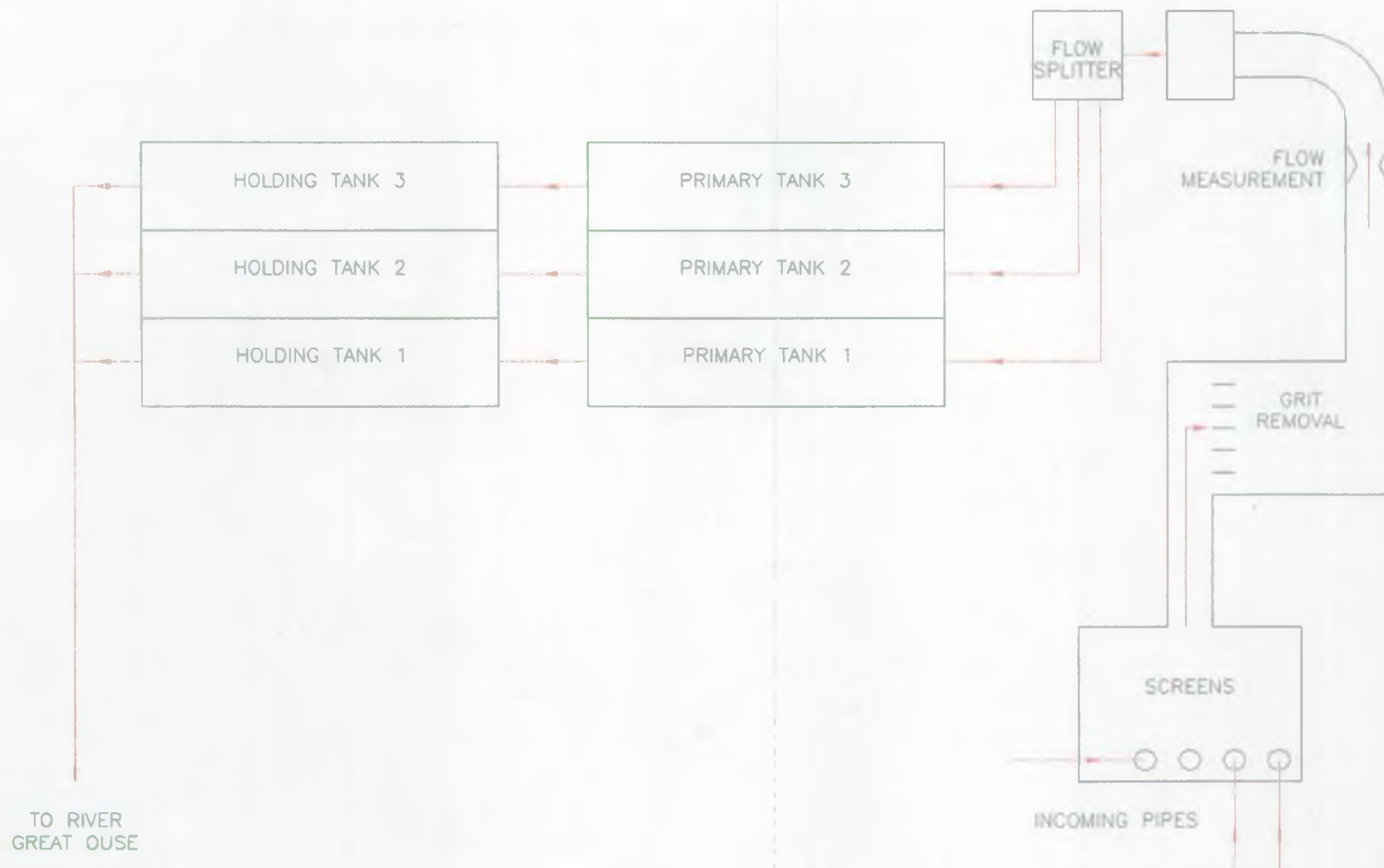
Since the commissioning of the new works the monitoring data has shown a dramatic increase in the quality of the final effluent, with both BOD and SS decreasing by a factor of ten. As a consequence monitoring has shown both parameters to be approximately 50% and 75% below the new much reduced consented levels respectively. No formal samples have been taken at King's Lynn in the last 12 months and of the 28 samples (27 BOD) up to the 31st of January 1999 there has only been one Look Up Table (LUT) failure for both parameters. The works is allowed 3 LUT fails and has 2 remaining. The failure was due to a combination of ongoing commissioning and a sudden high biological loading on the aerators.

6. Greenfield 2000

Dewatering plant has been installed as part of the £20m Greenfield 2000 project. The installations are temporary as the operating cost of lime treatment is high, and will be replaced with a more permanent solution during 2000-2005

The aim of the Greenfield 2000 project is to ensure that all biosolids production can be dewatered and treated by the end of this financial year to comply with the requirement of the British Retail Consortium (expressed in the ADAS Safe Sludge Matrix). Through this we have moved from 30% treatment, 25% dewatered last August to the ability to treat and dewater all of our biosolids.

The product is stable, odourless and contains significantly less pathogens. This can be applied to arable rotations, though the lime content reduces the extent of our market to those areas where lime is normally added to maintain soil pH.



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PROJECT TITLE	KINGS LYNN STW
DRAWING TITLE	SIMPLIFIED MAIN FLOW SCHEMATIC (BEFORE EXTENSIONS WORK)

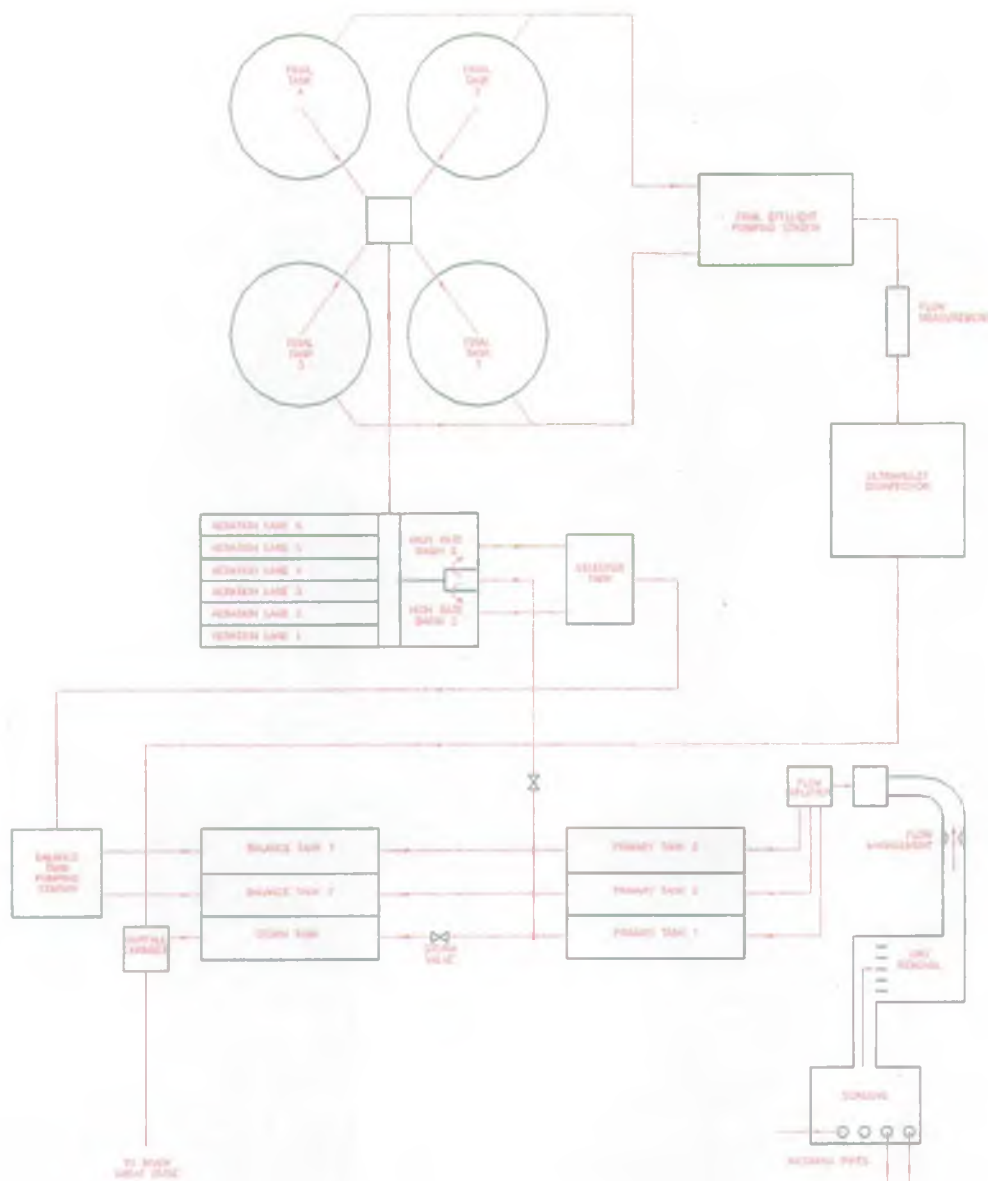


Anglian Water

ANGLIAN WATER SERVICES LTD.

NORWICH ENGINEERING, Yare House, 62-64 Thorpe Road,
Norwich, NR1 1SA, Tel: 01603 247000, Fax: 01603 247173

SURVEYED	DRAWN GRW	DESIGNED PB	CHECKED
APPROVED	DATE 26/02/00	SCALE N.T.S.	OCB KLYNST
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<p>PROJECT TITLE KINGS LYNN STW</p>			
<p>DRAWING TITLE SIMPLIFIED MAIN FLOW SCHEMATIC (AFTER EXTENSIONS WORK)</p>			
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SCALE	N.T.S.	DCD CODE	KLYNST
<p>DRAWING No.: SEW01618-002</p>			

ENGLISH NATURE COUNCIL MEMBERS / DIRECTORS

Baroness Young of Old Scone

Date App: 1 May 1998
App Ends: 31 March 2001

Early career spent in public relations and in health services management. Chairman of the National Council of the Institute of Health Services Management 1986/87 and in 1987/88 first women President since the IHSM was established. King's Fund International Fellow 1985-86, 1990-91; Former Chief Executive of Royal Society for the Protection of Birds 1990-98; Patron, Institute of Ecology and Environmental Management, 1993-; Trustee, the National Council for Voluntary Organisations, 1993-1997; Honorary Doctor of the University of Stirling, 1995; Hon. DSc. University of Hertfordshire 1997; Member of World Council of Birdlife International, 1994-1998; Member of Committee of the Secretary of State for the Environment's Going for Green Initiative 1994-96; Member of Committee of the Secretary of State for the Environment's UK Round Table on Sustainability, 1995-; Member of Committee on the Public Understanding of Science (COPUS), 1996-1997; Member of the Green Globe Task Force, 1997-98; Member of the BBC Rural and Agricultural Affairs Advisory Committee, 1997-; Member of the Minister for Agriculture's Advisory Group 1997-; Member of the House of Lords European Communities Committee - Sub-Committee D (Agriculture, Fisheries and Food) 1997-.

Melinda Appleby

After practical experience as Suffolk's first farm conservation adviser, she was appointed Countryside and Environment Policy Adviser by the National Farmer's Union, and was responsible for their first environmental policy. She also worked as Agriculture Policy Adviser for the RSPB and spent six years on the BBC's Rural and Agriculture Advisory Committee. - Currently Melinda is an independent policy and communications adviser in sustainable land management.

Dr A E Brown, BSc, PhD

After a degree in Zoology and Environmental Studies and a PhD in freshwater ecology took up a lectureship in Bayero University, northern Nigeria. Joined the Nature Conservancy Council in 1983 as Assistant Regional Officer for Cheshire and moved to Scotland Headquarters in 1986 to work as a Policy Development Officer responsible for freshwater and pollution issues. In 1989 moved to become the Senior Officer responsible for the York Office. Appointed in 1991 as the Strategic Planner in English Nature, responsible for promoting and facilitating a major strategic development programme. In 1996 appointed as Chief Officer of the Joint Nature Conservation Committee before returning to English Nature as a Director in early 1998. As Director has overall responsibility for work on designated sites, including the implementation of the EU Habitats Directive and the Birds Directive.

Professor D Norman

Date App: 1 September 1996

App Ends: 31 March 1999

Director, Synchrotron Radiation, CCLRC Daresbury Laboratory, Warrington and Visiting Professor in Surface Science, University of Liverpool. Chairman, Mersey Estuary Conservation Group, 1987-present; Vice-Chairman, Woolston Eyes SSSI Conservation Group, 1986-1995; Member of UK Ringing Committee, 1986-90; Ringing Recorder, Cheshire & Wirral, 1988-present; Member of Editorial Panel, *Ringing & Migration*, 1992-present; Member of Mersey South Banks Environmental Advisory Group, 1984-87; Member of Mersey Oil Spill Advisory Group, 1989-91; Member of Mersey Barrage Environmental Advisory Forum, 1986-93; Member of Cheshire County Council State of the Environment Project Advisory Group for Countryside and Wildlife Issues, 1989-92; Member of 'Inhabit' Project Advisory Committee (Mersey Basin Campaign), 1992-94; Member of Ringing Sponsors Panel, 1986-present; Secretary, Merseyside Ringing Group, 1981-84 and 1994-1996; Chairman, Merseyside Ringing Group, 1997-present; Chairman, Research Committee, Liverpool Bay Wader Study Group, 1995-present; Committee member, Cheshire & Wirral Raptor Study Group, 1995-present. Member of BOU, BTO, RSPB, Wildfowl & Wetlands Trust, Woodland Trust, Cheshire & Wirral Ornithological Society.

Mr S R Tromans

Date App: 1 September 1996

App Ends: 31 March 1999

Solicitor; being partner and head of environmental law at the London firm, Simmons & Simmons. From 1981-87 he taught at Cambridge specialising in property, planning and environmental law. He is honorary legal adviser to the Tidy Britain Group. Former Chairman of the UK Environmental Law Association; former Chairman of the Law Society's Environment Committee; has acted as Specialist Legal Adviser to House of Lords European Communities Committee, Environment Sub-Committee. Chairman of the Environment Committee of the London Chamber for Commerce and Industry. Sole or co-author of various books, including *The Encyclopaedia of Environmental Law*; *The Environment Acts 1990-95: Text and Commentary*; *Contaminated Land*; and the *Law of Nuclear Installations and Radioactive Substances*.

Mr G N Woolley, FRICS, FAAV, FRSA

Date App: 23 June 1993

App Ends: 31 March 1999

Managing Director of Woolley & Company, a private company specialising in asset management for city funds and the management of development projects which meet community needs and which are in harmony with the environment. Director of the Prudential Corporation in-hand farming company. Board Member of Harwich Haven Authority from 1 January 1998-(3 years). Chief Land Agent to Prudential Corporation 1979-91, responsible for the management of 85,000 acres and advice on all rural policy. Represents financial institutions on the Environment and Water Committee and also Council of Country Landowners Association; Vice-Chairman of Suffolk branch Country Landowners Association from 1997; member of Council of the Scottish Landowners' Federation. President of the Rural Practice Division of the Royal Institution of Chartered Surveyors, 1991-92; chaired various presidential working parties within the RICS including "Managing the Countryside"; initiated the Wye College research project "The Cost of Care" funded by MAFF and RICS and published in 1992 on the financial implications of environmental management regimes; is presently Chairing the RICS/Environment Agency research steering group into Comprehensive Project Assessment and Evaluation.

ENVIRONMENT AGENCY BOARD MEMBERS

The Lord De Ramsey, Chairman - Chairman of a family farming business in Cambridgeshire and letting agricultural land and redundant farm buildings as hi-tech industrial and commercial units. Deputy Lieutenant of Cambridgeshire; a Fellow of the Royal Agricultural Societies and a Crown Estates Commissioner since 1994; Director of a variety of farming and property companies and a riparian owner.

Formerly Director then Chairman of the Cambridge Water Company 1974-94 (Chairman 1985 to 1989); Ex-President of the Association of Drainage Authorities 1992-94, and Ex-President of the Country Landowners Association 1991-93;

Mr. Ed Gallagher (Chief Executive and Accounting Officer) - Chief Executive and Board member of the NRA until taking up his Environment Agency post; Governor, Chairman of Audit Committee and Visiting Professor at Middlesex University; Member of Council and Finance Advisory Group of Bristol University; Vice President of the Council for Environmental Education; Member of the Living Again Trust.

Formerly with Amersham International and Black and Decker in senior management and Director level posts.

Cllr. Colin Beardwood - Chair of Worcestershire County Council Environmental Services Committee; Vice-Chair of the Local Government Association Environment and Regeneration Board; non-Executive Director of West Midlands Enterprise, Hereford and Worcestershire Business Link, West Midlands Development Agency Ltd. and Alexandra NHS Trust.

Formerly Chair of Hereford and Worcestershire Strategic Planning and Transportation Committee and Chair of West Midlands County Council Waste Disposal Committee.

Mr. Alan Dalton - Health and Safety Co-ordinator, Transport and General Workers Union; Researcher, writer, consultant and lecturer on environmental, health and safety issues.

Formerly Senior Lecturer in Safety, at the Centre for Industrial Safety and Health, South Bank University; Health and Safety researcher, Labour Research Department; Research Fellow, Environmental and Occupational Health and Safety at the British Society for Social Responsibility in Science; research and development chemist in the pharmaceutical industry.

Mr. Nigel Haigh OBE - Honorary Fellow - Formerly Director and Company Secretary - of the Institute of European Environment Policy, London; Chairman of Green Alliance Ltd. and of Green Alliance Trust Ltd. Has published extensively on environmental policy and is author of "Manual of Environmental Policy: the EC and Britain"; consultant with NPI (a mutual providing pensions and retirement-related products); Visiting Research Fellow at Imperial College Centre for Environmental Technology, London.

Mr. Christopher Hampson CBE - Non-Executive Chairman of the RMC Group of companies; non-executive Director of SNC Lavalin Inc, Montreal, Canada and of the Transalta Corp., Calgary, Canada; Non-Executive Director of BG Plc; Non-Executive Chairman of British Biotech Plc; Vice- President of the Combined Heat and Power Association.

Formerly Chairman of the HMIP Advisory Committee and of the CBI Environment Committee; Director of Costain Group Plc, Chairman of Yorkshire Electricity Group Ltd.; Executive Director of ICI Plc; Non-Executive Director of British Biotech Plc.

Councillor Sir John Harman - Leader of the Kirklees Metropolitan Council; lecturer, Barnsley College; Director, Yorkshire Enterprise Ltd.; Director, AMA (Properties) Ltd.; Director, Kirklees Henry Boot Partnership Ltd and Honley Land Ltd; Director, Kirklees Metropolitan Development Co. Ltd.; Director, Kirklees Stadium Development Ltd.; Director, Calderdale and Kirklees Training and Enterprise Council; Director, Huddersfield Pride Ltd; member of the Energy Savings Trust; Chair of the Urban Commission of the Local Government Association.

Formerly Director of Kirklees Theatre Trust and Batley Action Ltd; Director, Local Government International Bureau.

Mr. Gerald Manning OBE - Head of a family farming business in Devon.

Formerly Chairman of the Agency's South-West Region Flood Defence Committee, Board Member of the National Rivers Authority and Board Member of the South-West Water Authority.

Prof. Richard Macrory - Professor of Environmental Law, Imperial College, London; Member, Royal Commission on Environmental Pollution; Barrister, Brick Court Chambers, Temple; Specialist Adviser in Environmental Law, House of Commons Select Committee on the Environment, Transport and the Regions; Hon. Vice Chairman, National Society for Clean Air; Member, Commission on Environmental Policy law and Administration, International Union on Nature Conservation; Hon. Chairman Merchant Ivory Film Productions Ltd. Formerly Legal Adviser to Friends of the Earth; First Chairman of the UK Environmental Law Association.

Prof. Jacqueline McGlade - Director of NERC Centre for Coastal and Marine Sciences, Director of View the World and of The Earth Centre; Trustee of Forum for the Future.

Formerly Professor of Biological Studies, Warwick University; Professor of Theoretical Ecology, Germany; Senior Research Scientist, Federal Government of Canada.

Dr. Anne Powell - A conservation consultant; Trustee of WWF-UK, and Chairman of their Conservation Committee; Trustee of Berkshire, Buckinghamshire and Oxfordshire Naturalists Trust and member of their Executive Committee; Trustee of the Thames Salmon Trust; member of the Council of the Freshwater Biological Association; Vice Chairman of the Oxfordshire Nature Conservation Forum and member of its Co-ordinating Group; Chairman of the Ponds Conservation Trust; member of the MAFF Fisheries Legislative Review Group; Honorary Fellow of Universidad Autonoma Baja California.

Previously a biology academic; company secretary of the River Restoration Project; and Chairman of Oxfordshire's Agenda 21 Steering Group. Founder of Pond Action, a not-for-profit company, limited by guarantee, undertaking research to support freshwater conservation.

Prof. Donald Ritchie - Professor of Genetics and Director of Graduate Training, University of Liverpool; Member of the EPSRC/NERC Waste & Pollution Management Programme Steering Committee and of the NERC Ecological Dynamics and Genes Programme Steering Committee; member of the NERC Centre for Ecology and Hydrology Programme Review Group; member of the Institute of Biology, Environment Committee.

Formerly Pro-Vice Chancellor of the University of Liverpool; employee of NERC; member of AFRC Food Research Committee.

Mr Tony Rodgers - Director of Shroders Asia Pacific Trust Plc and the Civic Trust; Chairman of Rodgers and Rodgers (marketing communications company); owner of Yeoman's Stud.

Formerly Executive Director of ICI Plc and Zeneca Group Plc.

Mr. Gareth Wardell - (Board Member with special responsibility for Wales) Head of the Geography Department at Trinity College, Carmarthen; Vice President of the National Society for Clean Air; lay member of the General Medical Council; Chair, Standing Orders Commission for the Welsh Assembly; Chairman of the Swansea, Neath and Bridgend region of the Prince of Wales Environment Trust; non-Executive Director of the National Botanic Garden of Wales and of the Industrial Trust; Board Member of the National Trust in Wales .

Formerly MP for Gower, 1982-1997 and Chairman of the House of Commons Welsh Affairs Committee.

ENVIRONMENT AGENCY DIRECTORS

Giles Duncan, Director of Personnel

1968 - 1970 Oxford University (RPE)

1971 - 80 National Union of Public Employees - Area Officer

1980 - 1995 Various posts with South West Thames Regional Health Authority, including Industrial Relations Manager and Director of Personnel 1989 - 1995.

1995 to date, Environment Agency Director of Personnel

1971 - 1986 Local Councillor, London Borough of Hounslow. 1982 - 86 Deputy Leader of the Council.

Dr Paul Leinster. Director of Environmental Protection

Dr Paul Leinster joined the Environment Agency in February 1998 as the Director of Environmental Protection. Prior to this he was the Director, Environmental Services with SmithKline Beecham. His previous employers also include BP International, Schering Agrochemicals and the consultancy Thomson-MTS where he was Managing Director.

Paul has a degree in chemistry and a PhD in environmental engineering from Imperial College and a MBA from the Cranfield School of Management.

Geoff Mance, Director of Water Management

Geoff Mance was appointed Director of Water Management for the Environment Agency in the summer of 1995 and is responsible for the water management functions of Flood Defence, Water Resources, Fisheries, Conservation, Recreation and Navigation. He has the lead role for the Agency for the Periodic Review of Water Prices and for Integrated River Basin Management. Prior to his appointment he was Director of Market Testing for the National Rivers Authority. Previously he was a Regional General Manager for the Severn Trent region, which he successfully created in 1988. He is currently senior Vice President of CIWEM.

Pre water privatisation he was responsible for environmental and drinking water quality in Severn Trent Water Authority, following 10 years in commercial research, specialising in water pollution control. He was originally trained in Zoology and Geology.

Ricardo Navarro LLB (Hons.) Lond., Director of Legal Services

Mr Navarro has been Environment Agency Director of Legal Services since April 1996. After 10 years in local government he joined the Department of the Environment in 1983. Worked on "the Right to Buy" and moved as Senior Legal Assistant to work on Water Privatisation in 1986. Responsible for taking the Water Act 1989 through Parliament. Moved from domestic environmental division to legal adviser to Her Majesty's Inspectorate of Pollution in 1992.

Dr Jan Pentreath, BSc, PhD, DSc, FIBiol, FSRP, Chief Scientist and Director of Environmental Strategy

Dr John (Jan) Pentreath has been the Environment Agency's Chief Scientist and Director of Environmental Strategy since its creation in 1995. Prior to that he was the NRA's Chief Scientist and Director of Water Quality, again from its creation in 1989. He was previously Head of MAFF's Aquatic Environment Protection Division and Deputy Director of Fisheries Research. He was educated at the Humphry Davy Grammar School, Penzance, and then at the Universities of London (BSc) and Auckland, New Zealand (PhD). Most of his career has been spent on research related to radioactivity in the environment, for which he was awarded a DSc by the University of London in 1980.

As the NRA's Chief Scientist, Dr Pentreath was responsible for all pollution control work, water quality, and its extensive R&D programme. In the Environment Agency he is responsible for its strategic approach to the environment as a whole, including the monitoring and assessment of the state of the environment, sustainable development aspects of conservation and environmental economics, scientific and technical data and information, and the Agency's overall £12M R&D programme.

Dr Pentreath is a visiting Professor at Imperial College of Science, Technology and Medicine, London and an honorary Professor at the University of East Anglia. He received an honorary Doctor of Science degree from the University of Hertfordshire in November 1998. He was a Council Member of the Natural Environment Research Council for 6 years and is currently a Council Member of the Marine Biological Association of the UK, and a Council Member of the Association for Schools Science Engineering and Technology (ASSET). He is also the Chairman of the Advisory Board of the Centre for Social and Economic Research on the Global Environment.

Miles Wilson, Director of Corporate Affairs

Miles Wilson has a degree in Modern History from Oxford University. He worked in journalism and publishing before moving into the oil industry. For six years he was Government Relations Advisor to Caltex Petroleum Corporation, based in the Arabian Gulf, and then spent nine years as a Public Affairs Manager for Mobil Oil in the UK and the US.

The next five years were devoted to the healthcare industry, with senior Public Affairs positions being held at Amersham International and Glaxo Holdings. He joined the National Rivers Authority as a consultant in 1992 and the following year was appointed Director of Public Affairs with overall responsibility for external Relations (including European Affairs) and Corporate Communications. On 1 April 1996 the NRA was merged with Her Majesty's Inspectorate of Pollution, over 80 local waste regulatory authorities and several sections of the Department of the Environment to form the Environment Agency for England and Wales. Miles was appointed Director of Corporate Affairs for the new organisation.