AN INVESTIGATION INTO THE EFFECTS OF ALTON SEWAGE WORKS ON THE RIVER WEY NORTH

HO

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CONTENTS

1. Summary

During the late summer and early autumn of 1991, the water quality in the upper reaches of the river Wey North, which is normally of very high quality, deteriorated significantly causing fish mortalities in the stretch used for game fishing, and RQO failures.

The deterioration in quality was due to Alton Sewage Works, which is operated by Thames Water Utilities, discharging an effluent into the river that at times breached the consent standards by a large margin. However, most of the time during the period in question, the effluent complied with the consent, but was significantly worse than that normally produced. Under these circumstances, this still caused severe water quality problems in the river downstream. This stretch of the River Wey normally poses no water quality problems such as these, and complies with the 1B RQO. This is because the effluent produced by Alton sewage works, which is the key to high water quality in this stretch, is normally very much better than the consent requires. A drop in quality from the works, although remaining within consent, can produce severe problems in the river. If the water quality in the upper reaches of the Wey North is to be maintained, the consent for Alton sewage works needs to be tightened.

2. Introduction

Alton sewage works is one of the largest sewage works in the River Wey catchment, and is consented to discharge up to approximately 34000m^3/day into the headwaters of the River Wey North. It discharges into a small stream known as the Caker Stream, where there is very little dilution for the effluent. This is a short distance from the confluence with the River Wey Northern arm. Again, there is very little dilution available here for the effluent as the source of the Wey North is very close and the flow is normally very low.

The Wey North from this point downstream to Farnham is of high amenity and as a result has an RQO of 1B. It supports a high quality game and course fishery for most of its length.

It is clear from flow figures alone that Alton sewage works effluent has a major effect on the River Wey North downstream, and the water quality in this stretch is largely dictated by the quality of the effluent.

The monitoring site for the river downstream of the sewage works is at Mill Court, Wyke, some 3.5km downstream. The relative locations of all these points can be seen on the catchment map Fig. 1. The stretch from Alton to Mill Court, and beyond, is normally of very good quality, and complies with the 1B RQO. However, towards the end of the summer of 1991, the water quality deteriorated dramatically due to the sewage works discharging a poor effluent.

The aim of this report is to monitor the impact of the sewage works discharge on the river, and to consider whether the consent limits are still appropriate.

3. Alton Sewage Works

Alton sewage works is located on the eastern edge of Alton, in the industrial area of the town. It is the largest sewage works that discharges into the Wey North catchment. The consent allows a discharge of up to 33909m^3 per day into the Caker Stream that must conform to the following standards:

Summer Standard 1st May - 30th November

Suspended Solids 25mg/l
BOD (ATU) 10mg/l
Ammoniacal Nitrogen 8mg/l

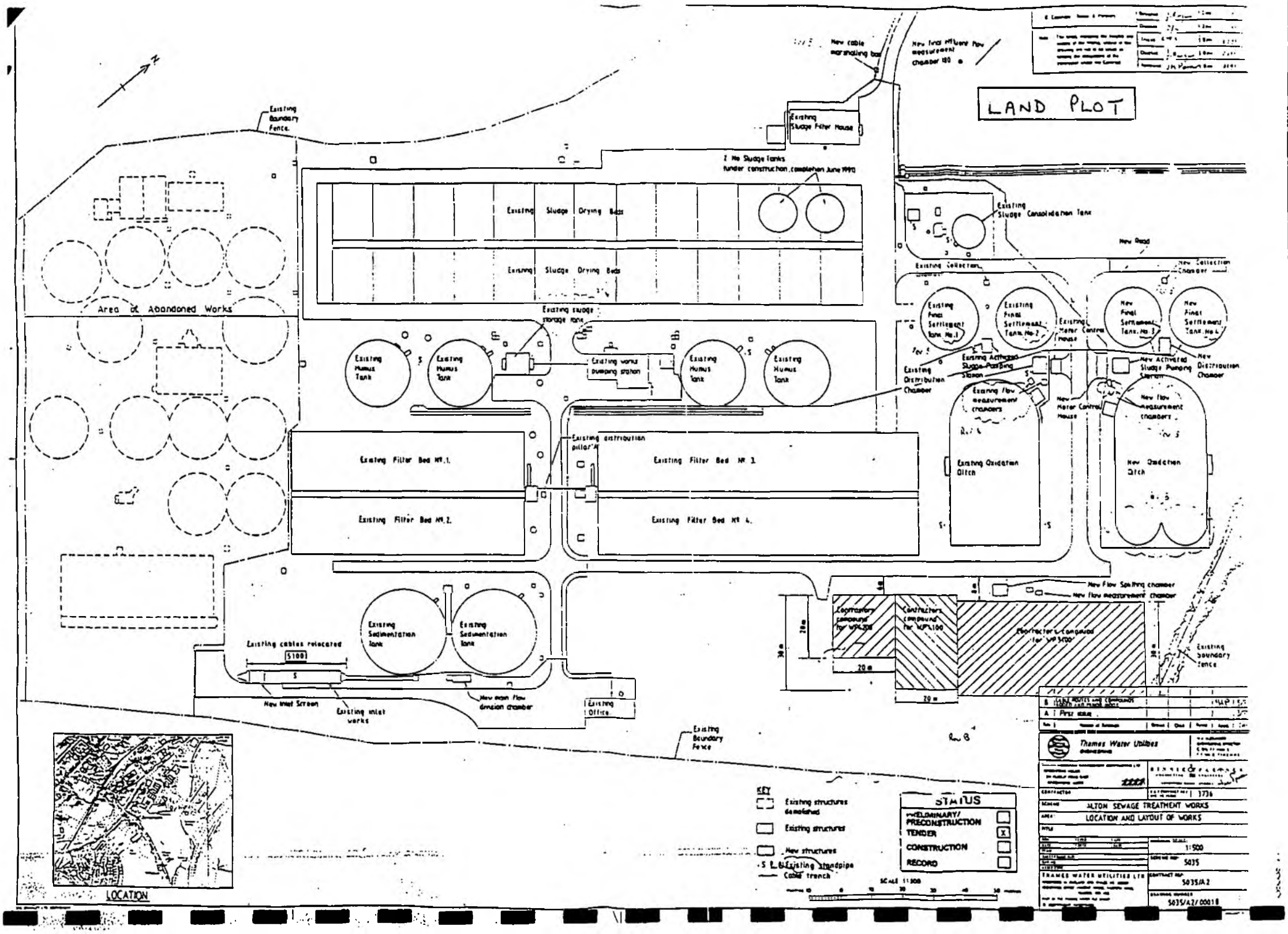
Winter Standards 1st December - 30th April

Suspended Solids 45mg/l
BOD 45mg/l
Ammoniacal Nitrogen 8mg/l

The plant comprises of four banks of rectangular cable drawn percolating filters, and a carousel activated sludge (A/S) oxidation ditch. The flow is normally split 50/50 between the A/S plant and the filters. After running through final settling tanks, the effluent can be put over a land plot for tertiary treatment prior to discharging into the Caker Stream.

Another oxidation ditch, identical to the existing one is currently under construction, to enable the works to accept increased flow from the Four Marks first time sewerage scheme. The existing ditch is currently operated without any primary settlement. Therefore there is one empty primary tank that can be used for storm, or to divert incoming flow to if the need arises.

LAND PLOT


New cable marshalling box
New final effluent flow measurement chamber No 8
Existing Boundary Fence
Existing Sludge Filter House
2 No Sludge Tanks under construction, completion June 1991
Existing Sludge Drying Beds
Existing Sludge Drying Beds
Existing Sludge Consolidation Tank
New Road
Existing Collection Chamber
New Collection Chamber
Area of Abandoned Works
Existing Sludge storage tank
Existing Humus Tank
Existing Humus Tank
Existing works pumping station
Existing Humus Tank
Existing Humus Tank
Existing Final Settlement Tank No.1
Existing Final Settlement Tank No.2
Existing Meter Control House
New Final Settlement Tank No.3
New Final Settlement Tank No.4
Existing Activated Sludge Pumping Station
New Activated Sludge Pumping Station
Existing Distribution Chamber
New Distribution Chamber
Existing flow measurement chambers
New Meter Control House
New flow measurement chambers
Existing distribution pillar "A"
Existing Filter Bed No.1.
Existing Filter Bed No 3.
Existing Filter Bed No.2.
Existing Filter Bed No 4.
Existing Oxidation Ditch
New Oxidation Ditch
New Flow Splitting chamber
New flow measurement chamber
Contractors compound for WPN 200
Contractors compound for WPN 100
Contractors compound for WPN 500
20 m
30 m
Existing boundary fence
Existing cables relocated
5100
Existing Sedimentation Tank
Existing Sedimentation Tank
New inlet Screen
Existing inlet works
New main flow division chamber
Existing Office
Existing Boundary Fence
LOCATION
KEY
Existing structures demolished
Existing structures
New structures
S Existing standpipe
Cable trench
SCALE 1:500
STATUS
PRELIMINARY/ PRECONSTRUCTION
TENDER
X
CONSTRUCTION
RECORD
A First issue
Thames Water Utilities
ALTON SEWAGE TREATMENT WORKS
LOCATION AND LAYOUT OF WORKS
1:500
5035
5035/A2
5035/A2/00018

4. Background

On the 2nd September 1992, dead fish were reported to have been seen at Holybourne. When investigated, six large adult Brown Trout (approx. 1-2kg) were removed from a 1 km stretch between Haw Bridge and Mill Court. Many small healthy fish were seen, but it appeared that all large fish had been killed. Apparently the odd one or two large fish had been found dead during the previous week, but had not been reported. The river appeared clean and uncontaminated, but when the DO was measured it was found to be less than 40% saturation at midday. A dawn survey was carried out for D.O. which showed levels only just above 0% saturation at Haw Bridge. Further investigations indicated that the problems in the river may have been caused by the Alton sewage works effluent. A sample taken on 2nd September 1992 at 1515 hours had a suspended solids of 7.6mg/l, a BOD of 11.8mg/l and an ammonia of 6.02mg/l. The consent is 25/10/8 so this sample failed on BOD. Fig. 9 shows archive data for Alton works over the last three years, and clearly shows that the effluent quality is normally much better than the sample taken on 2nd September 1992.

Alton sewage works uses activated sludge as well as a conventional percolating filter plant. Thames Water as part of their long term improvements for Alton, had planned to refurbish the filter beds. The filter beds were essentially arranged in four banks, and it was intended to take two banks at a time out of use for about three months for complete refurbishment. In order to do this, more flow would be put through the other filters, and the oxidation ditch. Thames Water had scheduled this work to start in August, without any prior consultation with the NRA to discuss potential problems that might arise as a result of this work.

On 27th, 28th and 29th August 1991 (Tuesday, Wednesday, Thursday) they conducted a trial run, temporarily taking the two smaller banks of filters out, and switching more flow to the oxidation ditch and the remaining filters. This was done to see if there was any deterioration in effluent quality. Apparently, the ammonia did increase, but remained within the consented limit of 8mg/l. This was based on spot sampling taken within working hours and measured only with a field test kit, no solids or BOD analysis was carried out. The following Monday (2/9/91) dead fish were seen in the stretch between Haw Bridge and Mill Court. The flow in the river at this time was very low indeed, as Fig. 12 and 13 show, and the weather was warm and sunny. The river was at its most vulnerable in conditions such as these, and any deterioration in the effluent quality from Alton STW was likely to have serious consequences.

On 12th September 1991 the same banks of filters were taken out of use again, and work began on refurbishing them.

In order to understand the full impact that this was going to have on the river, several recording D.O. meters were installed at strategic points between the sewage works and Mill Court. The data collected from these can be seen in Figs 2 and 3.

On the 18th, 19th and 20th September 1991, reports were received of foaming, and discolouration at Upper Neatham Mill. Some dead and moribund fish were also seen at that point. This was traced back and confirmed to have been caused by the effluent from the sewage works. The effluent was visually very poor, much worse than when inspected prior to the 18th. Sewage fungus was seen to be present on the outfall channel, the land plot, and the final tanks, especially those serving the percolating filter plant.

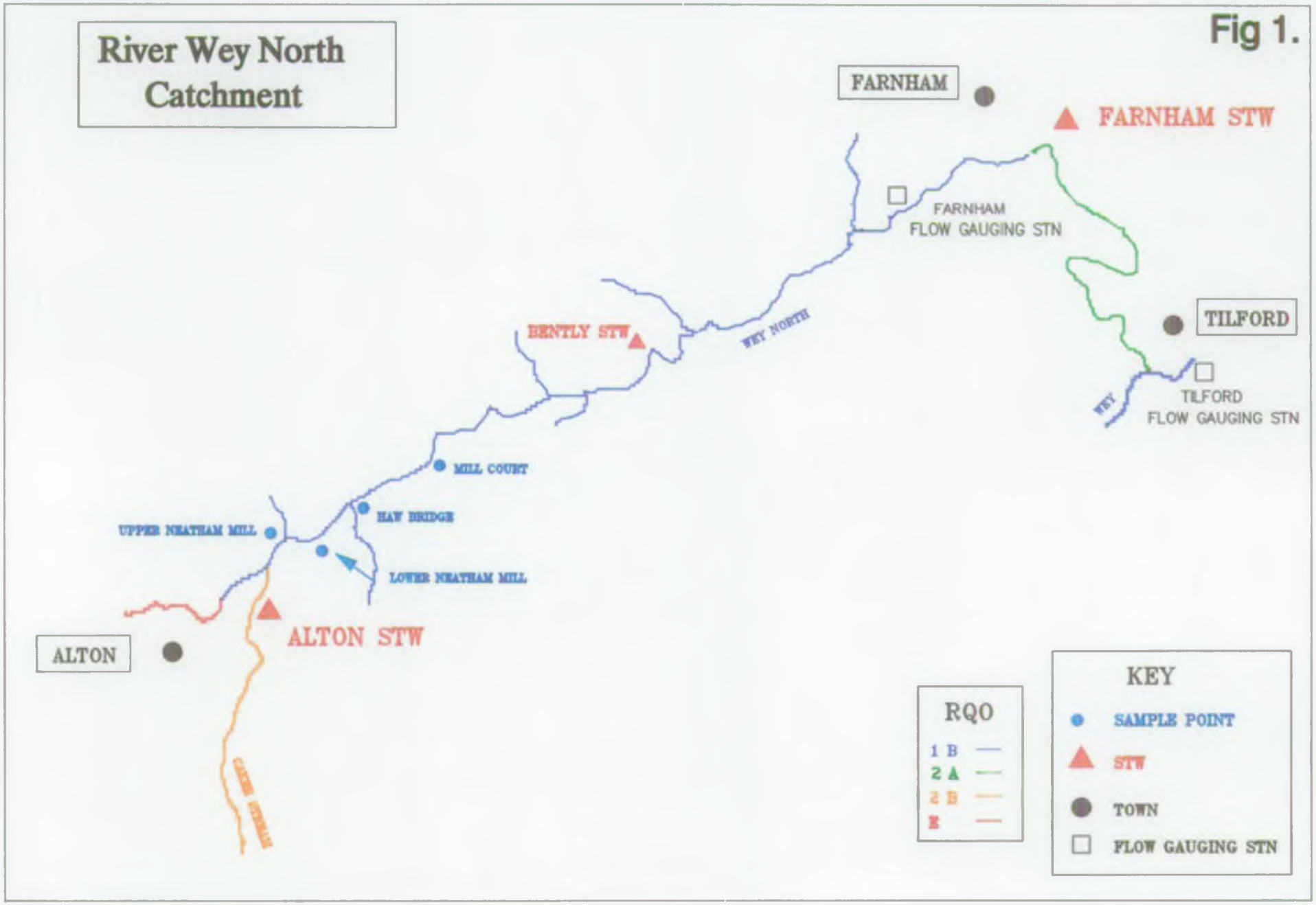
The D.O. levels in the river were considered to be critical, so NRA Fisheries staff installed on "Aero II" aerator in the river at Haw Bridge on 19th September 1991. Additional aerators were put in later at Upper Neatham Mill and Lower Neatham Mill.

The appearance of the sewage works effluent was so poor on Friday 20th September 1991, and the condition of the river so critical that Thames Water were pressurised by the NRA to take any measures they could to improve the effluent. During the afternoon a brief D.O. survey was carried out between the sewage works and Mill Court. The most vulnerable points found were Mill Lane, approximately 0.5km downstream of the works where the DO was 6% sat, Upper Neatham Mill where the D.O. was 10% sat, and upstream of Haw Bridge, where the D.O. was 4% sat. Fungus was visible on the river bed as far downstream as Lower Neatham Mill. Arrangements were made that evening to recirculate the flow that was running through the remaining filter beds. By this time, J. Forber the Area Manager, was sure that the deterioration in effluent quality since 18th September 1991, was due to the works being affected by trade effluent discharge, and not just as a result of the reduced capacity in the plant. Although there is no evidence to support this theory, there does seem to be some justification to suspect a discharge of some form of detergent into the works, as the foaming seen in the river coincided with the deterioration in effluent quality.

By Monday 23rd September 1991, the effluent quality had been improved significantly. Very little fungus was apparent within the works where it had previously been seen. There was also no fungus visible on the river bed at Lower Neatham Mill.

A 24 hour survey was carried out on the 23rd and 24th September 1991, monitoring BOD, ammonia and suspened solids, from the sewage works and the river down to Mill Court every three hours. The results of this survey can be seen in Fig. 4.

As the water quality problem in the river below the works was likely to continue for some months, a mobile Automatic Quality Monitoring Station (AQMS) was installed at Upper Neatham Mill, continuously monitoring the water above the weir. This was kept in place until January 1992. The results from the AQMS can be seen in Figs 5-8.


River Wey North Catchment
Fig 1.
FARNHAM
FARNHAM STW
FARNHAM FLOW GAUGING STN
TILFORD
TILFORD FLOW GAUGING STN
BENTLY STW
WEY NORTH
WEY
MILL COURT
HAW BRIDGE
UPPER NEATHAM MILL
LOWER NEATHAM MILL
ALTON STW
ALTON
RQO
1 B
2 A
2 B
E
KEY
SAMPLE POINT
STW
TOWN
FLOW GAUGING STN

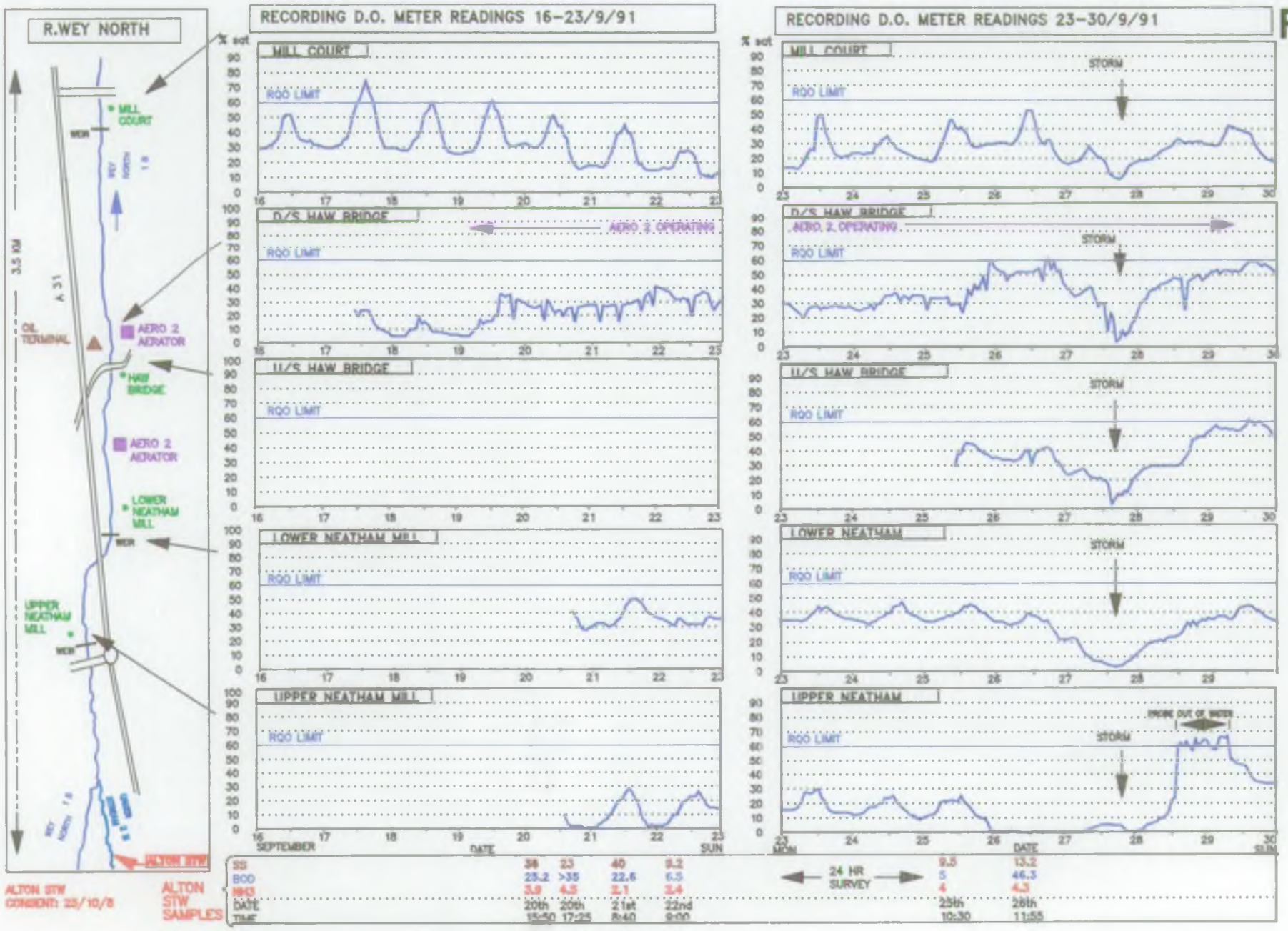

R.WEY NORTH
MILL COURT
WEIR
R. WEY NORTH
3.5 KM
A 31
OIL TERMINAL
AERO 2 AERATOR
HAW BRIDGE
AERO 2 AERATOR
LOWER NEATHAM MILL
WEIR
UPPER NEATHAM MILL
WEIR
R. WEY NORTH
ALTON STW
ALTON STW CONSENT: 25/10/8
ALTON STW SAMPLES
RECORDING D.O. METER READINGS 16-23/9/91
RECORDING D.O. METER READINGS 23-30/9/91
% sat
MILL COURT
D/S HAW BRIDGE
U/S HAW BRIDGE
LOWER NEATHAM MILL
UPPER NEATHAM MILL
RQO LIMIT
AERO 2 OPERATING
STORM
ENGINE OUT OF WATER
SEPTEMBER
DATE
MON
SUN
SS 38 23 40 9.2 9.5 13.2
BOD 25.2 >35 22.6 6.5 5 46.3
NH3 3.9 4.5 2.1 3.4 4 4.3
DATE 20th 20th 21st 22nd 25th 28th
TIME 15:50 17:25 8:40 9:00 10:30 11:55
24 HR SURVEY

Fig 2.


R.WEY NORTH
3.5 KM
A 31
MILL COURT
WEIR
WEY NORTH
OIL TERMINAL
AERO 3 AERATOR
HAW BRIDGE
AERO 2 AERATOR
LOWER NEATHAM MILL
UPPER NEATHAM MILL
ALTON STW
ALTON STW CONSENT: 25/10/5
ALTON STW SAMPLES
RECORDING D.O. METER READINGS 30/9/91 – 6/10/91
RECORDING D.O. METER READINGS 7–13 /10/91
%sat
MILL COURT
D/S HAW
U/S HAW
LOWER NEATHAM
UPPER NEATHAM
D/S HAW BRIDGE
U/S HAW BRIDGE
RQO LIMIT
DATA MISSING
MON
OCTOBER
DATE
SUN
SS 11.6 6
BOD — 4.5
NH3 2.3 <0.5
DATE 2nd 9th
TIME 12:30 10:45

Fig 3.

FIG 4.

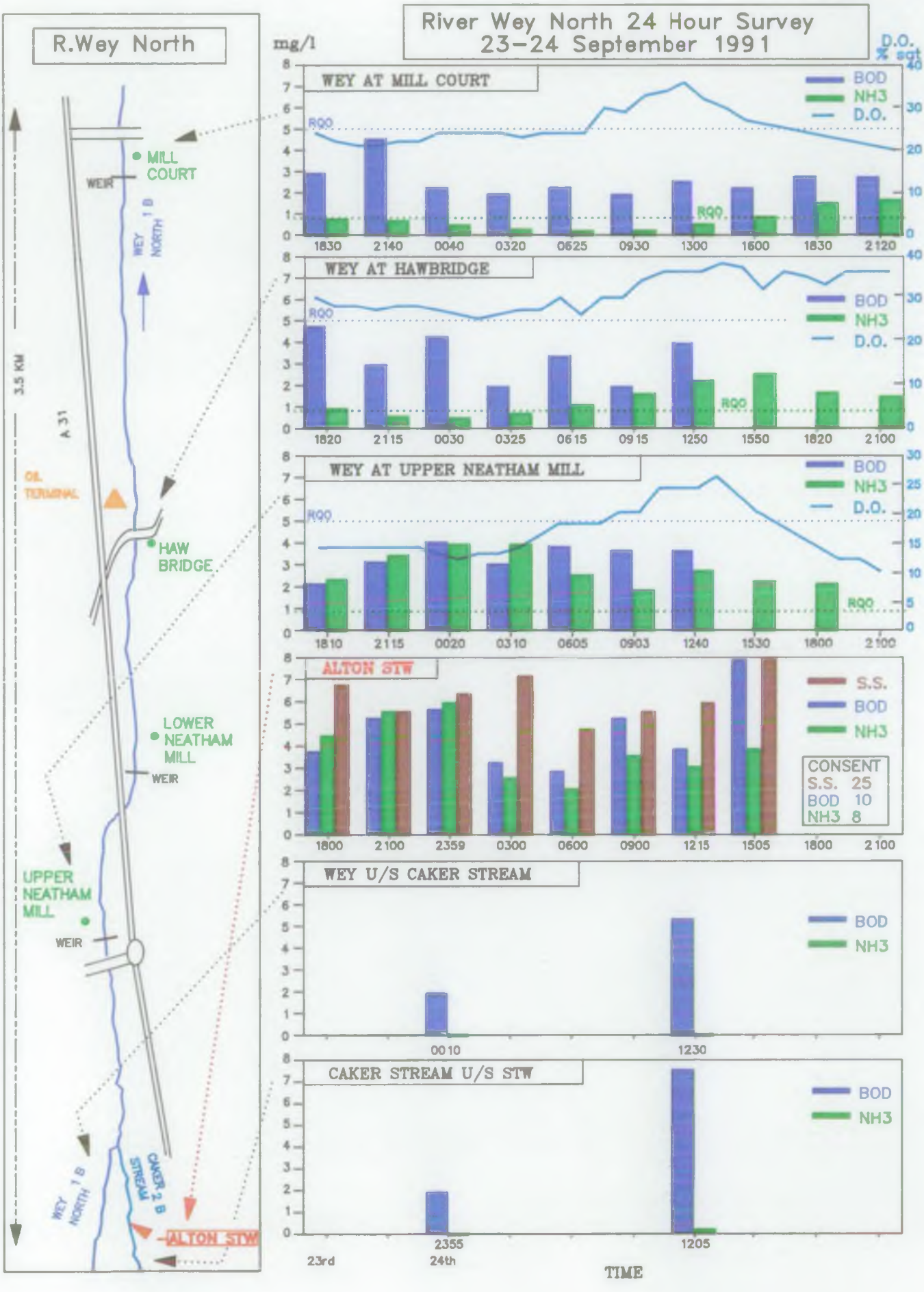

R.Wey North
River Wey North 24 Hour Survey
23–24 September 1991
mg/l
D.O. % sat
MILL COURT
WEIR
WEY NORTH 1 B
3.5 KM
A 31
OIL TERMINAL
HAW BRIDGE
LOWER NEATHAM MILL
WEIR
UPPER NEATHAM MILL
WEIR
WEY NORTH 1 B
CAKER STREAM 2 B
ALTON STW
WEY AT MILL COURT
BOD
NH3
D.O.
RQO
1830 2140 0040 0320 0625 0930 1300 1600 1830 2120
WEY AT HAWBRIDGE
1820 2115 0030 0325 0615 0915 1250 1550 1820 2100
WEY AT UPPER NEATHAM MILL
1810 2115 0020 0310 0605 0903 1240 1530 1800 2100
ALTON STW
S.S.
CONSENT
S.S. 25
BOD 10
NH3 8
1800 2100 2359 0300 0600 0900 1215 1505 1800 2100
WEY U/S CAKER STREAM
0010 1230
CAKER STREAM U/S STW
2355 1205
23rd 24th
TIME

Fig 5.

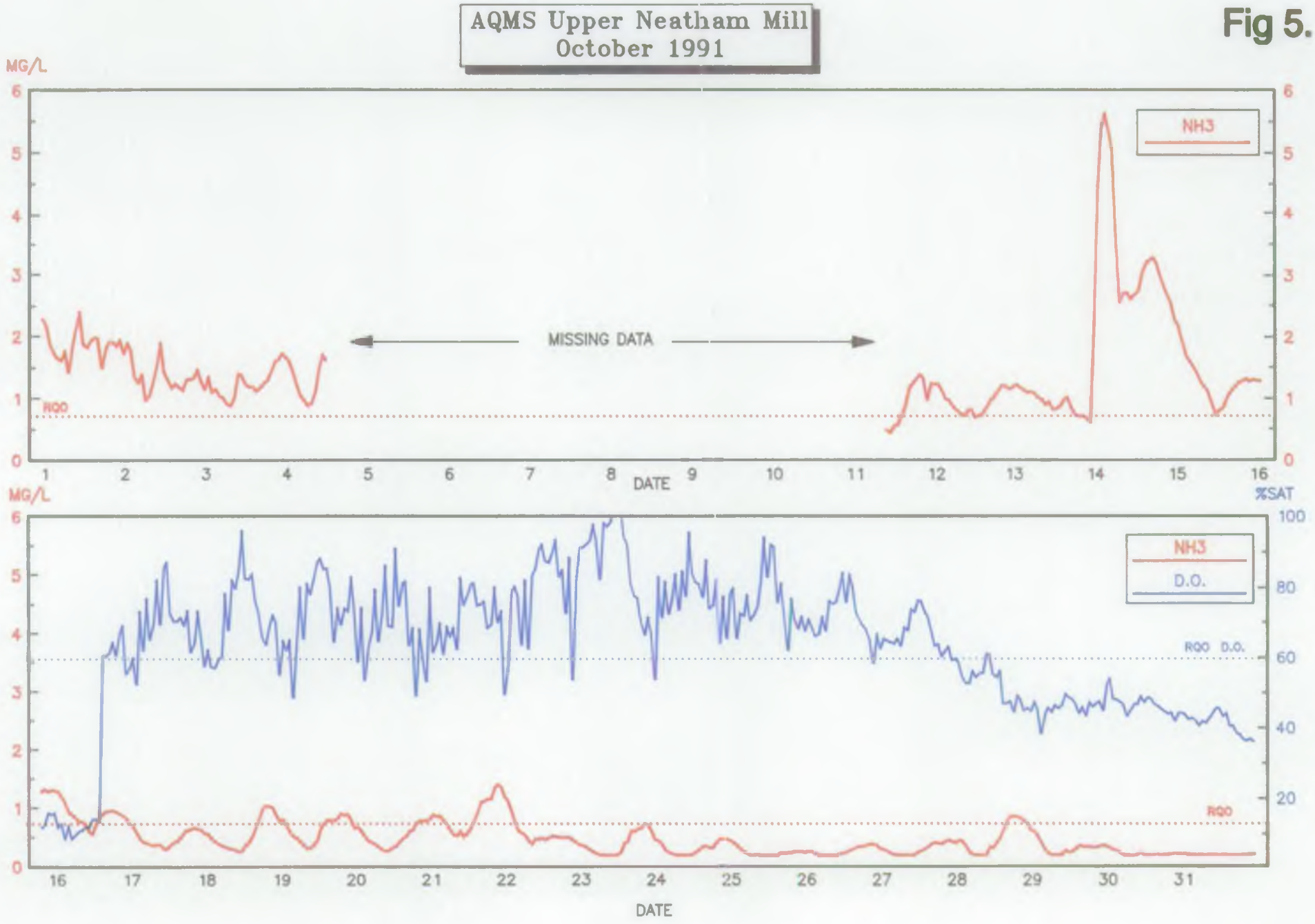

AQMS Upper Neatham Mill
October 1991
MG/L
NH3
RQO
MISSING DATA
DATE
MG/L
%SAT
NH3
D.O.
RQO D.O.
RQO
DATE

Fig 6.

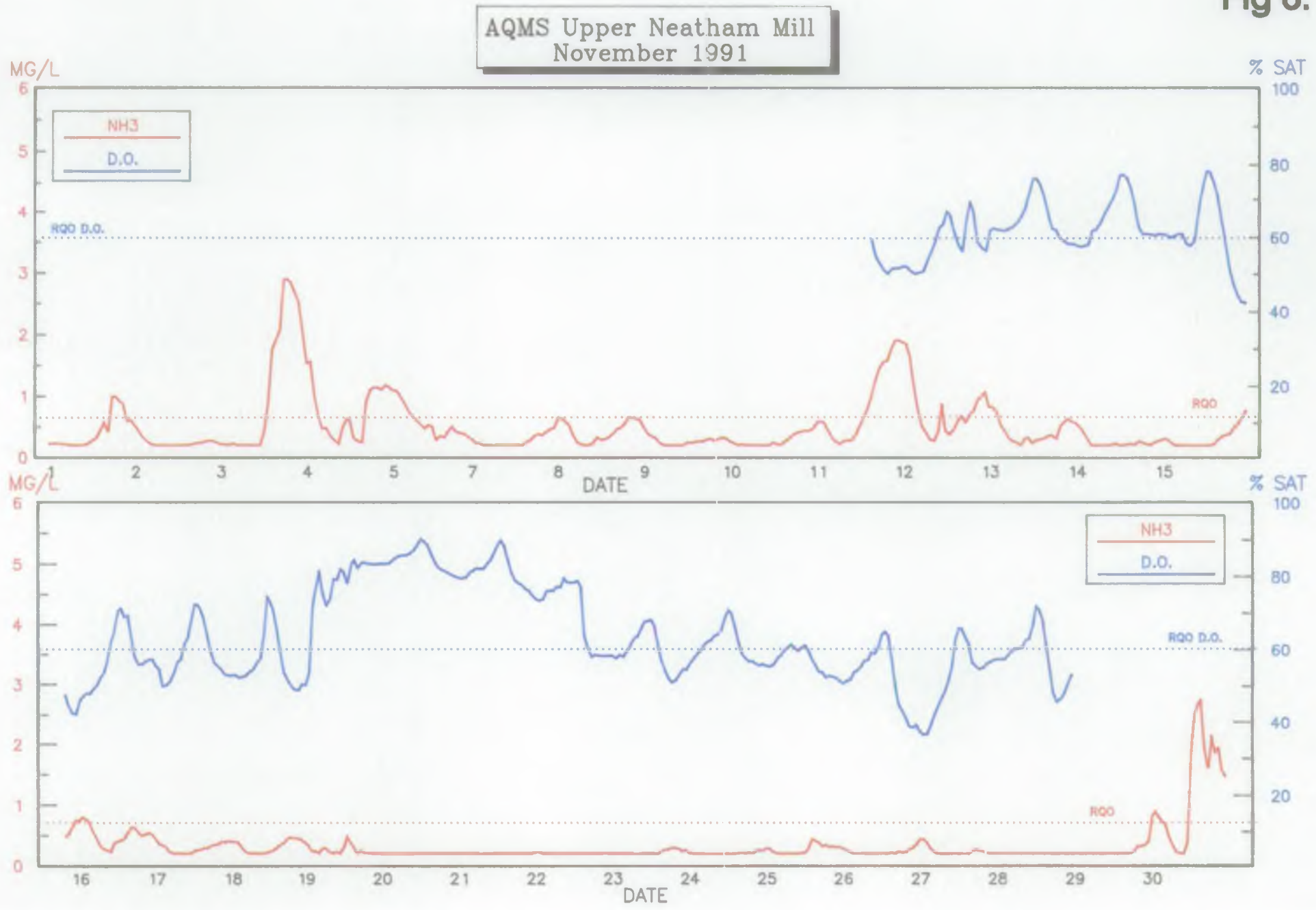

AQMS Upper Neatham Mill
November 1991
MG/L
% SAT
NH3
D.O.
RQO D.O.
RQO
DATE
MG/L
% SAT
NH3
D.O.
RQO D.O.
RQO
DATE

Fig 7.

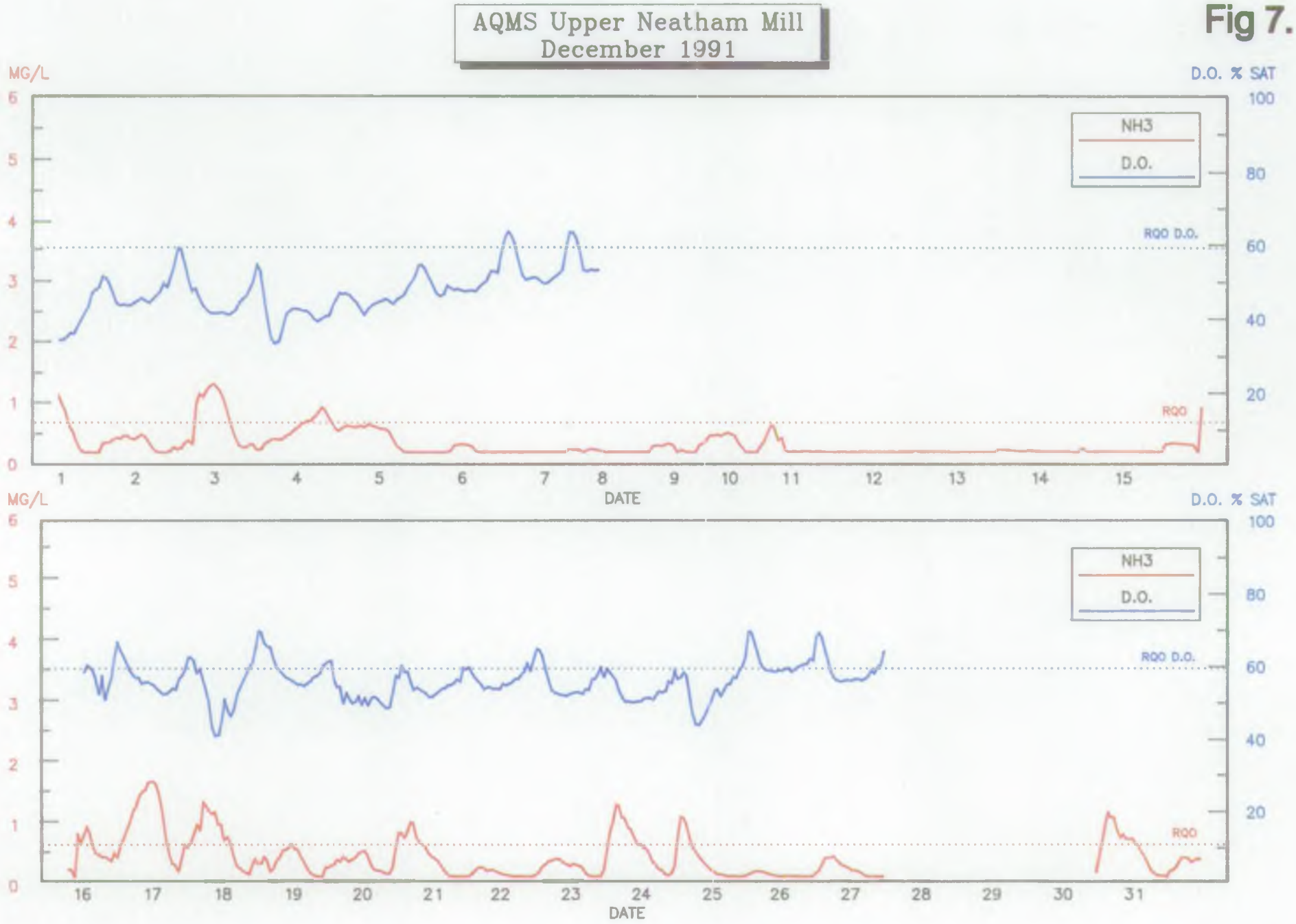

AQMS Upper Neatham Mill
December 1991
MG/L
D.O. % SAT
NH3
D.O.
RQO D.O.
RQO
DATE
MG/L
D.O. % SAT
NH3
D.O.
RQO D.O.
RQO
DATE

Fig 8.

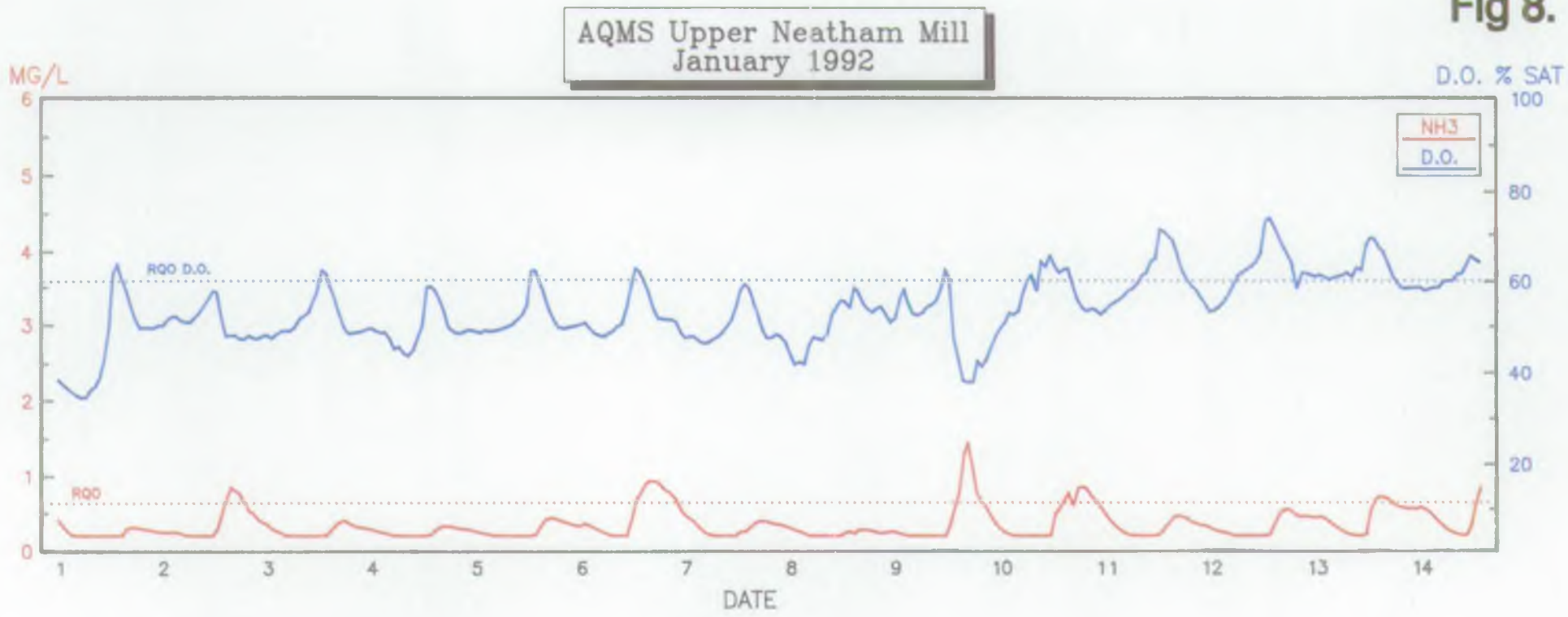
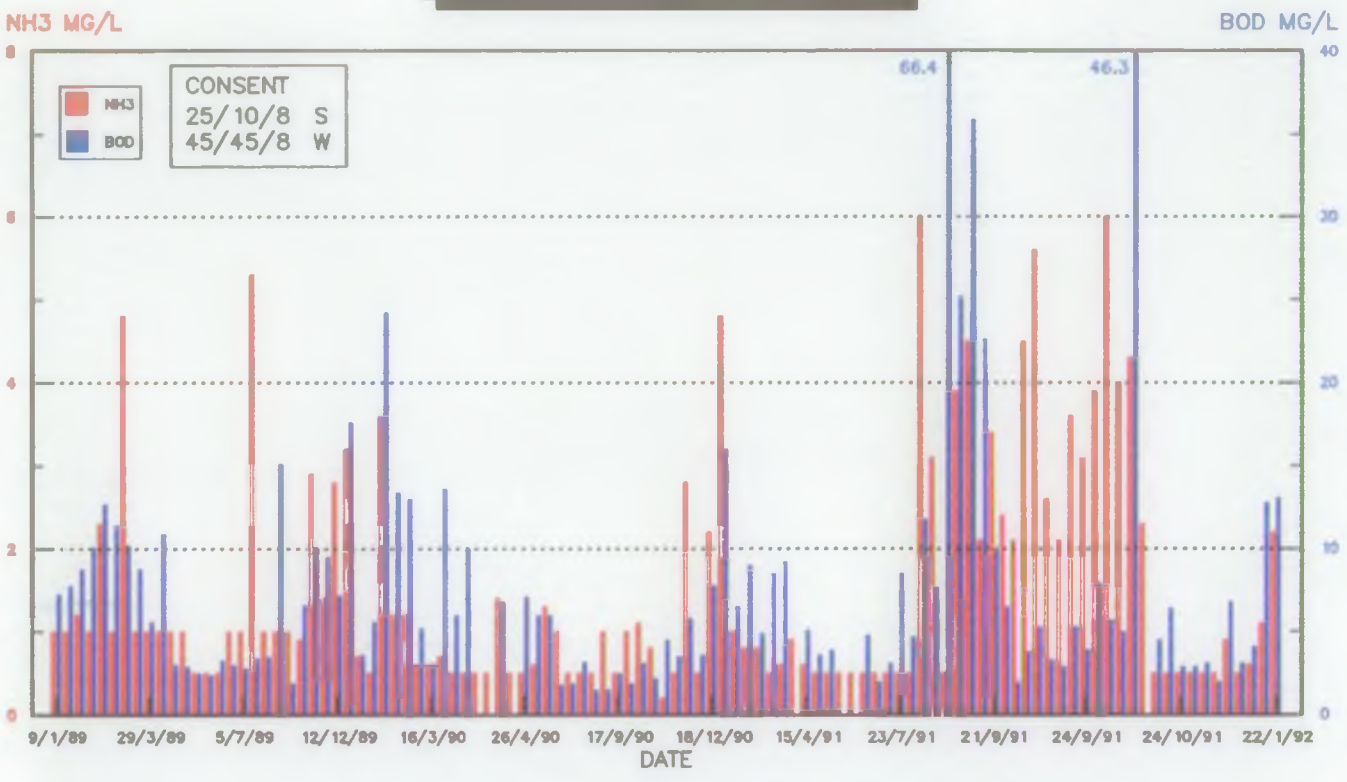

AQMS Upper Neatham Mill
January 1992
MG/L
D.O. % SAT
NH3
D.O.
RQO D.O.
RQO
0
1
2
3
4
5
6
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
11
12
13
14
DATE

Fig 9.

Archive Data
Alton STW 1989–1992



Archive Data
Miil Court 1989–1992

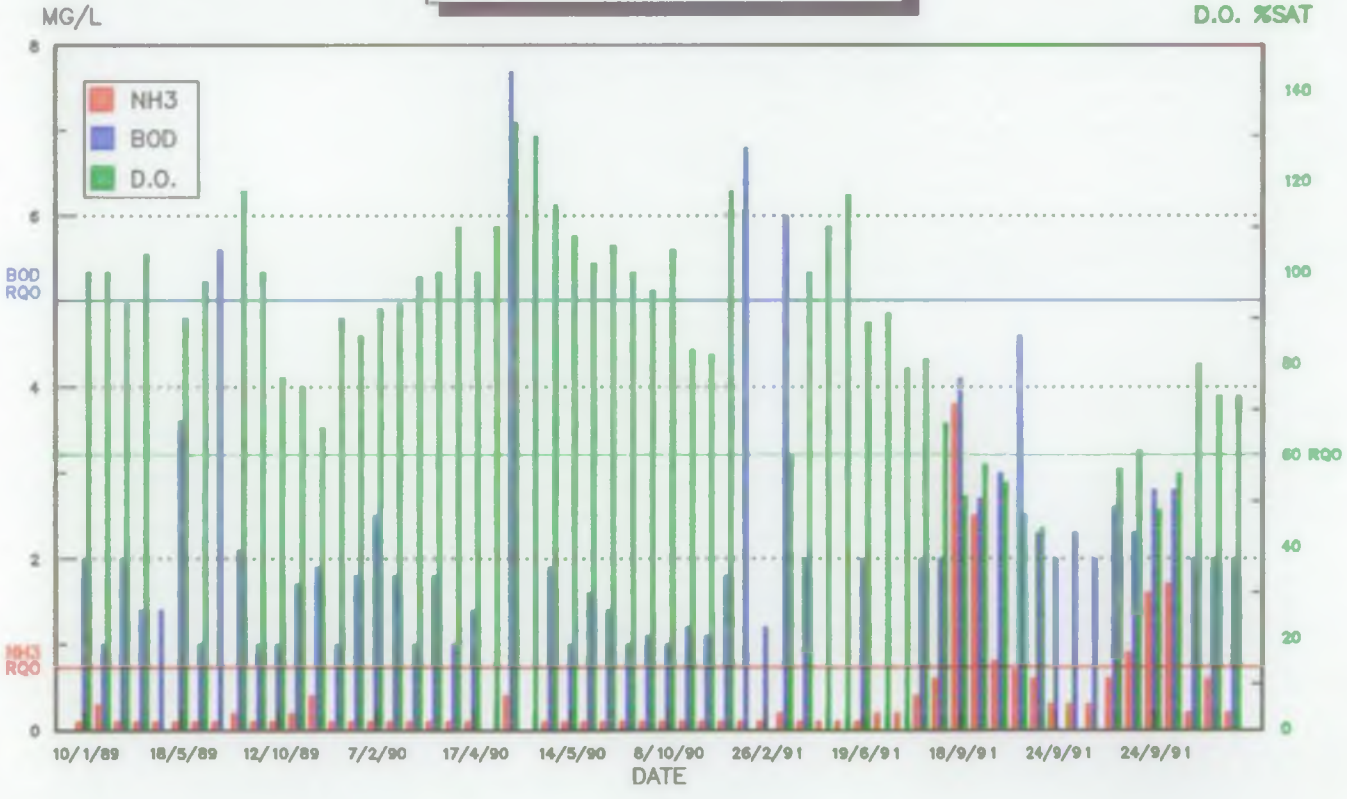


Fig 10.

R.Wey North at Hawbridge
Recording D.O. Meter Data
5th–10th October 1991

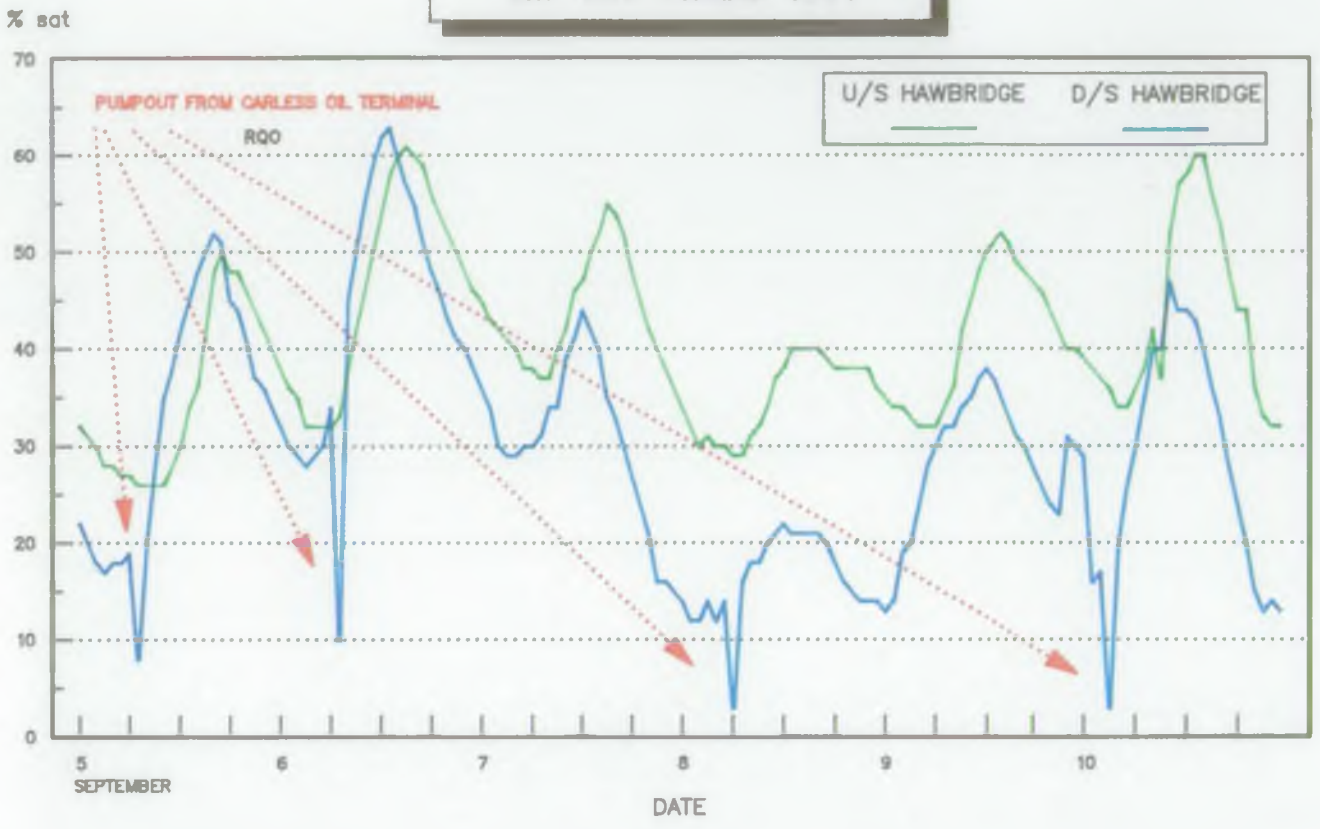


Fig 11.

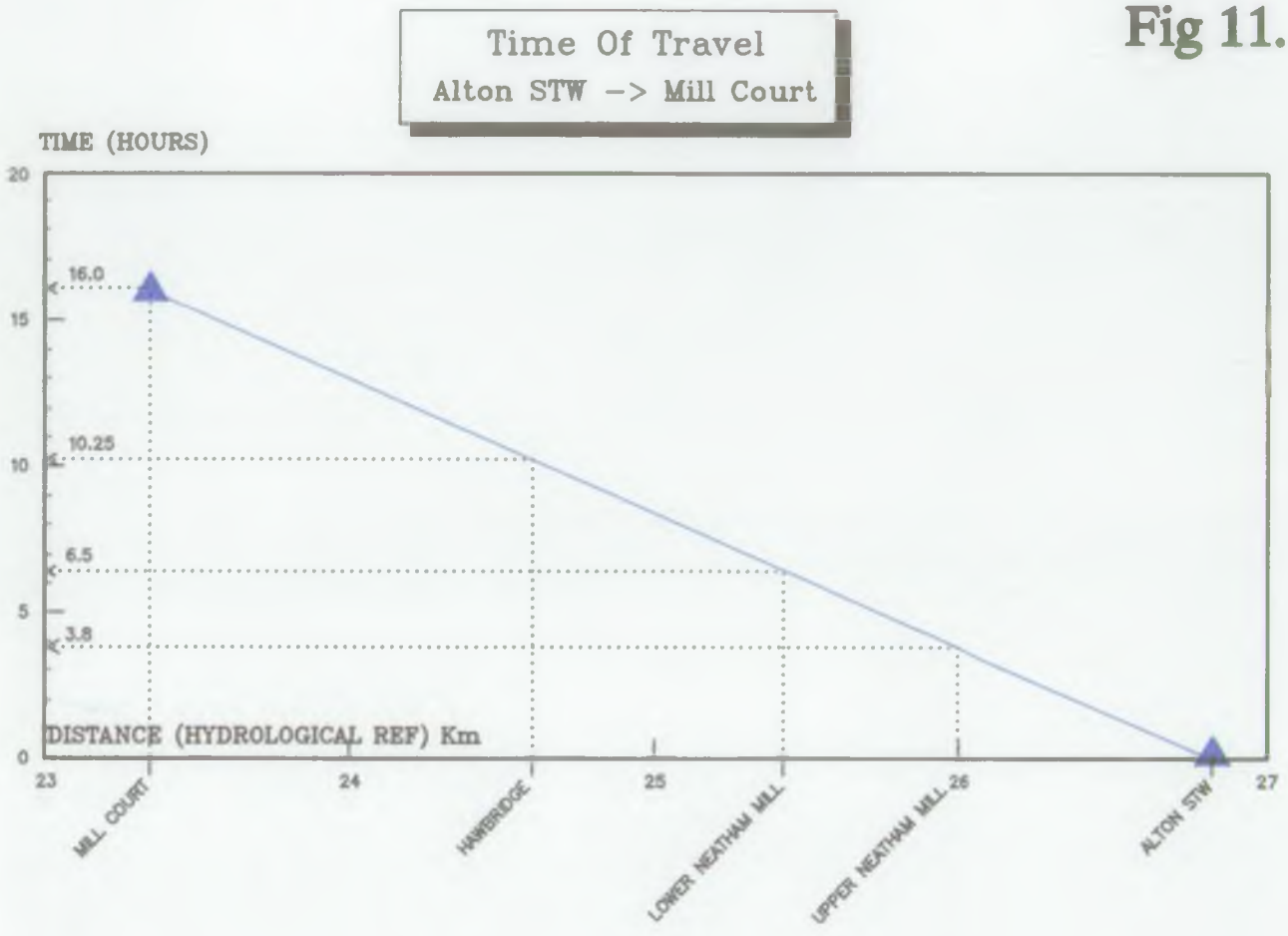

Time Of Travel
Alton STW -> Mill Court
TIME (HOURS)
20
15
10
5
0
16.0
10.25
6.5
3.8
DISTANCE (HYDROLOGICAL REF) Km
23
24
25
26
27
MILL COURT
HAMBRIDGE
LOWER NEATHAM MILL
UPPER NEATHAM MILL
ALTON STW

Fig 12.

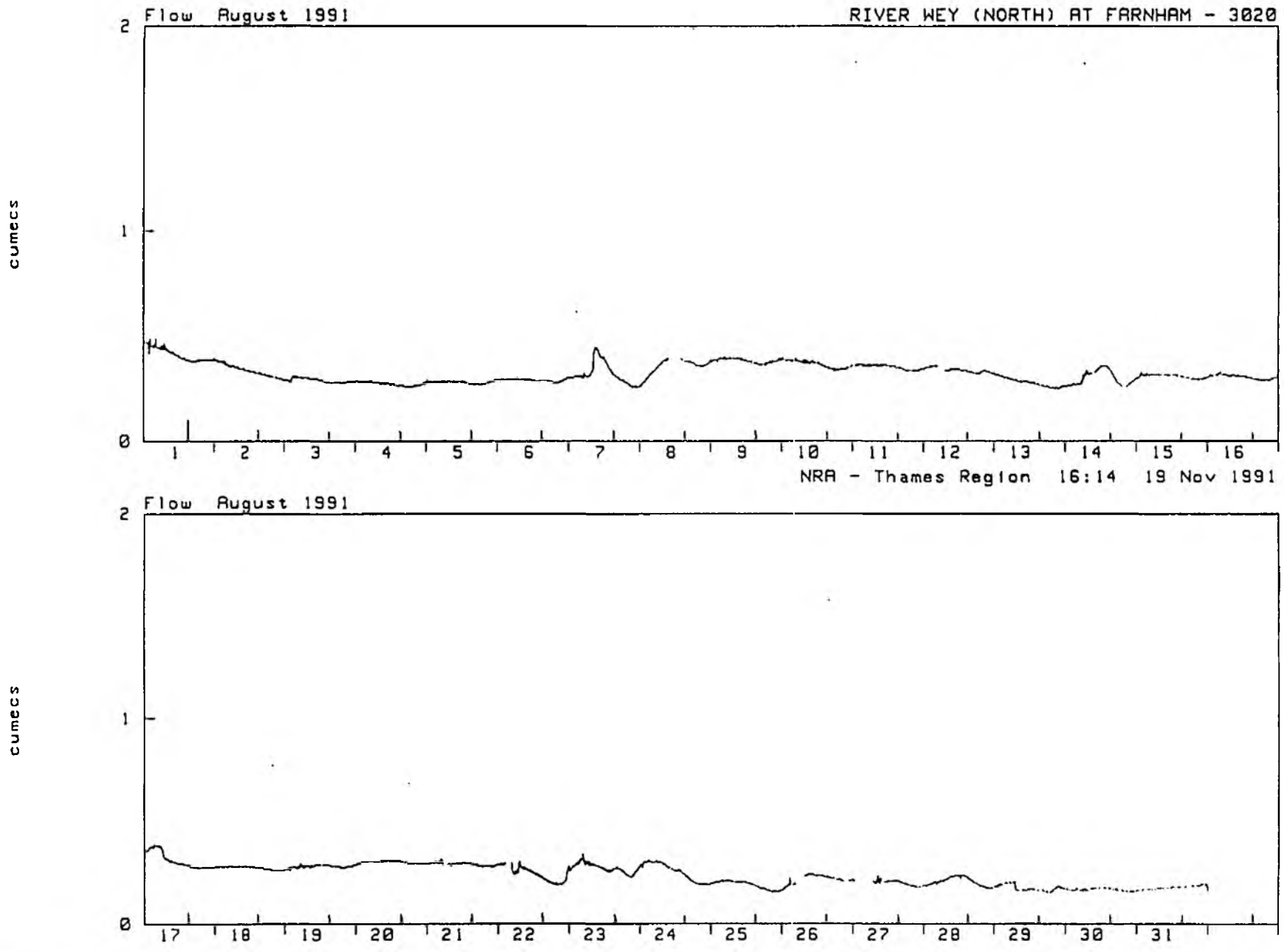

Flow August 1991
RIVER WEY (NORTH) AT FARNHAM - 3020
cumecs
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
NRA - Thames Region 16:14 19 Nov 1991
Flow August 1991
cumecs
2
1
0
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
WEY (NORTH) AT FARNHAM
midnight
9:15 a.m.

Fig 13.

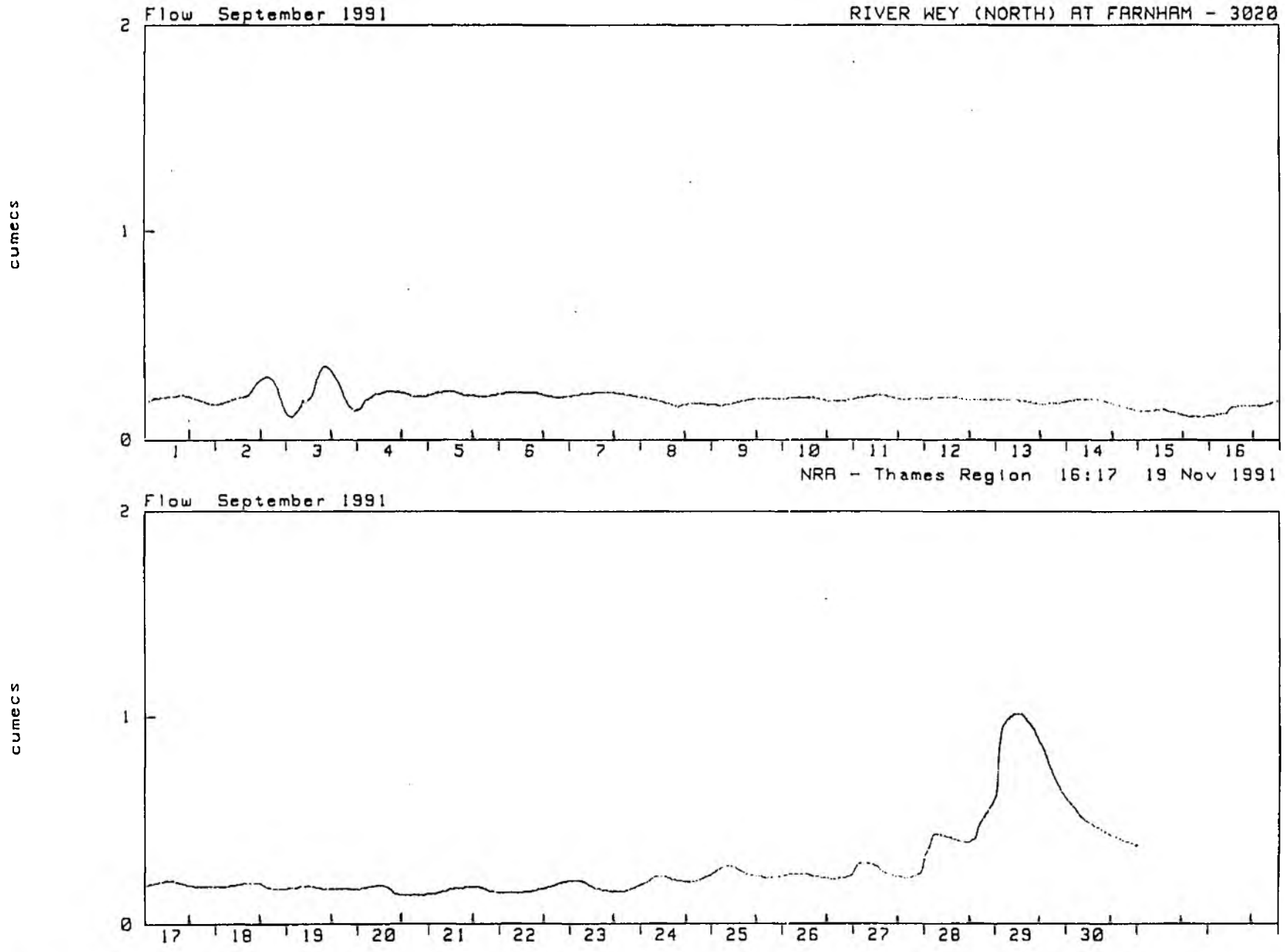

Flow September 1991
RIVER WEY (NORTH) AT FARNHAM - 3020
cumecs
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
NRA - Thames Region 16:17 19 Nov 1991
Flow September 1991
cumecs
2
1
0
17 18 19 20 21 22 23 24 25 26 27 28 29 30
WEY (NORTH) AT FARNHAM
midnight
9:15 a.m.

Fig 14.

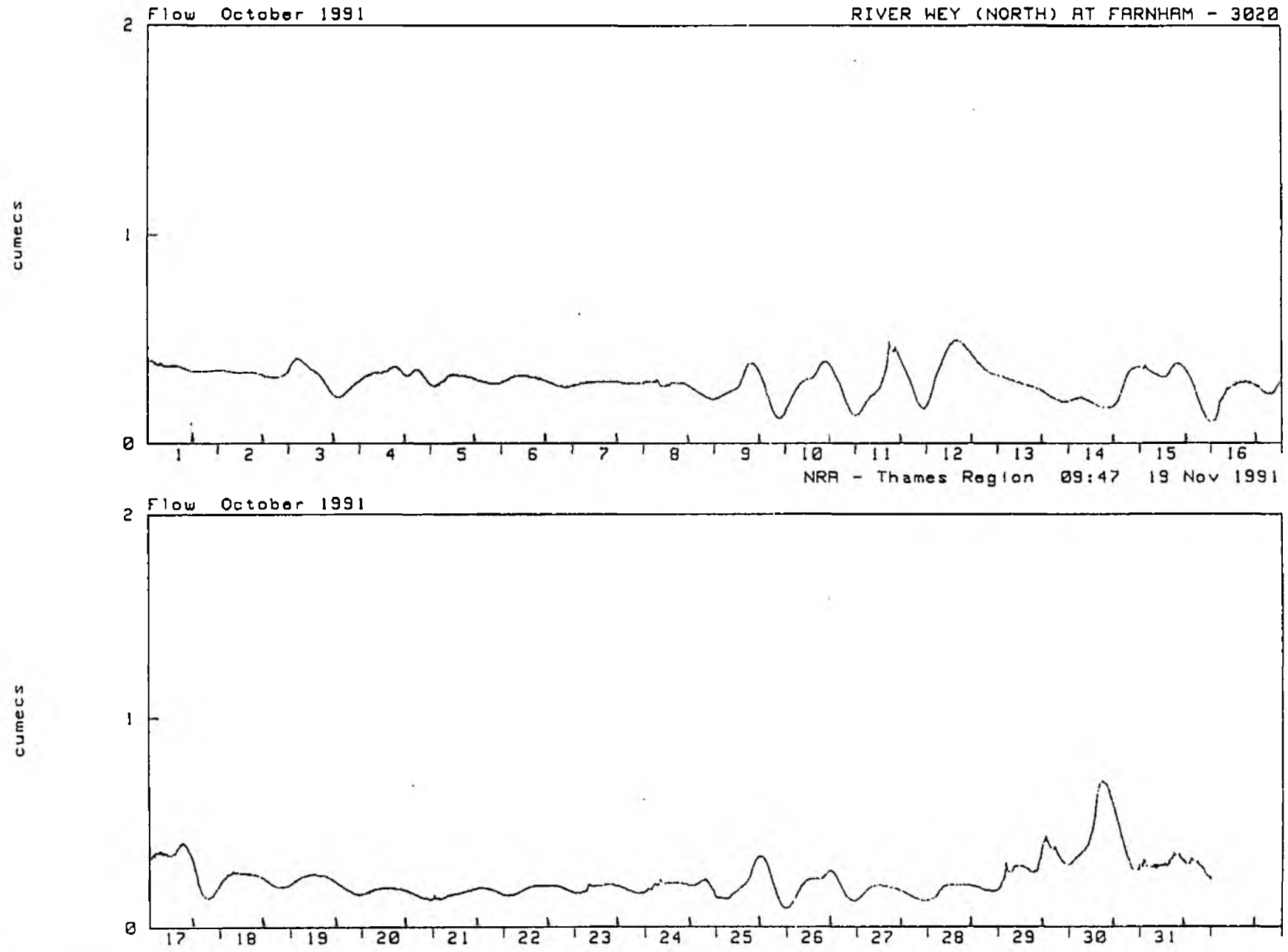

Flow October 1991
RIVER WEY (NORTH) AT FARNHAM - 3020
cumecs
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
NRA - Thames Region 09:47 19 Nov 1991
Flow October 1991
cumecs
2
1
0
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
WEY (NORTH) AT FARNHAM
midnight
9:15 a.m.

Fig 15.

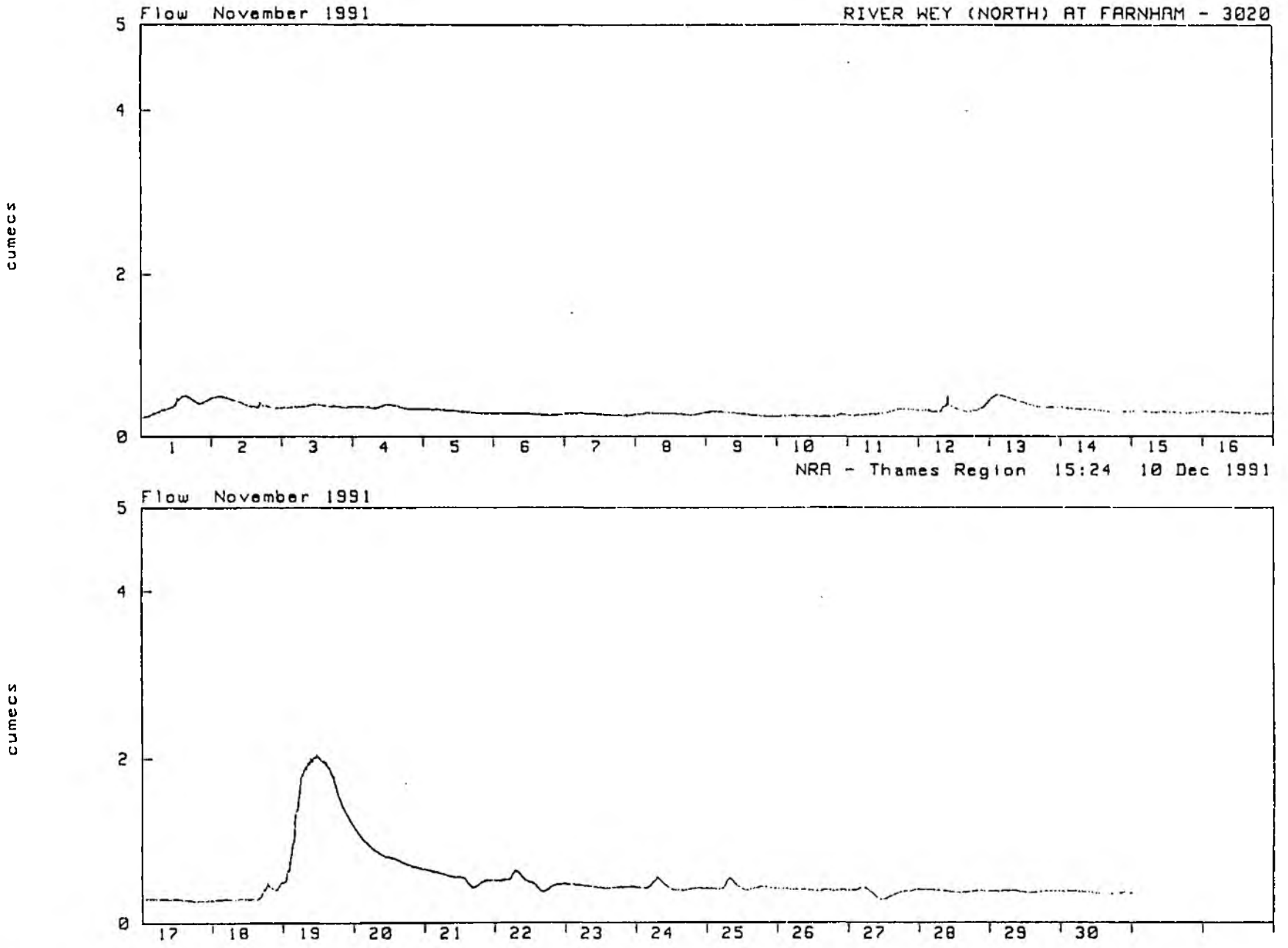
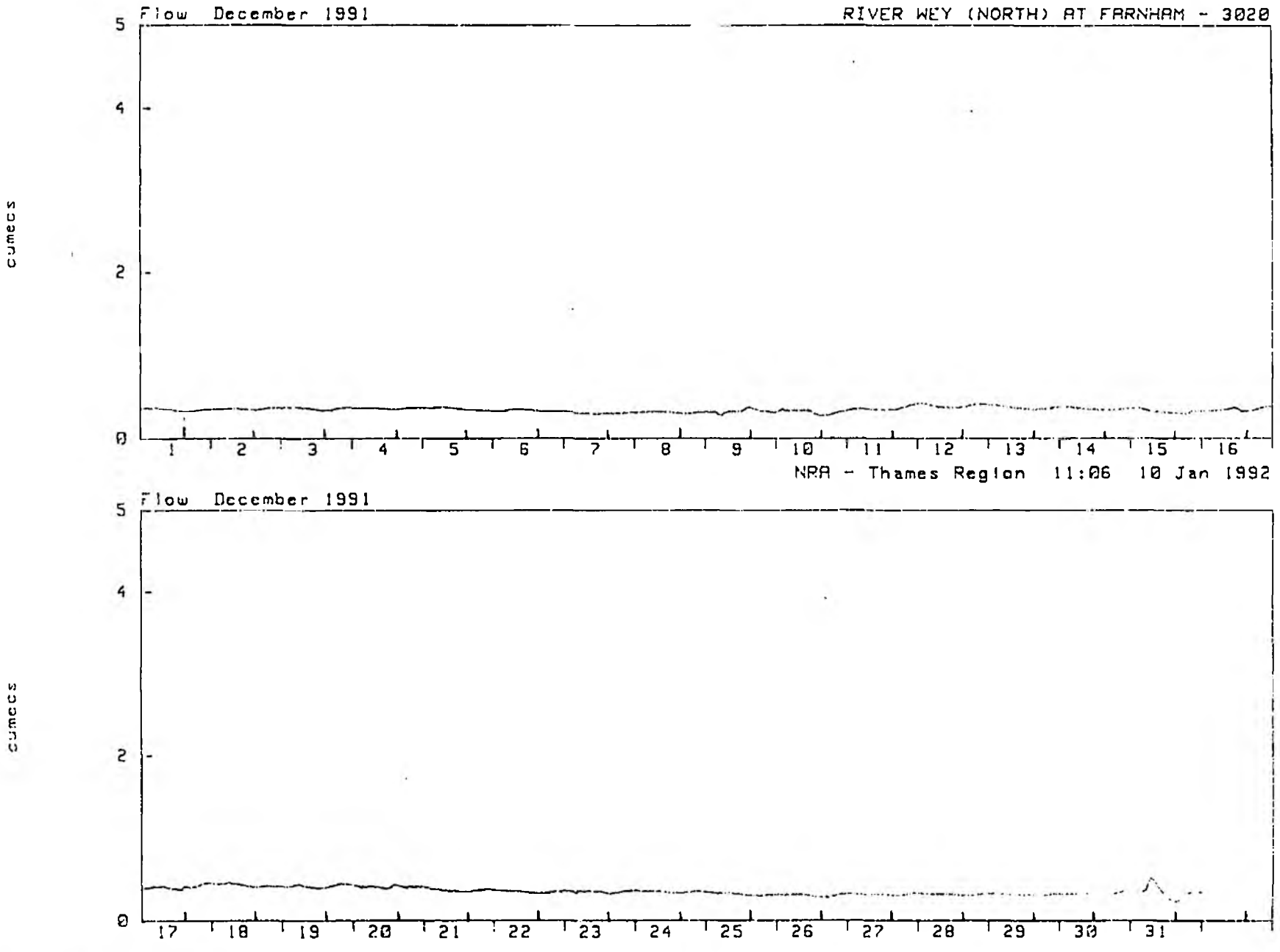

Flow November 1991
RIVER WEY (NORTH) AT FARNHAM - 3020
cumecs
5
4
2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
NRA - Thames Region 15:24 10 Dec 1991
Flow November 1991
cumecs
5
4
2
0
17 18 19 20 21 22 23 24 25 26 27 28 29 30
WEY (NORTH) AT FARNHAM
9:15 a.m.

Fig 16.


Flow December 1991
RIVER WEY (NORTH) AT FARNHAM - 3020
cumecs
5
4
2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
NRA - Thames Region 11:06 10 Jan 1992
Flow December 1991
cumecs
5
4
2
0
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
midnight
9:15 a.m.

Outfall from Alton Sewage Works into the Caker Stream

Confluence of the Caker Stream with the Wey North

Wey North at Upper Neatham Mill

Wey North Overdeepened Stretch above Haw Bridge

Aero II Aerator below Haw Bridge

Outfall from Carless Oil Terminal

Wey North at Mill Court Weir

Wey North at Mill Court Sampling Point

Fungus on Final Tanks Serving Filter Beds

Fungus on Spillway from Land Plot

Activated Sludge Plant at Alton Sewage Works

Filter Beds at Alton Sewage Works

5. Interpretation of Data

Daytime spot D.O. surveys

The spot sample surveys for D.O. carried out between 6th and 25th September 1991, showed low D.O.'s in the river due to the sewage works downstream to Mill Court. Beyond Mill Court the river rapidly recovered. Several particularly vulnerable sites for DO were identified. These were above the weir at Upper Neatham Mill, and further downstream at Haw Bridge. There is no weir at Haw Bridge but the river was over deepened by the landowner illegally dredging the stretch from Lower Neatham Mill to Haw Bridge. This has a similar effect to a weir, slowing down the flow, causing siltation of the bed, and allowing prolific plant growth. A situation such as this would exacerbate any potential D.O. problem.

Data from Recording Meters 16/9/91 - 13/10/91 Figs 2 and 3

The data obtained from the recording D.O. meters installed at Upper Neatham Mill and Haw Bridge that were previously found to be vulnerable, shows the D.O. drop to a minimum barely above 0% saturation at Upper Neatham Mill, and 5% saturation at Haw Bridge. Daytime maximum values were seen to be about 30% saturation. Bearing in mind the exeptionally low levels at dawn, it is assumed that all fish in this area, especially the larger ones either perished or moved out of the stretch.

Looking at Figs. 2 and 3, all sites where recording meters were installed, failed the 1B RQO minimum of 60% saturation for D.O. at all times between 16th September and 13th October 1991, with the exception of Mill Court which peaked at 75% saturation for a few hours on 17th September 1991. The data for Mill Court shows a steady downward trend from 16th September to 23rd September 1991, when it reached a dawn minimum of about 10% saturation. This coincides with the lowest D.O.'s at other sites, and very poor spot samples taken from Alton sewage works. The worst samples were taken from the sewage works mainly between 20th - 22nd September 1991. It is worth noting that the ammoniacal nitrogen for all of these daytime spot samples were not particularly high, and remained within the consent limit of 8mg/l. The BOD for several of these samples however, did exceed the consent level of 10mg/l, some by a very large margin.

On 27th September 1991 a there was a considerable amount of rainfall in the Alton area. This was the first significant rainfall for some weeks and combining with the problems already present in the river, caused a major D.O. sag that was recorded by all of the recording meters. The meter at Upper Neatham Mill showed the D.O. to drop to

0% saturation on the 26th, the day before the rain, and to remain approximately at that level for the duration of the storm. A sample taken from Alton Sewage Works on the 26th showed the effluent to be very poor, with a B.O.D. greater that 46.4mg/l. The previous day it was only 5mg/l. This sudden and considerable deterioration in quality probably gave rise to the additional D.O. sag seen at Upper Neatham Mill on 26th September 1991.

To put the data from the recording meters into context, a recording meter was installed at Mill Court for about four weeks between 16th June 1989 to 18th July 1989. A consistently repeatable pattern was seen for this whole period, showing the D.O. to peak at about 130% saturation in the late afternoon, and a minimum of 70% in the early morning.

Data from 24 hours Survey 23/24th September 1991 Fig. 4

During this period, the ammoniacal nitrogen from the sewage works, was seen to be at its highest during the late evening. However, the effluent remained within consent for all parameters throughout the 24 hours cycle. Despite this the river failed the RQO for ammoniacal nitrogen throughout the whole survey at Upper Neatham Mill, most of the time at Haw Bridge and for some of the time at Mill Court. The river failed the RQO minimum of 60% for DO at all sites throughout the whole survey. The peak ammonia discharge from the works can be seen travelling downstream, arriving at Mill Court the following evening.

Data from the A.Q.M.S. Figs. 5-8

The situation had improved by the time the AQMS was working reliably, but the data does show frequent RQO failures for ammoniacal nitrogen and D.O. It also confirms the pattern for ammoniacal nitrogen seen in the 24 hour survey. Fig. 4, namely the peak value arriving at Upper Neatham Mill during the late evening, approaching midnight. However, the levels seen at this point during the 24 hour survey were considerably higher.

By mid October the D.O. had recovered from the critically low levels found in September, to levels fluctuating around the RQO minimum of 60% saturation.

Archive Data Fig. 9

The data on the archive for spot sample mainly taken as part of the core sampling programme, clearly show that most of the samples taken at Mill Court easily comply with the 1B RQO, and also that most samples taken from the sewage works easily comply with the consent limits.

It can also be clearly seen that the dramatic deterioration in quality at Mill Court coincides exactly with a deterioration in effluent quality at the sewage works, although most of the samples in that period comply with the consent limits.

Between 1st January 1989 and 31st December 1991, the river failed the 1B RQO at Mill Court on thirteen occasions, nine of which were between September and the end of December 1991. During the same period, Alton sewage works failed its consent thirteen times, six of which were between September and the end of December 1991. There has only been one winter failure for the sewage works since 1989, and this was due to an illegal discharge of trade effluent into the works which badly affected treatment.

Carless Oil Terminal, Holybourne Fig. 10

In the course of monitoring the effects of Alton sewage works on the river, another interesting effect was discovered from the surface water outfall serving the Carless Oil Terminal which enters the river just below Haw Bridge. All of the surface water from the site drains via a large oil separator prior to being manually pumped to the river. The system cannot gravitate to the river, nor is it on an automated pumping system. The result is that every few days, depending on rainfall, a very large volume of deoxygenated water from the separator is pumped into the river at a high rate over a short time period. This was found to cause a very sudden and substantial D.O. sag in the river immediately downstream of the outfall. Fig. 10 shows these sags to be as much as 25% saturation and on some occasions reduced the D.O. in the river to a level approaching 0% saturation. If the fish and invertebrate population were able to survive the low D.O.'s caused by the sewage works, these additional D.O. sags would almost certainly have caused mortalities in the river close to the outfall, Under normal circumstances, although undesirable, this discharge would have little significant effect.

Flow Data Figs. 11-15

The data from the hydrometric gauging station at Farnham shows the Wey North to be in a low flow situation from August 1991 through to the end of the year. The only significant increases in flow were recorded for 28/29 September and 19/20 November 1991.

Some spot flow readings were taken by NRA Hydrology staff on 27th September 1991 between Alton and Mill Court.

Site Flow	ml/d
Caker Stream u/s Alton STW	1.0
Caker Stream d/s Alton STW	9.5
Wey N u/s Caker Stream	2.4
Wey N at Mill Lane	13.4
Wey N at Haw Bridge	12.4

This shows the river to be approximately 90% sewage effluent just below the sewage works, and approximately 69% effluent at Haw Bridge.

8. Conclusion

The reports from the Biology and Fisheries sections show that there was little damage done to the invertebrate population, but extensive damage to the fish population. The low D.O. levels primarily affected the larger fish which are more vulnerable under these conditions. The only fish surviving in significant numbers in the stretch surveyed, were small minnows and stone loach.

It is clear that if the 1B RQO is to be achieved at all times in the river below Alton sewage works, the current consent needs to be reviewed.

During the summer period, when the river is in a very low flow condition, and the weather is warm and sunny, 1B RQO can be breached even though the works stays within the 25/10/8 standard. The river under these conditions is approximately 90% effluent, and problems with low D.O. are found where the river is slowed down behind weirs and throughout over-deepened sections. The severe deoxygenation found in the river occurred when the effluent was breaching the consent for BOD, but when it recovered sufficiently to comply the river downstream still failed the RQO for D.O., as can be seen in the 24 hour survey data Fig. 4. The sewage works needs to consistently produce an effluent with a BOD of under 5.0mg/l and an ammoniacal nitrogen of under 1.0mg/l, if the river is to comply with the 1B RQO during low flow conditions.

The winter consent standard for the sewage works is 45/45/8. If the river is in anything other than high flow, an effluent approaching this standard would cause severe problems in the river, and RQO failures. This winter has shown that low flows normally experienced in summer months, can continue well into the winter. The consent standard has to be able to take account of this, the existing winter consent for Alton clearly does not.

Two of the major contributory factors with the water quality problems were that the work was carried out when the river was at its most vulnerable, and that the works was badly affected by a trade effluent discharge/spillage. The effect of this on the sewage works was more severe due to the reduced capacity within the works, and the influence of the resulting effluent on the river more serious due to the flow and weather conditions at the time.

There should be adequate consultation between Thames Water and the NRA if there is to be any work carried out on any of their sewage works that might affect effluent quality.

The river sites most vulnerable below the sewage works are Upper Neatham Mill, behind the weir, and at Haw Bridge. The situation at Haw Bridge has been made worse by the over dredging of a stretch of the river upstream. It has been estimated that to put this right would cost in the region of £35,000, it therefore seems improbable that the river will be reinstated as the dredging took place some time ago, and recovery of the cost from the landowner would be unlikely.

It is recommended that the site used for monitoring the river below Alton should be changed from Mill Court, to Haw Bridge, as this site more accurately reflects problems within the vulnerable reaches.

At present the consent for the surface water discharge from the Carless Oil Terminal at Holybourne has only a "no oil or grease" standard attached, with no quality standards. Bearing in mind the deoxygenation problems the discharge can have in the river, this needs to be reviewed to include standards for BOD and dissolved oxygen.

APPENDIX

RESULTS FROM DAYTIME SPOT D.O. SURVEYS

SITE	DATE 6/9/91	20/9/92	23/9/91	25/9/91
WEY U/S CAKER ST	95	92		
CAKER ST U/S STW	70			
CAKER ST D/S STW		34		
WEY N. MILL LANE		6		
WEY N. UPPER NEATHAM MILL	70	10		22
WEY N. LOWER NEATHAM MILL		40	55	44
WEY N. U/S HAW BRIDGE	40	4	25	30
WEY N. D/S HAW BRIDGE		25	50	50
WEY N. MILL COURT	80	48	50	45
WEY N. FROYLE MILL		100		

WEY NORTH SURVEY 23-4/9/91

24 HR SURVEY

	CAKER U/S STW				WEY U/S CAKER				ALTON STW				UPPER NEATHAM			
DATE	TIME	DO	BOD	NH3	TIME	DO	BOD	NH3	TIME	S.S.	BOD	NH3	TIME	DO	BOD	NH3
23									1800	6.8	3.8	4.5	1810	20	2.2	2.4
									2100	5.6	5.3	5.6	2115	14	3.2	3.5
24	2355	10	2	0.05	0010	34	2	40	2359	6.4	5.7	6	0020	14	4.1	4
									300	7.2	3.3	2.6	0310		3.1	4
									600	4.8	2.9	2.1	605		3.9	2.6
					903		3.7	1.9	900	5.6	5.3	3.6	903		3·7	1·9
	1205		7.6	0.26	1230	51	5.4	0.05	1215	6	3.9	3.1	1240	20	3.7	2.8
									1505	12.5	7.9	3.9	1530	24		2.3
													1800	25		2.2

HAWBRIDGE				MILL COURT			
TIME	DO	BOD	NH3	TIME	DO	BOD	NH3
1820	24	4.8	0.97	1830	54	3	0.83
2115	24	3	0.61	2140	47	4.6	0.75
30	22	4.3	0.54	0040	44	2.3	0.55
325		2	0.74	0320		2	0.34
615		3.4	1.14	0625		2.3	0.26
915		2	1.66	0930		2	0.28
1250	34	4	2.26	1300	57	2.6	0.59
1550	44		2.57	1600	61	2.3	0.93
1820	38		1.72	1830	48	2.8	1.56
2100	29		1.53	2120		2.8	1.73

ARCHIVED DATA: 1989 - 1992

ALTON STW

DATE	NH3	BOD
9/1/89	1	7.3
17/1/89	1	7.8
26/1/89	1.2	8.8
1/2/89	1	10.1
13/2/89	2.3	12.7
1/3/89	1	11.4
13/3/89	4.8	10.2
17/3/89	1	8.8
29/3/89	1	5.6
13/4/89	1	10.9
27/4/89	1	3
8/5/89	1	2.9
8/5/89	0.5	2.5
17/5/89	0.5	2.4
18/5/89	0.5	3.3
22/5/89	1	3
5/7/89	1	2.8
19/7/89	5.3	3.4
9/8/89	1	3.5
17/8/89	1	15.1
22/8/89	1	1.9
23/11/89	0.9	6.6
28/11/89	2.9	10.1
7/12/89	1.4	9.5
12/12/89	2.8	7.2
14/12/89	3.2	17.6
8/1/90	0.7	3.6
24/1/90	0.5	5.6
30/1/90	3.6	24.2
7/2/90	1.2	13.4
19/2/90	1.2	13
5/3/90	0.6	5.2
16/3/90	0.6	3.1
19/3/90	0.7	13.6
26/3/90	0.5	6
17/4/90	0.5	10
22/4/90	0.5	
23/4/90	0.5	
24/4/90	1.4	6.8
25/4/90	0.5	
26/4/90	0.5	7.1
27/4/90	0.6	6
30/4/90	1.3	6
3/5/90	1	1.8
14/5/90	0.5	1.9
24/5/90	0.5	3.2
14/6/90	0.5	1.5
18/6/90	1	1.5
17/9/90	0.5	2.5
1/10/90	1	1.9
8/10/90	1.1	3.1
12/10/90	0.8	2.2
30/10/90	0.2	4.5
13/11/90	0.5	3.5

MILL COURT

DATE	NH3	BOD	DO
10/1/89	0.1	2	100
13/3/89	0.3	1	100
17/4/89	0.1	2	93
9/5/89	0.1	1.4	104
17/5/89	0.1	1.4	
18/5/89	0.1	3.6	90
5/6/89	0.1	1	98
27/6/89	0.1	5.6	
7/8/89	0.2	2.1	118
4/9/89	0.1	1	100
12/10/89	0.1	1	77
22/11/89	0.2	1.7	75
4/12/89	0.4	1.9	66
8/1/90	0.1	1	90
24/1/90	0.1	1.8	86
7/2/90	0.1	2.5	92
19/2/90	0.1	1.8	93
5/3/90	0.1	1	99
19/3/90	0.1	1.8	100
26/3/90	0.1	1	110
17/4/90	0.1	1.4	100
23/4/90			110
24/4/90	0.4	7.7	133
25/4/90			130
3/5/90	0.1	1.9	115
14/5/90	0.1	1	108
24/5/90	0.1	1.6	102
14/6/90	0.1	1.4	106
18/6/90	0.1	1	100
17/9/90	0.1	1.1	96
8/10/90	0.1	1	105
13/11/90	0.1	1.2	83
17/1/91	0.1	1.1	82
18/2/91	0.1	1.8	118
25/2/91	0.1	6.8	
26/2/91	0.1	1.2	
26/2/91	0.2	6	60
25/3/91	0.1	2	100
21/4/91	0.1		110
19/5/91	0.1		117
19/6/91	0.1	2	89
8/7/91	0.2		91
31/7/91	0.2		79
2/9/91	0.4	2	81
4/9/91	0.6	2	67
18/9/91	3.8	4.1	51
19/9/91	2.5	2.7	58
23/9/91	0.8	3	54
23/9/91	0.7	4.6	47
24/9/91	0.6	2.3	44
24/9/91	0.3	2	
24/9/91	0.3	2.3	
24/9/91	0.3	2	
24/9/91	0.6	2.6	57

ALTON STW

DATE	NH3	BOD
30/11/90	2.8	5.8
6/12/90	0.5	3.6
18/12/90	2.2	7.8
8/1/91	4.8	16
14/1/91	1	6.5
11/2/91	0.8	9
25/2/91	0.8	4.9
26/2/91	0.5	8.5
12/3/91	0.6	9.2
'8/4/91	0.9	
15/4/91	0.6	5.1
8/5/91	0.5	3.5
16/5/91	0.5	3.9
22/5/91	0.5	
29/5/91	0.5	
6/6/91	0.5	4.8
24/6/91	0.5	2
2/7/91	0.5	3.1
23/7/91	0.5	8.5
15/8/91	0.5	4.7
2/9/91	6	11.8
4/9/91	3.1	7.7
19/9/91	0.5	>66.4
20/9/91	3.9	25.2
20/9/91	4.5	>35.9
21/9/91	2.1	22.6
21/9/91	3.4	9.9
22/9/91	2.4	6.5
23/9/91	2.1	2
23/9/91	4.5	3.8
23/9/91	5.6	5.3
24/9/91	2.6	3.3
24/9/91	2.1	2.9
24/9/91	3.6	5.3
24/9/91	3.1	3.9
24/9/91	3.9	7.9
24/9/91	6	5.7
25/9/91	4	5
26/9/91	4.3	46.3
2/10/91	2.3	
9/10/91	0.5	4.5
16/10/91	0.5	6.4
24/10/91	0.5	2.9
29/10/91	0.5	2.9
31/10/91	0.5	3.1
20/11/91	0.5	2
25/11/91	0.9	6.8
5/12/91	0.5	3.1
5/12/91	0.6	4.1
9/1/92	1.1	12.8
22/1/92	2.2	13.1

MILL COURT

DATE	NH3	BOD	DO
24/9/91	0.9	2.3	61
24/9/91	1.6	2.8	48
25/9/91	1.7	2.8	56
14/10/91	0.2	2	80
4/11/91	0.6	2	73
5/12/91	0.2	2	73

CURRENT METER GAUGING PROGRAM V2.0

RIVER : 3 CAKER STREAM AT IND ESTATE SU 729 38
FROM 1000 TO 1010 HRS ON: 27 SEP 1991
GAUGE READING:NONE ORIGIN:R BANK
METER NO : 16262 TECHNICIAN :JJG

TOTAL FLOW	0.012	M3/SEC	i.e. 1.0Ml/d
C.S. AREA	0.044	SQ. METRES	
WATER SPAN	0.600	METRES	
WETTED PERIMETER	0.731	METRES	
HYDRAULIC RADIUS	0.060	METRES	
MEAN VELOCITY	0.266	METRES/SEC	

DEPARTURE NUMBER	DEPARTURE METRES	DEPTH METRES	MEAN VELOCITY METRES/SEC
BANK	0.00	0.07	
1	0.10	0.07	0.321
2	0.30	0.08	0.411
3	0.50	0.07	0.125
BANK	0.60	0.06	

NO. OF VELOCITY MEASUREMENTS: 3 ALL WITHIN RATING

N.R.A. THAMES REGION: HYDROLOGICAL SERVICES

Flow figures for Wg N — ALTON

N.R.A. THAMES REGION

CURRENT METER GAUGING PROGRAM V.2.0

RIVER : CAKER STREAM AT [illegible] D/S STW SU729400
FROM 1020 TO 1040 HRS ON: 27 SEP 1991
GAUGE READING:NONE ORIGIN:R BANK
METER NO : 39657 TECHNICIAN :JG

TOTAL FLOW	0.110	M3/SEC	i.e. 9.5Ml/d
C.S. AREA	0.634	SQ. METRES	
WATER SPAN	1.950	METRES	
WETTED PERIMETER	2.544	METRES	
HYDRAULIC RADIUS	0.249	METRES	
MEAN VELOCITY	0.174	METRES/SEC	

DEPARTURE NUMBER	DEPARTURE METRES	DEPTH METRES	MEAN VELOCITY METRES/SEC
BANK	0.00	0.37	
1	0.10	0.38	0.100
2	0.40	0.38	0.146
3	0.80	0.36	0.185
4	1.20	0.33	0.255
5	1.50	0.28	0.211
6	1.80	0.21	0.167
BANK	1.95	0.21	

NO. OF VELOCITY MEASUREMENTS: 13 ALL WITHIN RATING

N.R.A. THAMES REGION: HYDROLOGICAL SERVICES

N.R.A. THAMES REGION

CURRENT METER GAUGING PROGRAM V.2.0

RIVER : WEY ALTON SU733404
FROM 1050 TO 1115 HRS ON: 27 SEP 1991
GAUGE READING:NONE ORIGIN:R BANK
METER NO : 39657 TECHNICIAN :JJG

TOTAL FLOW	0.155	M3/SEC	i.e. 13.4Ml/d
C.S. AREA	0.892	SQ. METRES	
WATER SPAN	3.150	METRES	
WETTED PERIMETER	3.583	METRES	
HYDRAULIC RADIUS	0.249	METRES	
MEAN VELOCITY	0.173	METRES/SEC	

DEPARTURE NUMBER	DEPARTURE METRES	DEPTH METRES	MEAN VELOCITY METRES/SEC
BANK	0.00	0.23	
1	0.10	0.23	0.116
2	0.40	0.25	0.199
3	0.80	0.27	0.241
4	1.20	0.30	0.219
5	1.60	0.30	0.193
6	2.00	0.30	0.172
7	2.40	0.32	0.150
8	2.70	0.31	0.136
9	3.00	0.28	0.097
BANK	3.15	0.15	

NO. OF VELOCITY MEASUREMENTS: 17 ALL WITHIN RATING

N.R.A. THAMES REGION: HYDROLOGICAL SERVICES

N.R.A. THAMES REGION

CURRENT METER GAUGING PROGRAM V.2.0

RIVER : WEY(30) ALTON SU724396
FROM 0930 TO 0945 HRS ON: 27 SEP 1991
GAUGE READING:NONE ORIGIN:R BANK
METER NO : 16262 TECHNICIAN :JJG

TOTAL FLOW	0.028	M3/SEC	i.e. 2.4Ml/d
C.S. AREA	0.264	SQ. METRES	
WATER SPAN	1.300	METRES	
WETTED PERIMETER	1.665	METRES	
HYDRAULIC RADIUS	0.159	METRES	
MEAN VELOCITY	0.105	METRES/SEC	

DEPARTURE NUMBER	DEPARTURE METRES	DEPTH METRES	MEAN VELOCITY METRES/SEC
BANK	0.00	0.20	
1	0.15	0.20	0.112
2	0.40	0.21	0.134
3	0.70	0.21	0.146
4	0.95	0.21	0.099
5	1.20	0.19	0.037
BANK	1.30	0.16	

NO. OF VELOCITY MEASUREMENTS: 12
NO. BELOW RATING: 2
NO. ABOVE RATING: 0

N.R.A. THAMES REGION: HYDROLOGICAL SERVICES

N.R.A. THAMES REGION

CURRENT METER GAUGING PROGRAM V.2.0

IVER : WEY(N) HAW BR SU745413
ROM 1135 TO 1155 HRS ON: 27 SEP 1991
GAUGE READING:NONE ORIGIN:R BANK
ETER NO : 39657 TECHNICIAN :JJG

TOTAL FLOW	0.144	M3/SEC	i.e. 12.4Ml/d
C.S. AREA	0.579	SQ. METRES	
WATER SPAN	2.950	METRES	
WETTED PERIMETER	3.270	METRES	
HYDRAULIC RADIUS	0.177	METRES	
MEAN VELOCITY	0.249	METRES/SEC	

DEPARTURE NUMBER	DEPARTURE METRES	DEPTH METRES	MEAN VELOCITY METRES/SEC
BANK	0.00	0.20	
1	0.20	0.21	0.052
2	0.50	0.17	0.173
3	0.80	0.18	0.278
4	1.20	0.20	0.309
5	1.60	0.26	0.278
6	1.90	0.23	0.309
7	2.20	0.21	0.328
8	2.50	0.17	0.303
9	2.80	0.14	0.210
BANK	2.95	0.10	

NO. OF VELOCITY MEASUREMENTS: 10 ALL WITHIN RATING

N.R.A. THAMES REGION: HYDROLOGICAL SERVICES

Survey carried out after 1st fish kill 2nd survey 20/9/91

ENVIRONMENTAL QUALITY
Biology (West)

Fobney Mead, Rose Kiln Lane
Reading, Berkshire RG2 0SF

National Rivers Authority
Thames Region

File Sew/Alt.

BIOLOGY LABORATORY REPORT

TO: Paul Greaves (DPO/3)
cc. John Steel (AB/West)
cc. Alan Butterworth (SFO/West)
cc. File: 3/WE/Wey(N)

FROM: Richard Ashby-Crane TELEPHONE: (0734) 311422

DATE: 18 September 1991 REF: BLR087RA.91D

EXAMINATION UNDERTAKEN:	macroinvertebrate sampling and identification
LOCATION:	Wey (N) & Caker Stream, Alton
DATE OF INVESTIGATION:	03/09/91
BIOLOGICAL SAMPLE NO.:	517 - 521
ORIGIN OF REQUEST:	Paul Greaves (DPO/3)
BIOLOGISTS TIME	person-days: 1.5
	site visits: 1

Dead fish - How Br

SUMMARY

Macroinvertebrate samples were taken at five sites (03/09/91) on the River Wey (N) and the Caker Stream following a mortality of fish in the Alton area.

Biological sampling revealed no evidence of a recent pollution incident. There may be longer term water quality problems associated with the outfall from Alton STW (biotic scores in the Caker Stream are generally very low), especially during periods of reduced flow.

N.B. Most of the taxa present at the sites are reasonably tolerant of OO segs. The more sensitive animals were present in very low numbers – even shrimps which would normally thrive in conditions such as those present.

RAC

INTRODUCTION

Macroinvertebrate samples were taken at five sites (03/09/91) on the River Wey (N) and the Caker Stream following a mortality of fish in the Alton area. The standard 3 minute kick/sweep/search method was followed and the samples were sorted and identified in the field.

The grid references of the sampling locations are given in the attached Routine Biological Reports and Taxa Lists.

RESULTS

The biotic scores and lists of taxa associated with each of the five samples are appended to this report.

At none of the sites sampled did the macroinvertebrate communities show evidence of a recent pollution incident.

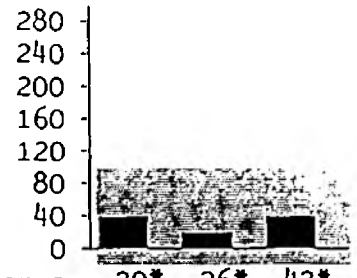
On the Caker Stream (PWER.0090, below Alton STW) and on the Wey (N) above (PWER.0091) and below (PWER.0092) it, the BMWP scores were the highest ever recorded. However, the observed BMWP scores at these three sites were significantly lower than the predicted BMWP scores. On the Wey (N) above the Caker Stream flows were very low and the channel was choked with rotting *Apium* (fool's water-cress). Some "sewage fungus" was present here also.

At Haw Bridge (PWER.0160) the BMWP score recorded was slightly lower than the previous sample (January 1990) but was within the 95% confidence interval of the predicted score. A similar BMWP score was recorded below the Carless Terminal SWO (PWER.9989). Low flows were apparent at these sites also; the gravels were covered in a heavy growth of benthic diatoms.

CONCLUSIONS

Biological sampling revealed no evidence of a recent pollution incident. There may be longer term water quality problems associated with the outfall from Alton STW (biotic scores in the Caker Stream are generally very low), especially during periods of reduced flow.

01910517 Caker Stream Below Alton Stw
Site Ref PWER.0090 Grid Ref SU73004000 Sampled 03/09/1991 at 14:00
Scores Current 43 Previous 26 Change is 65% Improvement. Biotic Class D

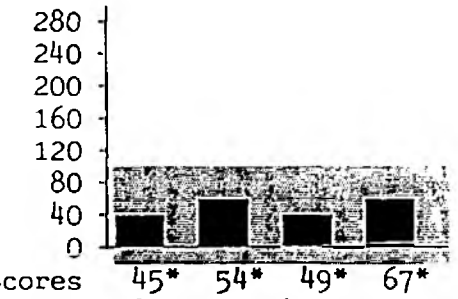


Predicted Score 116

Scores 39* 26* 43* * Non-Routine Sample
Dates 0987 0490 0991

Comments Sampled following fish mortality. High levels of diatoms, Cladophora and Vaucheria covered the pebble/gravel stream bed. Smell of treated sewage. Biological quality is generally very poor at this site, however this is the highest BMWP score recorded here to date.

01910518 Wey(N) Above Caker Stream
Site Ref PWER.0091 Grid Ref SU72904000 Sampled 03/09/1991 at 13:30
Scores Current 67 Previous 49 Change is 36% Improvement. Biotic Class C

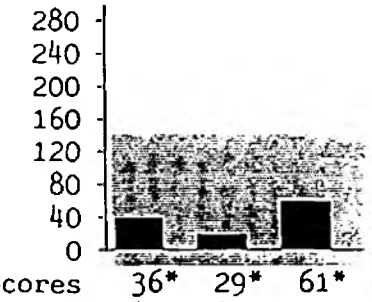


Predicted Score 111

Scores 45* 54* 49* 67* * Non-Routine Sample
Dates 0987 0290 0490 0991

Comments Sample taken following fish mort. d/s and in the Caker Str. Channel choked with Apium which was decaying (smelly) and promoting small growths of "sewage fungus". Gravels smothered in benthic diatoms, Vaucheria and Caldophora. BMWP score was the highest recorded at this site to date.

01910519 Wey(N) Below Caker Stream
Site Ref PWER.0092 Grid Ref SU73104020 Sampled 03/09/1991 at 13:00
Scores Current 61 Previous 29 Change is 110% Improvement. Biotic Class C

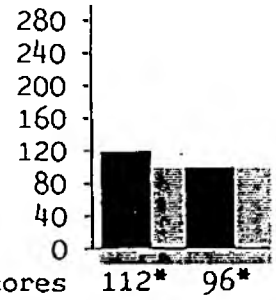


Predicted Score 127

Scores 36* 29* 61* * Non-Routine Sample
Dates 0587 0987 0991

Comments Sampled following fish mort. Gravels smothered with benthic diatoms, Vaucheria and Cladophora. Apium and willowherb dominant at margins. Smell of sewage. This is by far the highest BMWP score recorded here to date. However it achieves less than 50% of its predicted BMWP score.

01910520 Wey(N) At Haw Bridge, Cuckoo's Corner
Site Ref PWER.0160 Grid Ref SU74474117 Sampled 03/09/1991 at 15:00
Scores Current 96 Previous 112 Change is 14% Deterioration. Biotic Class C



Scores 112* 96* * Non-Routine Sample
Dates 0190 0991

Comments Sampled following fish mort. Sparganium, Callitriche and wiilowherb dominant. Gravels smothered in diatoms, Vaucheria and Cladophora. Similar BMWP score to previous visit. Actual biotic scores are only slightly less than those predicted.

01910521 Wey(N) 25m Below Carless Terminal Swo, Alton
Site Ref PWER.9989 Grid Ref SU74504120 Sampled 03/09/1991 at 15:30
Scores Current 94 Predicted 119 Biotic Class C

Comments Sampled following fish mort. Gravels smothered in diatoms, Vaucheria and Cladophora. Callitriche and Ranunculus dominant in stream; willowherb and nettles at margins. One dead bullhead seen. No deterioration in biological quality compared to sample at Haw Bridge 25m u/s Carless Terminal SWO.

Taxa List for PWER 0090 Caker Stream Below Alton Stw SU73004000
3 Samples taken previous to 05/09/1991

Biology Area	01	01	01
Day	17	24	03
Month	Sep	Apr	Sep
Year	1987	1990	1991
*Non Routine Sample			
Sample Number	0317*	0272*	0517*
ANCYLIDAE	*		*
HYDROMETRIDAE		*	
DYTISCIDAE			*
SIMULIIDAE	*		*
BAETIDAE	*		
VALVATIDAE	*		*
HYDROBIIDAE		**	**
LYMNAEIDAE	*		*
PLANORBIDAE	*	**	**
SPHAERIIDAE	*	**	**
GLOSSIPHONIIDAE	*	*	**
ERPOBDELLIDAE	*	***	*
ASELLIDAE	*	*	**
CHIRONOMIDAE	*	***	***
OLIGOCHAETA	*	**	***
BMWP Score	39	26	43
Pred. BMWP Score	166	169	116
BMWP/Pred BMWP	0.23	0.15	0.37
ASPT	3.25	2.89	3.31
Predicted ASPT		5.52	5.10
ASPT/Pred ASPT		0.52	0.65
Biotic Class	D	D	D

Taxa List for PWER 0091 Wey(N) Above Caker Stream SU72904000
4 Samples taken previous to 05/09/1991

Biology Area	01	01	01	01
Day	17	21	24	03
Month	Sep	Feb	Apr	Sep
Year	1987	1990	1990	1991
*Non Routine Sample				
Sample Number	0319*	0058*	0274*	0518*
ANCYLIDAE	*	*	**	*
GAMMARIDAE	*	***	*	*
CORIXIDAE				**
HALIPLIDAE	*		*	**
DYTISCIDAE		*		*
GYRINIDAE				*
TIPULIDAE			*	
SIMULIIDAE				*
PLANARIIDAE		**		*
DENDROCOELIDAE		*		
BAETIDAE				**
PISCICOLIDAE	*			
VALVATIDAE			*	**
HYDROBIIDAE	*	***	**	**
LYMNAEIDAE	*	**	*	*
PHYSIDAE	*	*		
PLANORBIDAE	*	**	**	***
SPHAERIIDAE	*	**	**	
GLOSSIPHONIIDAE	*	**	*	**
ERPOBDELLIDAE	*	*	*	
ASELLIDAE		**	*	**
CHIRONOMIDAE	*	**	***	**
OLIGOCHAETA	*	**	***	**
BMWP Score	45	54	49	67
Pred. BMWP Score	130	154	169	111
BMWP/Pred BMWP	0.35	0.35	0.29	0.60
ASPT	3.46	3.60	3.50	3.94
Predicted ASPT		5.41	5.69	5.10
ASPT/Pred ASPT		0.67	0.62	0.77
Biotic Class	D	C	D	C

Taxa List for PWER:0092 Wey(N) Below Caker Stream SU73104020
3 Samples taken previous to 05/09/1991

Biology Area	01	01	01
Day	19	17	03
Month	May	Sep	Sep
Year	1987	1987	1991
*Non Routine Sample			
Sample Number	0112*	0318*	0519*
CALOPTERYGIDAE			*
ANCYLIDAE	*	*	
GAMMARIDAE	*		*
HALIPLIDAE			*
DYTISCIDAE		*	*
TIPULIDAE		*	
SIMULIIDAE			**
PLANARIIDAE			*
BAETIDAE		*	
VALVATIDAE	*		*
HYDROBIIDAE	*		*
LYMNAEIDAE	*		*
PLANORBIDAE	*		**
SPHAERIIDAE	*		***
GLOSSIPHONIIDAE	*	*	**
ERPOBDELLIDAE	*	*	*
ASELLIDAE			***
CHIRONOMIDAE	*	*	***
OLIGOCHAETA	*	*	***
BMWP Score	36	29	61
Pred. BMWP Score	190	159	127
BMWP/Pred BMWP	0.19	0.18	0.48
ASPT	3.27	3.62	3.81
Predicted ASPT			5.40
ASPT/Pred ASPT			0.71
Biotic Class	D	D	C

Taxa List for PWER 0160 Wey(N) At Haw Bridge, Cuckoo's Corner SU74474117
2 Samples taken previous to 05/09/1991

Biology Area	01	01
Day	11	03
Month	Jan	Sep
Year	1990	1991
*Non Routine Sample		
Sample Number	0011*	0520*
LEPTOCERIDAE	*	
CALOPTERYGIDAE	*	*
PSYCHOMYIIDAE	*	
CAENIDAE	*	
LIMNEPHILIDAE	*	
ANCYLIDAE	*	*
HYDROPTILIDAE	*	*
GAMMARIDAE	*	
COENAGRIIDAE		*
CORIXIDAE		*
HALIPLIDAE	*	**
DYTISCIDAE		**
ELMIDAE		*
HYDROPSYCHIDAE	**	*
TIPULIDAE	*	*
SIMULIIDAE		*
PLANARIIDAE		*
DENDROCOELIDAE	*	
BAETIDAE	*	
VALVATIDAE	**	*
HYDROBIIDAE	**	**
LYMNAEIDAE	*	**
PHYSIDAE	*	*
PLANORBIDAE	**	***
SPHAERIIDAE	*	**
GLOSSIPHONIIDAE	*	**
ERPOBDELLIDAE	**	**
ASELLIDAE	**	**
CHIRONOMIDAE	**	**
OLIGOCHAETA	**	***
BMWP Score	112	96
Pred. BMWP Score	175	114
BMWP/Pred BMWP	0.64	0.84
ASPT	4.67	4.17
Predicted ASPT	5.59	5.00
ASPT/Pred ASPT	0.84	0.83
Biotic Class	B	C

Taxa List for PWER 9989 Wey(N) 25m Below Carless Terminal Swo, A SU74504120
1 Samples taken previous to 05/09/1991

Biology Area	01
Day	03
Month	Sep
Year	1991
*Non Routine Sample	
Sample Number	0521*
PHRYGANEIDAE	*
CALOPTERYGIDAE	*
ANCYLIDAE	*
HYDROPTILIDAE	*
HALIPLIDAE	*
DYTISCIDAE	*
ELMIDAE	*
TIPULIDAE	*
SIMULIIDAE	*
PLANARIIDAE	*
PISCICOLIDAE	*
VALVATIDAE	**
HYDROBIIDAE	**
LYMNAEIDAE	***
PHYSIDAE	*
PLANORBIDAE	***
SPHAERIIDAE	**
GLOSSIPHONIIDAE	**
ERPOBDELLIDAE	**
ASELLIDAE	**
CHIRONOMIDAE	**
OLIGOCHAETA	***
BMWP Score	94
Pred. BMWP Score	119
BMWP/Pred BMWP	0.79
ASPT	4.27
Predicted ASPT	5.20
ASPT/Pred ASPT	0.82
Biotic Class	C

POST POLLUTION SURVEY

WEY NORTH MILL COURT

INTRODUCTION

A survey of the Wey North was carried out on 15th October 1991 following a serious pollution of the river at Alton. This site was chosen as previous survey data was available from 1986.

METHODS

The survey site was the same as fished in October 1986 and is bordered by two small weirs. The section was isolated between two stop nets and pulsed D.C. electrofishing equipment was used to capture fish which were enumerated by species and their lengths(mm) and weights(gm) recorded.

The section contained large densities of stone loach Noemacheilus barbatulus and minnow Phoxinus phoxinus and low numbers of bullhead Cottus gobio which were recorded as present.

After this section had been fished a further 300m of river was fished to ensure that results obtained from the survey section were generally typical of the reach as a whole.

RESULTS

Site Description

The 145m section was bordered by two small weirs. The mean width was 5.5m which was 1.5m less than in October 1986. The average depth was approximately 0.2m. The section had several shallow pools with gravel riffles between them. The beds of Ranunculus sp noted in 1986 were less evident and the encroachment of marginal emergents and the presence of filamentous algae are indicative of the low flows suffered by this river during the last few years.

Conclusion

Apart from the numerous stone loach and minnow the fish population comprised of just seven roach and one stocked brown trout giving a total biomass of 1.1gm^2 at a density of 0.01nm^2.

Although the 1986 survey produced a biomass figure of 11.3gm^2 it was mainly comprised of a low density of large brown trout (probably stocked). The prevailing low flows suffered by this river obviously exacerbate any water quality problems and this coupled with the change in physical habitat is restricting the river's potential for successful spawning and providing fewer suitable holding areas.

Electrofishing a further 300m of river downstream of the survey site revealed similar results with the odd large brown trout and shoals of roach in the deeper glides.

It is hoped that the section between Hoare Bridge and Mill Court will be shortly restocked with approximately 2000 small brown trout (24g) which will hopefully provide us with a better long-term environmental monitor of water quality than the low numbers of larger trout stocked by the riparian owners.