ENVIRONMENT AGENCY

DEVON AREA
INTERNAL REPORT

AN INVESTIGATION INTO THE WATER QUALITY OF THE RIVER WALDON DURING WET WEATHER

JUNE 1996
DEV/E/17/96

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AN INVESTIGATION INTO THE WATER QUALITY OF THE RIVER WALDON DURING WET WEATHER 25 MARCH 1996.

1. CATCHMENT DESCRIPTION

The River Waldon rises at NGR SS 2955 1578 east of Redmondsford. The river flows south east through pasture / agricultural land for approximately 20.5 km and enters the River Torridge at NGR SS 4255 0790.

2. TERMS OF REFERENCE

2.1 OBJECTIVES

A request was received from the Water Quality Officer to determine the water quality of the River Waldon upstream of the Routine Monitoring Site (RMS) at Waldon Bridge ((R29C011 at NGR SS 3684 1041). The investigation was carried out by the Investigations Team Devon Area during the winter of early 1995 (Ref. report no. DEV/E/08/95).

A recommendation of this work was to carry out a further chemical survey in wet weather during winter to establish whether further pollution occurred and to determine the source.

The purpose of this investigation was also to assess areas of concern identified in the previous study and determine if the situation had improved or deteriorated.

2.2 PROJECT TEAM

T. Cronin (Project Leader)
P. Rose (Project Manager, author)
M. Humphreys (Technician)
N. Hicks (Technician)

2.3 METHOD

1. From the previous investigation (Ref. report no. DEV/E/08/95) planning of a chemical sampling survey to include known and potential pollution areas.

2. During the survey any obvious pollutions were to be followed up to source if possible and reported back to the Water Quality Officer for the area.

3. To report to the Water Quality Officer areas of interest.

3. RESULTS

The sampling locations and tabulated results are given in Figure 1 and Table 1. No in situ dissolved oxygen results were possible due to instrument failure.

From the 26 chemical samples taken, 4 of these (approximately 15 %) did not meet the standards for an RE class 2 river (River Ecosystem Use Class, see Table 1 and APPENDIX I). Of these 4 samples, 3 contained high BOD levels and 2 had high concentrations of total ammonia.

During the survey the watercourse was coloured in places which is reflected in the suspended solids concentrations ; 6.1 mm of rainfall were recorded on 25 March 1996 for this area (N.B. rainfall data not fully quality controlled).

For areas of concern please see proforma sheets.

4. DISCUSSION

Of the 5 exceeded values identified (4 sites in total) at the time of the survey, 2 were relatively high, the others were marginal.

The high concentration of total ammonia and high BOD level (9.60 mg/l standard = 0.60 mg/l & 69.2 mg/l standard = 4.0 mg/l respectively) were in the sample from site 21 (see Table 1), a small tributary near the head waters. Although no chemical impact was detected D/S in the River Waldon, the tributary attained an RE class of 5 at the time of sampling (see Figure 1). The pollution was the result of farm effluent from the Crosspark / Honnacotts area running down a road drain and into the watercourse. This area was previously identified during the dry weather investigation (Ref. report no. DEV/E/08/95).

The marginal exceedance recorded at site 6 (total ammonia = 0.74 mg/l, see Table 1) again was localised and did not cause an impact in the main river. The source of the pollution was not identified at the time of the survey, but was probably an unnamed yard from the New House area. This area was previously identified during the dry weather investigation as causing a problem (Ref. report no. DEV/E/08/95).

The sample taken from site 1 at the Berry Farm RMS marginally exceeded the BOD standard (BOD = 4.7 mg/l, see Table 1). The previous investigation did not include the reach between the RMS's Berry Farm and Waldon Bridge (R29C042 at NGR SS 3922 0986 and R29C011 at NGR SS 3684 1041 respectively) and as such, no pollution risk areas were identified. An appraisal of this reach and tributaries should be carried out to determine any potential /polluting inputs.

The fourth site (site 4) had a marginally high BOD level (4.4 mg/l, see Table 1) which did not result in an impact at Waldon Bridge (R29C011), the next RMS D/S. When this area was investigated during the previous study the biological community was indicative of good water quality and the river water contained a total ammonia of 0.03 mg/l (field test kit determination) giving no cause for concern. However there was obviously an U/S input to the tributary at the time of the wet weather survey and as such the area should be investigated further.

An un-licensed tip area was located abounding a tributary north west of Bradworthy (see Figure 1). Although no chemical impact was detected during the survey (see Table 1, site 22) it is feasible that waste matter / leachate could in time enter the watercourse in the future. Because of the nature of the site (owners own 'agricultural waste', see proforma), action by the Waste Regulation section was not found to be possible at this stage due to current legislation. However, action to remedy the situation under Water Resources law may be possible and is to be progressed by Water Quality.

It is encouraging that of the 9 polluting inputs identified during the winter of early 1995 (Ref. report no. DEV/E/08/95) only two areas were found to be still causing localised problems during the wet weather survey.

5. CONCLUSIONS

1. Four areas were identified as containing inputs which resulted in exceeded values of the RE Class 2 standards of the River Waldon.

2. Of these areas, 2 (at Crossparks / Hennacotts and New House) had been previously identified during the initial investigation in February 1995.

3. Chemical impact of the 2 previously identified inputs was less than that identified in February 1995.

4. Of the 4 RMS's sampled, only one (R29C042, Berry Farm) exceeded RE Class 2 standards. No cause for this marginal BOD exceedance was identified.

5. The cause of the marginally exceeeded BOD standard of the Abbots Bickington tributary was not identified.

6. An un-licensed tip site near Bradworthy was not causing an impact on the watercourse at the time of the survey but will be investigated further by the Water Quality Officer.

6. RECOMMENDATIONS

See proforma sheets.

Figure 1. Map showing the River Waldon wet weather sample sites used 25 March 1996.

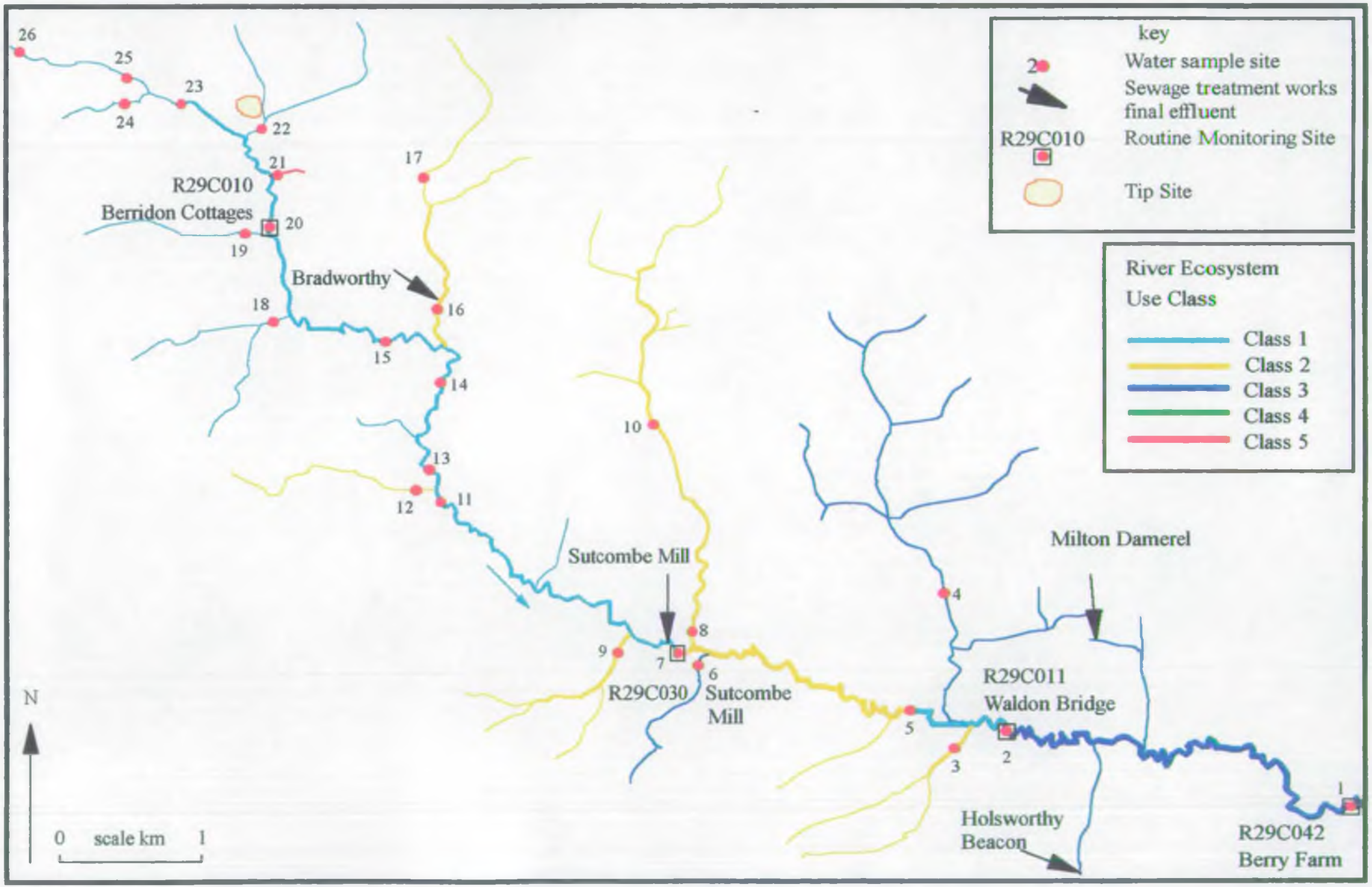

Table 1. River Waldon Wet Weather Survey 25 March 1996

Site	BOD mg/l	Total Ammonia mg/l	pH	Suspended solids 105°C mg/l	Suspended solids 500°C mg/l	River Ecosystem Use Class
1	4.7	0.11	7.45	34.0	26	3
2	2.3	0.15	7.50	31.0	20	1
3	3.3	0.58	7.40	69.0	56	2
4	4.4	0.12	7.25	32.0	27	3
5	2.8	0.11	7.45	16.0	NR	2
6	3.6	0.74	7.20	37.0	29	3
7	1.8	0.08	7.45	14.0	NR	1
8	2.9	0.09	7.40	27.0	23	2
9	3.6	0.27	7.25	33.0	25	2
10	2.9	0.20	7.00	61.0	52	2
11	1.7	0.15	7.40	17.0	NR	1
12	3.1	0.44	7.45	38.0	31	2
13	2.0	0.14	7.40	20.0	NR	1
14	1.7	0.15	7.50	12.0	NR	1
15	1.5	0.04	7.50	6.5	NR	1
16	2.7	0.22	7.45	36.0	29	2
17	2.1	0.12	7.15	21.0	<20	1
18	1.6	0.07	7.35	27.0	24	1
19	1.9	0.07	7.50	13.0	NR	1
20	1.6	0.06	7.40	11.0	NR	1
21	69.2	9.60	7.45	460.0	307	5
22	1.3	0.04	7.45	9.5	NR	1
23	1.6	0.04	7.30	8.5	NR	1
24	1.7	0.14	7.05	19.0	NR	1
25	1.6	<0.03	7.30	6.2	NR	1
26	1.8	0.16	7.00	10.0	NR	1

Standards for RE Class 2 river
BOD (Biochemical Oxygen Demand) = 4.0 mg/l
Total Ammonia = 0.60 mg/l
pH 6-9
NR = no result.

SITE	Crossparks / Honnacotts area
WATERCOURSE	Tributary River Waldon
NGR	SS 2312 1455

EVIDENCE OF WATER QUALITY PROBLEM

Coloured water entering tributary via road drain.

Chemical samples taken as part of the wet weather survey indicate the drain was having an impact in the tributary but not in the River Waldon downstream .

25 March 1996		*	**
Site Description	Site No.	TA mg/l	BOD mg/l
River Waldon D/S of Trib.	1	0.06	1.6
Crossparks / Honnacotts Trib.	2	9.60	69.2
River Waldon U/S of Trib.	3	0.06	1.6

RE Class 2 standards
*Total Ammonia (TA) = 0.60 mg/l
**BOD = 4.0 mg/l

SOURCE OF PROBLEM

Effluent in a ditch along the side of the road by Crossparks and Honnacotts farms was entering a road drain. The drain was in-turn entering the tributary.

IMPLICATIONS

During the wet weather survey the impact was localised to the tributary and was not detected D/S in the River Waldon. At the time of sampling, there was little water in the tributary and the subsequent dilution effect of entering the main river effectively prevented any further impact.

It is still conceivable that with such a direct route for farm effluent to enter the watercourse, should there be a major effluent release from the farms, impact would probably be detectable at Berridon Cottages the next RMS downstream (R29C010 at NGR SS 3184 1408).

This area was also identified during the appraisal of February 1995.

RECOMMENDATIONS

The Water Quality Officer should be aware of the potential risk that this area poses to the water quality of the River Waldon

Action - Water Quality Officer.

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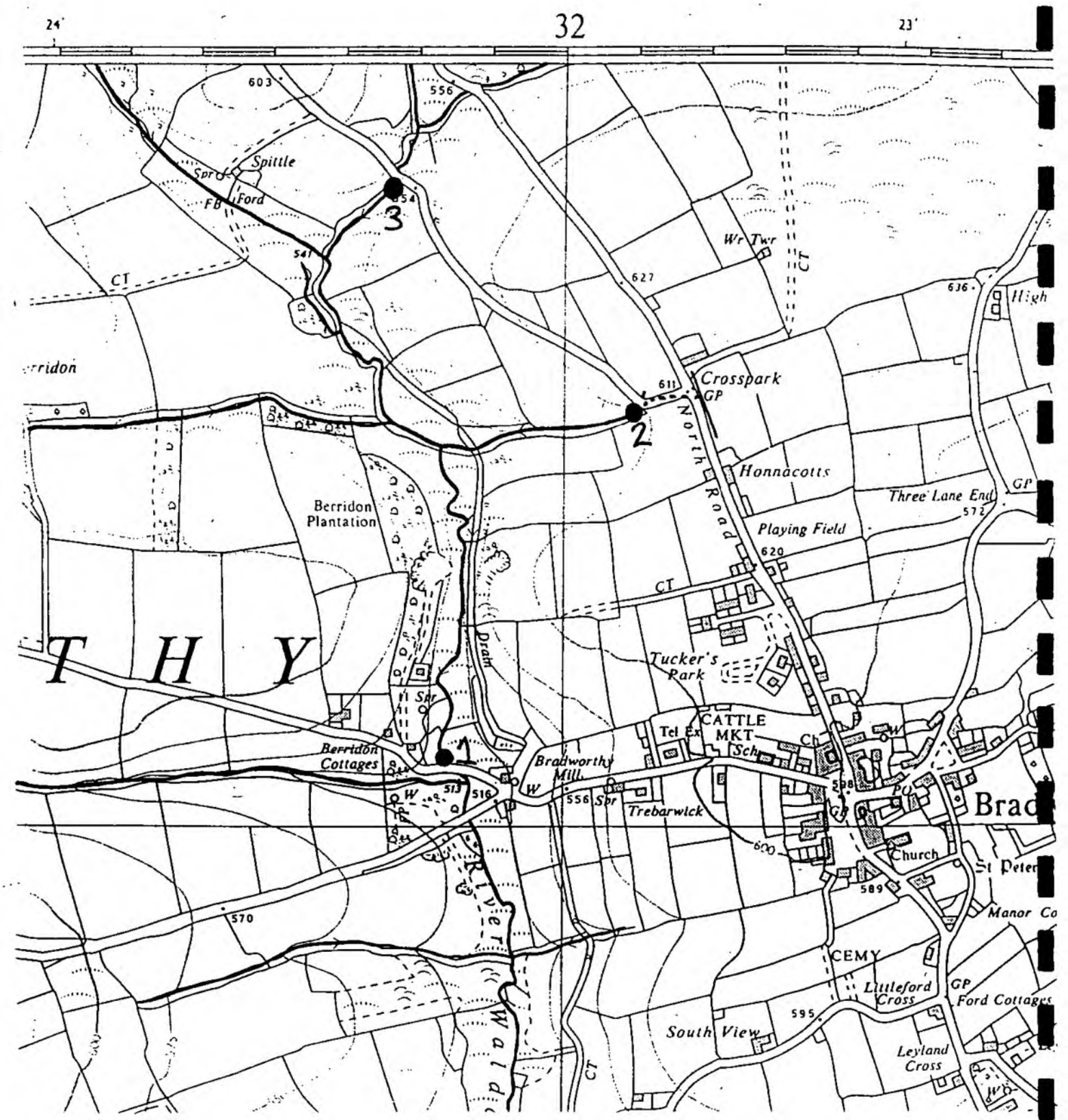


SITE	New House area
WATERCOURSE	Tributary River Waldon
NGR	SS 3485 1090

EVIDENCE OF WATER QUALITY PROBLEM

Chemical samples taken as part of the wet weather survey show the tributary to exceed a standard for an RE class 2 river.

25 March 1996		*	**
Site Description	Site No.	TA mg/l	BOD mg/l
River Waldon D/S of Trib	1	0.11	2.8
New House Trib.	2	0.74	3.6
Sutcombe Mill U/S of Trib.(R29C030)	3	0.08	1.8

RE Class 2 standards
*Total Ammonia (TA) = 0.60 mg/l
**BOD = 4.0 mg/l

SOURCE OF PROBLEM

No input was obviously identifiable during the survey as being responsible for the exceeded value. However, during the appraisal of February 1995, effluent was found flowing down the road and entering the tributary at New House Bridge. The effluent was traced back to an un-named yard at NGR SS 3482 1063. It is likely that was also the source during the wet weather survey.

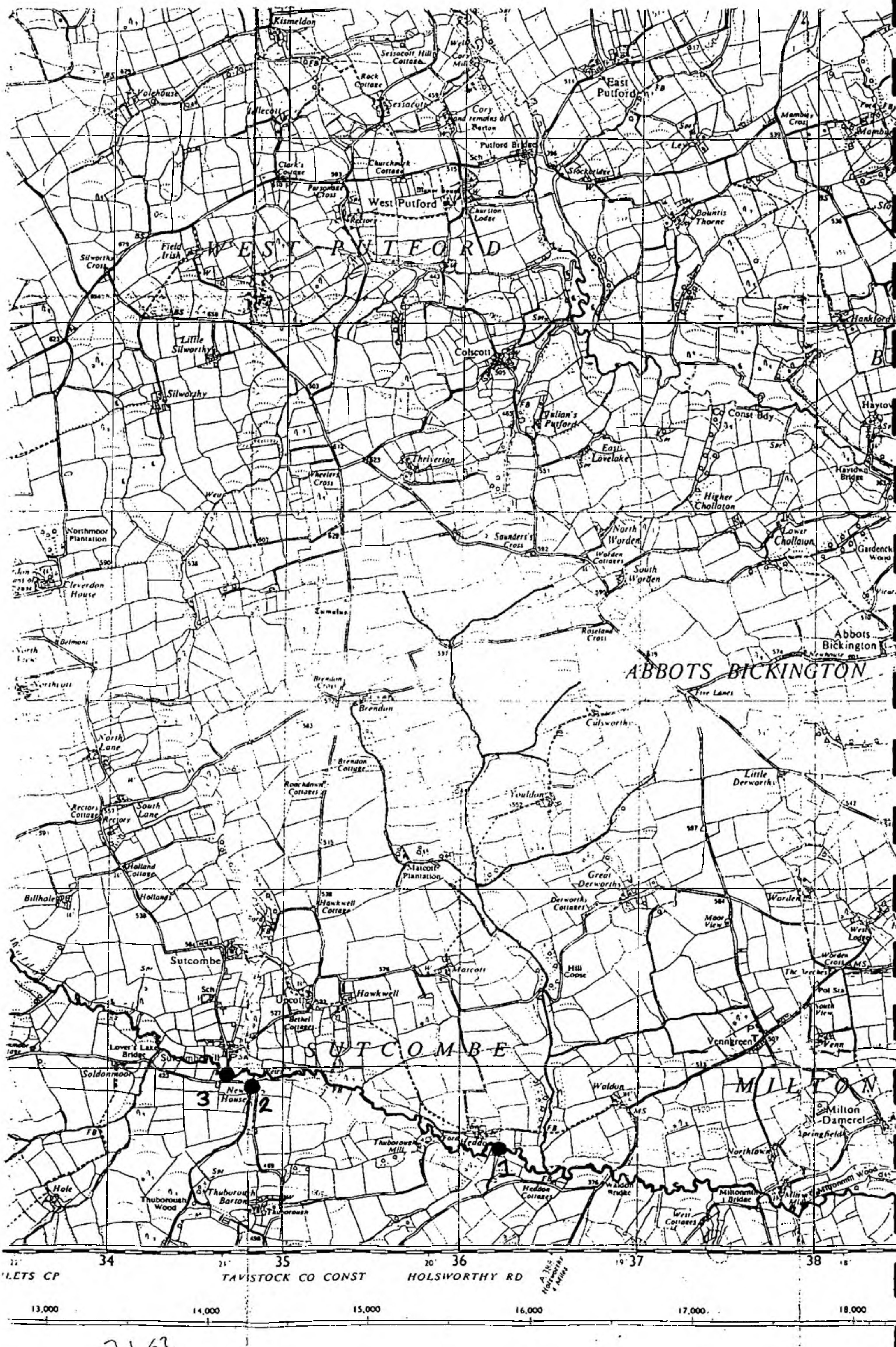
IMPLICATIONS

The exceeded value was marginal, the impact was localised and did not result in exceedances of RE class 2 standards downstream in the River Waldon.

RECOMMENDATIONS

The Water Quality Officer to visit the area.

Action - Water Quality Officer.



Kismeldon
Volehouse
Sessacott Hill Cottage
Rock Cottage
Sessacott
Cory Mill
Cory and remains of Barton
East Putford
Putford Bridge
Stockbridge
Clark's Cottage
Churchpark Cottage
Parsonage Cross
West Putford
Manor House
Churston Lodge
Rectory
Bountis Thorne
Field Irish
Silworthy Cross
WEST PUTFORD
Little Silworthy
Silworthy
Colscott
Julian's Putford
East Lovelake
Const Bdy
Hankford
Haytown Bridge
Thriverton
Wheelers Cross
Higher Chollaton
Northmoor Plantation
Cleverdon House
Saunders's Cross
North Worden
Worden Cottages
South Worden
Lower Chollaton
Abbots Bickington
Roseland Cross
Tumulus
Belmont
ABBOTS BICKINGTON
Brendon Cross
Brendon
Five Lanes
Culsworthy
North Lane
Brendon Cottage
Rockdown Cottages
Little Derworthy
Youldon
Rectors Cottage
Rectory
South Lane
Holland Cottage
Hollands
Matcott Plantation
Great Derworthy
Derworthy Cottages
Billhole
Hawkwell Cottage
Moor View
Sutcombe
Matcott
Hill Coose
Worden Cross
Hawkwell
Upcott
Bethel Cottages
SUTCOMBE
Venngreen
Venn
Lover's Lake Bridge
Sutcombemill
Soldonmoor
New House
Waldon
MILTON
Milton Damerel
Springfield
Thuborough Mill
Forde Heddon
Northlown
Hole
Thuborough Wood
Thuborough Barton
Thuborough
Heddon Cottages
Waldon Bridge
Miltonmill Bridge
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2162

SITE	Berry Farm RMS (R29C042)
WATERCOURSE	River Waldon
NGR	SS 3922 0986

EVIDENCE OF WATER QUALITY PROBLEM

Chemical samples taken as part of the wet weather survey show the river to have exceeded the standard for an RE class 2 river.

25 March 1996		*	**
Site Description	Site No.	TA mg/l	BOD mg/l
Berry Farm (R29C042)	1	0.11	4.7
Waldon Bridge (R29C011) U/S above	2	0.15	2.3

RE Class 2 standards
*Total Ammonia (TA) = 0.60 mg/l
**BOD = 4.0 mg/l

SOURCE OF PROBLEM

The reach between these two sample sites was not investigated during the appraisal of February 1995 but was included in this wet weather survey out of interest. No immediate cause was identified at the time of sampling.

There are two sewage treatment works on tributaries of the River Waldon in this area (see Figure 1). However, since the total ammonia concentrations were low the exceeded value was possibly due to general land run-off. Further investigations into the area are required.

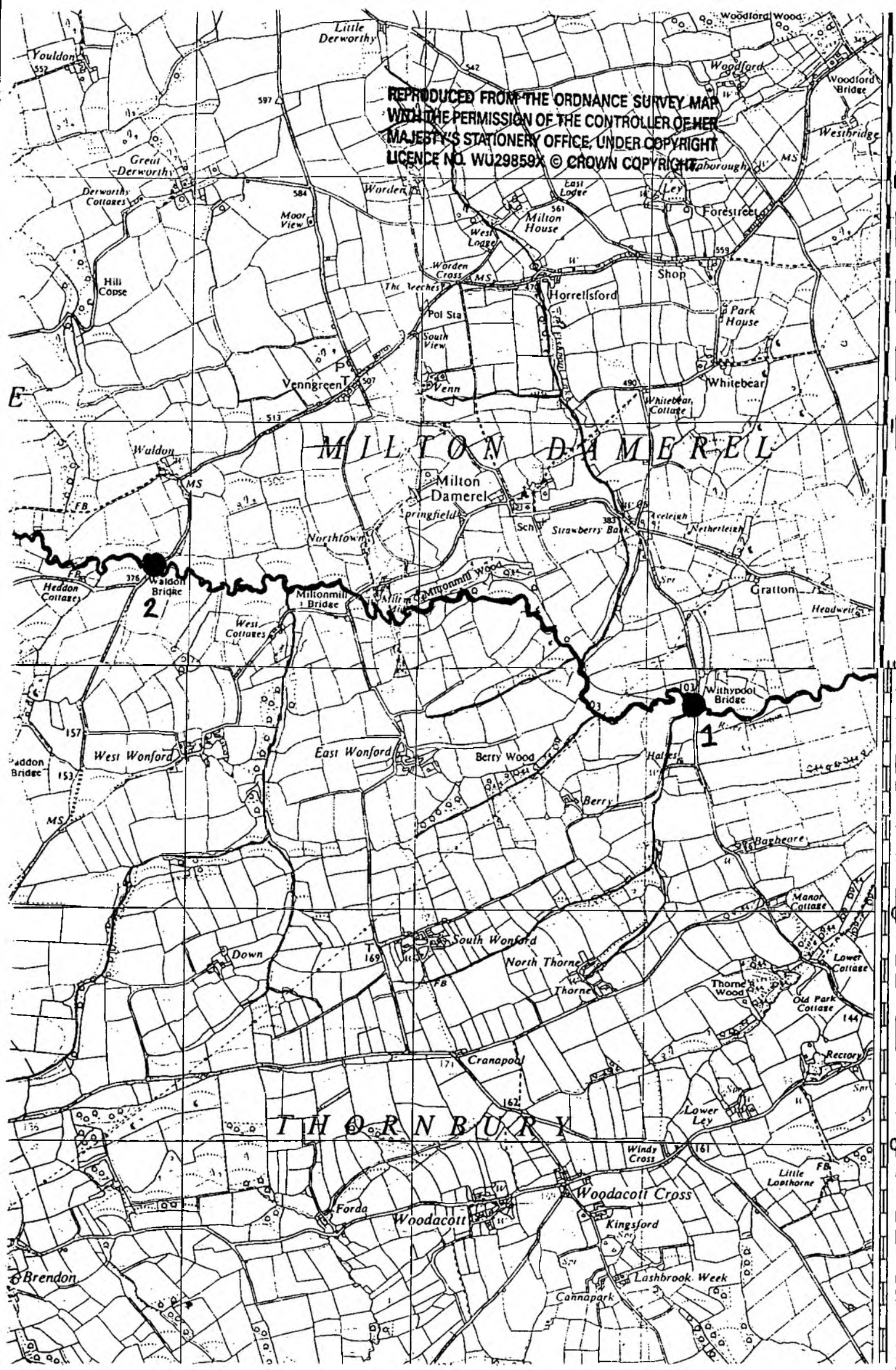
IMPLICATIONS

Although the exceeded value was marginal, it did occur in the main river at a RMS. Taking the dilution of the river into account , the input must have been substantial to result in the elevated BOD level.

RECOMMENDATIONS

Since the reach was not covered in the earlier appraisal, further work needs to be carried out to determine areas of potential risk to the water quality.

Action - Investigations Devon Area.


REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE, UNDER COPYRIGHT LICENCE NO. WU29859X © CROWN COPYRIGHT
MILTON DAMEREL
THORNBURY
Little Derworthy
Youldon
Great Derworthy
Derworthy Cottages
Moor View
Hill Copse
Worden
Worden Cross
West Lodge
East Lodge
Milton House
Ley
Forestreet
Woodford Wood
Woodford
Woodford Bridge
Westbridge
Shop
Horrellsford
Park House
Whitebear
Whitebear Cottage
The Beeches
Pol Sta
South View
Venngreen
Venn
Waldon
Milton Damerel
Springfield
Strawberry Bank
Northtown
Heddon Cottages
Waldon Bridge
Miltonmill Bridge
Miltonmill Wood
West Cottages
Netherleigh
Gratton
Withypool Bridge
West Wonford
East Wonford
Berry Wood
Berry
Halses
Bagheare
Manor Cottage
Lower Cottage
Old Park Cottage
Rectory
Lower Ley
Down
South Wonford
North Thorne
Thorne
Thorne Wood
Cranapool
Windy Cross
Little Loathorne
Woodacott Cross
Forda
Woodacott
Kingsford
Lashbrook Week
Cannapark
Brendon
1
2

SITE	Abbots Bickington tributary
WATERCOURSE	Tributary River Waldon
NGR	SS 3650 1140 sample location

EVIDENCE OF WATER QUALITY PROBLEM

Chemical samples taken as part of the wet weather survey show the tributary to exceed a standard for an RE class 2 river.

25 March 1996		*	**
Site Description	Site No.	TA mg/l	BOD mg/l
Waldon Bridge D/S of Trib (R29C011)	1	0.15	2.3
Abbots Bickington Trib.	2	0.12	4.4
River Waldon U/S of Trib.	3	0.11	2.8

RE Class 2 standards
*Total Ammonia (TA) = 0.60 mg/l
**BOD = 4.0 mg/l

SOURCE OF PROBLEM

This area was investigated during the previous appraisal and gave no cause for concern. The biological community was good and the total ammonia concentration (via field test kit) was very low (0.03 mg/l). As such, no further work was carried out U/S in the tributary.

The marginal BOD exceedance indicates an U/S input to the tributary at the time of the wet weather survey and as such the area should be investigated further

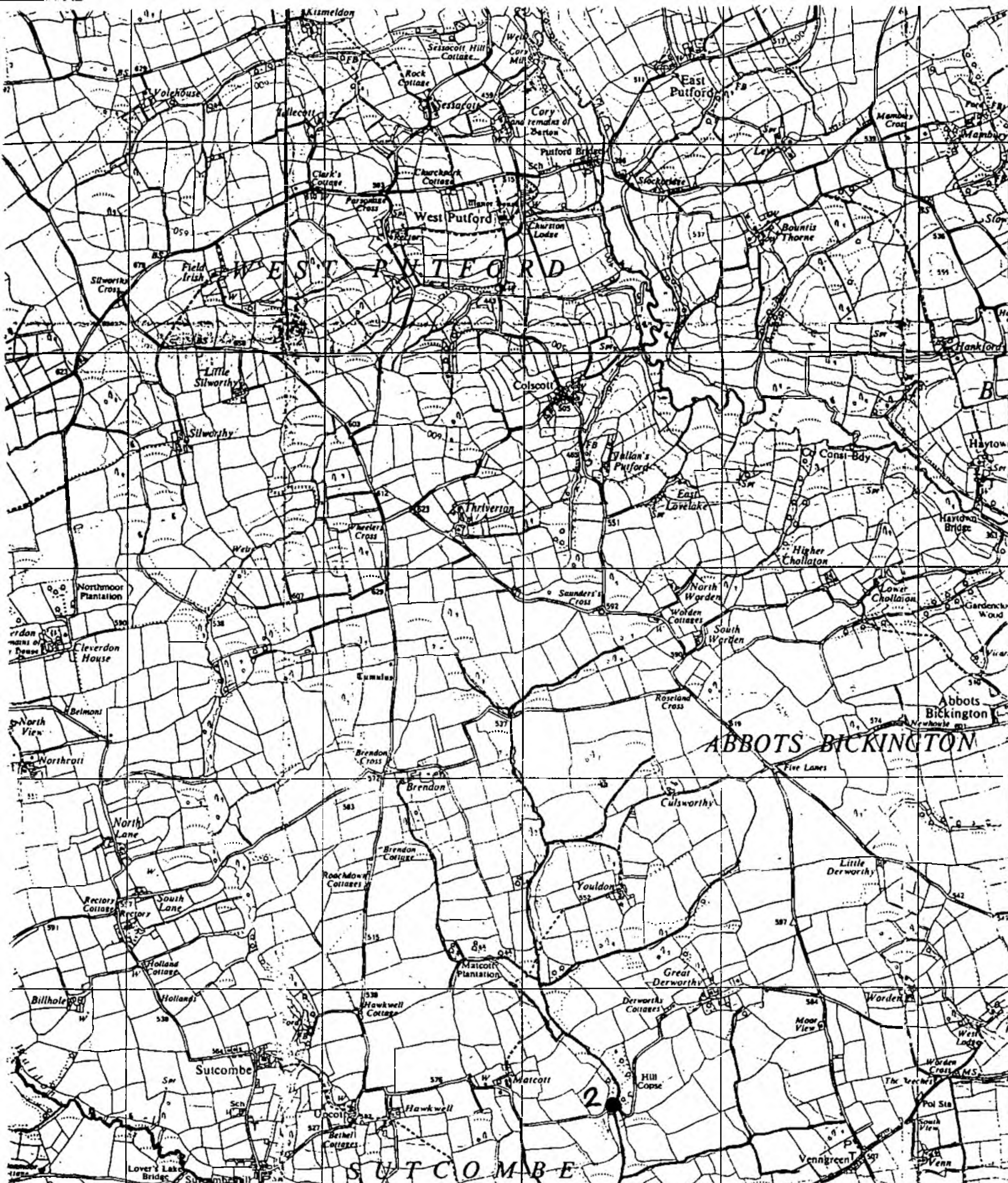
IMPLICATIONS

The exceeded value was very marginal, the impact was localised to the tributary and did not result in exceedances of RE class 2 standards downstream at Waldon Bride (R29C011), the next RMS on the River Waldon.

RECOMMENDATIONS

Since the tributary was not fully covered in the earlier appraisal, further work needs to be carried out to determine areas of potential risk to the water quality.

Action - Investigations Devon Area.


Kismeldon
Sessacott Hill Cottage
Rock Cottage
Volehouse
Sessacott
Cory and remains of Barton
East Putford
Putford Bridge
Mambury Cross
Mambury
Clark's Cottage
Churchpark Cottage
Parsonage Cross
West Putford
Churston Lodge
Stockleigh
Bountis Thorne
Silworthy Cross
Field Irish
WEST PUTFORD
Hankford
Little Silworthy
Colscott
Silworthy
Mallan's Putford
Const Bdy
Haytown
Thriverton
Wheelers Cross
East Lovelake
Haytown Bridge
Higher Chollaton
Northmoor Plantation
Saunders's Cross
North Worden
Lower Chollaton
Gardencluse Wood
Worden Cottages
South Worden
Cleverdon House
Tumulus
Roseland Cross
Abbots Bickington
North View
Belmont
Northrott
Brendon Cross
Brendon
ABBOTS BICKINGTON
Five Lanes
Culsworthy
North Lane
Brendon Cottage
Little Derworthy
Roachdown Cottages
Youldon
Rectory Cottage
Rectory
South Lane
Holland Cottage
Matcott Plantation
Great Derworthy
Billhole
Hollands
Hawkwell Cottage
Derworthy Cottages
Worden
Moor View
West Lodge
Sutcombe
Matcott
Hill Copse
Worden Cross
Pol Sta
Uncott
Hawkwell
Bethell Cottages
South View
Venngreen
Venn
Lover's Lake Bridge
Sutcombemill
SUTCOMBE
MILTON
Soldonmoor
New House
Wuldon
Milton Damerel
Springfield
Thuborough Mill
Northlown
Hole
Thuborough Wood
Thuborough Barton
Heddon Cottages
Waldon Bridge
Miltonmill Bridge
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3162

SITE	Spittle Farm area
WATERCOURSE	Tributary River Waldon
NGR	SS 3162 1490

AREA OF CONCERN

A tip site was found by the side of a tributary of the River Waldon. No chemical impact was detected at the time of the wet weather survey.

The tip site area was large (20 by 30 meters by 4 meters high in places; all measurements approximate) and consisted of scrap metal, tyres, half buried silage bales, carpet and house-hold waste.

BACKGROUND

The Waste Regulation section has been informed but is unable to proceed due to restraints of the current waste legislation.

The owner of the land insists the waste is his own agricultural waste and as such does not require a site licence. An explanation of the domestic refuse is that it is a temporary storage area so as to prevent damage to the bags by dogs if it were placed by the road side for collection. He also insists the site has been used historically as a tip for the village for some 20 years.

IMPLICATIONS

It is possible that this waste could present a hazard to the water quality of the tributary in the future from contamination via debris or subsequent leachate (nature of buried material as yet unknown). As such the Water Quality Officer should visit the site and determine what remedial action needs to be taken.

Action - Water Quality Officer.

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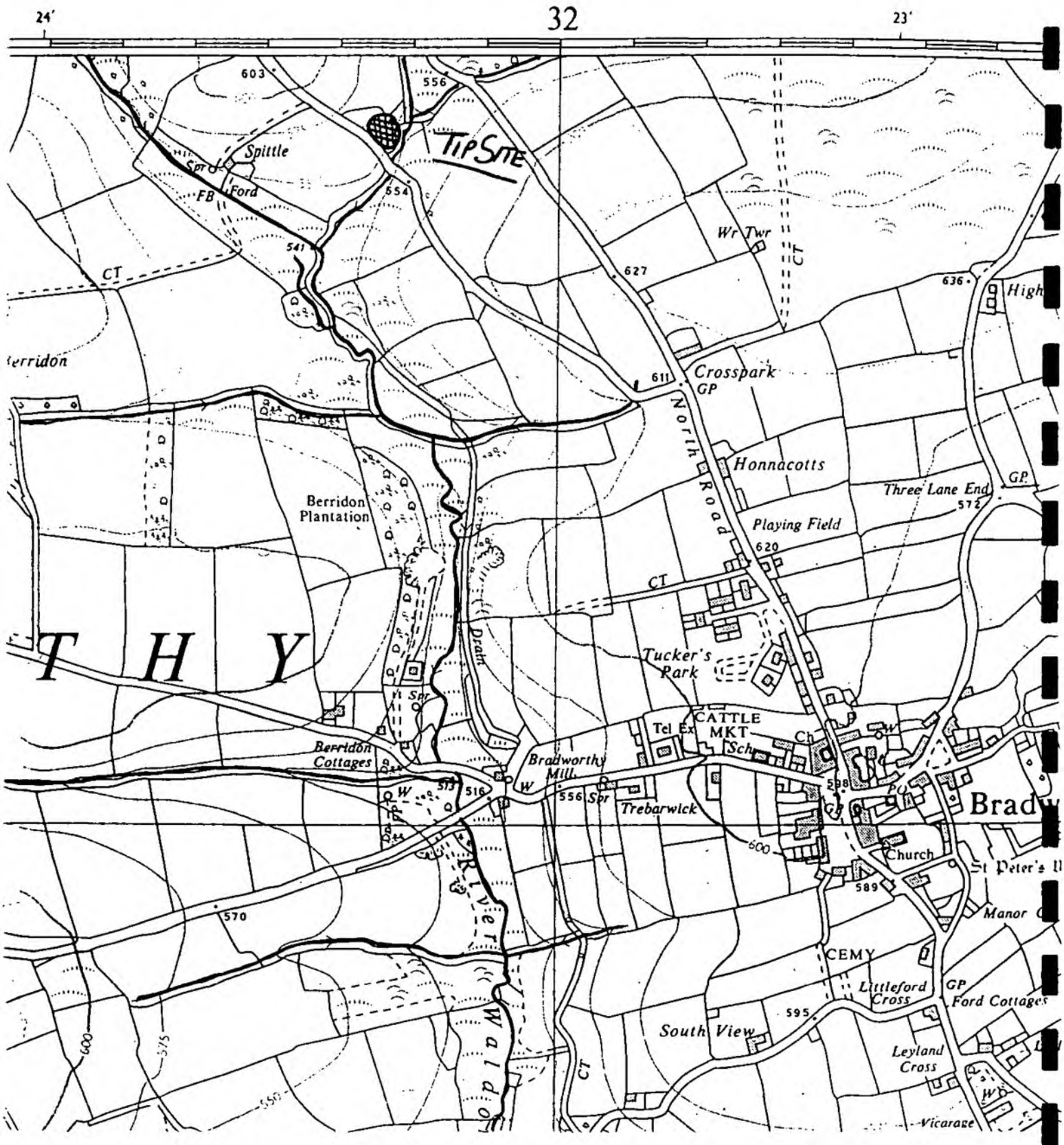

APPENDIX I

TABLE 1 : STANDARDS FOR THE FIVE RIVER ECOSYSTEM USE CLASSES

Use Class	DO % sat 10%ile	BOD (ATU) mg/l 90%ile	Total Ammonia mgN/l 95%ile	Un-ionised Ammonia mgN/l 95%ile	pH 5%ile & 95%ile	Hardness mg/l $CaCO_3$	Dissolved Copper µg/l 95%ile	Total Zinc µg/l 95%ile	Class Description
1	80	2.5	0.25	0.021	6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	30 200 300 500	Water of very good quality suitable for all fish species
2	70	4.0	0.6	0.021	6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	30 200 300 500	Water of good quality suitable for all fish species
3	60	6.0	1.3	0.021	6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	300 700 1000 2000	Water of fair quality suitable for high class coarse fish populations
4	50	8.0	2.5		6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	300 700 1000 2000	Water of fair quality suitable for coarse fish populations
5	20	15.0	9.0						Water of poor quality which is likely to limit coarse fish populations