DEPARTMENT OF TRANSPORT

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

ENVIRONMENTAL STATEMENT

Volume 2

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SECTION 1

INTRODUCTION

This volume of the Environmental Statement supplements the information contained in Volume I and covers detailed surveys and reports on the environmental effects of the proposed scheme.

SECTION 2

AMBIENT NOISE SURVEY

R3268.176/RSP/WP51/DECEMBER/1990/1

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING AMBIENT NOISE SURVEY

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SUMMARY

Following the request of the Department of Transport South East Construction Programme Division, a survey of existing noise levels was carried out in the vicinity of the proposed A21 improvements, during October 1990.

Noise measurements were taken at three sites, to determine the levels prevailing in the area before construction of the proposed scheme commences.

The weather conditions for this survey were not entirely ideal, due to a tendency for the wind to blow away from the source. However, the winds were light and therefore the measured levels are likely to be only slightly lower than those obtainable by prediction.

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1.0 INTRODUCTION

1.1 Following the request of the Department of Transport South East Construction Programme Division, a survey of existing noise levels was carried out in the vicinity of proposed A21 improvements between Vauxhall Lane and Longfield Road, during October 1990.

1.2 Three sites were agreed by the Department of Transport South East Regional Office, at which 1-hour measurements in consecutive hours were taken at each location.

1.3 Measurements from this survey will be used as a basis for assessing prevailing noise levels prior to construction. The L_{A10} 18-hour results are given with appropriate corrections.

2.0 THE SURVEY

2.1 All traffic noise measurements were taken in accordance with "Calculation of Road Traffic Noise" published by HMSO in 1988 for the Department of Transport and Welsh Office. A shortened measurement procedure, comprising measurements taken between 07.00 and 19.00 hours, was used at Oast House and Hunters Lodge and the full 18-hour procedure used at Colebrooke. The locations of these three sites are shown in Figures 1 and 2. The shortened noise measurements more than cover the period defined in "Calculation of Road Traffic Noise" and the requirements given in a letter dated 6th September 1990

2.2 The measurement positions are described in Table 1. All measurements were taken at a microphone height of 1.5m above ground level, at positions located on the maps, drawing numbers R3268/TE/3/1 and R3268/TE/3/3.

2.3 The following instrumentation was used for this survey, calibrated in accordance with manufacturers instructions:-

(a) CEL 262 Environmental Noise Analyser

(b) CEL 393A Precision Computing Sound Level Meter

(c) B&K 4426 Noise Level Analyser

All equipment conforms to the tolerances of Type 1 defined in BS 5969.

2.4 Wind direction and speed were measured on site with a Munro Anemometer.

3.0 OBSERVATIONS DURING THE SURVEY

3.1 The weather conditions during the survey, on 4th October 1990, were generally bright and clear, with light to moderate winds from the West. The noise measurements taken at Colbrooke were started at 13:00 hours on 3rd October 1990 during a period of heavy rain which lasted until 14:30 hours.The rest of the measurements at this position were taken during clear and still conditions.

3.2 The major noise source at Site 1, Colbrooke, was traffic using the A21 Pembury Road, which is situated to the East of the site. Other noise sources included aircraft which were frequent (approximately 20 every hour) and therefore made a significant noise contribution, bird song which was especially noticable at daybreak, and a nearby water fountain (situated approximately 20 metres away from the measurement position).

Site 2 noise, at the gate of Hunters Lodge, was influenced by road traffic noise on the A21 dual carriageway section, and from traffic on Longfield Road. Again noise from aircraft was significant, along with bird song and the rustling of leaves, which was also audible.

The noise equipment positioned at Site 3, on the North Facade of Oast House, was situated to the south of the A21 flyover, passing over Vauxhall Lane. The main noise sources include road traffic from the A21 and Vauxhall Lane and aircraft noise. Distant trains were also audible but at a lower noise level.

4.0 RESULTS OF MEASUREMENTS

4.1 Full details of all measurements taken are given in the Appendix . The averaged measurements over the morning, mid-day and evening periods and the 18-hour L_{A10} levels are given in the left hand column of the figures in Table 1. The right hand column of figures is derived from the measurements with adjustments as follows :

i. In the case of site 2 at Hunters Lodge a correction of 2.5 dB(A) is applied to obtain the situation for an equipment position 1 metre from a facade.

ii. In the case of sites 2 and 3, adjustments have been made as a result of the findings at site 1 and the 18 hour traffic flows described below.

4.2 The traffic flows monitored by Kent County Council are shown in the Appendix alongside the corresponding noise levels. The gaps in the traffic count figures were due to faults in the traffic counter machine. A comparison of the traffic flows on the 4th October with those from the previous month, (September 6th) when the traffic counter was fully operational, show a good correlation (in terms of noise, within 1 dB between 10.00 and 19.00 hours). It is therefore reasonable to assume that the levels of traffic flow on the A21 on October 4th are accurate between these hours.

4.3 A comparison between the noise levels measured at Colbrooke on the 3rd and 4th of October 1990, show a decrease of up to 5.5 dB(A) in the measured L_{A10} levels over an identical one hour period. The traffic counts for these two days are very similar. The reason for the difference in noise levels could be due to any of the following reasons :

i. On October 3rd there was little or no wind noted. On 4th October a wind of approximately 2 m/s was noted blowing from the measurement point towards the road from which traffic noise was being measured. The

negative component appears to have diffracted the sound from the source and in consequence, lower noise levels were observed on the 4th.

ii. Due to a thunderstorm on the 3rd October 1990, and the effect of wet roads, measurements made before 16.00 hours should be ignored in accordance with paragraph 39.1 of Calculation of Road Traffic Noise, 1988.

iii. The noise equipment was left unmanned on October 3rd and weather conditions were assumed to be similar to those 40 miles away at Horsham. This was a reasonable assumption as the conditions were still and calm when the site was left on the 3rd October and remained the same when the site was revisited at 06.00 hours the next day. The weather was monitored at the same distance of 40 miles away, where it remained calm and still throughout this period.

5.0 CONCLUSIONS

Measurements taken at the three sites are intended to determine the noise levels prevailing in the area before construction of the proposed scheme commences. The weather conditons on the 4th October 1990 were fairly consistant both with respect to wind speed and direction, and the clear sunny conditions. Some measurements were taken at Colbrooke on the 3rd October when the weather conditions were poor, due to a thunderstorm. The effects of the storm had been replaced by calm, still and dry conditions by 16.00 hrs, and the noise readings have been taken as valid from this time.

The noise levels measured during this survey are expected to be slightly on the low side due to the negative component of the wind, ie. There was a wind of between 1 and 3 m/s generally blowing away from the measurement positions towards the A21.

Further noise measurements using the shortened procedure of CRTN may be required in the future, when there is a positive wind component, to verify the present ambient noise levels.

TABLE 1

SUMMARY OF L_{A10} 18-HOUR NOISE LEVELS

USING THE CRTN SHORTENED PROCEDURE

Site	Location	Period	L_{A10} dB(A)	L_{A10} 18 hours
			Measured	
1	Colebrooke Mid point of south facing facade (1m from facade)	Morning Peak 07.00 to 10.00 -- -- -- -- -- Midday 12.00 to 15.00 -- -- -- -- -- Evening Peak 16.00 to 19.00	57.8 -- -- -- -- 53.0 -- -- -- -- 54.0	Measured 55
2	Hunters Lodge Measured 5m from the front Security Gate of Hunters Lodge/Dairy Cottage.	Morning Peak 07.00 to 10.00 -- -- -- -- -- Midday 12.00 to 15.00 -- -- -- -- -- Evening Peak 16.00 to 19.00	53.2* -- -- -- -- 52.8* -- -- -- -- 52.2*	Derived 53*
3	Oast House Measured at the North facade.	Morning Peak 07.00 to 10.00 -- -- -- -- -- Midday 12.00 to 15.00 -- -- -- -- -- Evening Peak 16.00 to 19.00	57.0 -- -- -- -- 56.0 -- -- -- -- 55.0	Derived 56

* Conversion to facade by adding 2.5 dB(A) where measurements were free-field.

FIGURE 1
Location of Colebrooke and Hunters Lodge,
Survey Sites 1&2

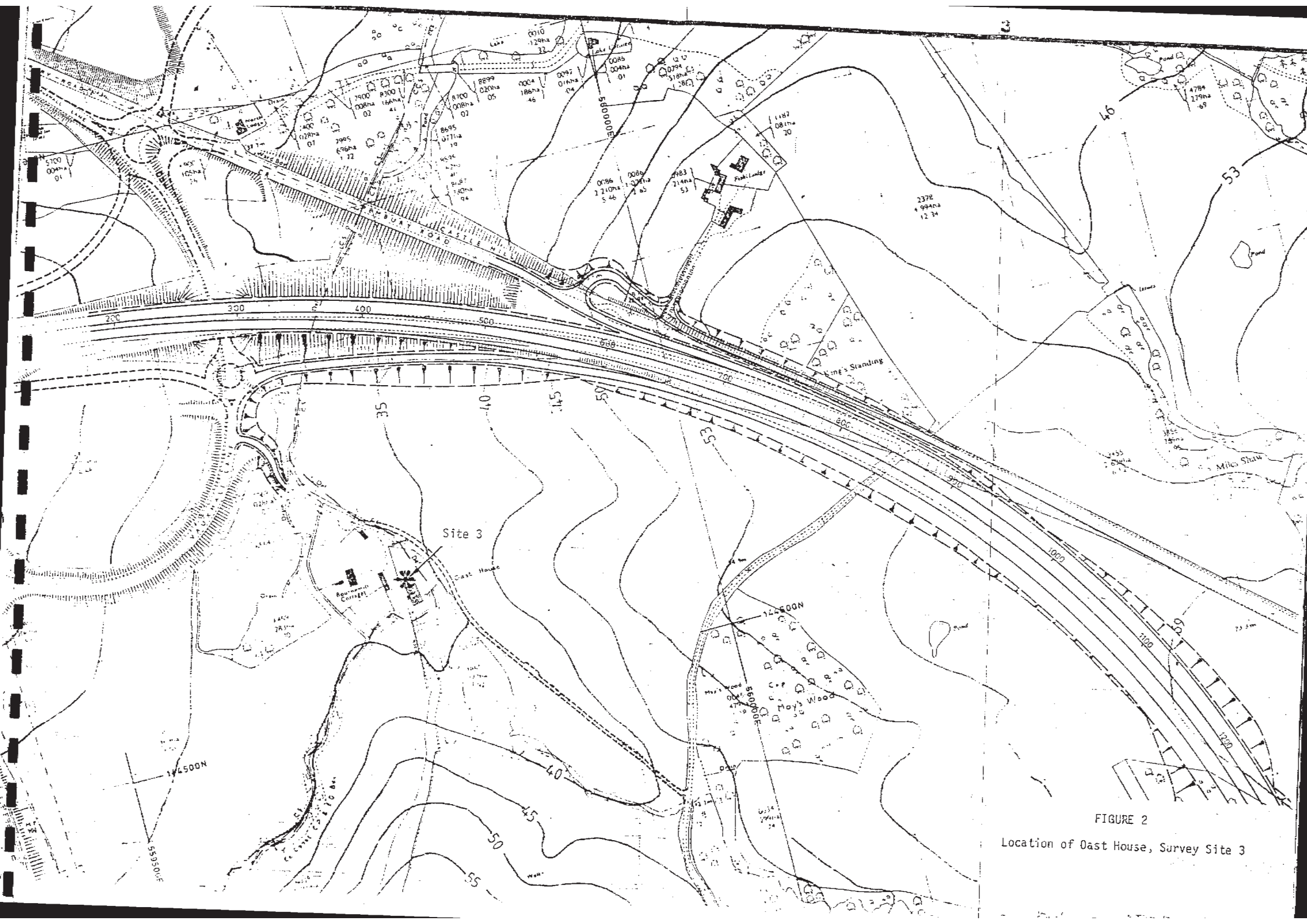


FIGURE 2

Location of Oast House, Survey Site 3

APPENDIX

Measured Noise Levels and Traffic Flows
A21, Tonbridge To Pembury Section

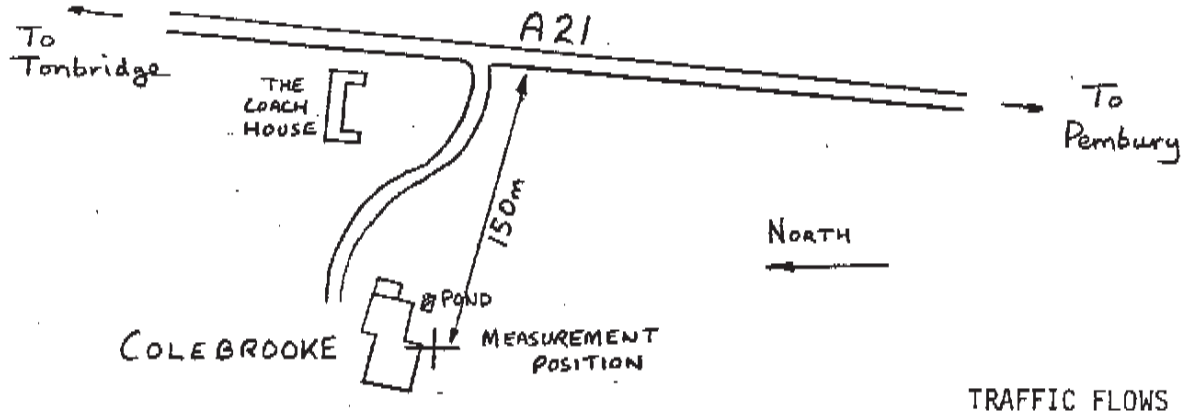
WS/Atkins

PROJECT

TONBRIDGE/PEMBURY

DATE 4 OCTOBER 1990 - THURS (also Wed 3rd)

SITE 1. COLEBROOKE - MID POINT OF SOUTH FACADE.. FACADE READING



TRAFFIC FLOWS

TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	To A21 Pembury	To A21 Tonbridge
13.00	14.00	51.5	53.5	56.0	64.0	56.4	842	824
14.00	15.00	52.0	54.0	56.5	59.5	54.9	923	831
15.00	16.00	54.0	56.0	58.0	63.0	57.0	1051	933
16.00	17.00	55.0	56.0	58.5	66.0	57.7	1229	1162
17.00	18.00	52.0	54.5	57.5	62.5	56.0	1565	1222
18.00	19.00	53.5	55.5	57.5	62.5	56.4	1381	828
19.00	20.00	53.0	55.0	57.0	60.5	55.7	861	568
20.00	21.00	50.5	54.0	56.5	60.0	54.9	-	357
21.00	22.00	47.0	51.5	55.0	57.5	52.5	-	233
22.00	23.00	45.5	50.5	54.5	59.0	52.0	-	198
23.00	00.00	42.0	49.0	53.5	61.5	51.6	-	114
00.00	01.00	38.0	44.5	51.5	55.0	47.8	-	61
01.00	02.00	33.0	39.5	49.5	53.5	44.8	-	-
02.00	03.00	31.5	36.5	48.5	54.5	44.4	-	-
03.00	04.00	33.0	38.5	48.5	53.5	44.4	-	-
04.00	05.00	37.5	45.0	52.0	55.0	47.9	-	-
05.00	06.00	44.0	50.5	55.0	58.5	52.1	-	-

NOTES

Readings started at approx. 13.00 hrs on Wednesday.

Weather Report

Weds	13.00 hrs	Rain heavy
	14.00 hrs	Rain stopped. Wind decreasing - now approx. less than 3m/s Direction - from the West
	16.00 hrs	Clear and very little wind.
	20.00 hrs	Clear and very little wind. Still.
Thurs	05.00 hrs	Clear and still but very cold.
	09.30 hrs	Wind 1 to 3m/s. Direction from the West.
	13.40 hrs	Wind 1 to 3m/s. Direction from the West.
	19.00 hrs	Wind calm, small breeze. <1m/s from West.

WS/Atkins

PROJECT: TONBRIDGE/PEMBURY

DATE: 4 OCTOBER 1990

SITE: 1. COLEBROOKE - MID POINT OF SOUTH FACADE (continued)

TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	TRAFFIC FLOWS To A21 Pembury	TRAFFIC FLOWS To A21 Tonbridge
06.00	07.00	51.5	55.5	58.0	63.0	56.4	-	-
07.00	08.00	55.0	57.0	58.5	62.0	57.4	-	-
08.00	09.00	54.0	56.0	58.0	62,0	56.9	-	1374
09.00	10.00	53.5	55.0	57,0	60.5	55.8	779	1180
10.00	11.00	50.0	52.0	55.0	64.0	56.7	1024	873
11.00	12.00	49.0	51.0	53.0	56.0	51.7	986	898
12.00	13.00	49.5	51.0	53.0	55.0	51.6	838	809
13.00	14.00	49.0	51.0	53.0	57.5	51.9	908	811
14.00	15.00	48.5	51.0	53.0	56.0	51.6	889	883
15.00	16.00	48.5	50.5	53.0	58.5	51.8	1071	1054
16.00	17.00	50.0	51.5	53.0	55.5	52.0	1373	1232
17.00	18.00	50.5	52.5	54.0	57.0	53.0	1457	1330
18.00	19.00	51.5	53.0	55.0	58.0	53.8	1379	840

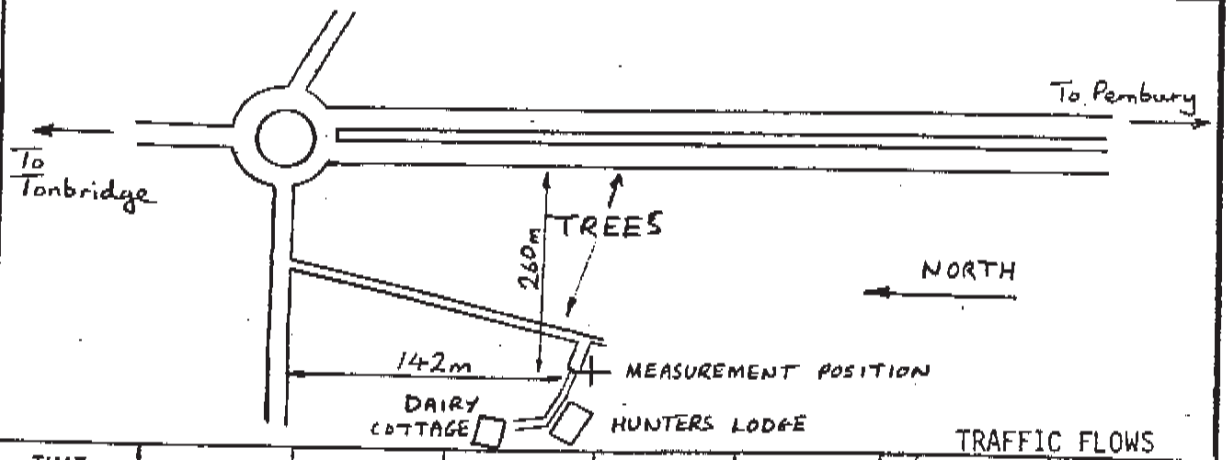
NOTES

WS/Atkins

PROJECT: TONBRIDGE/PEMBURY

DATE: 4 OCTOBER 1990

SITE: 2. GATE OF HUNTERS LODGE/DAIRY COTTAGE



TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	TRAFFIC FLOWS To A21 Pembury	To A21 Tonbridge
07.00	08.00	48.3	50.3	52.5	58.8	51.6	-	-
08.00	09.00	49.0	50.8	53.3	58.8	51.7	-	1374
09.00	10.00	48.3	50.3	53.8	60.3	52.3	779	1180
10.00	11.00	47.5	50.3	54.5	61.3	52.5	1024	873
11.00	12.00	46.0	48.8	52.0	58.3	51.2	986	898
12.00	13.00	40.8	50.1	53.8	57.3	51.2	838	809
13.00	14.00	46.3	49.3	52.8	58.8	51.0	908	811
14.00	15.00	46.3	48.8	51.8	55.8	49.6	889	883
15.00	16.00	46.3	48.8	52.0	56.3	49.8	1071	1054
16.00	17.00	46.5	48.5	51.5	56.3	49.9	1375	1232
17.00	18.00	46.8	48.5	51.0	56.3	51.8	1457	1330
18.00	19.00	46.3	48.0	54.0	55.4	51.7	1379	840

NOTES

Noise sources:- Mainly traffic from A21 and Longfield Rd
Planes (must be on Gatwick/Heathrow flight path)
Bird song - rustling of trees

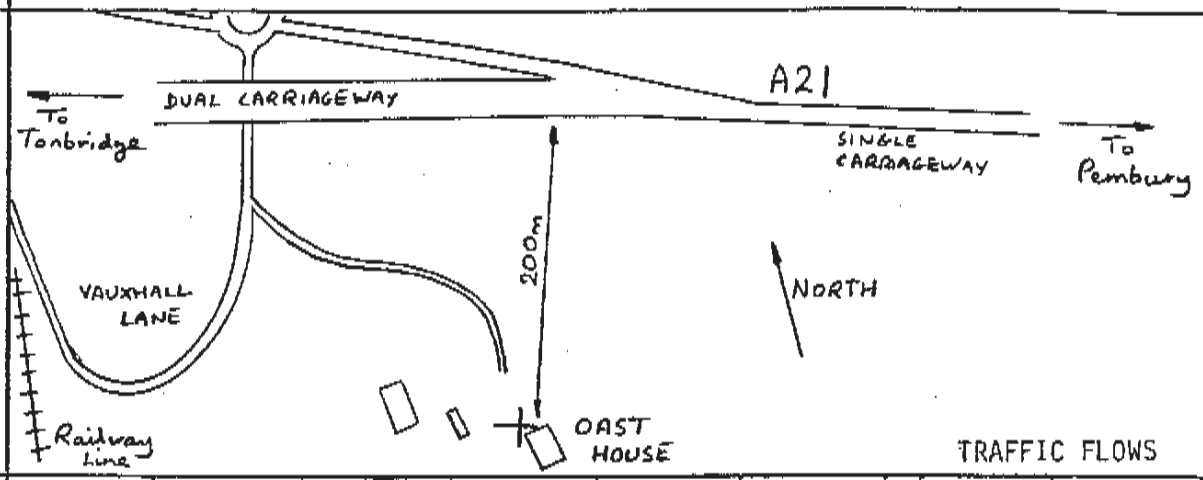
07.00 Clear and no wind. Cold - 6°C
10.30 Wind freshening up to 5m/s in gusts (near top of hill on dual carriageway)
14.00 Wind approx. 2m/s - gusts of 5m/s
17.00 Wind calm (small gusts in tree tops 2m/s from West)
18.00 Wind calm (small gusts in tree tops 2m/s from West)

WS/Atkins

PROJECT: TONBRIDGE/PEMBURY

DATE: 4 OCTOBER 1990

SITE: 3. OAST HOUSE. FACADE READING



TRAFFIC FLOWS

TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	To A21 Pembury	To A21 Tonbridge
07.00	08.00	51.0	54.0	57.5	72.4	55.7	-	-
08.00	09.00	53.0	54.5	58.0	62.3	55.8	-	1374
09.00	10.00	48.5	52.0	55.5	71.6	53.4	779	1180
10.00	11.00	48.5	52.5	57.0	78.6	54.6	1024	873
11.00	12.00	48.0	52.5	56.5	72.6	64.3	986	898
12.00	13.00	47.5	51.5	56.0	74.8	54.1	838	809
13.00	14.00	46.0	51.0	55.5	68.6	52.2	908	811
14.00	15.00	48.0	52.5	56.5	75.4	54.1	889	883
15.00	16.00	48.5	52.5	56.5	79.4	54.8	1071	1054
16.00	17.00	48.0	51.5	55.5	76.0	53.1	1375	1232
17.00	18.00	48.0	51.5	55.0	73.3	53.3	1457	1330
18.00	19.00	46.5	50.0	54.5	85.4	55.0	1379	840

NOTES

Main Noise Sources:- A21 - Flyover/Bridge - dual carriageway
The Vauxhall Rd Loop - traffic very busy
Bird song
Planes
Trains can just be heard over traffic noise

07.00 Cold 5/3°C. Clear - no cloud. Wind - still.
09.30 Bright and sunny but cold (9°C). Wind - 1 to 3 m/s (mainly 1 m/s). Direction from the West.
12.30 Some light high cloud. Bright and sunny. Wind 3 to 5 m/s. Direction from the West.

SECTION 3

ADDITIONAL SURVEY OF PREVAILING NOISE CONDITIONS

R3268.310/061MSW/DECEMBER/1991/1

Issue No: 1

Issue Date: December 1991

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS - ADDITIONAL SURVEY OF PREVAILING NOISE LEVELS

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SUMMARY

This report details the results of all noise measurements taken south and west of the area of the proposed A21 Tonbridge Bypass to Pembury Bypass improvement. A total of 3 sites were measured in accordance with the shortened procedure defined in Calculation of Road Traffic Noise 1988. All of the sites were selected in areas that would be difficult to calculate on account of the distant roads and the probable effect of other environmental noise. The effects of temporary short term local noises that occurred during the survey have been considered. The results of this survey in the absence of these short term local sources will be used as the basis for determining noise levels prevailing before construction commences and a "do nothing" situation as part of an environmental impact assessment.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 As a result of indications from predictions of road traffic noise that the effect of the proposed A21 Tonbridge Bypass to Pembury Bypass Section may now reach a greater extent than previously envisaged, a study of the effects of noise impact is being undertaken. In order to establish noise levels prior to construction at certain properties lying in excess of 300 metres from existing roads and in very hilly terrain, measurements have been taken at 3 locations which are additional to those undertaken in October 1990 and given in our report reference R3268.176/RSP/WP51/DECEMBER/1990/1. The measurements were chosen to represent situations which were difficult to predict accurately using the prescribed calculation procedure. At all of these sites, the prevailing source of noise was at some distance away, and the sites were possibly affected by non-traffic sources, including distant aircraft and other local sources. Short term local noise sources found during the course of the measurements and not considered as a general effect have been discounted in the final analysis.

2.0 THE SURVEY

2.1 All traffic noise measurements were taken in accordance with "Calculation of Road Traffic Noise" published by HMSO in 1988 for the Department of Transport and Welsh Office. A total of 3 sites located on Figure 1 and detailed in Appendix A were chosen to represent situations which are in excess of 300 metres from existing roads to the south and west of the proposed scheme where there are a number of isolated rural properties in a hilly terrain. Measurements were taken between 1200 hours and 1430 hours at these sites. All were measured in accordance with the shortened procedure defined in paragraphs 43 and 44 of "Calculation of Road Traffic Noise".

2.2 The following instrumentation was used for this survey and calibrated in accordance with manufacturers instructions.

a) Bruel & Kjaer type 2231 sound level meter

b) CEL 262 environmental noise analyser

2.3 As conditions changed, measurements of wind direction were taken from time to time, using a Munro Anemometer. During the survey the wind gradually veered from a north west to north easterly direction.

2.4 All noise measurements were carried out at the positions described below at a microphone height of 1.5 metres above ground level. The positions are also located in Figure 1 at 1/10000 scale.

1) 35m east of Forest Farm Cottages (free field)
2) 75m north of Keepers Cottage (free field)
3) 20m from Hope Cottage (off North Farm Lane) (free field)

3.0 OBSERVATIONS DURING THE SURVEY

3.1 Weather conditions were in accordance with the conditions described in paragraph 39 of "Calculation of Road Traffic Noise" - 1988. The wind speed was generally light, veering from a north west to north easterly direction, during the survey, giving a positive component of noise from the present main road to the receiver. The weather was mild and cloudy throughout with roads remaining dry.

3.2 The effect of noise other than road traffic was noted at some sites and some of this may be of only temporary significance. In particular, intermittent construction work was taking place in the area of Hope Cottages (site 3). It is understood that further redevelopment work is expected to take place in the area shortly. At all sites aircraft noise was apparent from time to time and this is considered as part of the overall situations at present. Other neighbourhood noise, notably dog barking, (possibly due to our presence) was apparent at Keepers Cottage (site 2) and where this has occurred, the results have been discarded.

4.0 RESULTS OF MEASUREMENTS

Full details of all measurements taken are set out in Appendix A. The following parameters are given:- L_1, L_{10}, L_{50}, L_{90} and L_{eq} in dB(A). For the purposes of traffic noise assessment, the L_{10} readings are appropriate and these are summarised below:-

Site 1 near Forest Farm	52 dB(A)
Site 2 near Keepers Cottage	
in the absence of dog barking	53 dB(A)
Site 3 near Hope Cottage	
without construction site noise	47 dB(A)
with work in progress	55-62 dB(A)

5.0 CONCLUSIONS

Measurements taken at the 3 sites are intended to illustrate some of the levels prevailing in the area before construction. The measured conditions were generally good throughout. It is considered that the effects of wind were appropriate, being generally positive from the direction of the present road. Some temporary and long term non-traffic noise sources were identified at two sites and these have results that are higher than those calculated from road traffic only. The results of this survey in the absence of these particular temporary sources will be taken into consideration in the environmental statement and preliminary noise report. It is concluded that the calculation method would not have been appropriate in the assessment of prevailing noise at these sites.

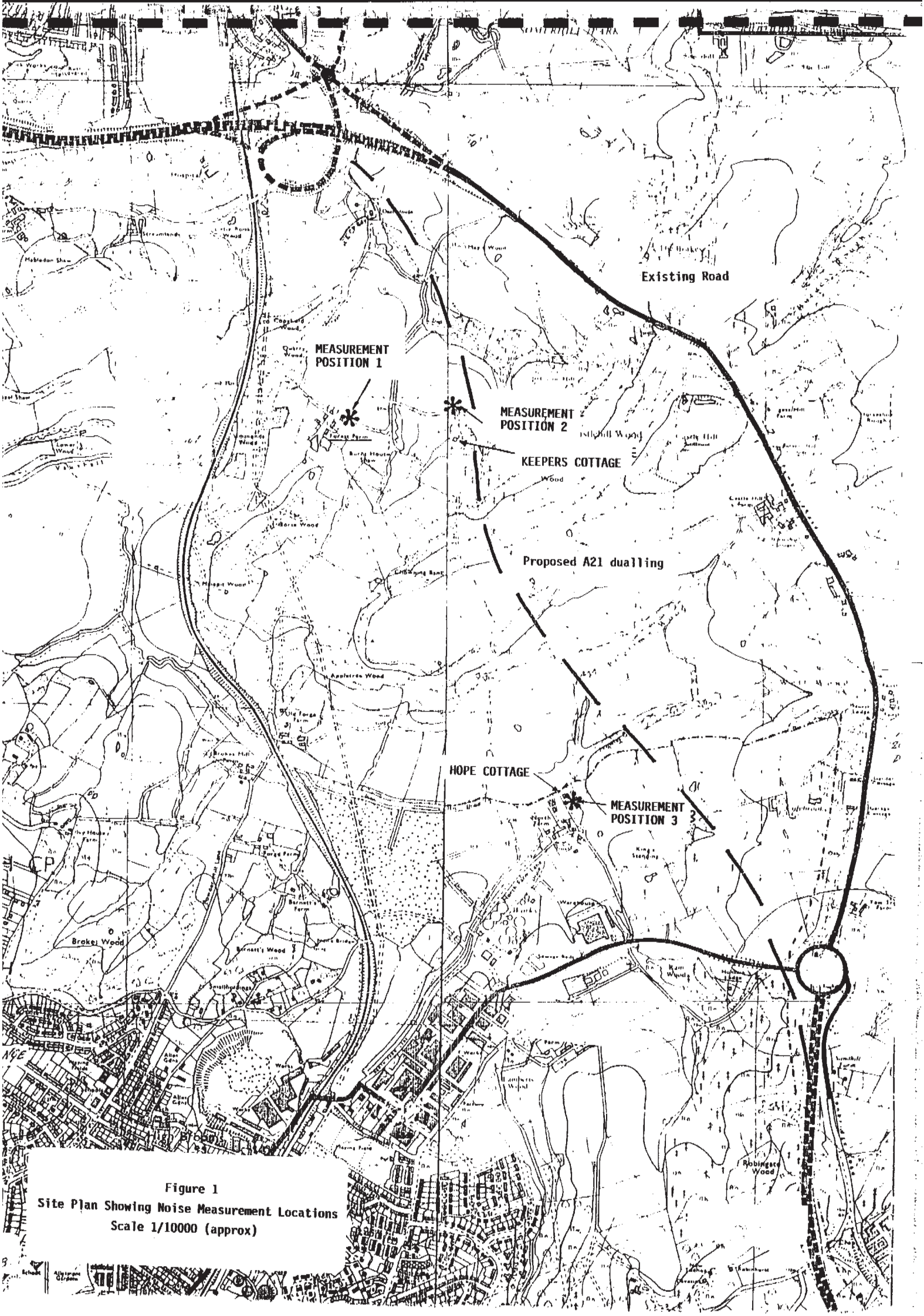


Figure 1
Site Plan Showing Noise Measurement Locations
Scale 1/10000 (approx)

APPENDIX A

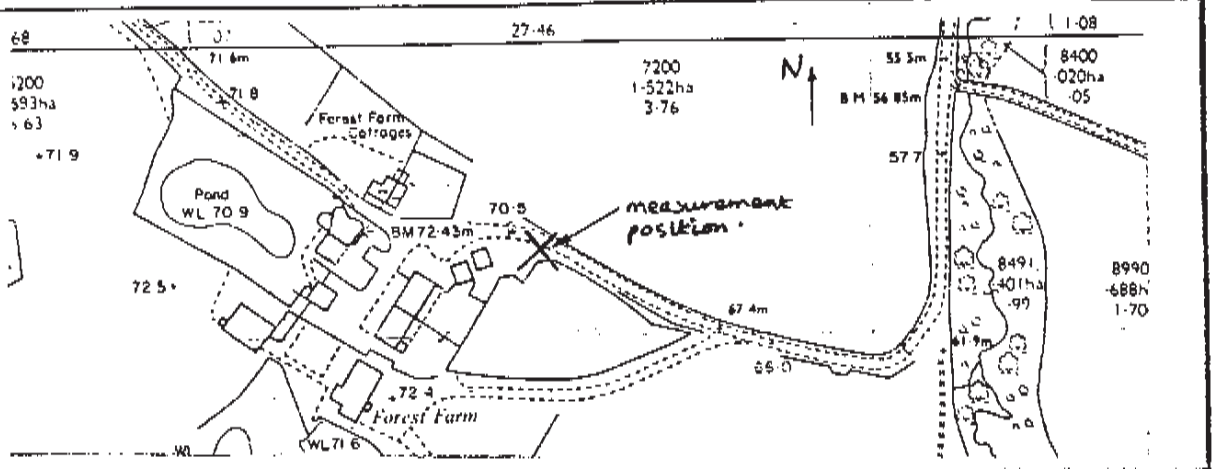
THE RESULTS OF MEASUREMENTS OF NOISE LEVELS

WS/Atkins

PROJECT: A21 TONBRIDGE BYPASS

DATE: 2ND DEC 1991

SITE: 1. FOREST FARM



TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	TRAFFIC COUNT LIGHTS	TRAFFIC COUNT HEAVIES
12·15	12·30	47·5	49·5	52·0	67·0	55·7		
13·00	13·15	47·0	49·0	51·0	56·5	49·7	1	
14·00	14·15	47·0	49·5	52·0	56·5	50·1		

NOTES

Noise Sources

Main background noise source is road traffic on A21

Helicopter @ 12:19 hrs

Trains and Aircraft.

Weather

Mild for time of year, 100% cloud but no rain

At 12:00 hrs wind speed – 3 m/s, direction from NW

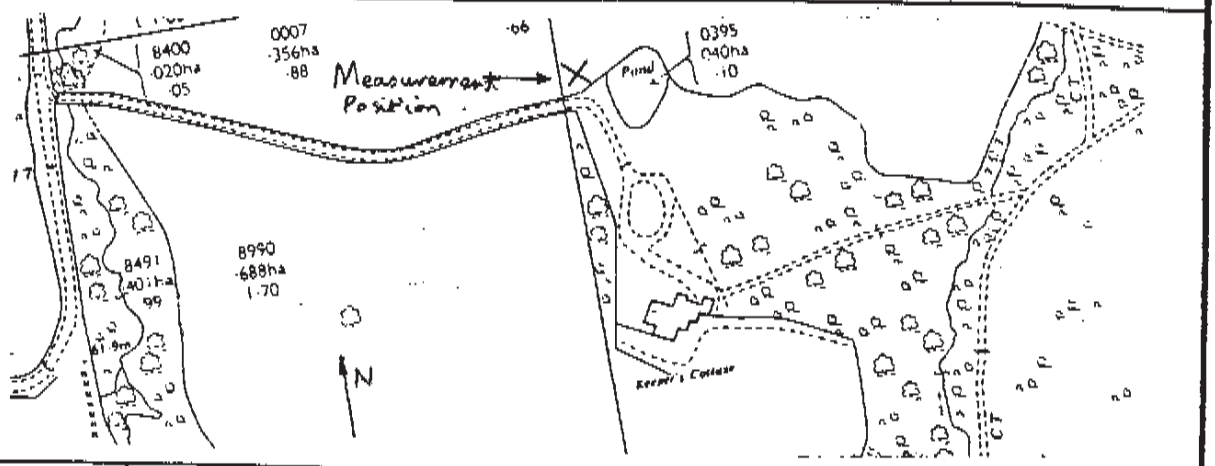
By 14:00 hrs wind had veered, speed 4 m/s, direction from NE

WS/Atkins

PROJECT: A21 TONBRIDGE BYPASS

DATE: 2ND DEC 1991

SITE: 2. KEEPERS COTTAGE



TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	TRAFFIC COUNT LIGHTS	TRAFFIC COUNT HEAVIES
12:38	12:53	48.0	50.0	52.5	55.5	50.4		
13:20	13:35	49.0	50.5	53.0	55.5	52.1		
14:20	14:35	49.5	52.0	57.0	62.0	53.9		

NOTES

NOISE SOURCES

Main background noise source is road traffic on A21
Dog barking at Keepers Cottage (especially at 14:30 hrs)
Aircraft.

WEATHER

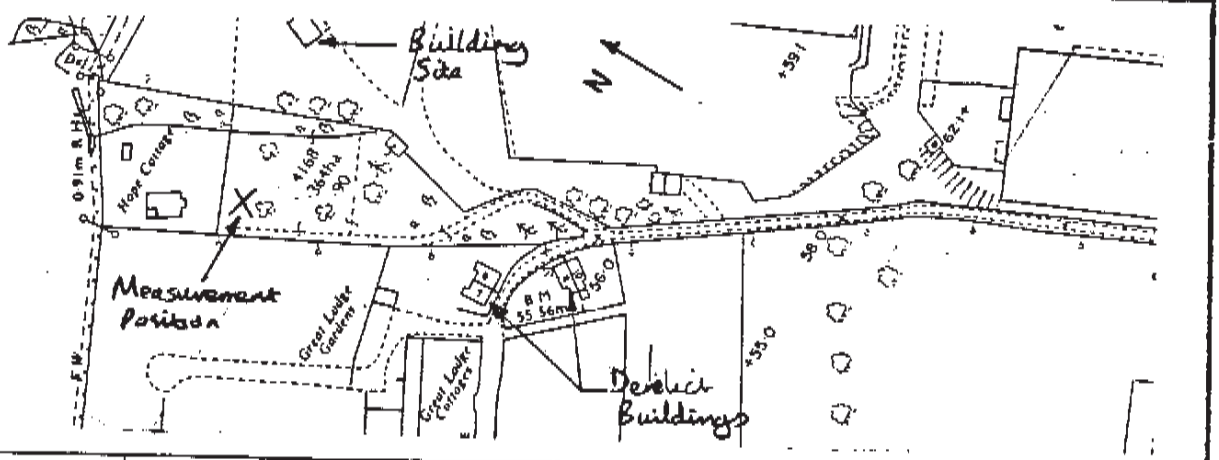
Mild, 100% cloud but no rain.
Wind from NW but veered to from NE by 14.20 hrs.
Wind speed 3-4 m/s.

WS/Atkins

PROJECT: A21 TONBRIDGE BYPASS

DATE: 2ND DEC 1991

SITE: 3. HOPE COTTAGE



TIME ON	TIME OFF	L_{90}	L_{50}	L_{10}	L_1	L_{eq}	TRAFFIC COUNT LIGHTS	TRAFFIC COUNT HEAVIES
12:00	12:15	—	47.0	57.5	65.5	54.3		
12:15	12:30	—	—	56.0	77.0	71.7		
12:30	12:45	—	—	46.0	62.5	48.5		
12:45	13:00	—	—	46.0	50.5	44.5		
13:00	13:15	—	—	48.5	55.5	47.1		
13:15	13:30	—	48.5	55.0	63.0	53.0		
14:00	14:15	—	48.5	61.0	68.5	57.5		
14:15	14:30	—	52.0	61.5	67.0	58.0		

NOTES

Noise due to a nearby building site increased the noise levels in the area of Hope Cottage. The building site lunch hour was between 12:30 and 13:15 hrs and the noise levels in this period are likely to be representative of this area.

NOISE SOURCES

Nearby House Construction Site Noise.
Fork lift truck in 'Jewsons' yard
Birds & Geese & Aircraft

Weather

Mild, 100% cloud but no rain.
Wind light with variable direction (sheltered position).

SECTION 4

AIR QUALITY ASSESSMENT

DEPARTMENT OF TRANSPORT

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

AIR QUALITY ASSESSMENT

Department of Transport
South East Construction
Programme Division
Federated House
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Dorking
RH4 1SZ

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Woodcote Grove
Ashley Road
EPSOM
Surrey
KT18 5BW

WP Ref No AA132A21

July 1992

CONTENTS

1 INTRODUCTION

1.1 This report evaluates the air quality consequences resulting from the operation of the A21 Tonbridge Bypass to Pembury Bypass Dualling scheme. Do-minimum, opening year (1996) and design year (2011) scenarios have been considered.

1.2 Air Pollution Modelling

1.2.1 The method used for predicting emissions from road traffic is based upon the graphical screening method specified in the Department of Transport's Manual of Environmental Appraisal (MEA). The model gives estimates of the average peak hour concentration of carbon monoxide. Vehicular emissions are the source of over 85% of ambient carbon monoxide, which is, therefore, used as an indicator of overall roadside air pollution levels. Model inputs include peak hour traffic flow and speed, and the distance from the receptor of interest to the road centre.

1.2.2 The MEA recommends that a detailed study is carried out if the screening method indicates an average peak hour carbon monoxide concentration exceeding 4 ppm at residential property.

1.3 Emissions Control Equipment

1.3.1 Emissions of carbon monoxide, nitrogen oxides and hydrocarbons are expected to decrease as a result of the progressive introduction into the national vehicle fleet of cars equipped with three-way catalytic converters. This is due to recent European legislation. The Warren Spring Laboratory, part of the Department of Trade and Industry, has estimated future reductions, as shown in Figure 1.

1.3.2 Compared to carbon monoxide emissions in the Year 1989, a 45% to 55% reduction is expected by the Year 1996, and an 82% to 88% reduction is predicted by the Year 2011. As a conservative estimate, the results of the

screening method have been reduced by a factor corresponding to the upper bounds of the reductions shown, to give results applicable to the opening year and the design year of the proposed scheme.

2 AIR QUALITY STANDARDS

2.1.1 The World Health Organisation (WHO) has suggested guidelines for exposure to carbon monoxide. There are no national or European statutory limits. The WHO guidelines for the protection of human health are summarised below in Table 1.

TABLE 1

AIR QUALITY GUIDELINES FOR CARBON MONOXIDE

Maximum CO Concentration Parts Per Million (ppm)	Exposure Period (Hours)
50	0.5
25	1
10	8

2.1.2 The threshold level of a peak hour annual average carbon monoxide concentration of 4 ppm recommended by the UK Department of Transport's Manual of Environmental Appraisal is related by empirical data to the 8-hour limit value, which should not be exceeded. An average peak hour concentration of 4 ppm does not itself pose a direct risk to health. It is however indicative of a possible problem associated with air pollution, as there is considerable day-to-day variation throughout the year, and the 8-hour limit is likely to be breached on one or more days during the year if the average peak hour concentration exceeds 4 ppm. On those occasions, the peak hour carbon monoxide level will exceed 10 ppm, and remain high following the rush hour periods.

3 AIR QUALITY ASSESSMENT

3.1.1 The scheme involves joining two existing stretches of dual carriageway by a proposed 2½ km dual carriageway across a rural environment. The main issues regarding air quality are;

a) a large traffic flow across currently rural land;
b) a major reduction in traffic flows along the existing Pembury Road;
c) redistribution of traffic flows on collector roads north and south of the proposed scheme.

3.1.2 Predicted carbon monoxide concentrations for all years are given in Table 2. Traffic data used in the calculation for these results is given in Table 3. Various locations have been chosen to illustrate examples of air quality trends in their surrounding areas.

3.2 Existing Road Network - 1996

3.2.1 Concentrations of carbon monoxide in excess of the 4 ppm threshold are experienced at some properties on Pembury Road due to peak hour traffic emissions.

3.2.2 Any property with a facade closer than 35 m to the centre of the road is likely to experience this concentration. This includes 60% of all properties on the Pembury Road.

3.3 Proposed Scheme - 1996

3.3.1 The proposed dual carriageway results in a dramatic reduction in traffic flow on the Pembury Road. A peak house flow of 300 vehicles/hour has been assumed for modelling purposes. concentrations of carbon monoxide are found not to exceed 0.2 ppm at any receptor location along this road.

3.3.2 No properties lie close enough to the proposed route to experience any significant effects in terms of air quality. The minor redistribution of traffic on collector roads north and south of the proposed scheme does not significantly effect air quality in those areas.

3.4 Proposed Scheme - 2011

3.4.1 Despite increased traffic flows, carbon monoxide concentrations have decreased slightly from the 1996 values. This is due to the increased use of catalytic converters, as previously discussed.

TABLE 2 - PREDICTED CARBON MONOXIDE CONCENTRATIONS

Location (Receptor)	Road (Source)	Carbon Monoxide 1 hour (ppm)		
		Do-Minimum 1996	Scheme 1996	Scheme 2011
Technical School	Pembury road	0.6	0.8	0.4
Colebrooke	Pembury Road	0.3	<0.1	<0.1
	Proposed A21	-	0.1	<0.1
Horseshoe Cottages	Combined	0.3	0.1	<0.1
Yew Tree Farm	Pembury Road	5.6	0.2	0.1
Burgess Hill Cottage	Pembury Road	4.7	0.2	0.1
Bournemill Cottages	Vauxhall Lane	4.2	0.25	0.1
	Existing A21	0.1	0.1	0.1

TABLE 3 - TRAFFIC DATA

Location (Receptor)	Road (Source)	Distance from Road Centre (m)	Speed (km/hr)			Peak Flow (veh/hr)		
			Do-Minimum 1996	Scheme 1996	Scheme 2011	Do-Minimum 1996	Scheme 1996	Scheme 2011
Technical School	Pembury Road	30	68	64	58	1064	1454	2042
Colebrooke	Pembury Road	125	50	80	80	5110	300	300
	A21	165	0	92	86	0	6020	8460
Horseshoe Cottages	Pembury Road	11	50	80	80	5110	300	300
Yew Tree Farm	Pembury Road	18	50	80	80	5110	300	300
Burgess Hill Cottage	Pembury Road	22	50	80	80	5110	300	300
Bournemill Cottages	Vauxhall Lane	115	62	59	51	1708	2015	2834
	A21	200	86	92	86	4046	4566	6418

3.5 Summary

3.5.1 There is a general decrease in concentrations along all routes in future years, due to the increased use of exhaust emission controls. An improvement to air quality in the area will be experienced by residents of the Pembury Road corridor which will have a marked reduction in traffic flow.

REFERENCES

DTp (1983) Manual of Environmental Appraisal. Department of Transport. Assessment Policy and Methods Division.

WSL (1987) The Calculation of Emissions from UK Petrol Engined Vehicles. Warren Spring Laboratory Report LR612 (AP)M.

WHO (1987) Air Quality Guidelines for Europe. World Health Organisation Regional Office for Europe. Copenhagen. WHO Regional Publications, European Series No 23.

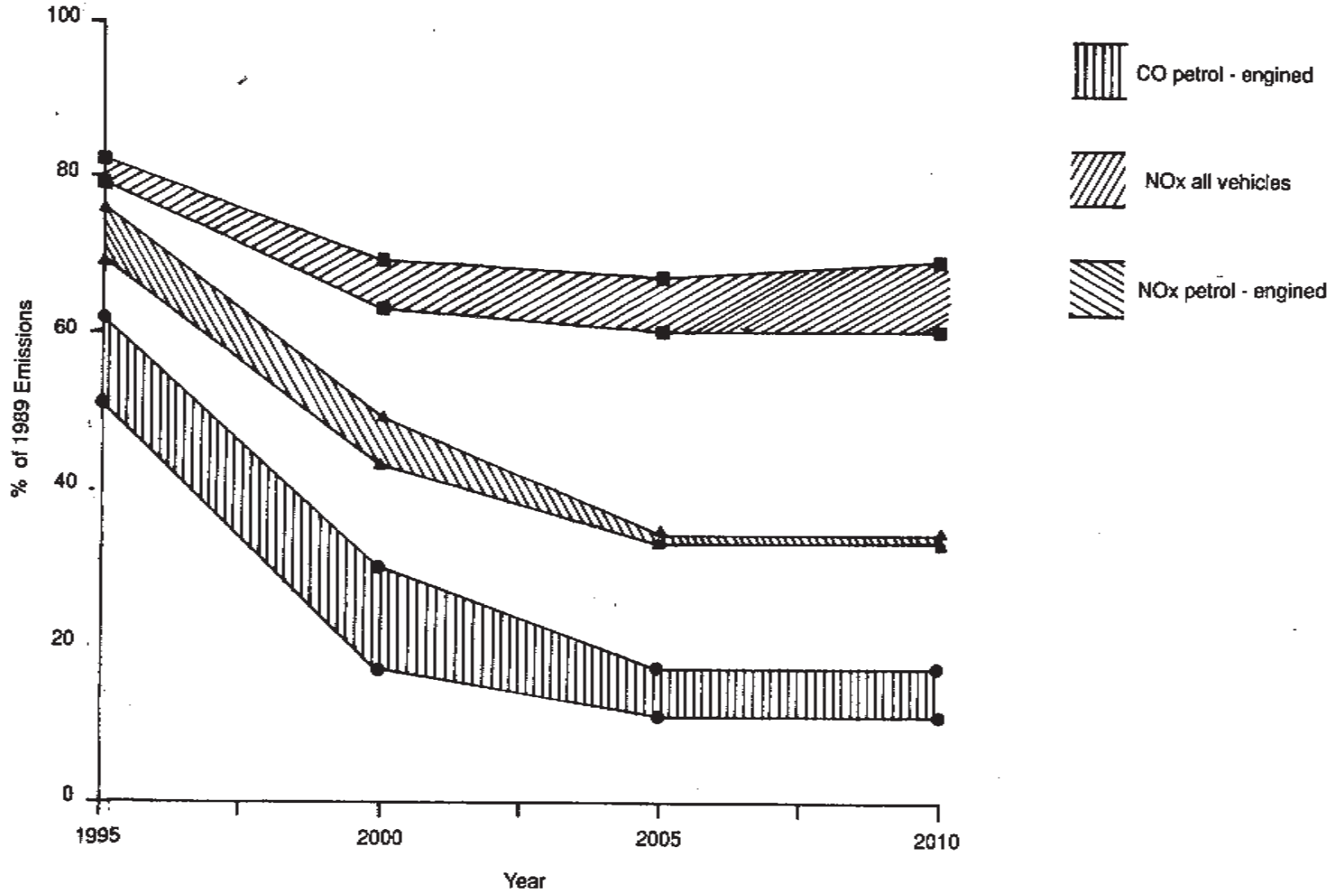

Figure 1 Reductions in Traffic Emissions Compared to 1989
(With 3 - Way Catalytic Convertors on all New Vehicles)

SECTION 5

INITIAL ECOLOGICAL APPRAISAL

A21 Tonbridge Bypass to Penbury Bypass Dualling

Initial Ecological Appraisal

Department of Transport
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May 1987

A21 Tonbridge Bypass to Penbury Bypass Dualling

Initial Ecological Appraisal

CONTENTS

List of Figures

53267/1/2/RIC/pd

1st May 1987

1. INTRODUCTION

1.1 The Department of Transport's 'Manual for Environmental Appraisal' (MEA) indicates in Part B, Section 7 'Ecological Impact' that, due to growing awareness of the significance of the environment, it is appropriate to undertake assessments of ecological changes that may occur as a result of highway development.

1.2 Two levels of appraisal for such assessments are referred to, namely an 'Initial Appraisal' to establish whether or not there are any sensitive areas within or near to the proposed road corridors and, where necessary, a 'Full Appraisal' to describe the likely effects of the road development on these sensitive areas.

1.3 In this report, we present an Initial Appraisal of the proposed A21 Tonbridge - Pembury Dualling, based on six possible corridors. We have taken as our brief, the objective outlined in Section 7.2 of the MEA, namely to take a preliminary look at the ecology of the area surrounding each route in order to discover whether there are ecologically sensitive areas that might be affected by the proposed highway scheme. Further, we have considered it necessary to extend the investigation beyond the immediate lines of the proposed routes, being a scenario which was alluded to in the MEA.

1.4 A general description of the area is given below, including the most significant sensitive features. There is then a brief description of each of the 6 possible routes, highlighting their individual significance in ecological terms. The potential impacts are then presented in abbreviated form suitable for inclusion in an assessment framework. Finally, we make recommendations on our perceived requirements for a 'Full Appraisal'.

2. THE ECOLOGY OF THE STUDY AREA

Introduction

2.1 Information concerning the ecology of the study areas has been supplied by the South East England Regional Office of the Nature Conservancy Council (NCC). A substantial part of the area is wooded, the greater proportion of which appears as ancient semi-natural woodland in the NCC's provisional Ancient Woodland Inventory (See Fig 1). The habitat was not described in detail by the NCC, but a number of particularly important areas were identified by the Regional Office. Most important is the fact that a substantial proportion of the land to the east of the existing A21 has either recently become established as a nature reserve to be managed under lease, by the Royal Society for the Protection of Birds (RSPB), or is an area to which the RSPB may ultimately have access (see fig 2).

2.2 The NCC made the following specific observations on particular woodland areas:

- "Brakeybank Wood (including Burgess Rough) - TQ 616438. These woods form part of the Tudeley Woods reserve, managed by the RSPB with the post of reserve warden, grant aided by the NCC. A recent survey carried out for the RSPB noted a high density of common breeding birds here, and the presence of sparrowhawk and woodcock. Woodpeckers are also well represented with all three species breeding."

- "Robinsgate Wood - TQ 607415. The north eastern corner of this wood would be affected by (the) options."

- "Pembury Walks (part of Pembury Wood) - TQ 603436. The eastern corridor passes through the north west corner of this wood, which is also part of the RSPB Tudeley Woods Reserve. This wood supports a range of uncommon breeding birds not found in any other woodlands in the reserve and is also interesting botanically. Plants found include bilberry (a very local Kent plant), the scarce birds nest orchid and the broad leaved helleborine."

- "Castle Hill Wood - TQ 603436 (sic). The western corridor route crosses the centre of this wood. Although this wood is not part of the Tudeley Woods reserve, an RSPB Survey noted the presence of a strong population of nightingales."

2.3 The provisional Ancient Woodland Inventory is essentially a desk study which identifies areas of woodland from ancient records and, in particular, Ordnance Survey maps. Specific information is therefore not available on the habitat ranges and ecological significance of the areas, with the exception of the NCC judgements and the data that have already been collated by the RSPB for the purpose of delineating the most significant areas from a nature conservation viewpoint. Given that the leasing of the reserve is the first such exercise entered into between the RSPB and a landowner, it can be assumed that the area is of considerable ecological value.

Field Survey

2.4 Although the status of the Tudeley Woods reserve was not disputed, it was considered appropriate to undertake some limited fieldwork to better evaluate the significance of the area. The findings for the various portions of the woodland study area are summarised below.

Ancient Woodland Character

2.5 Generally speaking, field work supports the NCC's initial views that significant portions of the study area consist of ancient semi-natural woodland. Regretfully it has not been possible to undertake any of the fieldwork at suitable times of the year, so that not a great deal can be said about the specific aspects of botanically important ground flora. However, observations on the tree types indicate a number of Stand Types, probably including Ash-Hazel with Oak Standards, Oak with Birch, and some small areas of Beech.

2.6 Even the broadleaf woodland areas that are intensively managed from a forestry point of view, being almost exclusively sweet-chestnut coppicing, appear to be of ancient origin, judging by the size of the individual tree stools, particularly in Castlehill Wood. It is important to note that even though the majority of the woodland areas are managed from a commercial forestry viewpoint, the methods employed, i.e. mainly coppicing and selective removal of mature standards, is conducive to nature conservation and to the viable continuance of the ancient woodland.

Plantations

2.7 Parts of the woodland have been either turned over to conifer plantations or mixed conifer/birch or conifer/birch/oak plantations. On their own such typically 'monoculture type' areas with limited ground flora and understorey shrubs, would result in a paucity of species diversity and only limited ecological value. However, their presence in the midst of the diverse, well-managed broadleaf woodland means that the ecological diversity of the area as a whole is, in fact, increased.

2.8 It may be due to the presence of such habitats that the area has particular importance from a bird point of view; coniferous woodland often provides an appropriate habitat for sparrowhawks, as well as several smaller bird species such as goldcrest, siskin, and members of the tit family.

Specific Habitats

2.9 Of all the habitat types identified, the most diverse and 'natural' is to be found in Brakeybank Wood and this is considered the most ecologically significant piece of woodland. This is followed closely by Pembury Walks, but here there has been more significant influence of plantation establishment. Although this has been identified as advantageous from an avian viewpoint, it is not possible to clarify how much these plantations enhance or reduce the botanical value of the woodland.

2.10 Parts of Pembury Walks exhibit a heathland ecotype rather than woodland and therefore overall, may have considerable importance for the nature conservation value of the area as a whole - note the NCC comment about botanical rarities such as bilberry, birds nest orchid and broad leaved helleborine.

2.11 Castlehill Wood and Calves Lodge Wood are both in an area under different ownership and management to the woodlands to the east of the A21. This is reflected to some degree in the types of habitat encountered in the area west of the A21. The blocks of formal plantation, whether it be conifer, sweet-chestnut or mixed species, gives a different dispersion of habitats. There is less species diversity within the blocks of plantations as they appear more 'regular' in perimeter and layout. However, there still exists a considerable range in ecotypes and these support a wide selection of common and less common birds. In addition to the nightingales identified by the RSPB survey, woodcock and a considerable number of small bird species were noted in the area during field work.

Botanical Survey

2.12 As the most significant feature of ancient woodland is considered to be based on the ground flora and shrub layer associations, it is not possible to evaluate their relative significance without detailed study of the areas. Although the main 'tree-based' habitats have been identified and therefore, an idea of the likely ground flora can be obtained from the scientific literature, it is not possible to fully determine what particular species, especially rarities, are present in the woodland. Neither is it possible to give any indication of the relative distribution, abundance and ecological significance of any ground flora species.

2.13 Consequently, it is not feasible to adjudge the relative significance of the proposed alternative highway alignments in anything but the broadest terms.

3. ROUTE ALIGNMENTS

3.1 Because of the absence of data on the most ecologically significant features of the woodland areas, namely associations of ground flora and shrub layers, there is no detailed quantitative, empirical baseline upon which to base a comparative assessment of the preferred alternative highway alignments (shown in fig 3).

3.2 The only basis that can be sensibly employed is a purely quantitative one in terms of amount of woodland lost through direct take, plus indirect effects outside the immediate take area e.g. due to changes in drainage patterns. A qualitative judgement can also be introduced by considering the number of different habitat types affected by a particular route or corridor.

3.3 Consequently, a tentative 'ranking', based on the relatively coarse factors described in 2. above, is presented in Table 1 for the six route corridors under consideration.

Table 1: Tentative Comparison of Route Corridors

Route Number	Direct Ecological Land Take		Indirect Effects eg drainage	Overall Ranking
	Loss of Reserve	Loss of Woodland Ecology		
1	1 =	1	1	1
2	3 =	2	2	2
3	3 =	3	3	3
4	6	5	6	6
5	1 =	6	5	4 =
6	5	4	4	4 =

3.4 The overall ranking of the various routes is more fully explained in Table 2, the Assessment Framework. However, what has not been possible is to undertake a quantitative comparison of the ecological value of the various routes. The coarse assessment does not permit the significance of relative habitat losses to be fully evaluated. Route 1 (upgrading the existing A21) will obviously have little or no effect on either the nature reserve or woodland generally and can be clearly evaluated as the 'preferred' route from an ecological view point. However, it may be that there will be subtleties in comparing, for example routes 4, 5 and 6 - all of which are potentially highly damaging ecologically - which are not presently obvious as we are not in possession of detailed ecological data.

3.5 Consequently, the only broad conclusions that can be drawn here are:

- Route 1 will have least ecological impact; potentially nothing of any long-term, irreversible nature.
- Route 2 will probably be the next, least impacting, but it is not feasible to say how much more significant its effect will be compared to Route 1, nor how much less its effect compared to Route 3.
- Routes 4, 5 and 6 all have potentially undesirable effects from an ecological, forestry and informal recreation veiwpoint.
- Because Routes 4 and 6 affect an area designated as a nature reserve whilst Route 5 impacts on an area with only limited natural history data, it is neither feasible nor sensible to try to directly compare the three routes.
- Due to its lesser length relative to Route 4, Route 6 is likely to cause less impact than Route 4.
- Lack of quantitative ecological data precludes further ranking of Routes 5 and 6.

- In order to determine the significance of the various routes, it is considered essential to undertake a Full Scale Assessment of this ecologically and potentially politically sensitive area, along the lines that have been described in our proposal dated 1.12.86 .

4. PUBLIC CONSULTATION FRAMEWORK

Introduction

4.1 The public consultation framework reflects the potential effects of the proposed routes under six main groups or headings:

- Group 1 - Travellers
- Group 2 - Occupiers
- Group 3 - Users of facilities
- Group 4 - Policies for conserving and enhancing the area
- Group 5 - Transport development and economic policies
- Group 6 - Financial effects

4.2 The degree of effect of the various routes on nature conservation and conservation management should be represented in three categories, namely:

Group 2 - Occupiers
Group 3 - Users of facilities
Group 4 - Policies for conserving and enhancing the area.

4.3 Group 4 is the most obvious category for reflecting the potential impacts of the various routes, but the remaining groups, namely 'Occupiers' and 'Users of facilities', should also be included since the woodlands are managed with nature conservation as well as forestry in mind. Also, sections of the woodland to the east of the existing A21 are leased to the RSPB, and this organisation can therefore be considered in Group 3 since some routes have impact on an area of nature reserve managed by the RSPB under the leasing agreement. Additionally, the financial implications of loss of forestry resource should be reflected under a Group 6 'Financial Effects' assessment.

Policies Considered

4.4 In formulating the scope of the assessment framework, it was considered appropriate to make reference to the Kent Structure Plan and Countryside Local Plan, produced by Kent County Planning Department in January 1984 and May 1983 respectively. This was in order to determine whether any of the County's stated policies would be affected by the proposed Department of Transport development.

4.5 A number of policies were considered likely to be affected to a lesser or greater degree by the proposals, the significance of which are reflected in the framework that follows. The affected policies include:

Forestry

Objective: • To conserve, enhance and renew the broad leaf trees and woodlands which give character and identity to parts of Kent, whilst recognising both the value of woodlands as a commercial and recreational resource, and the needs of modern agriculture.

Policy CC5: (i) In considering proposals for development or for tree felling, to require, wherever practicable, existing trees and woodlands to be conserved when they contribute significantly to the landscape or the appearance of a site and its locality.

Note: The 1981 Alternations to the Structure Plan propose to modify CC5 (i) as follows:

'In considering proposals for development or for tree felling in the countryside existing trees and woodlands will wherever practicable be conserved when they contribute significantly to the wildlife, the landscape or the appearance of a site or its locality.'

Nature Conservation

Objective: • To conserve and enhance the habitat diversity and rarity of the Kent countryside and coast.

Policy: CC8: Development will not be permitted at or near nature reserves or Sites of Special Scientific Interest, unless it can be shown that the proposals will not materially harm the maintenance of the wildlife interest.

Note: The 1981 Alterations to the Structure Plan propose a new policy as follows (approved CC10 will be renumbered CC11):

CC10: 'In areas to which Policies CC8 and CC9 (applicable to areas of high nature conservation value), do not apply development will not be permitted if it is likely to cause a loss of habitat or features which have importance for nature conservation, unless it can be demonstrated to the satisfaction of the local planning authorities that the need for the development over-rides the nature conservation interest and no appropriate alternative site is available.'

Informal Recreation

Objective: • To improve informal recreation provision particularly by:

a) the establishment of country parks and picnic sites;
b) the opening of existing parks and gardens to public access;

c) entering into access agreements to allow public access and recreation in areas of open countryside which are in private ownership;

d) re-appraising the use and management of areas of open countryside already in public ownership or control; and

e) the maintenance and improvement of existing rights of way used for informal recreation, and where desirable, having regard to agricultural interests, the creation of new rights of way, including bridleways and recreation paths.

Policy CC11: Suitable facilities for informal recreation will be provided or permitted at appropriate locations in the countryside or at the coast.

4.6 The assessment of the potential effects of various alternatives are presented below in Table 2.

TABLE 2: NATURE CONSERVATION ASSESSMENT FRAMEWORK OF PROPOSED A21 DUALLING BETWEEN TONBRIDGE AND PEMBURY

Group 2 Occupiers

Sub-group	Effect	Unit	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6
Forestry - Conservation of broadleaf woodland (Policy CC5i)	Land take	Length of route in km causing direct woodland take	1.25 km	1.75 km (plus loss of saw-mill and timber preparation area)	1.75 km (plus loss of saw-mill and timber preparation area)	2.75 km	1.0 km	2.75 km
		Ha	4.75	12.0	10.5	22.0	10.5	18.5
Group 3 Users of facilities								
Loss of RSPB Nature Reserve CC.11/CC8		Ha	1.25	10.0	8.25	21.5	0.00	15.0
Group 4 Policies for conserving and enhancing the area								
a) To safeguard Nature Reserve (Policy CC8)			Edge Effect (slight)	Loss or disruption of comparatively small areas (slight/mod)	As for Route 2 (slight/mod)	Major intrusion through Brakeybank Wood and additional peripheral effects of drainage - (Substantial)	No effect (slight)	Passing closer to periphery of Brakeybank Wood than Route 4 but still with disruptive effect (Moderate)
b) Protection of Ancient Woodland (Policy CC10 CC5)			No direct effect. Possibly minor take at edge of The Brakes or Castlehill Wood (slight)	Loss of small area of woodland in west of Burgess Rough and Brakeybank Wood (slight/mod)	Disruption and loss of woodland in The Brakes, Burgess Rough and Brakeybank Wood (Moderate)	Loss and disruption to area of The Brakes, Burgess Rough Brakeybank Wood and Pembury Walks (Substantial)	Loss of woodland; effectively splits large unit of Castlehill and Calves Lodge Woods damage to Pilgrims Wood and Prowlers Gill (Subs/Sev)	Loss and disruption to areas of The Brakes and Burgess Rough (as per R4) Brakeybank Wood and Pembury Walks; less intrusive than R6 (Mod/Sub)
c) Additional area of effect due to drainage etc.			No effect	Small effect	Small effect	Substantial effect	No effect	Moderate effect

N.B. All quantities in this table must be taken as approximate. In particular, schemes 1, 3 and 4 have now been eliminated from further appraisal, and consequently have not been subject to the same degree of development as the other schemes.

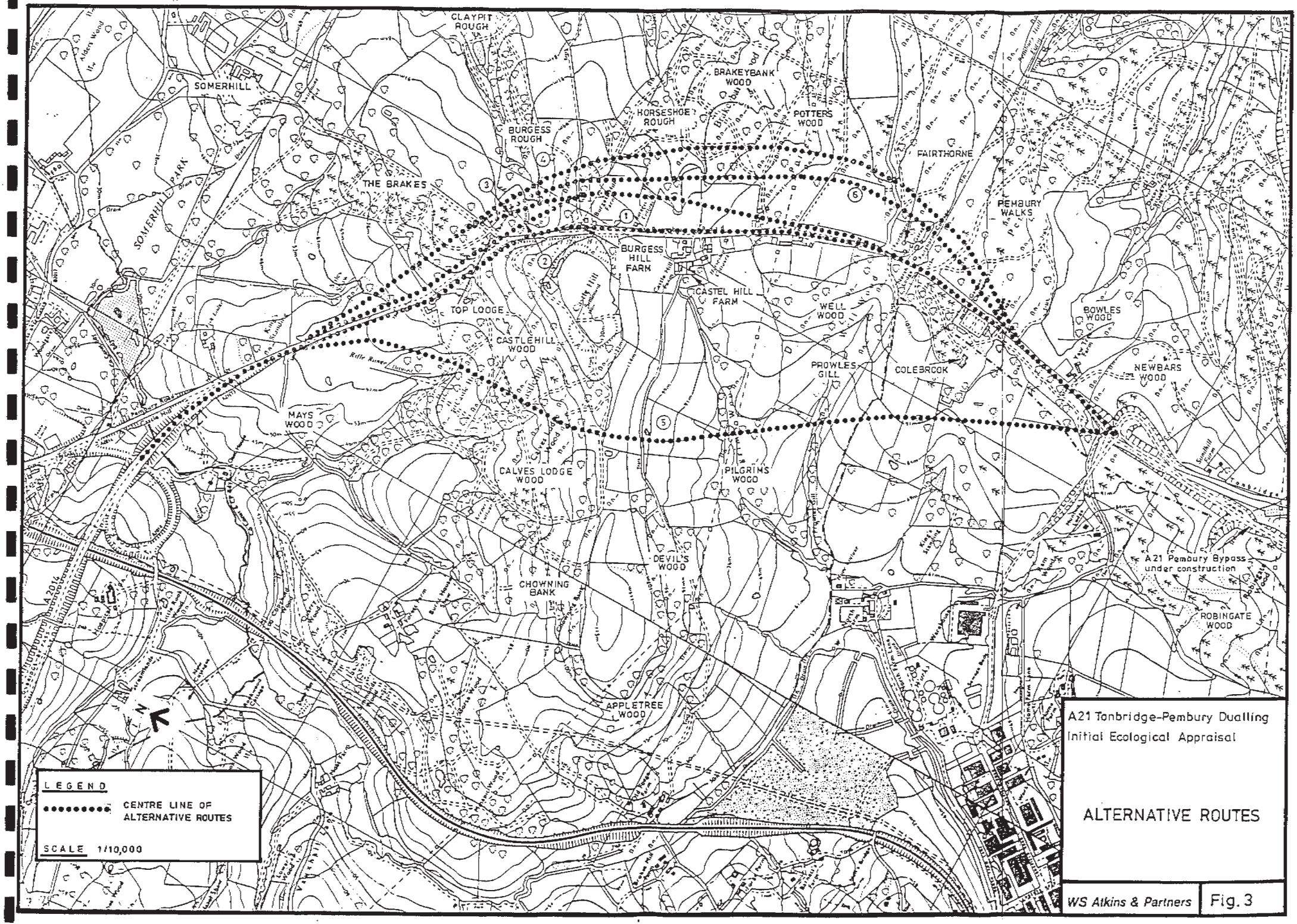

CLAYPIT ROUGH
SOMERHILL
BRAKEYBANK WOOD
HORSESHOE ROUGH
POTTERS WOOD
BURGESS ROUGH
FAIRTHORNE
THE BRAKES
SOMERHILL PARK
PEMBURY WALKS
BURGESS HILL FARM
CASTEL HILL FARM
WELL WOOD
TOP LODGE
CASTLEHILL WOOD
BOWLES WOOD
PROWLES GILL
COLEBROOK
NEWBARS WOOD
MAYS WOOD
CALVES LODGE WOOD
PILGRIMS WOOD
DEVIL'S WOOD
CHOWNING BANK
A21 Pembury Bypass under construction
ROBINGATE WOOD
APPLETREE WOOD
A 2014
N
LEGEND
CENTRE LINE OF ALTERNATIVE ROUTES
SCALE 1/10,000
A21 Tonbridge-Pembury Dualling
Initial Ecological Appraisal
ALTERNATIVE ROUTES
WS Atkins & Partners
Fig. 3

TABLE 2: NATURE CONSERVATION ASSESSMENT FRAMEWORK OF PROPOSED A21 DUALLING BETWEEN TONBRIDGE AND PEMBURY

Sub-group	Effect	Unit	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6
Group 2 Occupiers								
Forestry - Conservation of broadleaf woodland (Policy CC5i)	Land take	Length of route in km causing direct woodland take	1.25 km	1.75 km (plus loss of saw-mill and timber preparation area)	1.75 km (plus loss of saw-mill and timber preparation area)	2.75 km	1.0 km	2.75 km
		Ha	4.75	12.0	10.5	22.0	10.5	18.5
Group 3 Users of facilities								
Loss of RSPB Nature Reserve CC.11/CC8		Ha	1.25	10.0	8.25	21.5	0.00	15.0
Group 4 Policies for conserving and enhancing the area								
a) To safeguard Nature Reserve (Policy CC8)			Edge Effect (slight)	Loss or disruption of comparatively small areas (slight/mod)	As for Route 2 (slight/mod)	Major intrusion through Brakeybank Wood and additional peripheral effects of drainage (Substantial)	No effect (slight)	Passing closer to periphery of Brakeybank Wood than Route 4 but still with disruptive effect (Moderate)
b) Protection of Ancient Woodland (Policy CC10 CC5)			No direct effect. Possibly minor take at edge of The Brakes or Castlehill Wood (slight)	Loss of small area of woodland in west of Burgess Rough and Brakeybank Wood (slight/mod)	Disruption and loss of woodland in The Brakes, Burgess Rough and Brakeybank Wood (Moderate)	Loss and disruption to area of The Brakes, Burgess Rough Brakeybank Wood and Pembury Walks (Substantial)	Loss of woodland; effectively splits large unit of Castlehill and Calves Lodge Woods damage to Pilgrims Wood and Prowlers Gill (Subs/Sev)	Loss and disruption to areas of The Brakes and Burgess Rough (as per R4) Brakeybank Wood and Pembury Walks; less intrusive than R6 (Mod/Sub)
c) Additional area of effect due to drainage etc.			No effect	Small effect	Small effect	Substantial effect	No effect	Moderate effect

N.B. All quantities in this table must be taken as approximate. In particular, schemes 1, 3 and 4 have now been eliminated from further appraisal, and consequently have not been subject to the same degree of development as the other schemes.

SECTION 6

ECOLOGICAL SURVEY

CONTENTS

JUNE 1991

1 INTRODUCTION

A survey has been completed of the proposed route for the A21 dual carriageway that will connect the existing Tonbridge and Pembury bypasses. In order to assess the ecological impact of the proposals and to enable the formulation of measures for mitigation, a detailed ecological survey of the corridor has been undertaken.

The route does not affect any statutory sites for nature conservation but traverses a number of ancient woodlands listed in the Nature Conservancy Council (now English Nature) Inventory of Ancient Woodlands for Kent.

Many of the ancient woods in the area have replanted with sweet chestnut (managed as coppice) or conifers. These habitats and the other areas considered in this survey are shown on the attached Ecological Survey Map.

2 THE PROPOSED ROUTE

A brief description is given below of land-use along the proposed route from south to north with a comparative assessment of ecological interest. Areas of ecological interest are later described in more detail.

i) Robingate Wood: Even-aged coniferous plantation (pine, spruce and larch) over a low-diversity ground flora of bracken, bramble and occasionally wood sage (*Teucrium scorodonia*) and some birch stands.
Ecological interest: low

ii) Field Nº 1: Reseeded rye-grass/clover ley. To the east of this field is a screen of mature trees, beech, oak and sweet chestnut with some hazel coppice by the existing A21 and much rhododendron throughout. The southern section by Middle Lodge is mainly sweet chestnut coppice.
Ecological interest: moderate.

iii) Field Nº 2: Somewhat rank acid grassland lightly grazed by sheep and probably semi-improved in the past. There are a number of old parkland trees present (sweet chestnut, beech and a single corsican pine). There are a number of herb species present in the sward. The field slopes down to the west to a springline which supplies a pond.
Ecological interest: moderate.

iv) To the east of this field a similar area of acid grassland has been planted with tree screens (densely-packed pine with oak and sweet chestnut in one stand of around 15 years in age, other areas have been newly planted).
Ecological interest: low to moderate.

v) Field Nº 3: Pasture similar to Field Nº 2, though showing a greater degree of agriculture improvement with a higher proportion of rye-grass (*Lolium perenne*) in the sward and fewer herb spices.
Ecological interest: low

vi) The embankment running east-west across the field is of interest as an old landscape feature and for the scattered old trees it supports with mammal burrows (mainly rabbits) in their roots.
Field 3a is a closely-grazed horse paddock with parkland trees (beech).
Ecological interest: low.

vii) Prowles Gill: A narrow strip of ancient semi-natural woodland along a stream course. At the time of the visit there was evidence of sheep grazing within the wood.
Ecological interest: high.

viii) Field Nº 4: Semi-improved pasture with the grasses *Lolium perenne*, *Holcus lanatus*, *Agrostis tenius* and *Festuca rubra*. There are few herb species (mainly *Trifolium repens* and *Cirsium arvense*).
Ecological interest: low.

ix) Pilgrim's Wood: An area of ancient semi-natural woodland around a deeply incised stream valley. Up the valley to the east the deciduous cover gives way to a plantation of spruce. Further down the valley there is a stream-fed pond in the wood situated by a farm track that crosses the valley.
Ecological interest: high.

x) Field Nº 5: Improved/reseeded pasture dominated by rye grass sloping up northwards to Castlehill Wood.
Ecological interest: very low.

There is a circular pond in this field, fenced off from the pasture (grazed by horses) with shrubs and young trees to the north and east.
Ecological interest: moderate.

xi) Calves Lodge Wood: The southern section of this large block of woodland (including Castlehill Wood to the north) has been converted to blocks of even-aged plantation of pine, spruce, sweet chestnut and birch. The ground flora is generally poor. The woodland tracks make a significant contribution to the overall botanical diversity in this site. The pond on the southern boundary is virtually dry and heavily shaded and in the process of being infilled.
Ecological interest: low to moderate.

xii) Castehill Wood: Ancient semi natural deciduous woodland with two stream valleys and woodland rides.
Ecological interest: very high.

xiii) Field Nº 6: Reseeded rye-grass ley. There is a pond in the centre of this field, surrounded by trees and shrubs, which was not surveyed in detail since it lies outside the road corridor and it should not be affected by the construction works.
Ecological interest: very low.

xiv) The southern section of this field 6a, has not been reseeded though the grassland appears to be secondary, probably arising from formerly disturbed ground. Grass species include *Agrostis stolonifera*, *A tenius*, *Festuca rubra* and *Holcus lanatus*. A range of herb species are present, many of them typical of disturbed ground eg. *Ranunculus repens*, *Senecio jacobea*, *Sonchus asper*, *Cirsium arvense*, *Dipsacus fullonum*, *Centaurium erythraea* along with *Hypericum* and *Epilobium* species. Closer to the woodland edge *Pulicaria dysenterica* was present. Further to the south east there is a tall-herb community growing on what appears to be a former landfill site. This area was not surveyed in detail. Ecological interest: low to moderate.

The sites of moderate to high ecological interest, which will now be described in more detail, are as follows:

Castlehill Wood
Pilgrim's Wood
Prowles Gill
The grasslands and pond in Field Nº 2
The pond in Field Nº 5

The three areas of ancient woodland are fairly similar in terms of their plant communities. Drier areas higher up the valley are dominated by birch (*Betula pendula*) with scattered oak and beech. Bracken, bramble and wood sage are typical of the ground flora. Lower down the valleys, and forming perhaps the dominant stand type, hazel coppice with ash and oak is present. Other tree and shrub species include aspen, rowan, field maple, guelder rose, common hawthorn and midland hawthorn (*Crataegus laevigata*). Alder with crack willow domate the wettest sites at the bottom of the valley. The ground flora includes *Glechoma hederacea*, *Circea lutetiana Volia sp*, *Geranium robertianum*, *Endymion non-scriptus*, *Veronica montana*, *Primula vulgaris*, *Ajuga reptans*, *Geum urbanum* and *Lonicera periclymenum*. Typical of the wetter areas around the stream and on lateral flushes are *Carex pendula*, *C remota*, *C sylvatica*, *Cardamine flexuosa*, *Chrysosplenium oppositifolium* and *Scrophularia nodosa*. Many of these species are characteristics of an ancient woodland flora.

Part of Castlehill Wood on a north-facing slope is more open in character with scattered old oak and beech trees and stands of younger birch over dense bracken.

The grasslands in field Nº 2 are part of a parkland landscape that include a number of old trees and a pond constructed by damming the stream valley to the west. The acid grasslands here appear to be less affected by agricultural improvements than in the other fields along the route though in part of field Nº 2 the sward appears to have been mechanically disturbed. Grass species present include *Agrostis tenius*, *Holcus lanatus* and some *Lolium perenne* along with the herbs *Achillea millefolium*, *Stellaria graminea*, *Lotus corniculatus*, *Medicago lupulina*, *Plantego lanceolata* and *Rumex acetosa*. The rushes *Juncus effusus* and *J inflexus* are locally common.

There are five ponds along the proposed road corridor. The pond in the west of field Nº 2 should not be directly affected by the proposals. It is fed by a spring at the base of the sloping field and is screened by mature trees. There are fringing reedbeds of reedmace and bur-reed and a good area of open water remains with a variety of aquatic plants. The site of worthy of protection. It is assumed that the proposed construction would not affect the springline though there may be some reduction in the area of the catchment.

The circular pond in field Nº 5 will be lost to the development. It retains a small area of open water which was particularly turbid at the time of the site survey so that depth could not be assessed. There is however, a broad fringe, much of it in very shallow water of reedmace and bur-reed and it is probable that the remaining areas of standing water are shallow. With the rank growth of vegetation on the banks and an open aspect to the south (allowing sunlight to warm the pond) it is likely that the site is still inhabited by species of amphibia. Subsequent surveys revealed that this pond does in fact sustain amphibia; frogs and palmate with the Great Crested Newt having been found. In view of the presence of the great crested newt a protected species, relocation measures will be required prior to the start of the works.

The three remaining ponds in the proposed road corridor are not considered in further detail. One is currently being infilled while the pond in field Nº 6 should remain unaffected by the construction. The pond in the lower section of Pilgrim's Wood is situated around 200 metres to the east of the road corridor. It is supplied by the woodland stream and is unlikely to be affected by the proposals.

The streams in the wooded valleys have not, apart from the associated wetland flora, been considered in detail. The streams of this area have run dry during recent summers and the permanent aquatic communities are therefore likely to be poorly developed.

3 ANIMAL COMMUNITIES

Birds noted during the survey were typical of the habitat and no exceptional species were recorded. A comprehensive survey is only possible during the breeding season. Nightingales have been recorded in Castlehill Wood.

Animal paths were evident in some of the woodlands particularly along the stream valleys. Rabbits are particularly common in the area and a fox was seen on one of these valleys during the survey. No badger setts were found along the proposed route of the road but outlying areas were not searched and the presence of a sett in the sandy soils of this locality is probable. Badgers may also use the stream valleys as foraging routes.

4 IMPACTS OF THE PROPOSED ROUTE AND PROPOSALS FOR MITIGATION

The greatest impact of the proposed road on the ecological characteristics of the area will result from landtake. In the case of the wet wooded valleys habitat loss under the present design conditions is unavoidable. Losses could be much reduced by the provision of bridges across the valleys. This would preserve the integrity of the valley ecosystem by allowing for the retention of a strip of natural vegetation along the stream banks. At the very least a broad underpass should be provided to take the stream and to provide for animal foraging

routes. A 600 mm pipe is normally adequate as a badger tunnel under dry embankments. Along water courses, however, a broader underpass is required with a raised ledge to provide a dry path. An underpass along the stream valley in Castlehill Wood is also desirable and may assist in the prevention of animal kills.

Appropriate habitat restoration measures on the slopes of embankments and cuttings will partially compensate for habitat loss. In areas of woodland loss this should take form of tree and shrub planting of species appropriate to the area.

Those other sections of verge and embankment not to be planted with trees or shrubs should be seeded with a low competitive grass seed mix (*Agrostis-Festuca*) which would concord with the semi natural grasslands found in field Nº 2. An acid-grassland wild-flower mix could be considered for these grasslands.

The small woodland streams have, under recent climatic conditions run dry during the summer months leaving the occasional pool further down the valley, particularly where lateral springs emerge. Thus, these watercourses will be unable to dilute and carry away road run-off water and there would be a tendency for impoundment of pollutants in the pools. The provision of suitably designed balancing ponds will prevent pollution of these watercourses and compensate for the loss of the existing aquatic habitats.

5 SUMMARY AND RECOMMENDATIONS

An earlier report (Initial Ecological Appraisal, May 1987) placed due emphasis on all ancient woodland habitats, including the replanted areas. During this survey it has been possible to refine the ecological assessment of the individual woodlands and of other habitats along the route.

The northern section of Castlehill wood is of high ecological value, as are the narrow valley woodlands Prowles Gill and Pilgrim's Wood. The impact of the proposed route on these habitats is high both in terms of direct habitat loss and habitat partition. Measures to retain access and connectivity between the woodland blocks should be considered.

The blocks of plantation are considered to be of less ecological value and there will be the opportunity for net gains in habitat quality by planting the embankments and providing connecting corridors of hedgerow and woodland.

Additional work on certain groups is recommended in order to complete the proposals for environmental mitigation. The pond in field Nº 5 should be surveyed in early summer for amphibia. Should this survey record the presence of protected species it will be necessary to move these to a suitable receptor habitat immediately prior to the commencement of earthworks.

More information is required to establish if there are badger setts in the vicinity of the proposed road corridor and the courses of any traditional foraging routes. Three local residents were of the opinion that there were no deer in the locality and none had seen a badger in the area. The latter animal can be particularly secretive and a full search by the local badger group of the broader road corridor is advisable.

SECTION 7

AMPHIBIAN SURVEY

British Herpetological Society

Conservation Committee

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING.
SURVEY OF CASTLE HILL FARM PONDS FOR AMPHIBIANS.

Castle Hill pond was surveyed for amphibians on the afternoon of 11th April and the evening of 13th May 1992. The object of the survey was to assess its value for amphibians, concentrating particularly on the newts. Having discovered great crested newts in the pond a further two ponds were surveyed to assess their suitability for supporting great crested newts in the event of the original pond being destroyed. The latter two ponds were netted on the 10th May and surveyed by torchlight on 13th May. As the surveys were commissioned rather late in the season it was not possible to quantify the numbers of common frogs and toads using the ponds, and consequently survey for these species went no further than detecting the presence of hatching spawn/tadpoles.

Results.

Pond 1 was not particularly large (maximum length 20m, by max width 8m) and was located in an improved field. Good terrestrial habitat was present in Calves Lodge Wood, approximately 100m to the north and west of the pond. A narrow belt of rough grass/brambles and scrub surrounded the pond, providing useful edge habitat. The pond was shaded by willow scrub over approximately 25% of its area, and a further 10% of the water surface was occupied by emergent vegetation (*Typha*). No submerged vegetation was observed, however the water was extremely turbid making such observations impossible. The pond appeared to be relatively deep and looked capable of lasting well into the summer and supporting tadpole development in most years. The pond did not appear to be stocked with fish. To the south of the pond there were a few shallow wet puddles, less than two metres square in area, and only about 10cm deep. The only aquatic plants noted in these puddles were small quantities of filamentous algae.

Survey methods were determined by the state of the pond. Torch-light surveys were impossible because of the the extreme turbidity of the water (this being the best method of quantifying the numbers of great crested newts). The lack of submerged vegetation did not make netting for newts easy, although there were a number of rafts of dead *Typha* stems which were sampled both for adult newts and newt eggs. The pond was subjected to a 15 minute period of netting on 13th April in which numbers of newts captured were recorded to enable the relative newt population sizes to be assessed according to the Nature Conservancy Council's amphibian survey methods.

Great crested newt eggs (identified by their larger size) were numerous among the dead Typha stems. No adults were caught but one female was observed near the surface in the centre of the pond. A total of 14 palmate newts were captured during the 15 minute netting period. A further period of netting resulted in several more palmates being caught, but no smooth newts were found. There was no evidence of toad spawn, but one hatching

clump of frogs spawn was netted from the pond, and in the puddles to the south a further two clumps of spawn had been laid. Other frog spawn masses may have been missed in the main pond. Using the NCC scale for evaluating the amphibian assemblage the site scored a total of 4 points (2 for palmate newts and 1 each for the common frog and great crested newt).

The pond was revisited on the evening of 13th May to survey by torchlight, but the water was still too turbid to reveal any newts. One common frog was found by the pond.

Pond 2 was much larger, and apparently formed by damming a wooded valley. It was approximately 50m wide, but the length was not measured. It appeared to be quite deep, but like pond 1 was very turbid. Curiously there were many trees growing out of the pond, including birch, which suggested that the water level had only recently been raised. The trees probably result in at least 75% of the water surface being shaded. There was little if any emergent vegetation, other than a few clumps of *Juncus*. There were small patches of *Callitriche* in the pond, but no other aquatic weeds were recorded. The southern edge of the pond was netted for 15 minutes but no amphibians were found.

The torchlight survey produced three adult frogs, a frog tadpole, and one adult male great crested newt.

Pond 3 was located to the north of a small block of woodland, adjacent to an area of pasture. The pond was about 60m long by 30m wide, and relatively shallow. The base of the pond was covered in fairly deep leaf litter making wading into the centre unwise. The pond was only about 15% shaded, despite being surrounded on all sides by woodland or Rhododendron scrub. About 40% of the water surface was dominated by emergent vegetation (mainly *Sparganium*, with some *Typha*). The pond appeared also to have been formed by damming a valley, and part of the dam had several deep holes, suggesting its long term future might be precarious. There were scattered specimens of *Potamogeton natans*. The water was clear. Netting the pond produced only large numbers of frog tadpoles, and these were the only amphibians observed under torchlight as well, despite good visibility.

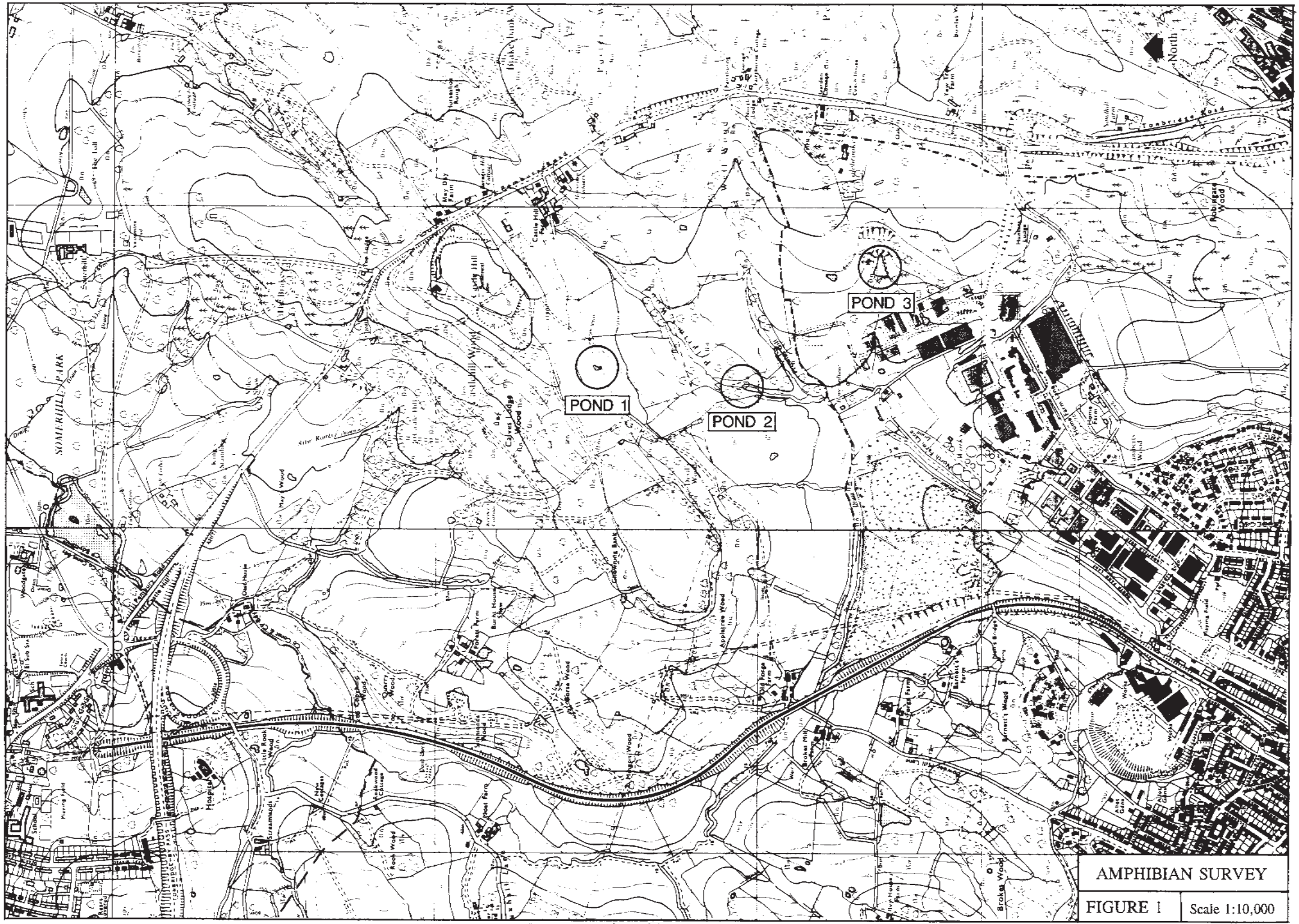
Conclusion.

Pond 1 is likely to be destroyed by the bypass which is unfortunate, since it supports a breeding population of the great crested newt, as well as palmate newts and common frogs. Because of the lateness of the survey, and the difficulty of neting and torching the pond for newts it was not possible to assess the size of the amphibian populations. The protected status of the great crested newt should be taken into consideration when planning the route of the road. It would be better to avoid the pond, but if this is not possible the newts should be rescued and translocated to another pond before road construction begins. Translocation of the nwts to pond 2 would not be a good idea, since this pond supports the species already, and the exercise would probably only result in over-crowding of an existing newt population. given the highly shaded nature of this pond this is not a very secure site any way. Pond 3 does not appear to support newt populations, unless they are very small. This may because the pond is so shallow and prone to desiccation. If newts were to be introduced here it

would be advisable to deepen the pond slightly by removing silt from the bed of the pond. It need not be too deep, preferably just drying out in occasional drought years to prevent establishment of predatory fish. However this pond is vulnerable to damage to the dam, which holds back the water, and also to invasion of scrub, and may not provide a secure future for the newts.

In our opinion the transfer of newts to an existing pond would not be the most satisfactory option, since in habitat terms there will have still been a net reduction in the amount of wetland. A better idea would be to excavate a new pond on land owned by a sympathetic owner in the area, and transfer any amphibians to such a new site before constructing the road. Given that the soil in this area is quite clayey this should not be too difficult to do. The best place to do this would be in one of the fields where grazing would keep the pond open and unshaded, but not too close to the new road to prevent road mortality.

The British Herpetological Society is the membership based conservation organisation specialising in the conservation of amphibians and reptiles. It works in partnership with the herpetological Conservation Trust, a non-membership-based conservation organisation. BHS contract surveys are undertaken by experienced volunteer herpetologists under supervision from experts in its Conservation Committee. All income from such work is directed to the conservation work of the BHS/HCT.



AMPHIBIAN SURVEY

FIGURE 1 | Scale 1:10,000

Base plan reproduced from the Ordnance Survey Map

SECTION 8

ARCHAEOLOGICAL SURVEY

ARCHAEOLOGICAL ASSESSMENT OF THE A.21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

April 1992

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Contents

1. INTRODUCTION

1.1 South Eastern Archaeological Services were commissioned by W. S. Atkins Transportation Engineering (consulting engineers to the Department of Transport) to conduct an archaeological assessment of the proposed route of the A.21 Tonbridge Bypass to Pembury Bypass dualling. The brief provided was a copy of that prepared for the proposed Lamberhurst Bypass by the County Archaeologist, Dr. J. Williams.

2. METHOD

2.1 The Kent County Council Sites and Monuments Record (henceforth referred to as the S.M.R.) was checked for relevant information.

2.2 Aerial photographs held by Kent County Council (surveys of 1867, 1972 and 1990) and W. S. Atkins (survey of 1990) were checked for crop, soil, and shadow marks.

2.3 The route was systematically inspected for surviving historic and archaeological features. Where only a narrow strip adjacent to an existing road is included in the proposed route, it proved satisfactory to conduct the inspection from the adjacent road rather than by gaining access to the affected land. In the case of the property known as "Middle Lodge", most of the site could be inspected from the adjacent road or field. Those parts which could not were covered by an impenetrable growth of rhododendron bushes, and gaining access was therefore of no advantage.
Note that it was not possible to carry out fieldwalking to recover surface artifact scatters, because none of the fields concerned had been recently ploughed. All the land on the route, with the exception of the garden of "Middle Lodge" and the existing roads, was either wooded or had a covering of mature grass.

2.3 Ditch and stream banks were inspected for indications of buried archaeological features, and consideration was given to the possible presence of palaeoenvironmental evidence.

2.4 Early maps held at the Centre for Kentish Studies, County Hall, Maidstone, were checked for any relevant information.

3. RESULTS

3.1 The Sites and Monuments Record.

Two sites immediately adjacent to the proposed route are noted on the S.M.R.:

3.1.1 S.M.R. No. TQ 64 SW 1 (N.G.R. TQ 6075 4390). An Iron Age hillfort on Castle Hill is a Scheduled Ancient Monument (No. Kent 42). The boundary of the scheduled area (Fig. 1) is approximately 70 m. from the eastern fence-line of the proposed road. There are actually two separate forts within the complex. Archaeological excavations have been conducted in the fort itself (Money 1975), but there have been none in the immediate environs.

3.1.2 S.M.R. No. TQ 64 SW 5 (N.G.R. TQ 6010 4414). A medieval and post-medieval bloomery (iron-working) site. Reports in 1913 and 1931 indicate signs of occupation and iron-working waste, though no signs of occupation were definitely recognisable in 1959. There were several minepits nearby. The suggested occupation site is approximately 100 m. to the west of the land affected by the proposed road, but the area of archaeological potential indicated on the S.M.R. plan extends eastwards into the affected part.

3.1.3 Various other sites are recorded in the surrounding area, summarised below:

O.S. Grid/S.M.R. No.		Description
TQ 54 SE	3	Med./post-med. pond and forge
	4	Neolithic axe (chance find)
	5	Med./post-med. forge and mill
	6	Iron Age axe and cinerary urn (chance find)
	7	Bronze Age axe (chance find)
	8	Undated stone adze or hoe (chance find)

	9	Mesolithic flint implements (chance find)
	11	Undated enclosure (from aerial photographs)
TQ 64 SW	2	Neolithic or Bronze Age flint axe hoard (chance find)
	7	Med./post-med. bloomery, furnace and mine
	9	Bronze Age scraper (chance find)
	10	Bronze Age knife and scraper (chance find)
	11	Neolithic arrowhead (chance find)
	12	Neolithic axe (chance find)
	13	Mesolithic or Neolithic scraper (chance find)

3.2 Aerial Photographs

Aerial photographs revealed no definite features affected by the proposed route. On W. S. Atkins' photographs nos. 13/90 110 and 111, the northernmost field (O.S. No. 0061) and the northen end of the adjacent one (O.S. No. 0034) appeared to show an irregular pattern of small dark patches, apparently measuring approximately 2-5 m. across. These did not show on any other photographs. The interpretation of these is not certain. Their presence on only one set of photographs suggests that they may not be caused by buried features, though it is quite possible for these to show only under certain conditions. If they are of archaeological interest, the darkness suggests they may be some form of pit. The scale of the photograph is too small to allow for accurate interpretation, however, and any such interpretation must be speculative at this stage.

3.3 Ground Survey

Several earthworks were located, shown sketch-plotted on the plans accompanying this report. For convenience they are numbered and described from north to south.

3.3.1 Field No. 0034 contains at least two, possibly more, shallow depressions, roughly circular or elliptical, approximately 20 m. across. Their positions are shown very approximately on the plan, numbered 1 and 2. If they are of some antiquity, these are likely to be filled-in marlpits or possibly ponds. A few fragments of cinders and 19th century pottery were noted on the surface of No. 1, though the origin of this material is not known.

Note, however, that information from the landowner revealed that this field was used in recent times as a landfill site. This was confirmed by Kent County Council, but neither they nor the District Council have any detailed records. There has obviously been extensive tipping at the southern end of this field, but it is not known how far north this extended. It is possible, therefore, that the depressions noted are merely irregularities left after reinstatement of the ground.

3.3.2 At the northern end of Castle Hill Wood are various low banks and ditches, numbered 3 and 4 on the plan. The remains of a modern fence are partly situated on that numbered 3, and are plotted by the Ordnance Survey. These are shown on the 1842 tithe map (Parish of Tonbridge Southborough), and are the boundaries of former fields that have become incorporated in the woodland. They are similar to the features described in sections 3.3.5, 3.3.6, 3.3.7 and 3.3.9 below.

The date of these features is not certain. During the medieval period increased pressure on land resources led to the piecemeal

clearance of marginal woodland, a process known as "assarting". This resulted in a pattern of small irregular fields, some of which subsequently reverted to woodland in the late medieval and post-medieval periods. Such a pattern can be traced today in the fields to the south of Castle Hill Wood, and can be seen to be much more widespread on the 1842 tithe map. It is possible, therefore, that these field boundaries could be medieval in origin, though map evidence can only confirm a date prior to the early 19th century. Their form is variable, but is generally a low bank and small ditch. This is also characteristic of post-medieval field boundaries, but it is possible that their form could have altered with time, regardless of their original date.

3.3.3 The area shown enclosed by a dashed line, numbered 5 on the plan, roughly delimits an area containing many closely packed hollows up to 1.5 m. deep and 2-4 m. across, surrounded by irregular spoil deposits. These were not plotted individually, and there are probably more than were observed because areas of impenetrable bracken and brambles prohibited complete inspection. Although there are rifle butts nearby, which have been used in the past by the army, they are unlikely to be the result of military training activity, being too large for individual foxholes and too irregular for gun emplacements. They are undoubtedly the minepits referred to in section 3.1.2 above.

3.3.4 Two small possible terraces, numbered 6 on the plan, are of uncertain origin. Their edges are not well defined, though the central areas appear too flat to be natural. One small piece of charcoal was noted, and it is possible that they are charcoal-burning platforms.

3.3.5 A bank and ditch, which has been plotted by the Ordnance Survey and here numbered 7, is also shown as a field boundary on the 1842 tithe map, though it is now incorporated in the woodland. It is associated with a former pond (not shown on the O.S.).

3.3.6 Further low banks are situated as shown 8 and 9 on the plan. That at 8 has an associated ditch, that at 9 is only a low bank, barely discernible at the eastern end. The corner in the former is marked by a very large yew tree. It was not possible to tell whether the bank pre-dated the tree or vice versa, as was also the case with a further large yew on the line of the bank shortly before it disappeared at the west.

3.3.7 Low banks and ditches, similar to those described in sections 3.3.2, 3.3.5 and 3.3.6 above, are situated as numbered 10 and 11 on the plan, largely still forming the present field boundaries. They enclose a strip of formerly coppiced woodland between fields 8915 and 5500 (O.S. numbers); such strips are known locally as a "shaw" or "rew".

3.3.8 A disused track crossed Field No. 9658 as numbered 12 on the plan. This is not shown on the 1825 plan of the Great Lodge Estate, and is assocated with a gate to the present Colebrooke House. It can be assumed to be of 19th century origin. (The site of the former Great Lodge is shown as 12a on the plan).

3.3.9 In Robingate Wood a long, low bank and ditch, similar to those described in sections 3.3.7, etc. is in the position numbered 13 on the plan. It is not shown on either the tithe map or the estate map referred to above, as the area was by then wooded. It must therefore date from the beginning of the 19th century or, perhaps more likely, earlier. It is on a similar alignment to the boundary numbered 13a, of which it may have been a continuation.

If this is the case its length and form suggest it may represent an estate boundary, though in the absence of an accurate survey this point is unconfirmed.

3.3.10 A substantial bank and ditch runs roughly in a E-W direction, as numbered 14 on the plan. It is clearly cut through by, and is therefore earlier than, the bank and ditches described in section 3.3.9 above. At its maximum it is approximately 2 m. high from the present base of the ditch to the top of the bank, and 10 m. across the top of the ditch to the centre of the bank. It has been buried by the modern road embankment at the east, and becomes discontinuous and eventually disappears to the west. The total length traceable is approximately 50 m., all of the best preserved length (to the east of the later boundary) being affected by the proposed road line. It is not visible to the east of the present road. Its date and function are not known, but its size and form suggest it is medieval or earlier.

3.3.11 A few minor earthworks were clearly attributable to either forestry or military activity, and were not recorded.

3.4 Map Evidence

In addition to items noted at relevant points throughout this report, it was noted that field O.S. No. 0236 to the north of Robingate Wood was named "Kiln Field" on the 1825 map of the Great Lodge Estate. It is similarly annotated on the plan accompanying this report. The site of the brick kilns contemporary with the map is to the south of "Hunter's Lodge", and is not affected by the proposed road line. It is possible, however, that this field may contain the sites of earlier kilns.

4. CONCLUSIONS

4.1 The absence of ploughed fields severely hampered the initial assessment process because the identification of surface artifact concentations in such fields is one of the main means by which archaeological sites are located. This is not possible in fields down to grass. Further assessment work is necessary, as described in section 5.2 below.

4.2 The following features of archaeological significance were located:

4.2.1 The large bank and ditch (No. 14 on the plan, section 3.3.10).

4.2.2 The minepits (No. 5 on the plan, section 3.3.3).

4.2.3 The possible charcoal-burning terraces (No. 6 on the plan, section 3.3.4).

4.3 The proximity of the Castle Hill hillforts (section 3.1.1), and the presence of a number of other sites in the area (section 3.1.3), strongly suggest the likelihood of other archaeological remains being present, which could not be detected by the means used in this initial assessment.

4.4 Aerial photographs revealed no certain features, but the possible presence of pit-like features in fields nos. 0061 and 0034 (section 3.2.1).

4.5 Map evidence suggests there may be the remains of early kilns in the field marked "Kiln Field" on the plan (section 3.4).

4.6 No features of archaeological significance were identified by inspection of the side of stream banks.

4.7 The size of the large bank (section 3.3.10) suggests that there may be a buried land surface preserved beneath it, which may yield palaeoenvironmental evidence. No other likely sources of such evidence were noted.

5. RECOMMENDATIONS FOR FURTHER WORK

5.1 Summary

5.1.1 Further assessment by means of machine-dug trial trenches of the fields currently under grass, i.e. all those not covered by woodland (see section 5.2 below).

5.1.2 Archaeological excavation of:

the bank and ditch (see section 5.3.1 below)

minepit(s) (see section 5.3.2 below)

the possible terraces (see section 5.3.3 below)

5.1.3 The tree felling and clearance in Castle Hill Wood and Robingate Wood to be programmed to allow for an archaeological watching brief and excavation if necessary. Two other small areas should receive similar treatment (see section 5.4 below).

5.2 Further Assessment

5.2.1 Because of the unsuitability of the terrain for fieldwalking, the fields affected by the proposed road line which are currently under grass should be investigated by means of machine-dug trial trenches, cut down to the top of the undisturbed subsoil. This will reveal any archaeological features present. The machine used should be a JCB 3CX or equivalent, fitted with a wide toothless ditching bucket, the trenches to be one bucket's width. An example of the trenching proposed is illustrated in Fig. 2. After basic recording, the trenches should be backfilled pending full assessment of the results. Excavating, recording and backfilling would be conducted as a continuous rolling programme, rather than successive separate stages.

5.2.2 Dr. and Mrs. Banfield have confirmed that the affected fields in their ownership (13 on land ownership plan no. R3268/5/2) are "set-aside" to grass, and it appears likely that some, and possibly all, of the remainder are the same. In this case, the proposed trial trenching should not interfere with agricultural requirements, and it is therefore recommended that the work should be carried out as soon as possible.

5.2.3 On completion of the trial trenching a further report would be submitted, detailing any sites identified and any recommendations for full archaeological excavation or other work. It is recommended that any such excavation take place well in advance of road construction work. On land under "set-aside" this could be done without interfering with the current land use, and would avoid any conflict with the road works. On land used as pasture, any disruption to agriculture would be less than would be caused to the road programme should excavation be left to a later stage.

5.2.4 To simplify this operation, it is recommended that three small areas are omitted from the programme described above:

Firstly, the grounds of "Middle Lodge" form the garden of a private house, and it would not be reasonable to conduct trial trenching in them.

Secondly, three fields to the north-east of the existing Pembury Road (O.S. Nos. 0086, 0978 and 1666) are slightly affected by the new road alignment. In all cases the area concerned is relatively small. It is considered that including them in the watching brief, as described in section 5.4.2, will minimise potential loss of information whilst allowing attention and resources to be

concentrated on the bulk of the area requiring further assessment. Thirdly, the small corner of field O.S. No. 8915 is in a different ownership, and is barely affected by the scheme.

Additionally, it would probably be possible to design an adequate trenching sample without affecting the grounds of the house known as "Colebrooke Park". However, if the owners are agreeable it may be useful to include this land, at least the paddock at its northern side.

5.3 Excavations

The sites described below are all considered to be worthy of archaeological excavation. They are all in woodland and the excavations proposed could take place with no disruption to the existing land use. It is therefore recommended that they be carried out well in advance of the road construction to avoid conflict with the requirements of the latter.

5.3.1 The large bank and ditch (described in section 3.3.10) should be excavated by means of a trench to provide a cross-section, and its shape and position accurately surveyed and planned. This may suggest its function, and should provide evidence for its date. Nothing is known of the landscape associated with the hillforts on Castle Hill, and the possibility that this feature is contemporary, perhaps representing a land division, should be investigated. The bank may preserve a buried land surface dating from the time of its construction, and provision should be made for the recovery and analysis of environmental evidence (pollen, etc.). The feature is likely to be medieval or earlier (see 3.3.10), and provision should be made for radiocarbon dating.

Only part of this feature is affected by the proposed works, but this is by far the best-preserved portion, which will provide the

highest quality of archaeological evidence. Although it will be buried by the new embankment, it is not considered that such burial would provide sufficient protection to eliminate the need for excavation. It is likely to suffer considerable damage from heavy machinery during initial clearance, and in the event of road alterations in the future, it would be impossible to remove the overlying embankment without destroying most or all of the buried feature.

5.3.2 At least one of the minepits (described in section 3.3.3) should be archaeologically excavated. It would be preferable to excavate two, because this would increase the chance of recovering dating evidence, which is not prolific in such features. Few such pits have been excavated to date. In general terms, therefore, any additional evidence would be important. Specifically, although it is conjectured that these pits and the adjacent bloomery site can be equated to documentary references dating to 1340, this is not certain. Although slightly further north than currently known prehistoric iron-working sites, the proximity of the Castle Hill forts suggests at least the possibility of an Iron Age origin, and it is therefore important to try to ascertain their date. Provision should be made for radiocarbon dating.

5.3.3 The small terraces (described in section 3.3.4) should be archaeologically excavated to ascertain their origin and date. A trench along the line of the slope of one of them would confirm whether or not they are artificial. If this is the case, the platform should be excavated to identify its function. Provision should be made for radiocarbon dating. The position and shape of the terraced areas should be accurately surveyed and plotted.

5.4 Watching Brief and Excavation

5.4.1 Although there may be further, undetected, archaeological features in Castle Hill Wood and Robingate Wood, the tree cover prevents any further investigation at this stage. For the same reason, trial trenching is impractical. It is therefore considered that resources should initially be concentrated on the programme described in sections 5.2 and 5.3 above. However, it is recommended that the construction work be programmed to allow for archaeological inspection during tree felling and top- and subsoil removal. The programme should allow for time between this and subsequent major earthmoving to permit excavation and recording, should archaeological remains become apparent. This is particularly important for Castle Hill Woods, which surround the Scheduled Ancient Monument.

5.4.2 The areas referred to in section 5.2.4 should be subject to similar provisions. The topsoil and subsoil removal should be monitored, and provisions made for basic excavation and recording of any archaeological features revealed prior to major earthmoving operations.

5.4.3 A general watching brief on the whole line of the road should be maintained during the initial earthmoving, to allow basic recording of any further features encountered.

6. REFERENCES

Cleere, H. and Crossley, D. 1985. The Iron Industry in the Weald.

Money, J. H. 1975. Excavations in the Two Iron Age Hillforts of Castle Hill, Capel, near Tonbridge, 1965 and 1969-71. Archaeologia Cantiana 91; 61-85.

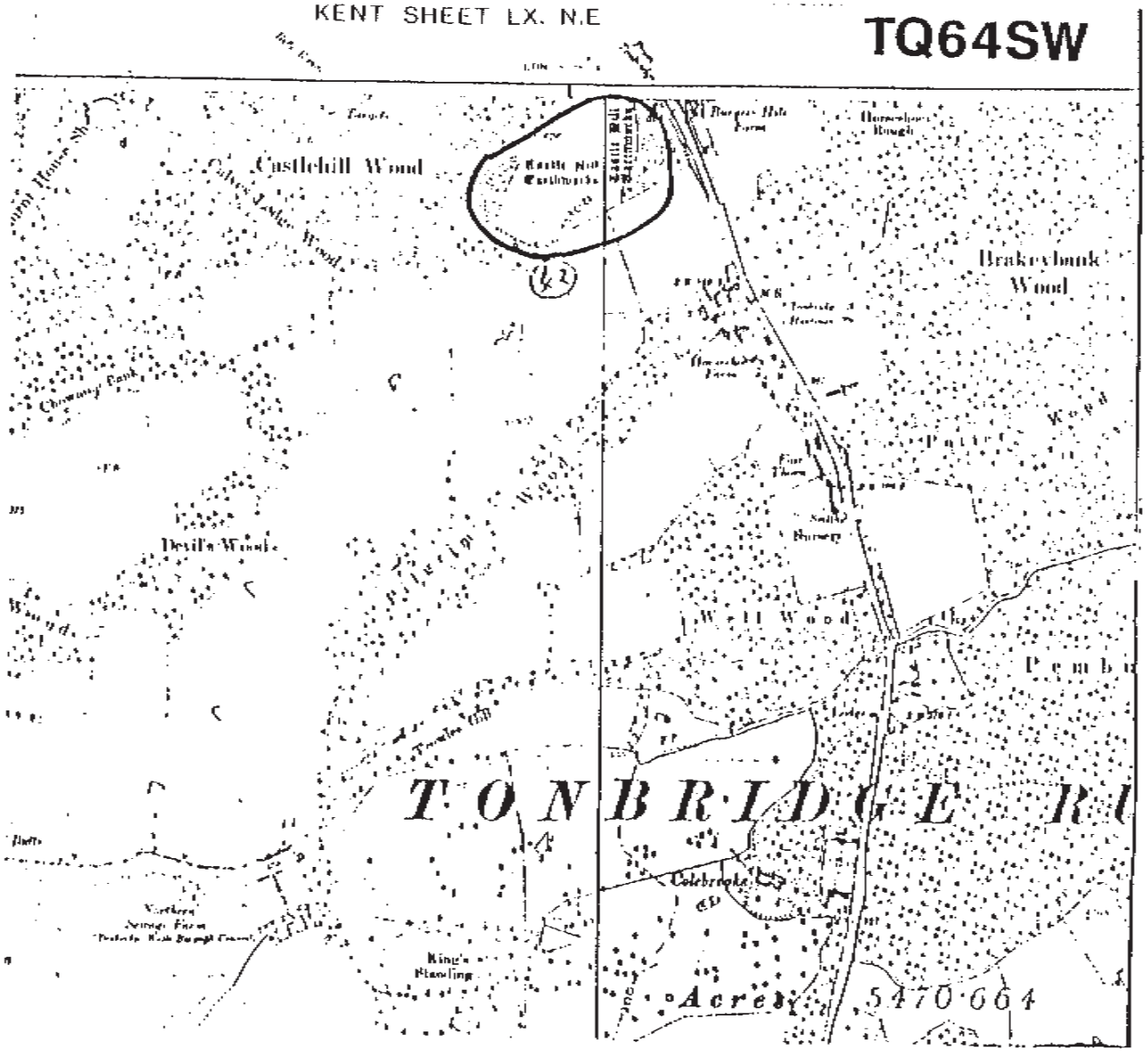
KENT SHEET LX. N.E
TQ64SW
Castlehill Wood
Brakeybank Wood
Devil's Wood
TONBRIDGE
Acres 5470·664

Fig 1

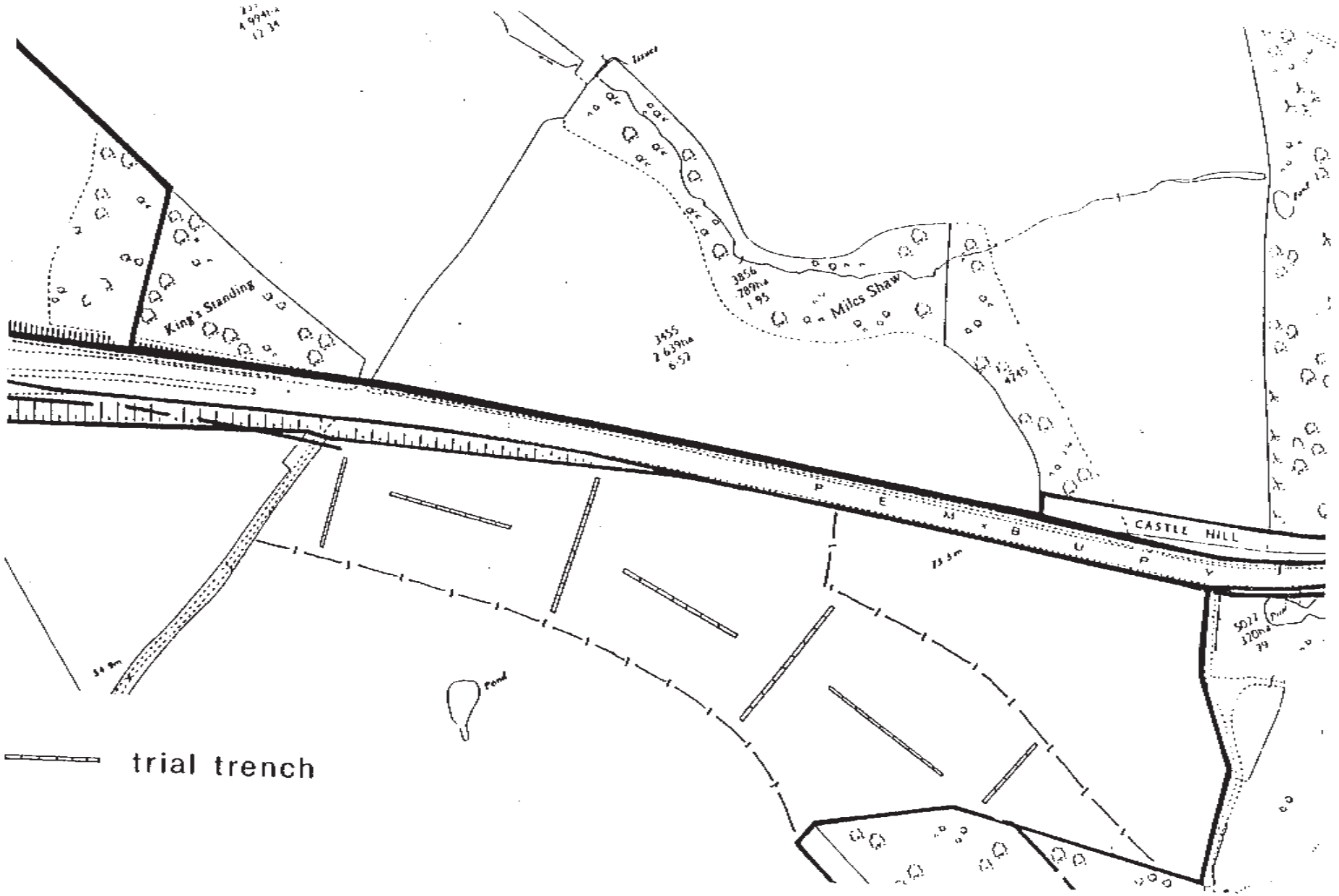

Fig 2

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NOTES

Rev	Description	By	Date	Chk. & Auth.

Purpose of Issue	Rev	Date	Authorised

WS Atkins Consultants Limited
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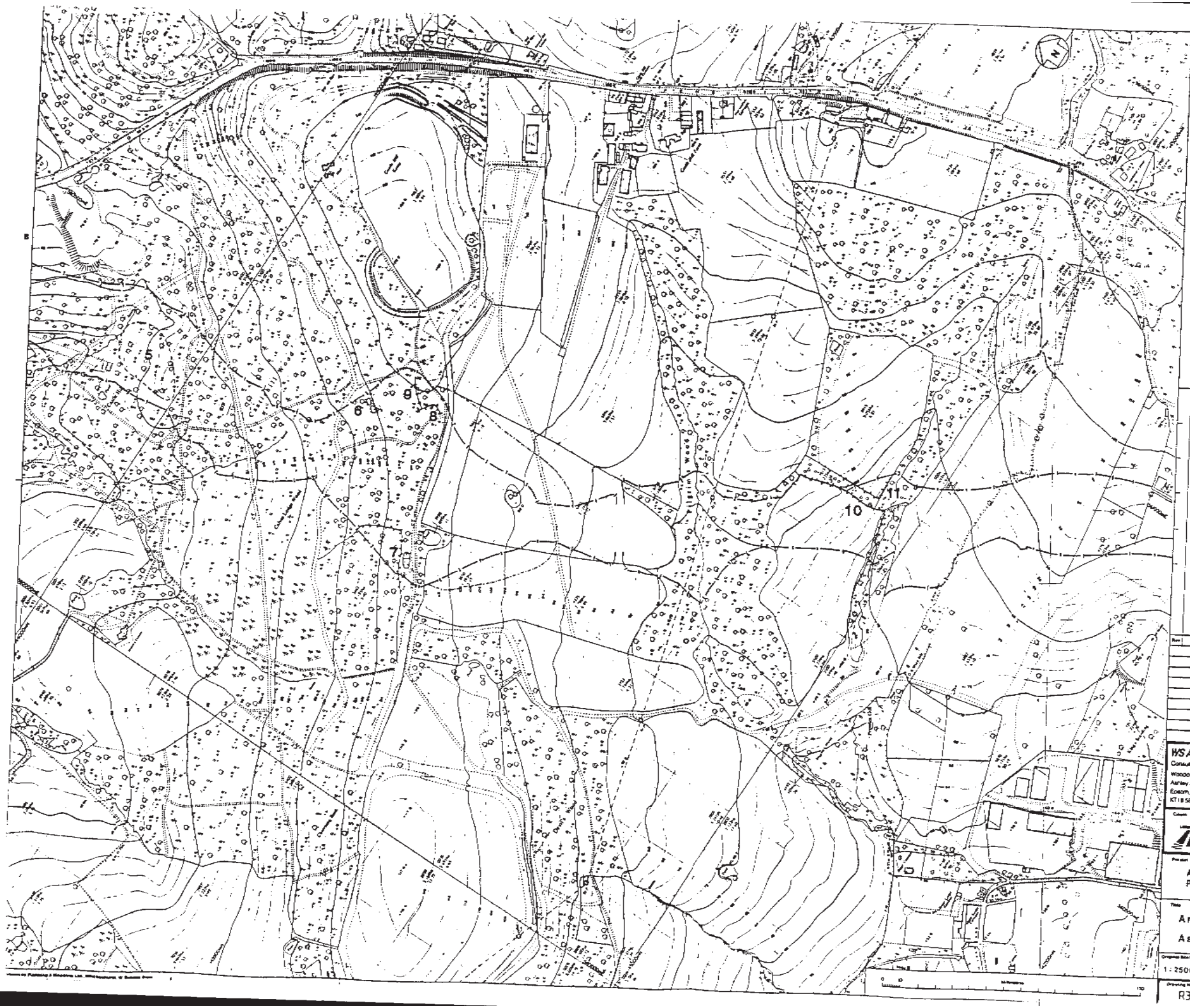
Project
A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

Title
Archaeological Assessment

Original Size	Drawn	Checked	Supervised
1:2500	Date	Date	Date

Drawing Number
R3268/TE/M/1

Rev



WS/Atkins

NOTES

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A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

Title

Archaeological Assessment

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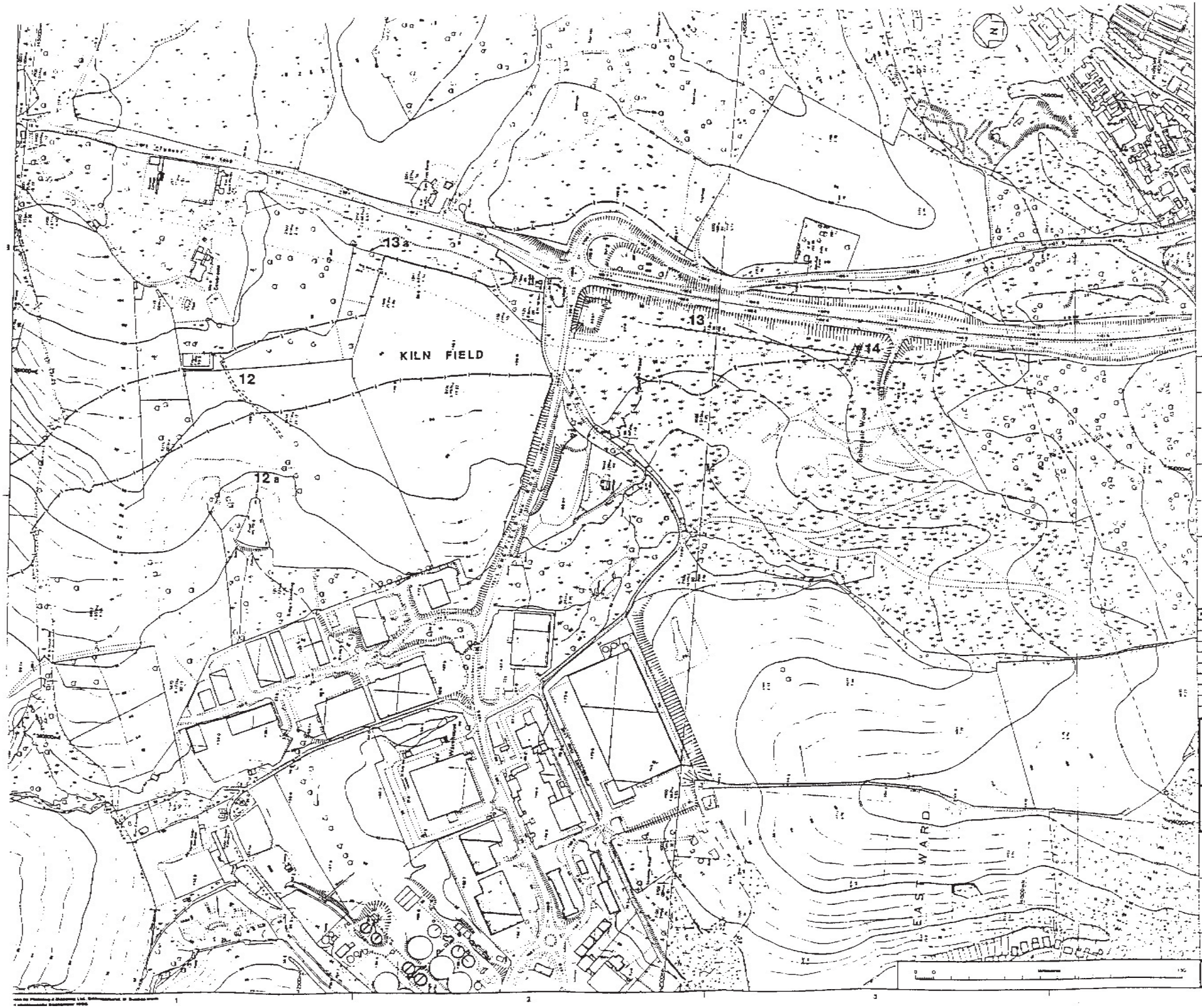
1:2500	Date	Date	Date

Drawing Number

R3268 / TE/M/2

Rev



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NOTES

Rev	Description	By	Date	Chk'd	Auth'd

Purpose of issue	Rev	Date	Authorised

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A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

Title

Archaeological Assessment

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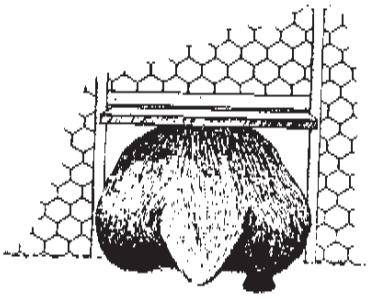
1:2500	Date	Date	Date

Drawing Number: R3268/TE/M/3

Rev

SECTION 9

BADGER SURVEY



THE BADGER CONSULTANCY

Penny Cresswell B.Sc.
Warren Cresswell B.Sc., Ph.D.

1 TILLING WALK, BRISTOL, BS10 5AH. (0272) 519841

REPORT ON A21 IMPROVEMNET - TONBRIDGE, KENT

Badgers and the Law

Badgers are protected under the Badgers Act (1973) and the Wildlife and Countryside Act (1981) and subsequent Amendment (1985). As such, it is an offence to willfully take, kill, injure or ill-treat a badger. Under the Badgers Act (1991), their setts are also protected against obstruction, destruction, or damage in any part and the animals within a sett cannot be disturbed. If necessary, it is possible to move badgers from a sett, but the rate of success of such action is extremely variable and will depend on how crucial the sett is to the badgers and whether a suitable alternative sett exists within that group's territory. All setts (used or disused) on an occupied territory will require a licence to be issued by English Nature before the badgers can be moved and the setts destroyed.

Background Biology

Badgers live in groups and the members of each group jointly defend a territory. Other badgers are more or less excluded from this area, which will encompass sufficient foraging opportunities to support the group throughout the year. Badgers defaecate in small (2-3cm deep) scrapes called dung pits, and these are often used to mark out the territory boundary. A number of setts of different sizes and functions may be found within the territory of a single group. In areas where badgers are at low density or on urban fringe, territory boundaries can become much less well defined. Areas with low density badger populations appear to contain more setts which are used on an intermittent basis.

The four categories of sett are:

MAIN SETTS. These are in continuous use, they are large, well established and often extensive. It is where the cubs are most likely to be born. There is only one main sett per social group of badgers.

ANNEXE SETTS. These occur in close association with the main sett, and are linked to the main sett by clear well-used paths. If a second litter of cubs are born, this may be where they are reared.

SUBSIDIARY SETTS. These are setts of more than five holes, but which are not in continuous use.

OUTLYING SETTS. These consist of only one or two holes. Usually they have small spoil heaps indicating that they are not very extensive underground.

Survey Methodology

The area outlined on map 1 was examined in detail for the characteristic signs of the presence of badgers. All woodland, scrub and hedgerows were inspected, although, in some of the thickest areas, access proved difficult and a truly systematic search was inappropriate.

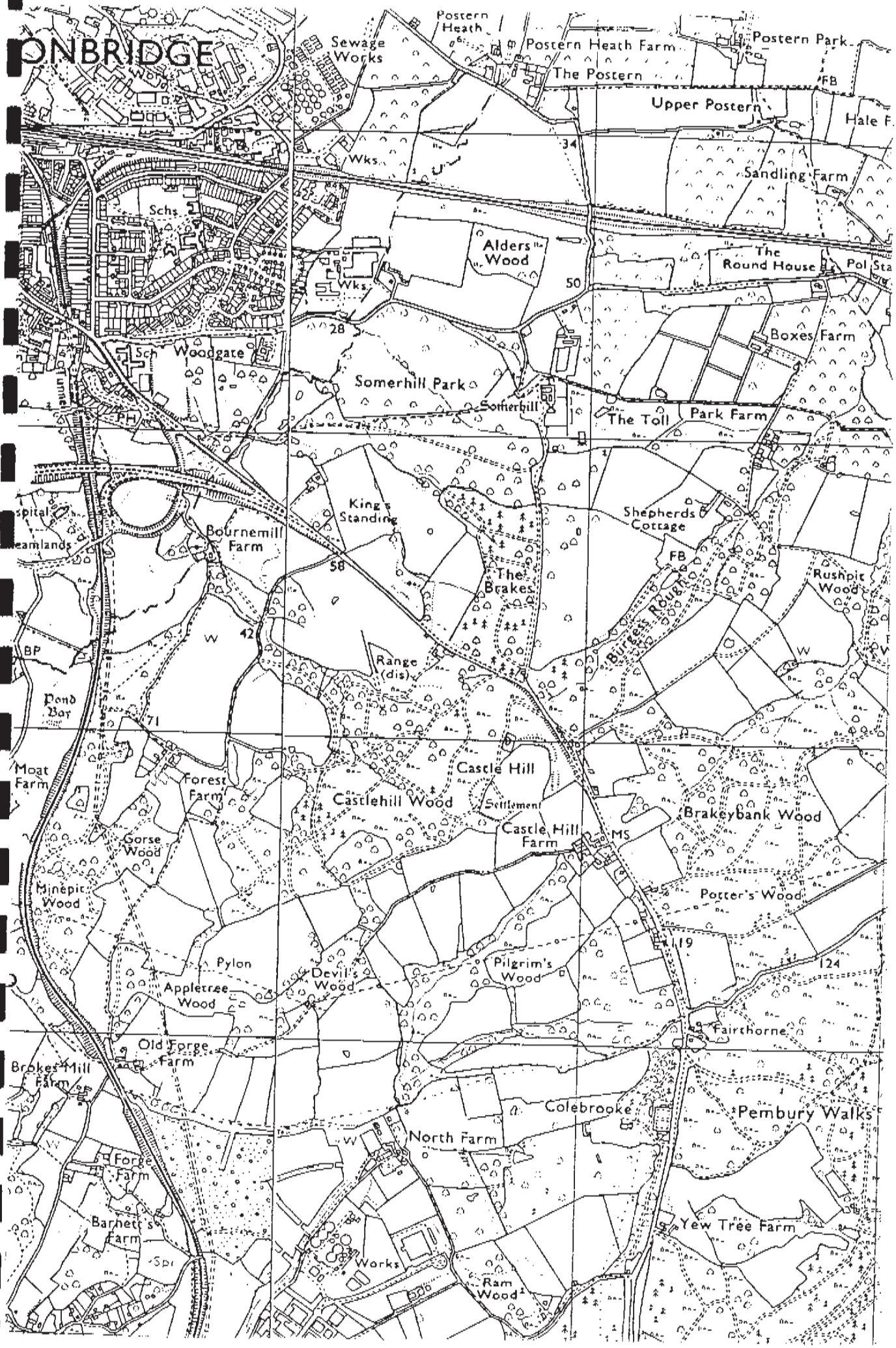
Survey Results

Much of the background detail given above is unnecessary for this survey, since no setts or signs indicating the presence of badgers (ie dung pits, hairs, obvious paths, identifiable feeding signs) were found within the survey area.

The absence of setts could be explained by an unsuitable soil type: much of the survey area contained a fine silty soil with frequent springs and flushes, elsewhere heavy clays were evident. However, it is unusual for such a large area to be devoid of badger activity. It is inconceivable that badgers never visit the area, but clearly they do not do so frequently.

Recommendations

Since no badger activity was recorded, we would not recommend extensive mitigation measures such as badger-proof fencing and underpasses.


ONBRIDGE
Postern Heath
Sewage Works
Postern Heath Farm
Postern Park
The Postern
FB
Upper Postern
Hale F
Wks
34
Sandling Farm
Schs
Alders Wood
The Round House
Pol Sta
Wks
50
28
Boxes Farm
Sch
Woodgate
Somerhill Park
Somerhill
The Toll
Park Farm
PH
King's Standing
Shepherds Cottage
spital
Bournemill Farm
FB
58
The Brakes
Rushpit Wood
Burgess Rough
W
42
BP
Range (dis)
Pond Bar
71
Moat Farm
Castle Hill
Forest Farm
Castlehill Wood
Settlement
Brakeybank Wood
Castle Hill Farm
MS
Gorse Wood
Potter's Wood
Minepit Wood
119
124
Pylon
Pilgrim's Wood
Devil's Wood
Appletree Wood
Fairthorne
Old Forge Farm
Brokes Mill Farm
Colebrooke
Pembury Walks
North Farm
W
Forge Farm
Barnett's Farm
Yew Tree Farm
Works
Ram Wood

SECTION 10

RSPB REPORT ON PUBLISHED ROUTE

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

Notes on the conservation interest of the woodlands along the proposed blue route

Compiled by Martin Allison
RSPB, Tudeley Woods, Kent.

September 1991

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

BLUE ROUTE

Notes of the conservation interest of the woodlands along the proposed blue route bypass.

Introduction

Three wooded areas were visited on three dates in late April and early May, 1989. These were Castlehill Wood, Pilgrim's Wood and Prowles Ghyll (map 1). The purpose of the visits was to assess habitat stands for their ecological importance and to consider the impact of the proposed route upon these habitats.

All birds recorded appear as an appendix to these notes. Extensive botanical notes were not kept.

Habitats (map 2)

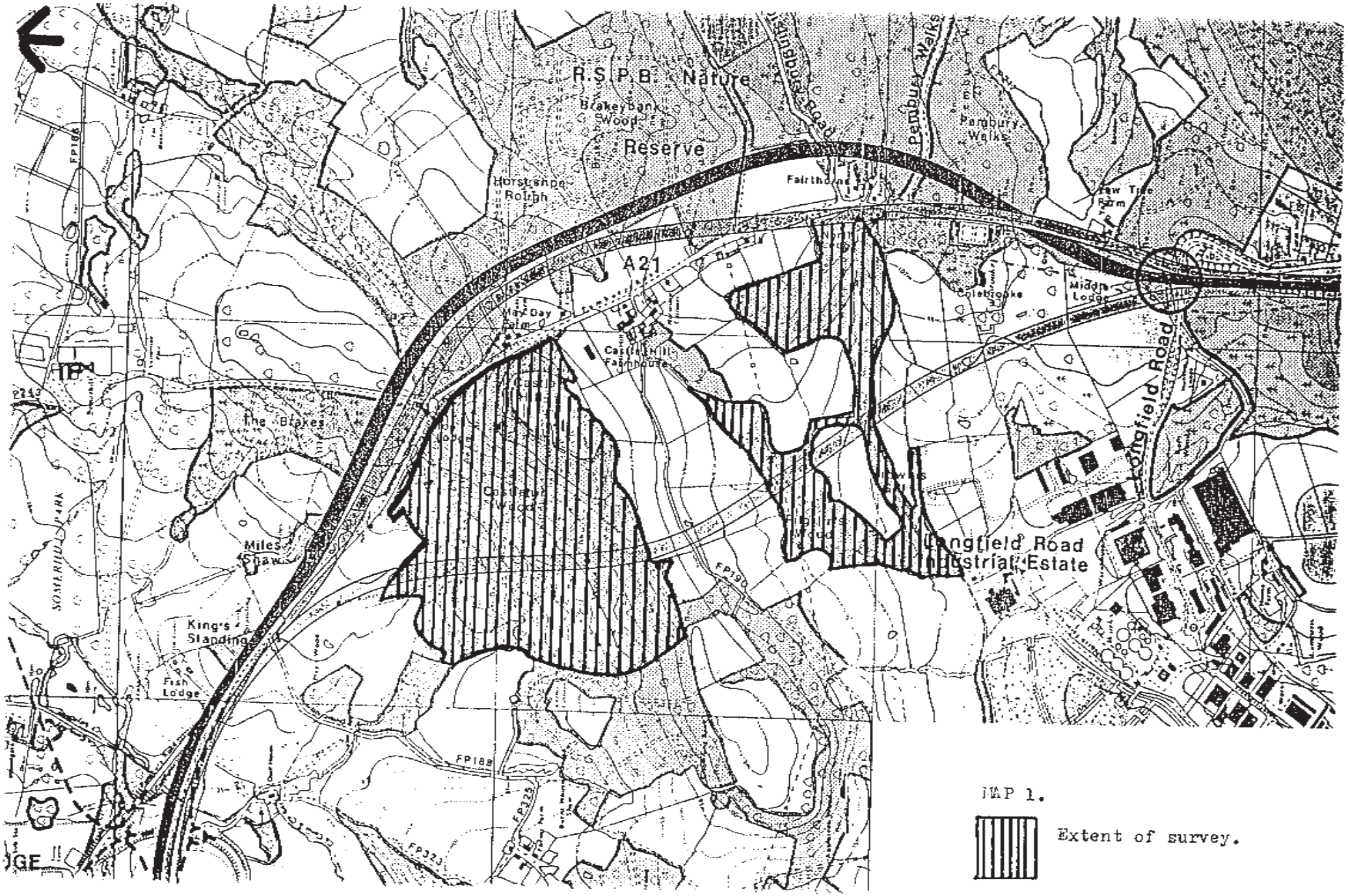
a) Sweet chestnut coppice

This comprises dense stands of non-native sweet chestnue Castanea sativa cut commercially on a 12-15 year rotation. These woodlands hold little conservation interest due to the rapid growth and dense shade cast by the coppice regeneration. Where the plants had been recently cut, stands of bluebell Endymion non-scriptus were present. - Ornithological interest was minimal through these plantations. The habitat is more or less confined to the east of the proposed blue route.

b) Mixed softwood plantation

Large areas of this stand type exist in central Castlehill Wood. The natural vegetation here has been greatly subdued by conifer planting, mainly Scots pine Pinus sylvestris and Norway spruce Picea abies. Some oak Quercus robur is found within the plantation and may have been planted with the softwoods. The habitat offers little in the way of conservation interest in its present state. The trees are in tight lines, closely planted with poor light penetration through the canopy. Where light reaches the ground bramble Rubus fruticosus agg becomes dominant, and willow Salix spp, birch Betulla pendula and B. pubescens, sycamore Acer pseudoplatanus and gorse Ulex europea can all be found.

Ornithological interest was restricted to a few common species including coal tit and goldcrest.



MAP 1.

Extent of survey.

ii) The final route should avoid the hazel and mixed coppice woodland of Pilgrim's Wood (area E, map 2) by re-routing east of the present drawn line.

iii) The same comment applies for the damp ghyll (area F map 2). Re-routing to the east would save much of the botanical interest here. Consideration must be given to drainage as the ghyll flora relies on run-off and seasonal flooding.

An alternative blue route is shown on map 3, taking the road east into the poorer sweet chestnut habitats and thus safeguarding some of the more important sites.

Summary

All habitats of conservation value identified along the blue route can be found over greater areas within the RSPB reserve. The reserve is managed for its ornithological, botanical and invertebrate interest, as well as for recreational and educational use.

Much of the woodland has been altered by planting and other activities (ie. the shooting range). There was little evidence of original wood-banks, ditches and other historical indicators of antiquity.

c) Ash coppice

On the lower slopes of Castlehill Wood where the ground is damper an impressive stand of ash Fraxinus excelsior is found. The canopy is light enough to allow a dense ground flora to develop. The dominant species here are bramble and pendulous sedge Carex pendula. This was the only site on the survey to hold nightingale. Great spotted woodpecker was also heard, along with many other species including treecreeper and marsh tit.

d) Open bracken with mature oak and beech

Minimal ornithological or botanical interest was recorded within this glade but the mature trees should be attractive to nuthatch and woodpeckers.

e) Hazel and mixed species coppice with standards

A good, well-stocked traditional hazel Corylus avellana coppice over a carpet of bluebells. To the north a deep ghyll runs east-west supporting a high-forest canopy of ash, birch, oak and beech Fagus sylvatica. These woods held good numbers of common breeding birds and warrant further study, both ornithological and botanical. A substantial pond is also present in Pilgrim's Wood.

f) Damp ghyll (Prowles Gill)

Prowles Gill is a narrow strip of marshy ground comprising ash and alder Alnus glutinosa coppice with a ground flora including pendulous sedge and marsh marigold Caltha palustris. Some of the ash and alder appears to be of considerable antiquity. Sheep grazing and poaching (trampling) is a problem here.

g) Damp birch and hazel (Prowles Gill)

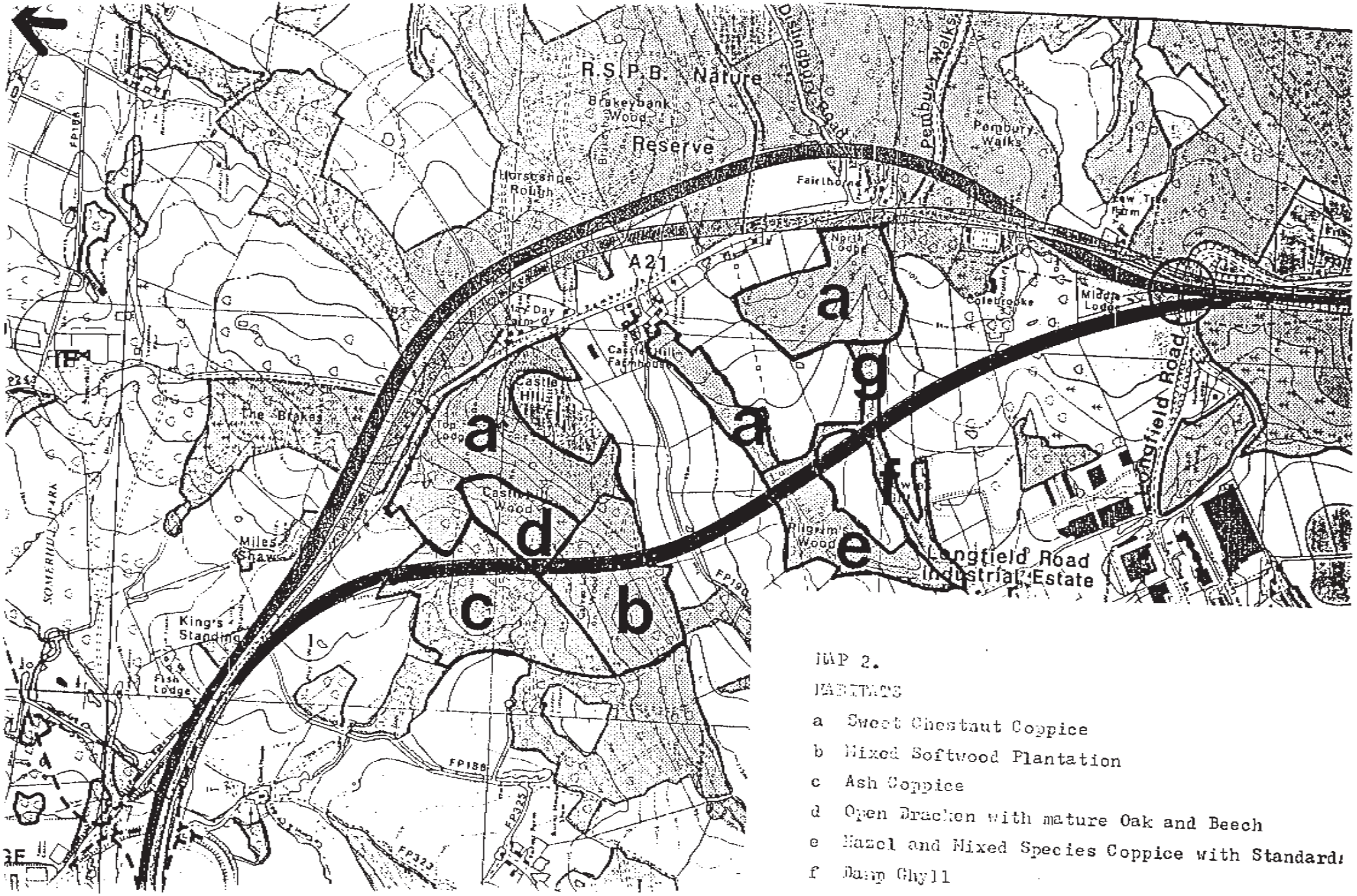
A small woodland of mixed birch and hazel growing on a damp soil and badly poached (trampled) by sheep, and therefore with little surviving vegetation present.

There was no outstanding ornithological interest in the last two habitats.

Recommendations

A high disturbance impact on the woodlands surveyed is inevitable, but with some minor alterations to the line of the blue route the impact could be minimised on the three habitats of conservation value identified in this survey:

i) The ash coppice in Castlehill Wood held breeding nightingale (area C, map 2). Fortunately the best of the ash woods are found west of the proposed route and consequently the bulk will be left undisturbed. The proposed route should not enter the wood west of the old rifle range.



MAP 2.

HABITATS

a Sweet Chestnut Coppice

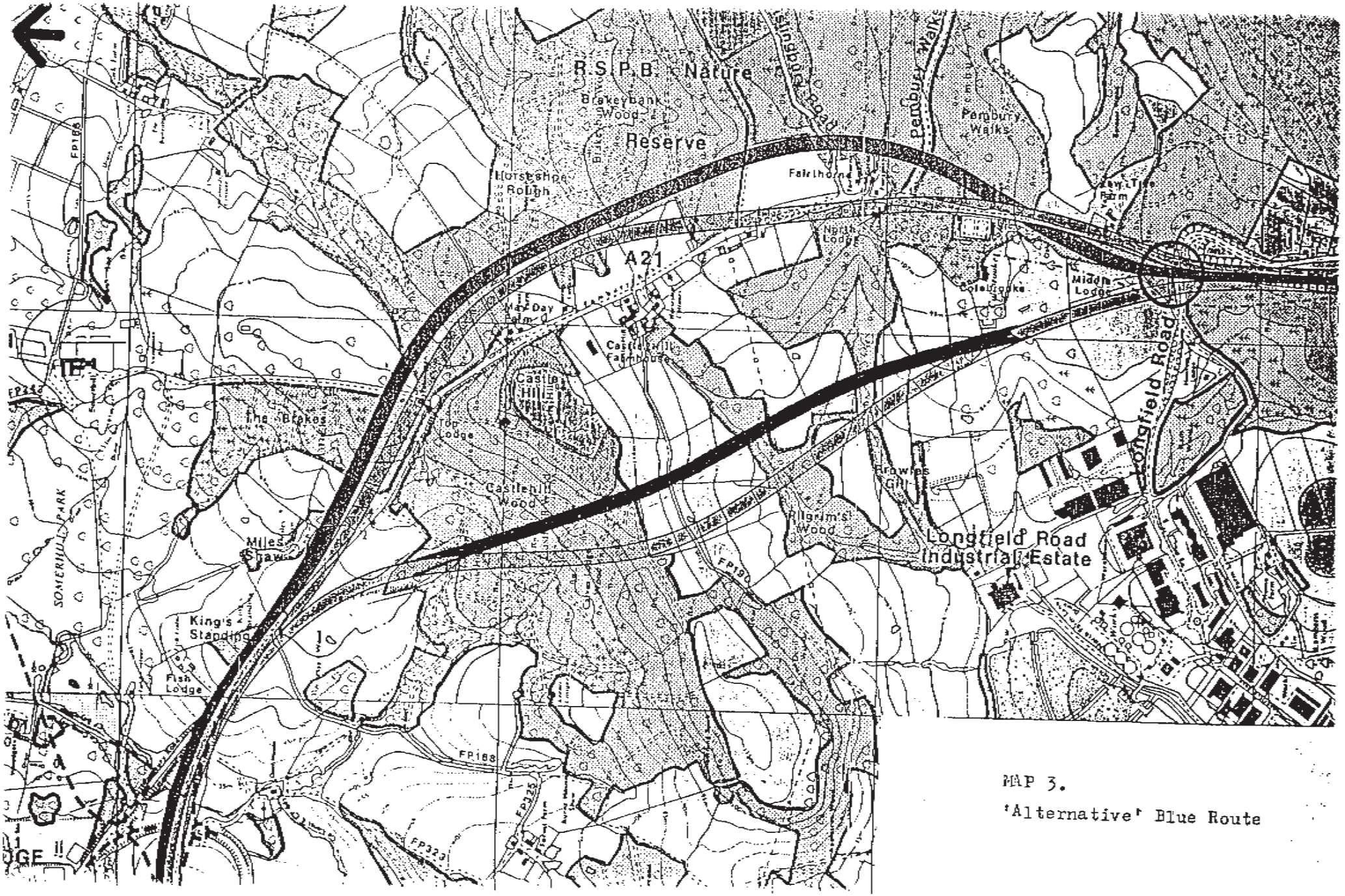
b Mixed Softwood Plantation

c Ash Coppice

d Open Bracken with mature Oak and Beech

e Hazel and Mixed Species Coppice with Standards

f Damp Ghyll



MAP 3.

'Alternative' Blue Route

Species list of all birds recorded during the blue route survey

Moorhen
Wood pigeon
Green woodpecker
Great spotted woodpecker
Dunnock
Blackcap
Willow warbler
Chiffchaff
Goldcrest
Robin
Nightingale
Blackbird
Song thrush
Mistle thrush
Long-tailed tit
Coal tit
Great tit
Blue tit
Marsh tit
Nuthatch
Treecreeper
Wren
Yellowhammer
Chaffinch
Goldfinch
Greenfinch
Bullfinch
Linnet
Starling
Jay
Magpie
Carrion crow

SECTION 11

VISUAL IMPACT ASSESSMENT

CONTENTS

1 INTRODUCTION

Visual impact assessment forms part of the environmental evaluation of a road proposal during the route selection stage and also provides a basis for the development of mitigation proposals later in the design process. The assessment is carried out by a single landscape architect on a subjective basis according to the procedures laid out in the Department's Manual of Environmental Appraisal (MEA) and the subsequent Note of Current Practice of February 1988. The MEA is currently being updated.

The findings of the visual impact assessment are provided in detail in the schedule and accompanying drawings and summarised in the Environmental Statement Appraisal Framework (Appendix F) which also contains information on the expected effects of the proposed road upon the intrinsic value of the landscape and any specially designated locations within it.

The assessment is concerned with changes in visual intrusion and therefore automatically accounts for the existing quality of a view. The assessment methodology concentrates on the effects on views from properties, but the nature of the fieldwork and the inclusion in the summary drawing of affected footpaths and public amenities allows a more general conclusion on the extent of visual intrusion anticipated from a proposed road.

2 METHODOLOGY

The terms used to describe the differing degrees of visual impact are high, medium and low. These are applied on the following basis:

High : where the road would be considered to be the dominant intrusive element in the view

Medium : where the road would be considered to be an important intrusive element in the view

Low : where the road would be considered to be an intrusive element in the view

The degree of visual intrusion takes into account a variety of factors involving not only the effect of the road, its earthworks and lighting, but also the effect of traffic moving on the road. Distance and the arc of the view are important, but the assessment also takes into account the character and extent of the existing view and to what degree it would be down-graded. Embankments generally make schemes more intrusive, whereas cuttings four metres deep or more would effectively hide traffic.

The assessment was carried out entirely on site by walking local roads and footpaths to gain vantage points of the study corridor and, wherever possible, views from the intended line of the road. From these views judgements were made on the degree of impact as defined above. At the same time visual barriers or screens, such as woodlands, tree belts and significant hedges, were plotted to indicate how effective these would be in containing or softening views of the road from the surrounding area.

In making these assessments allowance has been made for the variation in profile of the road compared with the present ground level, the effect of cuttings and embankments on views and the effectiveness of existing tree screens and hedges in winter. The appearance and immediate effect of landscape regrading was taken into account in assessing the degree of visual impact, but proposed planting, which would need time to establish, was not. Environmental screens such as earth mounds, noise fences or walls are not considered necessary as part of the current scheme proposals.

It should be emphasised that the visual impact of the new road would be ameliorated over time by the provision of landscape measures and that the assessment of visual impact can be taken to be a 'worst case' assessment.

3 RESULTS

The visual impact assessment drawings, Figures 1 and 2, illustrate the results of the study and the accompanying schedule shows the number of properties affected by varying degrees of visual impact. The schedule also indicates the approximate distance of the property from the centre line of the nearest visible part of the road and the measures included in the

Landscape Proposals (see Volume 1 for figures) to ameliorate the visual impact as identified. Three photographic viewpoints are included to illustrate the existing landscape character, Figures 3 and 4. The scheme proposals on day one of opening and ten to fifteen years later are illustrated as artist impressions from photographic viewpoints 1 and 3 on figures 5 and 6.

The following totals have been extracted from the schedule:

	Impact		
	High	**Medium**	**Low**
Residential			
Houses	5	12	205
Other Uses			
Schools	-	-	3
Public Houses	-	-	1
Hotels	-	-	1
Sewage Works	-	-	1
Offices	-	-	2
Retail Units, Warehouses	-	-	8
Stables	-	-	1
Properties Affected	5	12	222

NOTES

Reference Number used on the Visual Impact Drawing to locate the affected properties.

Distance from Road CL this shows the approximate distance of the affected buildings(s) from the centreline of the nearest visible carriageway, slip road or structure, or of a carriageway beyond a visible environmental screen. The height of traffic on the road and of any lighting is taken into account when determining visibility.

Landscape Measures these are the proposals made by the Department to ameliorate the visual impact of the road. These are represented by the following key:

a: hedgerow planting
b: dense planting
c: intermittent planting
d: contouring
e: acquisition of existing vegetation

Nature of View this describes where the road can be seen from, what type of view the property has and what section of the road can be seen.

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF RESIDENTIAL PROPERTIES

Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
001 002 003 004- 008	A26 London Road	Marbledon Lodge Pipers Wait Rutlands Havens View Car Tref Welwyn Somerleyton St Mary's	House, 2-Storey, Detached House, 2-Storey, Detached House, 2-Storey, Detached House, 2-Storey, Detached	2100 2000 2100 2200			1 1 1 5	a b e a b e a b e a b e	) Partial distant views from back of property) framed by garden vegetation, of road at grade) and on embankment through Castlehill Wood. First floor open distant views from back of properties of road at grade and on embankment through Castlehill Wood.
009- 011		Kennett Deep End Nightingales Farmhouse	House, 2-Storey, Detached	2300			3	b e	First floor mainly open distant views from back of properties framed by woodland in foreground of road on embankment through Castlehill Wood.
012- 014	Harland Way	Nos 7 and 8 Courtlands No 9	House, 2-Storey, Detached	2800			3	a b e	First floor open distant views from front of properties of road at grade and on embankment through Castlehill Wood.
015- 017		Nos 10, 11 and 12	House, 2-Storey, Detached	2800			3	a b e	Open distant views from front of properties of road at grade and on embankment through Castlehill Wood.
018- 020		15, 16 and 20	House, 2-Storey, Detached	2800			3	a b e	First floor partial distant views from front of properties of road at grade and on embankment through Castlehill Wood.
021- 026	Vicarage Road	Cherry Dawn Eastbury Hatotty Hylands Whiteoaks Lothlorien	House, 2-Storey, Detached	2750			6	b e	Oblique open distant views from back of properties, some framed by vegetation in foreground, of road on embankment through Castlehill Wood.
027- 028		Holmhurst Stenson	House, 2-Storey, Detached	2750			2	b e	First and second floor oblique distant views from front of properties overlooking existing houses in foreground, of road on embankment through Castlehill Wood.
029- 042		Pennington Manor (Housing Association)	Flats, 3-Storey Building	2750			14	b e	Oblique distant views from rear block of flats framed by vegetation in foreground, of road on embankment through Castlehill Wood.

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF RESIDENTIAL PROPERTIES

Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
043-047 048-049	Great Brooms Road	Nos 36, 38, 40, 42, 44 Nos 46 and 48	House, 2-Storey, Semi-detached House, 2-Storey, Semi-detached	2000 2000			5 2	b c d b c d	First floor oblique views from back of properties of road on embankment through Castlehill Wood. Direct open distant views from back of properties of road mainly on embankment between Castle Hill and Longfield Road Junction in rural setting.
050-059	Welbeck Avenue	Nos 37, 39, 41, 55, 57, 59, 61, 63, 65, 67	House, 2-Storey, Semi-detached	1950			10	b d	Mainly first floor distant views from back of properties, overlooking industrial buildings and framed by some garden vegetation, of road south of Castle Hill in rural setting.
060-062	The Close	Nos 1, 2 and 3	House, 2-Storey, Terrace	2050			3	b d	First floor distant views from front of properties overlooking and framed by industrial buildings, of road south of Castle Hill in rural setting.
063-087	Caley Road	Nos 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47 and 49	House, 2-storey, Semi-detached	1900			25	b d	First floor open distant views and partial ground floor views from back of properties overlooking playing fields, of road on embankment south of Castle Hill in rural setting.
088-091	Hawthorn Walk	Nos 15, 17, 19 and 21	House, 2-Storey, Semi-detached	1250			4	a b d	First floor partial distant views from back of properties of road on embankment south of Castle Hill in rural setting.
092-095	Appletree Lane	Nos 1, 3, 5, and 7	House, 2-Storey, Terrace	1600			4	a b d	Open distant views from front of properties overlooking and framed by industrial/commercial buildings. Possible new building development in foreground would obscure views.
096-097	Theodore Close	Nos 15 and 16	House, 2-Storey, Semi-detached	1450			2	a b d	First floor partial distant views from back of properties overlooking new housing estate, of road on embankment south of Castle Hill in rural setting.

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF RESIDENTIAL PROPERTIES

Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
098-105	High Brooms Road	Nos 68, 70, 72, 74, 76, 78, 80 and 82	House, 3-Storey, Semi-detached (Nos 68 and 70 at rear of shop)	2000			8	a b c d	Mainly first and second floor views from back of properties overlooking housing in foreground of road mainly on embankment between Castle Hill and Longfield Road Junction in rural setting.
106-114	Oakwood Rise	Nos 50, 52, 54, 56, 58, 60, 62, 64, and 70	Flats, 2-Storey building				9		First floor open distant views from back of properties of road on embankment south of Castle Hill.
115-116	Brokes Way	Nos 1 and 3	House, 2-Storey, Semi-detached	2100			2	b d	First floor direct open views from front of property of road on embankment between Castle Hill and Prowles Gill in rural setting. First floor direct open views of road on embankment between Castle Hill and Prowles Gill in rural setting. Direct views from front of properties framed by housing along Brokes Way, of road on embankment south of Castle Hill
117-124		Nos 4, 6, 12, 14, 20, 22, 38 and 40	Flats, 2-Storey building	1900			8	a b d	
125-128		Nos 41, 43, 45 and 47	House, 2-Storey, Terrace	2200			4	b	
129-134	Tudeley Lane	Nos 31, 33, 35, 37, 39 and 41	Flats, 2-Storey building	1400		6		b e	Mainly first floor views of road rising on embankment through Castlehill Wood. Vegetation in foreground provides some screening. Mainly first floor views of road rising on embankment through Castlehill Wood. Vegetation in foreground provides some screening.
135-138		Nos 51, 53, 55 and 57	Flats, 2-Storey building	1400			4	b e	
139-142	Lodge Oak Lane	Nos 80, 82, 88 and 90	House, 2-Storey, Terrace	1500			4	b e	First floor partial views from front of properties overlooking housing and pub in foreground, of road rising on embankment through Castlehill Wood.

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF RESIDENTIAL PROPERTIES

Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
143-148	Dowgate Close	Nos 65, 67, 69, 71, 73 and 75	House, 2-Storey, Semi-detached	1400			6	b e	First floor partial views from back of properties overlooking housing in foreground, of road rising on embankment through Castlehill Wood.
149-177	Kings Road	Nos 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76 and 86	House, 2-Storey, Semi-detached	1550			29	b e	First floor partial views from back of properties overlooking housing in foreground, of road rising on embankment through Castlehill Wood.
178-188		Nos 21, 39, 41, 43, 45, 47, 49, 51 53, 55 and 57	House, 2-Storey, Semi-detached	1550			11		First floor partial views from front of properties overlooking housing in foreground of road rising on embankment through Castlehill Wood.
189-191	Deakin Leas	Nos 103, 105 and 107	House, 2-storey, Detached	1300			3	a b e	First floor views from back of properties of road rising on embankment through Castlehill Wood and oblique views of cutting. Partial screening by vegetation in foreground.
192-193		Nos 99 and 101	House, 2-storey, Semi-detached	1300			2	a b e	First floor views from back of properties of road rising through Castlehill Wood and oblique views of cutting. Partial screening by vegetation in foreground.
194-196	Vauxhall Gardens	Nos 26, 28 and 30	House, 2-storey, Detached	550			3	a b e	Views from end gable of road at grade.
197	A21	Fish Lodge	House, 3-storey, Detached	150			1	b	Ground floor views from side of property of access road at grade. (Views opened up by clearance of existing vegetation.
198-201	A26 South Frith	Nos 2, 3, 4 and 5	House, 2-Storey, Detached	1650			4	a b e	Distant elevated views from back and side of properties of road at grade and glimpses of road on embankment through Castlehill Wood.

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF RESIDENTIAL PROPERTIES

Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
202	A21	Lake Cottage	House, 2-storey, Detached	250			1	b	Mainly first floor view from side of property of road at grade and access road through clearance of existing vegetation.
203		North Cottage	House, 2-storey, Detached	150		1		b	Open views dominated by roundabout of Eastern Relief Road but significant views of road on embankment and balancing pond when existing vegetation cleared.
204	Off A26	Mabledon Farm	Farmhouse, 2-storey, detached	1700			1	a b e	Partial views from back of property of road on embankment through Castlehill Wood beyond existing woodland and railway.
205-206	Vauxhall Lane	New Cottages, Nos 1 and 2	House, 2-storey, Semi-detached	1200			2	a b e	First floor open view from front of property of road on embankment through Castlehill Wood beyond existing woodland and railway.
207	Off A21	Forest Farm	House, 3-storey, Detached	800			1	b e	Oblique view from front of property of road on embankment through Castlehill Wood.
208		Forest Farm, North Barn	House, 2-storey, Semi-detached	800			1	b	Oblique view from front of property of road on embankment through Castlehill Wood.
209		Forest Farm, The Oast House	House, 2-storey, Detached	775			1	b e	Partial view from front of property frame by buildings of road on embankment through Castlehill Wood.
210-211		Forest Farm Cottages	House, 2-storey, Semi-detached	840	2			b e	Direct open views from back of property of road at grade and in partial cutting
212	A21	Castle Hill Farmhouse	House, 3-storey, Detached	620	1			a b d	Open views from back of property of road on embankment south of Castle Hill.
213	A21	Castle Hill Farm Oasthouse	House, 2-storey, Detached	500	1			a b d	Open views from back of property of road on embankment south of Castle Hill.

APPENDIX 1
VISUAL IMPACT ASSESSMENT
SCHEDULE OF RESIDENTIAL PROPERTIES

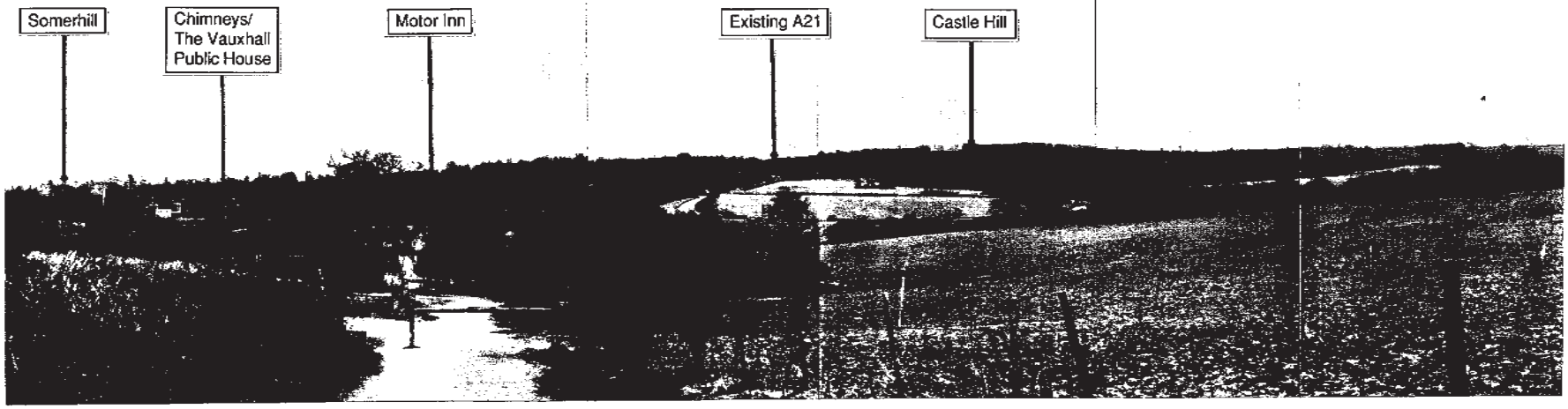
Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
214-215	A21	Castle Hill Farm Cottages Foxbury Nos 1 and 2	House, 2-storey, Semi-detached	600			2	a b d	First floor partial views from rear of property of road on embankment south of Castle Hill
216-217	A21	Horseshoe Cottages Nos 1 and 2	Cottages, 3-storey, Semi-detached	650		2		a b d	First floor views direct open from back and side of properties. Ground floor screened by outbuildings and boundary vegetation of road on embankment south of Castle Hill
218	A21	Carpenters Yard (Managers House)	House, 3-storey, detached	800		1		a b d	Third floor oblique gable end view of road on embankment south of Castle Hill
219	A21	Garden Cottage	House, 2-storey, detached	450		1		b c	First floor partial view from side of property to Longfield Road junction.
220	A21	Coach House	House, 2-storey, detached	400			1	b c	First floor partial view from side of property to Longfield Road junction.
221	Off A21	Colebrooke	House, Large, Detached period house	250	1			a b c	Front and side view of road junction and road on embankment.
222		Robingate	2-storey, detached	1200		1		a b c	First floor direct views from rear of property framed by woodland at Longfield Road junction approach.

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF PROPERTIES WITH OTHER USES

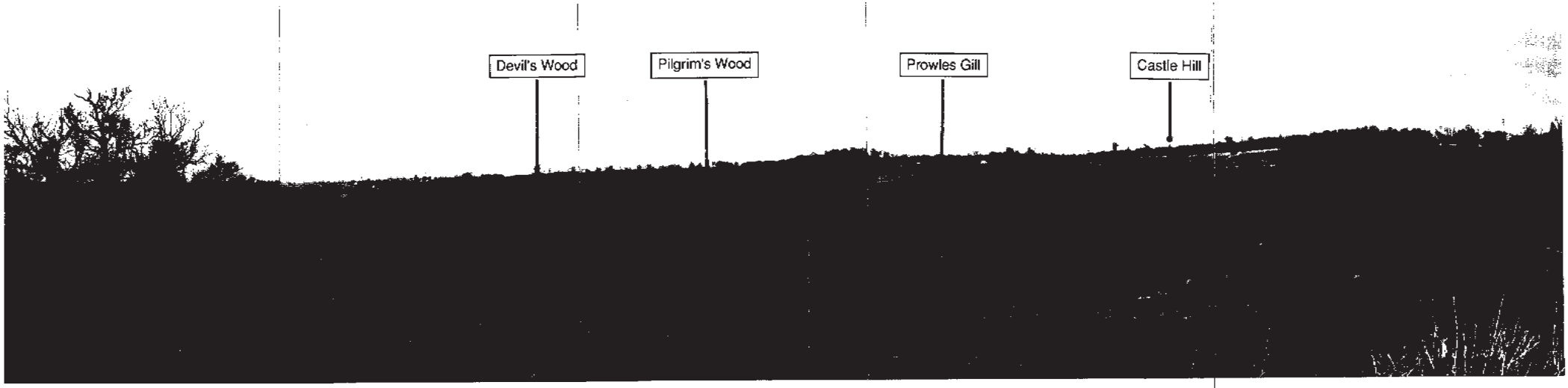
Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
S1	-	Tonbridge Grammar School for Girls - Deakin Leas	? storey building in grounds	1100			1	a b e	Views of road rising on embankment through Castle Hill Wood and oblique views of cutting vegetation partially screens some views
S2	-	Tonbridge Technical High School for Girls	2 storey building in grounds	1500			1	b e	Mainly upper storey views of road rising on embankment through Castle Hill Wood. Vegetation partially screens some views
S3	-	Southborough High Brooms Primary School for Girls	Schoolhouse 1 storey building	2000			1	a b c d	Direct open distant views from back of property of road mainly on embankment between Castle Hill and Longfield Road Junction
S4	A21	Knowles Bank Stud	1 storey building	500			1	b	Partial views of road on embankment south of Castle Hill
S5	Pembury Road	Chimneys/The Vauxhall Public House	2 storey building with car park	150			1	b	Direct open views of road at grade and on embankment through Castle Hill Wood
S6		Motor Inn	2 storey building with car park	150			1	b	Direct open views of road at grade and on embankment through Castle Hill Wood
S7	Kings Standing Business Park	Crown Trade	Small retail warehouse unit	400			1	b	Partial limited views of road south of Prowles Gill and west of Colebrooke
S8	Longfield Road	Office	Office building 3 storey office development	800			1		Upper storey views from front of building overlooking industrial buildings in foreground, of road between Castle Hill and Prowles Gill
S9	Longfield Road	Seeboard Shop	Commercial large retail warehouse building with car park	750			1	b d	Limited views from warehouse loading bays of road between Castle Hill and Prowles Gill
S10	Colebrook Industrial Estate	St Michaels	Commercial warehouse building with adjoining 3 storey office development with car park	500			1	a b c d	Direct open views across valley from side of property of road between Castle Hill and Longfield Road Junction

APPENDIX I
VISUAL IMPACT ASSESSMENT
SCHEDULE OF PROPERTIES WITH OTHER USES

Ref No	Road	Address	Character of Property	Approx Dist from Road CL m	Impact Assessment			Landscape Measures	Nature of View
					High	Medium	Low		
S10	Colebrook Industrial Estate	St Michaels	Commercial warehouse building with adjoining 3 storey office development with car park	500			1	a b c d	Direct open views across valley from side of property of road between Castle Hill and Longfield Road Junction
S11	Longfield Road	Magnet	Retail warehouse building with car park	850			1	b d	Partial views of road from back of property between Castle Hill and Prowles Gill
S12		Do it all	Commercial - large retail warehouse building with car park	850			1	b d	Partial views from back of property between Castle Hill and Prowles Gill
S13	Dowding Way	Sewage Works	Open site with treatment plant	800			1	b d	Intermittent direct open views of road between Castle Hill and Prowles Gill
S14		British Telecom	2 storey office development with car park	1050			1	b d	Views overlooking sewage works in foreground, of road between Castle Hill and Prowles Gill
S15	Dowding Way	MFI	Retail warehouse unit with public car park	1050			1	b d	Views overlooking sewage works in foreground, of road between Castle Hill and Prowles Gill
S16		PB	2 storey office unit and warehouse with car park	1100			1	b d	Views overlooking sewage works in foreground, of road between Castle Hill and Prowles Gill
S17		Citroen	Large car showroom with offices	1100			1	b d	Views overlooking sewage works in foreground, of road between Castle Hill and Prowles Gill

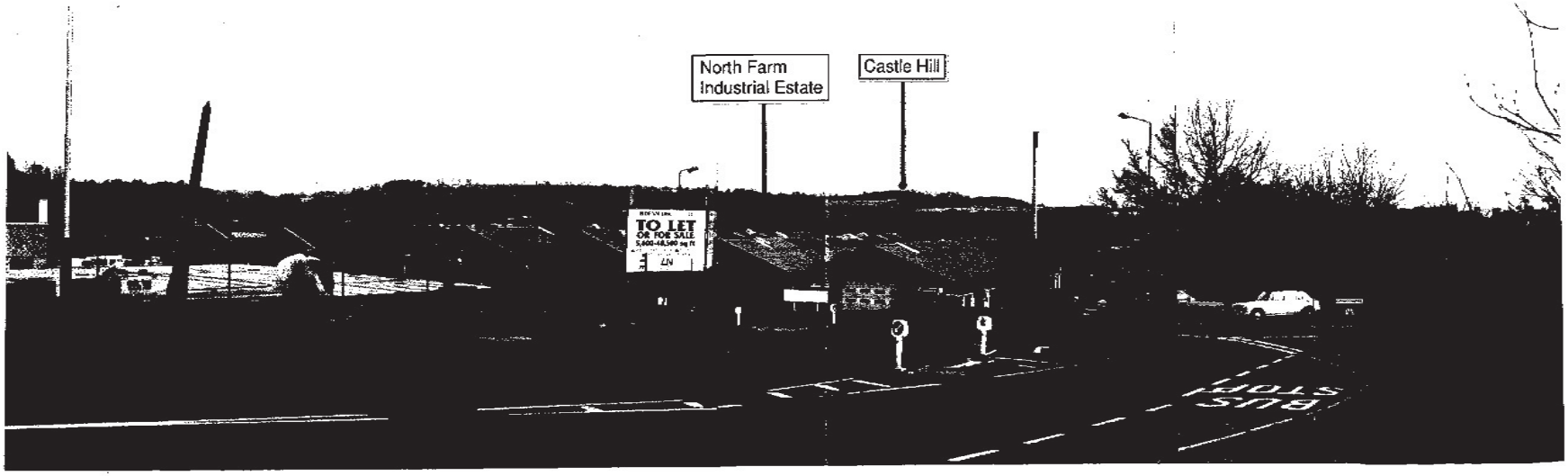


1. View looking south-east from access to Vauxhall/Priory Wood open space



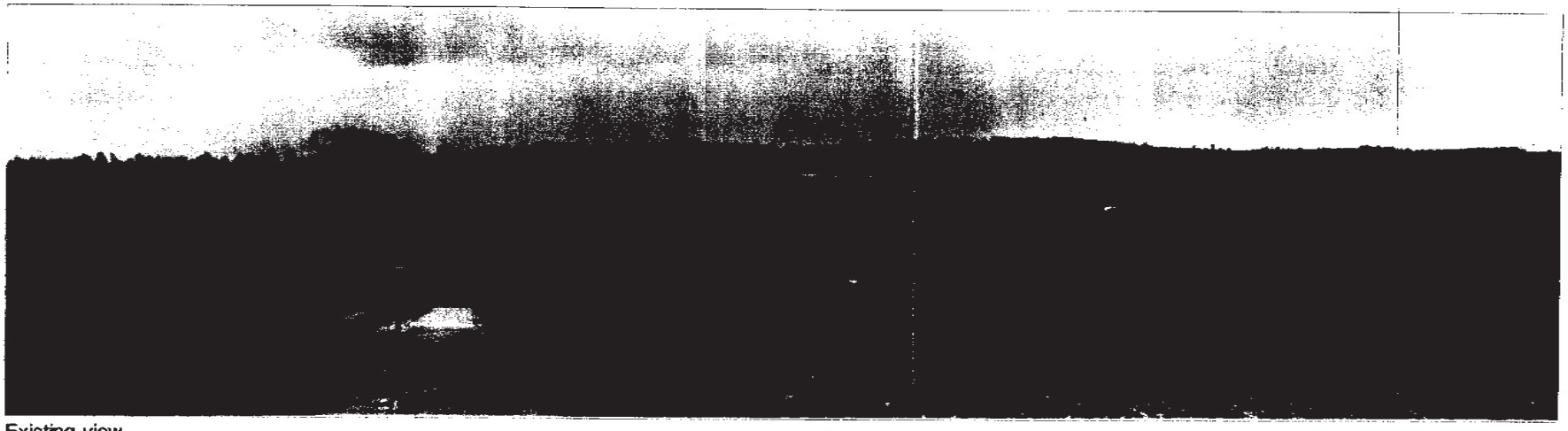
2. View looking north-west from footpath west of Well Wood

PHOTOGRAPHIC VIEWPOINTS	
July 1992	FIGURE 3



3. View looking north, from Liptraps Lane, northern edge of Tunbridge Wells

PHOTOGRAPHIC VIEWPOINT	
July 1992	FIGURE 4



Existing view

Artist impression - day1 of opening

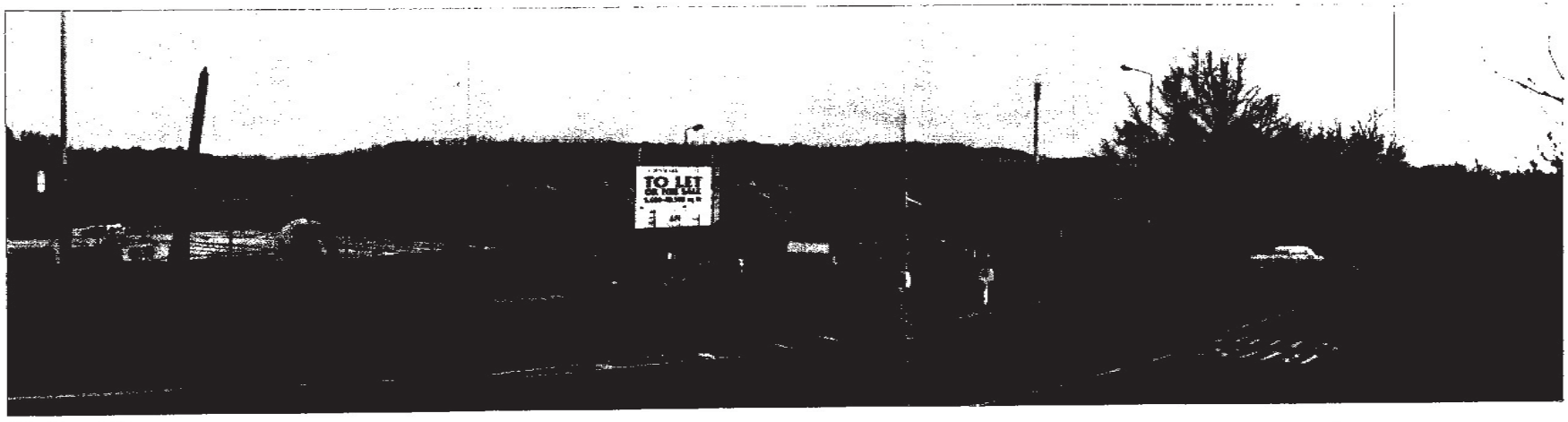
Artist impression - 10 to 15 years later

ARTIST IMPRESSION

View looking south-east from access to Vauxhall/Priory Wood open space

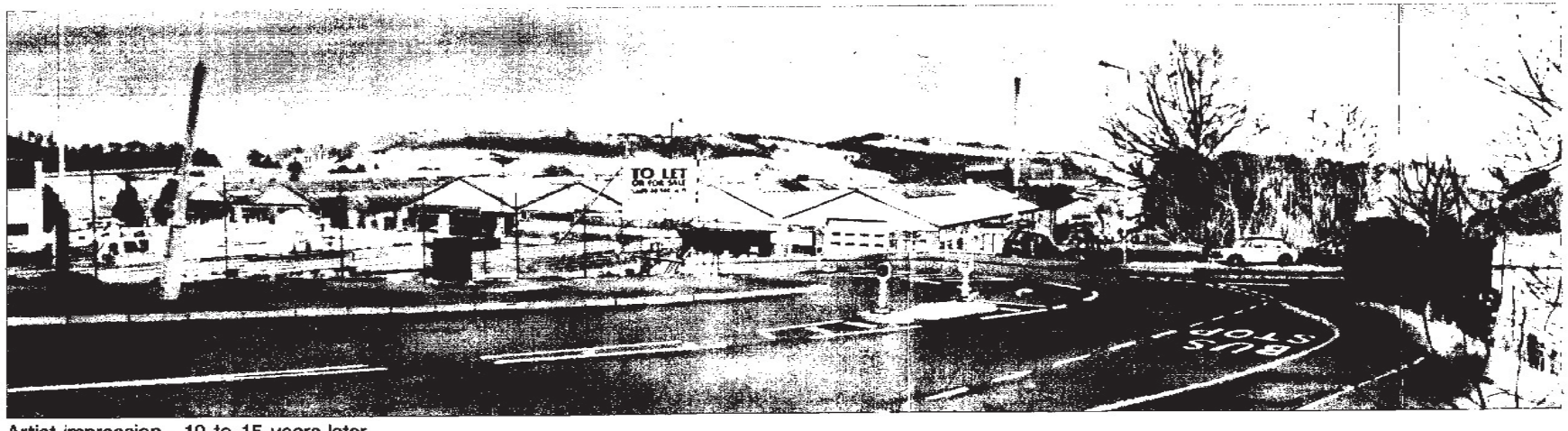
FIGURE 5

September 1992



Existing view

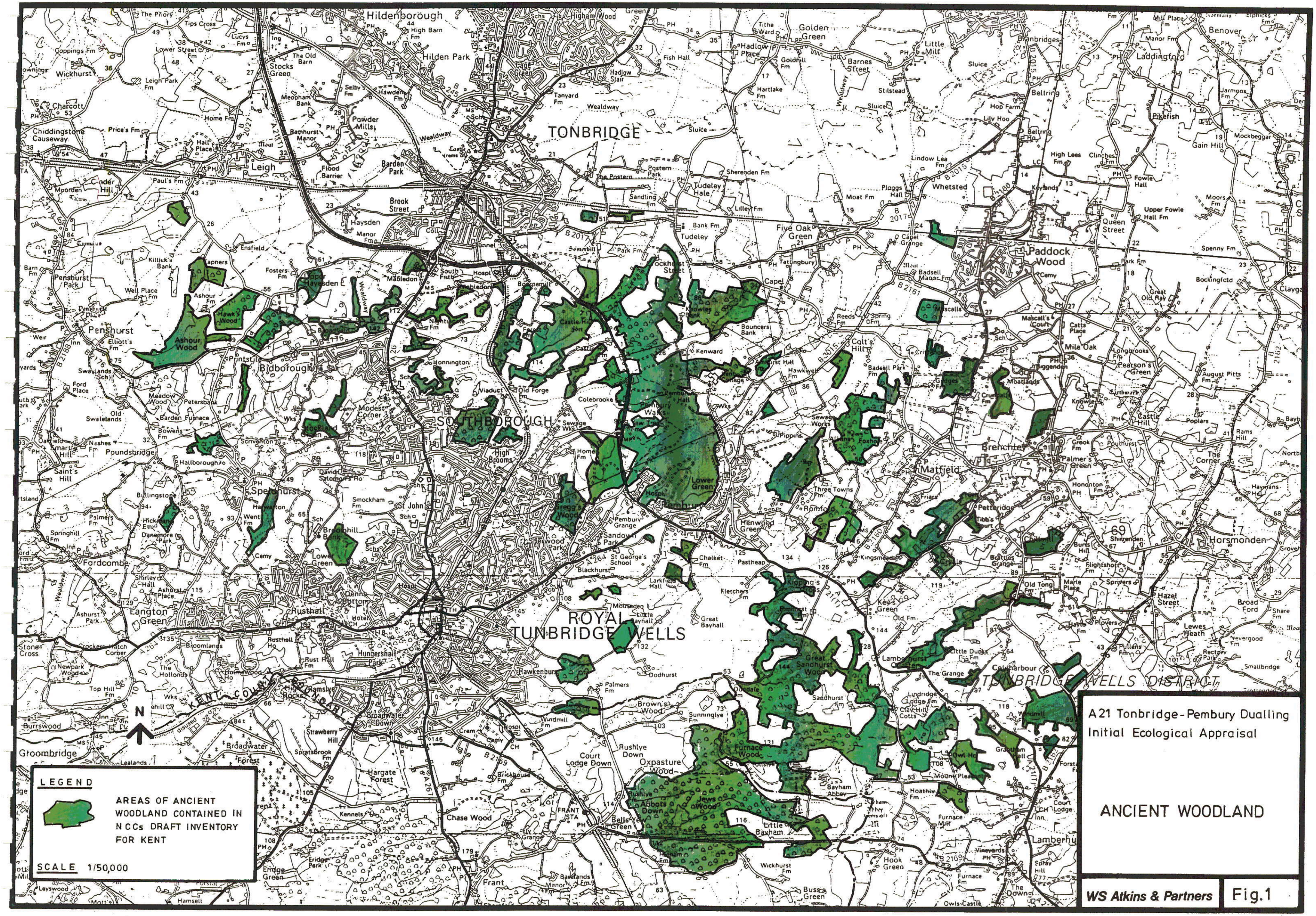
Artist impression - day 1 of opening



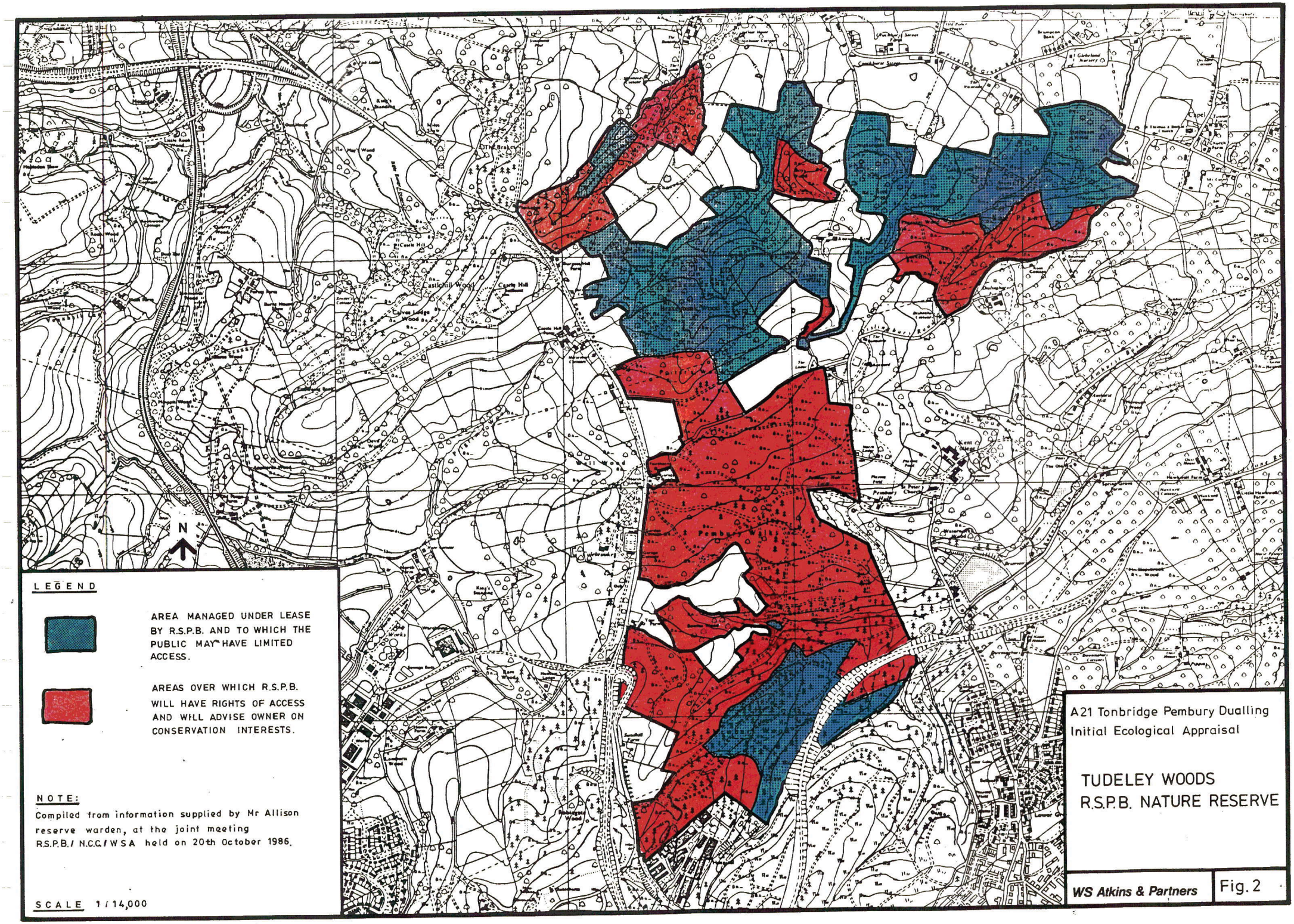
Artist impression - 10 to 15 years later

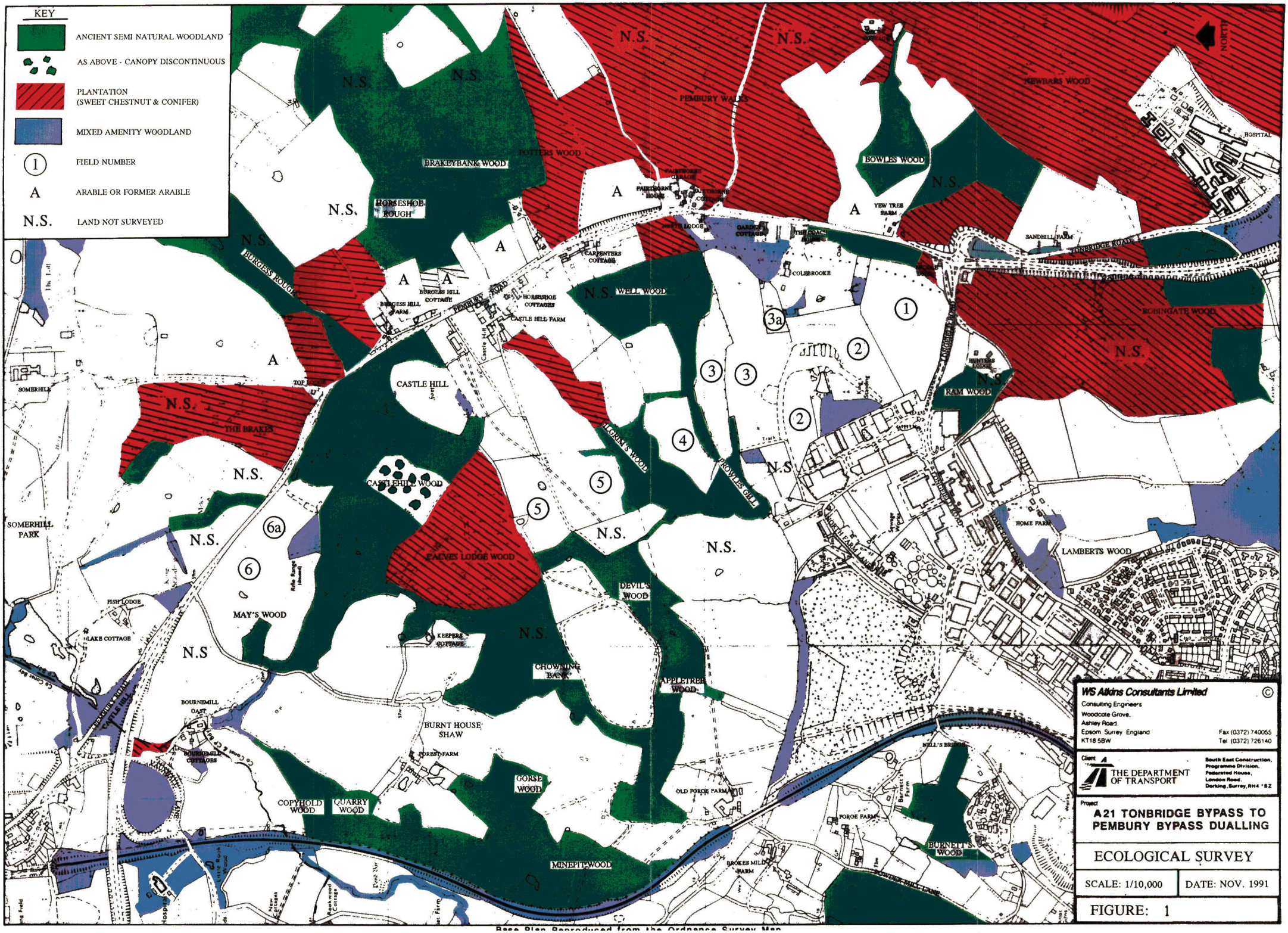
ARTIST IMPRESSION
View looking north, from Liptraps Lane, northern edge of Tunbridge Wells
FIGURE 6
September 1992

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING – ENVIRONMENTAL STATEMENT VOL. 2 09/92

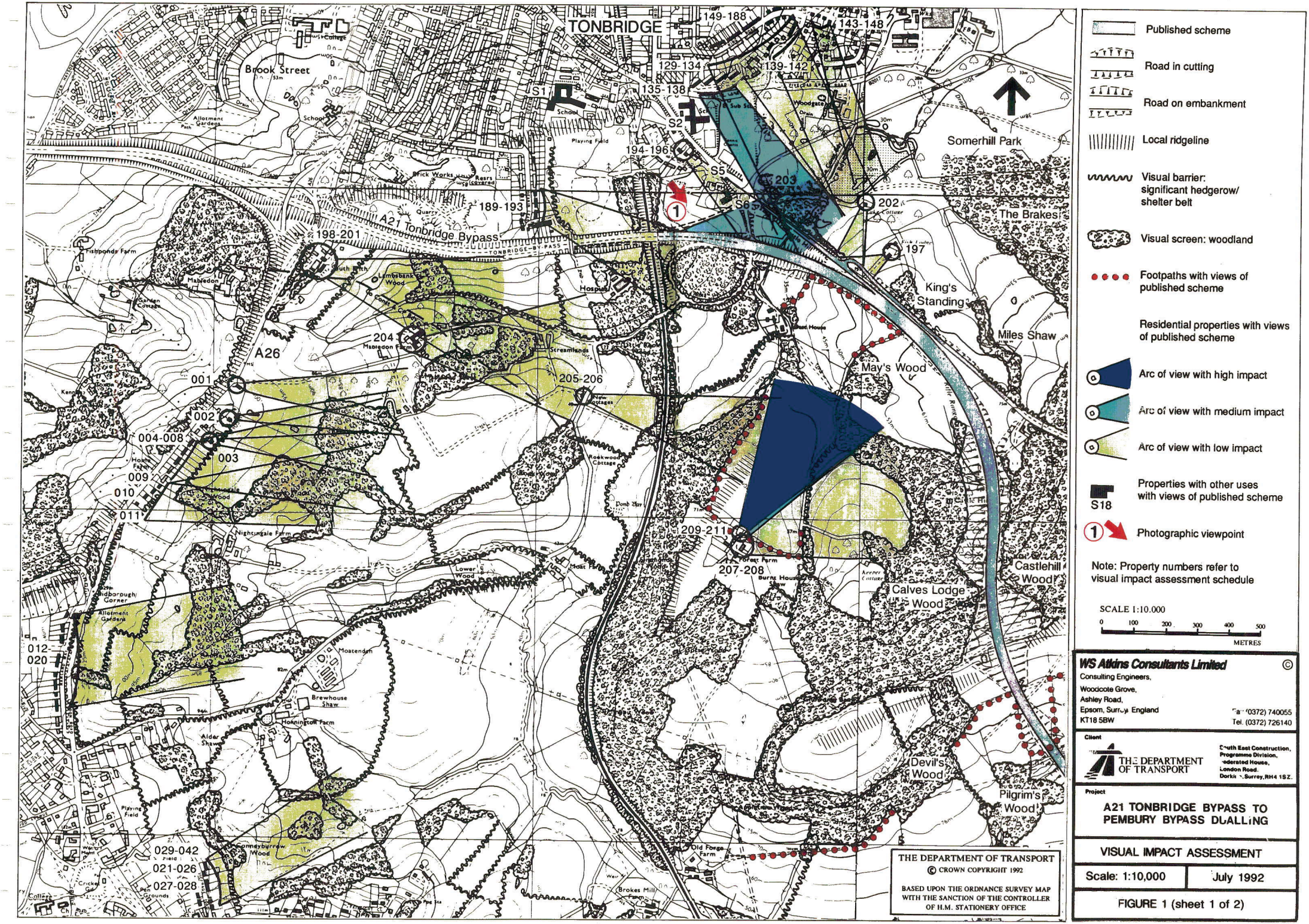


TONBRIDGE
SOUTHBOROUGH
ROYAL TUNBRIDGE WELLS
TUNBRIDGE WELLS DISTRICT
KENT COUNTY BOUNDARY
Paddock Wood
Pembury
Matfield
Brenchley
Horsmonden
Penshurst
Bidborough
Speldhurst
Langton Green
Rusthall
Hildenborough
Leigh
N
LEGEND
AREAS OF ANCIENT WOODLAND CONTAINED IN NCCs DRAFT INVENTORY FOR KENT
SCALE 1/50,000
A21 Tonbridge-Pembury Dualling
Initial Ecological Appraisal
ANCIENT WOODLAND
WS Atkins & Partners
Fig.1


N
LEGEND
AREA MANAGED UNDER LEASE BY R.S.P.B. AND TO WHICH THE PUBLIC MAY HAVE LIMITED ACCESS.
AREAS OVER WHICH R.S.P.B. WILL HAVE RIGHTS OF ACCESS AND WILL ADVISE OWNER ON CONSERVATION INTERESTS.
NOTE:
Compiled from information supplied by Mr Allison reserve warden, at the joint meeting R.S.P.B./ N.C.C./ W S A held on 20th October 1986.
SCALE 1/14,000
A21 Tonbridge Pembury Dualling
Initial Ecological Appraisal
TUDELEY WOODS
R.S.P.B. NATURE RESERVE
WS Atkins & Partners
Fig. 2



Base Plan Reproduced from the Ordnance Survey Map



Published scheme

Road in cutting

Road on embankment

Local ridgeline

Visual barrier: significant hedgerow/ shelter belt

Visual screen: woodland

Footpaths with views of published scheme

Residential properties with views of published scheme

Arc of view with high impact

Arc of view with medium impact

Arc of view with low impact

S18 Properties with other uses with views of published scheme

1 Photographic viewpoint

Note: Property numbers refer to visual impact assessment schedule

SCALE 1:10.000

0 100 200 300 400 500 METRES

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THE DEPARTMENT OF TRANSPORT

South East Construction, Programme Division, Federated House, London Road, Dorking, Surrey, RH4 1SZ.

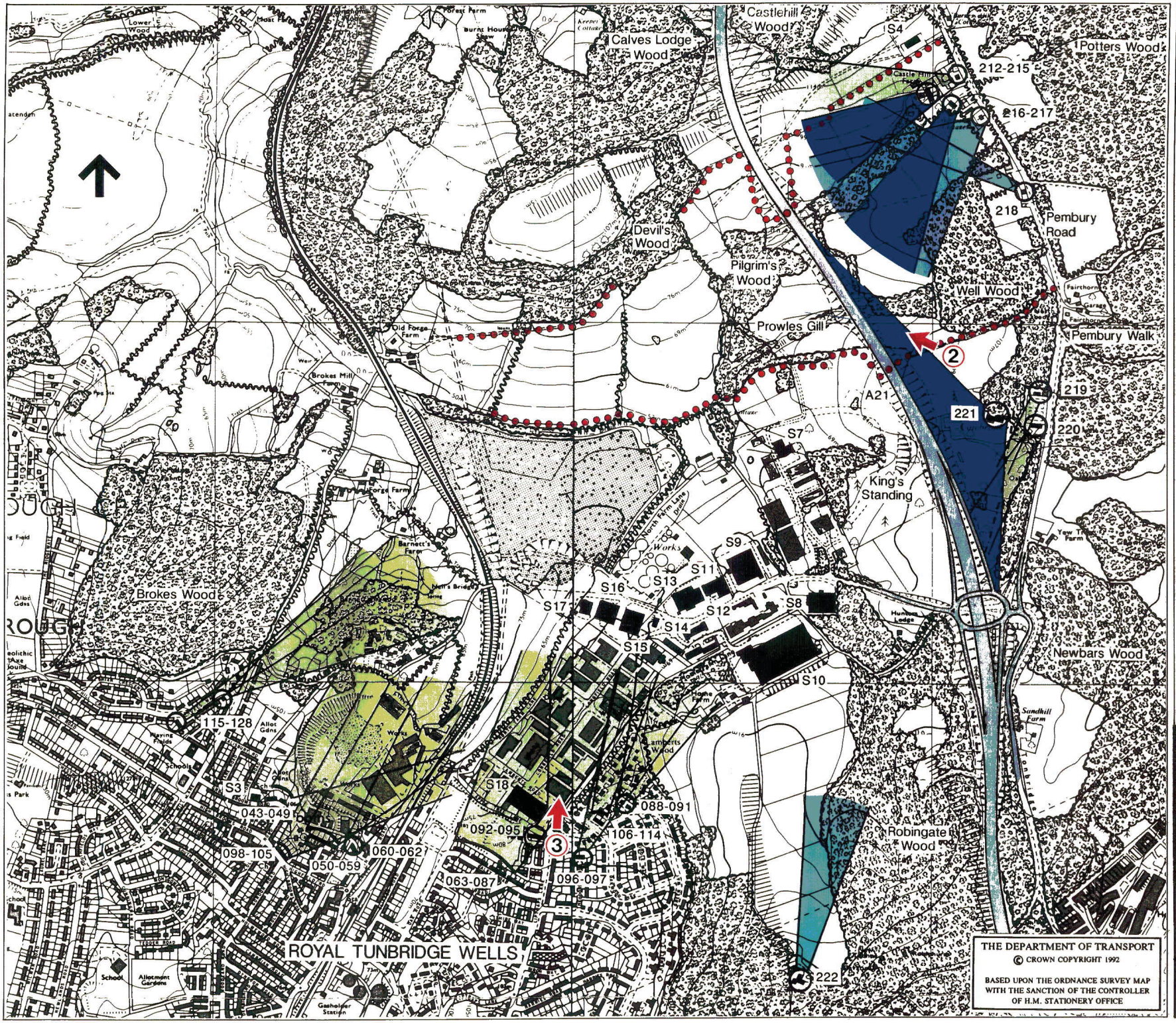
Project

A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

VISUAL IMPACT ASSESSMENT

Scale: 1:10,000 | July 1992

FIGURE 1 (sheet 1 of 2)



Published scheme

Road in cutting

Road on embankment

Local ridgeline

Visual barrier: significant hedgerow/ shelter belt

Visual screen: woodland

Footpaths with views of published scheme

Residential properties with views of published scheme

Arc of view with high impact

Arc of view with medium impact

Arc of view with low impact

S18 Properties with other uses with views of published scheme

② Photographic viewpoint

Note: Property numbers refer to visual impact assessment schedule

SCALE 1:10.000

0 100 200 300 400 500 METRES

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Project
A21 TONBRIDGE BYPASS TO PEMBURY BYPASS DUALLING

VISUAL IMPACT ASSESSMENT

Scale: 1:10,000 | July 1992

FIGURE 2 (sheet 2 of 2)

A27 Worthing/Lancing Improvements

Figure 1

Site Location