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ENVIRONMENT & LANDSCAPE  
Environmental Statement

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**A36 BATHEASTON/SWAINSWICK BYPASS & A36  
LINK – SUPPLEMENT TO ENVIRONMENTAL  
STATEMENT 04/90**



\*HC 44/27/451# 1\*



THE DEPARTMENT  
OF TRANSPORT

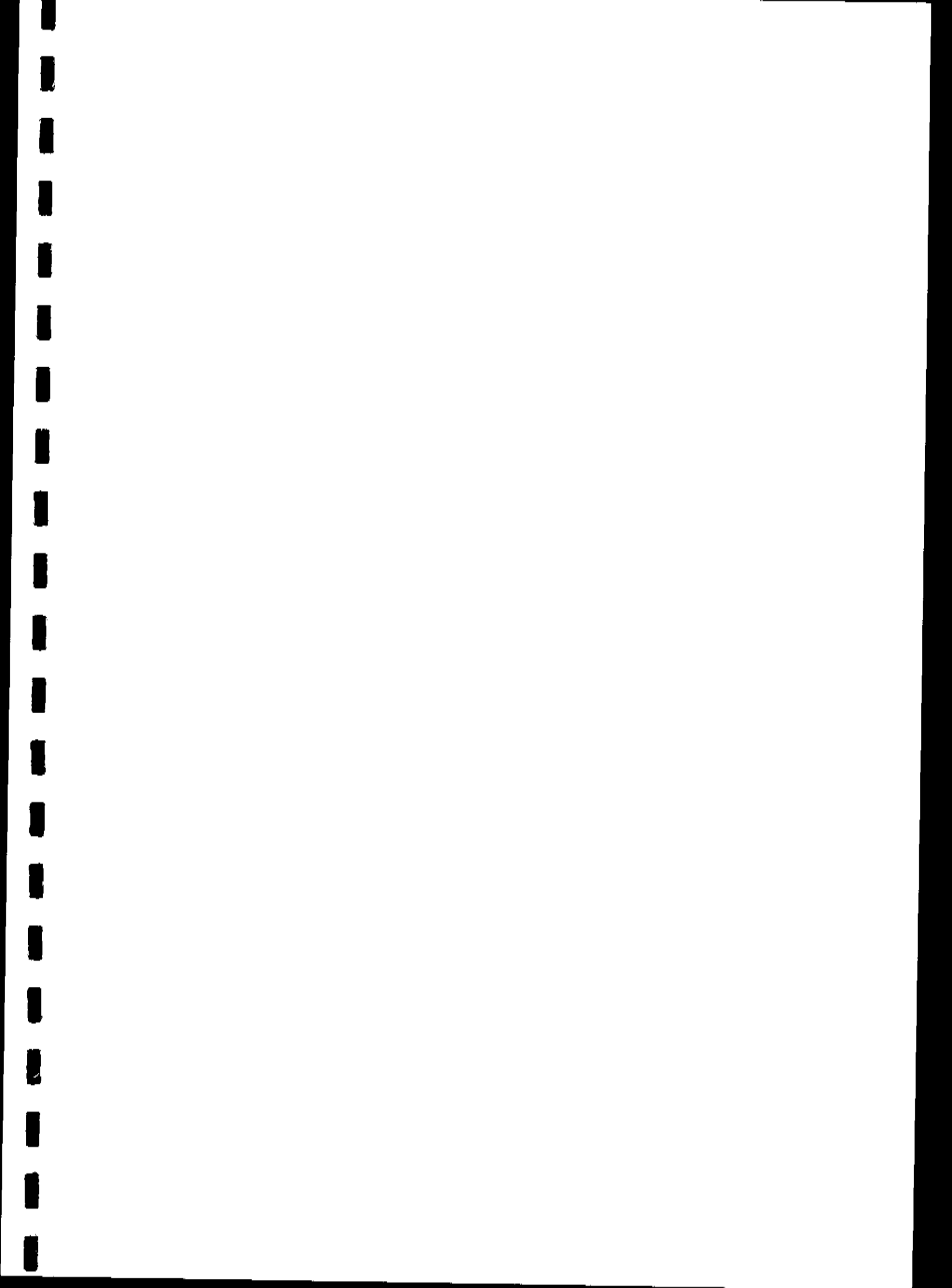
# **Batheaston/Swainswick Bypass and A36 Link**

## **Supplement to Environmental Statement**

Sir Alexander Gibb & Partners Ltd  
Consulting Engineers  
Earley House  
Reading

Department of Transport  
South West Regional Office  
Tollgate House  
Bristol

APRIL 1990





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OF TRANSPORT

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NOTE: Within this supplement the section and paragraph prefixes have the following meanings in relation to the deposited Environmental Statement for the scheme.

- A - supplementary or additional section or paragraph
- S - substitute section or paragraph superseding the same numbered section or paragraph in the Environmental Statement.

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## INTRODUCTION

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- This supplement should be read in conjunction with the Environmental Statement for the A4/A46 Batheaston/Swainswick Bypass and A36 Link scheme deposited at the publication of draft Scheme Orders in June 1989.
- Draft Orders under the Highways Act 1980 for the A4/A46 Batheaston/Swainswick Bypass and A36 Link were first published in June 1989. They comprised Line and Slip Road Orders, Detrunking Orders and Side Road Orders.
- In December 1989, following representation and objection to the published scheme, the Detrunking and Side Roads Orders published in June were withdrawn, and revised draft Detrunking and Side Roads Orders published in place. These Orders incorporated a number of local changes to the scheme and as such call for corresponding changes to the scheme Environmental Statement, which are now covered in this supplement.
- Also in the 11 months since the production of the Environmental Statement, several enhancements have been made to the scheme in terms of protection and facilities and a number of 'environmental' surveys have taken place relating to matters of archaeological, geological and ecological interest. Comment on these additions is now made in this supplement.

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A.2 SUPPLEMENT TO 'THE PUBLISHED SCHEME' (SEE ANNEX 2S)

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In reading the text of Section 2 in the Environmental Statement and the contents of this supplementary section, reference should be made to the 'Plan of Published Scheme' contained at Annex 2S.

A2.1 Supplement to 'Swainswick Bypass'

A2.1.4 At the northern extremity of the scheme a lay-by would be provided for southbound main road traffic. In addition a further lay-by would be provided along the proposed extension to Swainswick Lane, this being intended more as a facility for visitors to the Little Solsbury Hill area. To aid enforcement of the mandatory 50 mph speed limit, two police observation platforms would be sited about 500 metres apart alongside the southbound carriageway at Upper Swainswick.

A2.1.5 Under the new proposals the existing Gloucester Road at Upper Swainswick, north of the priority junction with the new northbound carriageway, would be reduced in width to serve as a local access road terminating at a turning head to the north of Hill Farm House. The alignment of the Gloucester Road at the approach to the priority junction would be modified to avoid the possibility of vehicles entering Tadwick Lane and the village of Upper Swainswick at speed. On the opposite side of the new dual carriageway the network of footpaths and bridleways providing walks to Little Solsbury Hill and Batheaston to the east would, with the exception of Public Bridleway No BA 24/8 remain largely unaltered with the provision of stiles in the new highway boundary fence where intersections occur. A new Public Bridleway access

replacing BA 24/8 would be provided from Swainswick Lane extension to the aforesaid amenity area, which by the use of the Swainswick Lane underbridge, would afford pedestrians and equestrians originating from west of the new main road, access to the area without the need to cross the dual carriageway at grade.

A2.1.6 About  $\frac{1}{2}$  kilometre to the south of Upper Swainswick, access along the Public Footpath No BA 24/7 between Gloucester Road and Swainswick Lane would be maintained, although the crossing of the dual carriageway would be at grade. Further to the south the Public Footpaths Nos 24/5 and 24/6 would be diverted either side of the new road, so that walks from the Gloucester Road to Swainswick Lane would be via Bailbrook.

A2.1.7 At Bailbrook it is proposed to construct a section of cut and cover tunnel some 70 metres long. This would enable existing accesses to most properties in the area to be maintained on the existing line as well as affording a slightly shorter connection for Public Footpaths Nos BA24/5 and BA 24/6 to the east and west of bypass and would therefore reduce the level of severance. It would create a small reduction in noise and visual intrusion for properties near the route at Bailbrook.

A2.2 Supplement to 'Batheaston Bypass'

S2.2.1 The Batheaston Bypass has the same cross section as the Swainswick Bypass, described in paragraph 2.1.1. It would start as a continuation of the Swainswick Bypass at a two level roundabout junction with the existing A4 London Road. This junction, which would be lit, would allow for all turning movements between the bypasses and the London Road. The Batheaston Bypass would terminate at a new at-grade roundabout near Bathford, which would also be lit.



- A2.2.4 It is acknowledged that the London Road roundabout junction would be busy for much of the day and would be difficult for cyclists to negotiate. A cycle/footpath is therefore proposed, leading to the south, alongside the River Avon and then across fields joining Public Footpath BA 24/1 to rejoin the London Road some 150 metres east of the existing A46 junction at Lambridge. Whilst this route represents a detour of some 300 metres it would nevertheless provide a route free of traffic hazard for those who choose to use it. Part of the cycle/footpath would form a permanent diversion for Public Footpath BA 24/1 and elsewhere would provide better access to this footpath and the public enjoyment of aspects of the river.
- A2.2.5 Originating from the cycle/footpath to the east of the Bypass a new footpath would be provided across the east side of the Avon viaduct to connect with Footpath No BA 1/3. In total this pedestrian route would represent a new facility, enabling residents of the Lambridge area to enjoy walks in the meadows to the south of the River Avon. The embankment of the new Bypass would sever the existing line of Public Footpath No BA1/3, so that a diversion some 100 metres to the north is proposed under the Avon viaduct.
- A2.2.6 At the southern approach to the off slip road serving to access the London Road roundabout a lay-by would be provided in a position some 300 metres west of Mill Lane alongside the Bristol to London railway.
- A2.2.7 At the eastern extremity of the scheme, it is acknowledged that the Bathford at-grade roundabout would be busy for much of the day. A separate system of cycle/footpaths is therefore proposed around the outside of the roundabout, in particular, making use of the Bathford viaduct to take the cycle/footpath underneath the new

Bypass. As the new Bypass would be the most heavily trafficked link of the roundabout and the detour is short, this represents a useful new facility, free from traffic hazard.

A2.3 Supplement to 'A36 Link'

A2.3.4 Some 100 metres south of the crossing of the Bristol to Southampton railway, a priority T junction would be provided off the Link to the east, facilitating access to a timber yard and three outlying properties lying to the east of the Link. In addition it is proposed to provide an underpass for Tynning Road of dimensions sufficient for agricultural vehicles, so providing a local link for the outlying residents to their local community of Bathampton. The combination of the new access to the link on the east side and the connection to Tynning Road lays open the possibility of a 'rat run' developing for traffic travelling southbound on the Link, but seeking to access Bathampton or parts of Bath. It is proposed to prevent the movement by connecting the highway elements concerned at a very acute angle. In addition to the facility for outlying residents, the underpass at Tynning Road would retain the connection to Public Footpath BA 1/32 maintaining a pedestrian route between Bathampton and Bathford without the need to cross the new A36 Link at-grade.

A2.3.5 A further 200 metres south of Tynning Road lay-bys would be provided on each side of the link. Connecting into the lay-by on the east side would be a private means of access for the British Waterways Board leading to the Kennet and Avon Canal. At the canal crossing the continuity of the towpath and the Public Footpath No BA 1/5 would be maintained by a walkway under the bridge, 3.2 metres wide with a headroom of 2.9 metres.

A2.3.6 Midway between the Kennet and Avon Canal and Dry Arch Junction an underpass would be provided to accommodate access to Holcombe Farm and a diversion of Public Footpath No BA 1/25. This footpath leads from Bathampton to the Bathampton Swing bridge over the canal and so connects to the Public Footpath No BA 1/5 along the towpath. The underpass would therefore retain an important local amenity without the need to cross the proposed new Link at-grade.

A2.3.7 At Dry Arch Junction a footway would be provided around the north side of the junction, crossing the new link via a traffic island at-grade. The footway would extent to the south as far as Public Footpath No BA 1/25.

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S3 EFFECT ON TRAFFIC (SEE ANNEX S3)

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S3.1 It is anticipated that the Published Scheme would substantially reduce traffic flows along the A46 south of Upper Swainswick, the A4 east of the new London Road junction and Mill Lane.

S3.2 Annex S3 is a diagrammatic representation of the existing roads in the area showing the changes in traffic flows if the Published Scheme is constructed. It can be seen that compared with 1988 flows, A46 Gloucester Road traffic on opening (in 1995) will reduce by 85-90%, A4 traffic through Batheaston by about 75-80% and Mill Lane by about 50%.

S3.3 However, the A4 west of the London Road junction, the A36 Warminster Road, the A363 Bradford Road, the A4 Box Road, Bathford Hill and Bannerdown Road would all experience an increase in traffic flows. This is not due to the construction of the Published Scheme but to the general growth of the traffic volumes in the Bath area. Recent traffic growth within Bath itself has been restrained to about 1% per annum by the urban conditions and parking facilities available. Outside Bath, traffic growth on the A36 and A46 roads has more closely followed the higher national road traffic forecasts at about 4% p.a. The increase of 63% in traffic flows at opening on the A36 through Bathampton is due mainly to local growth but with a 10% component attributable to the Published Scheme.

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A4 SUPPLEMENT TO 'MITIGATION MEASURES'

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In reading the text of Section 4 in the Environmental Statement and the contents of this supplementary section, reference should be made to the plan of 'Principal Landscape Proposals' at Annex S4.

A4.2 Supplement to 'Specific Proposals'

A4.2.1 Supplement to 'Swainswick Bypass'

A4.2.1.1 Point A

Some 70 metres north of the Swainswick Lane bridge it is proposed that a 2.4 metre high acoustic screen fence be erected at the back of the verge, adjacent to the northbound carriageway. This would extend southwards providing a reduction in noise levels to properties in the area, and would also immediately screen from view of the road and provide privacy to those properties lying immediately to the east. As this structure could be potentially intrusive, consideration is being given to it being of natural timber appearance. It would sit behind establishing trees and shrubs and would rarely be seen on the skyline, as the land to the east rises steeply towards Little Solsbury Hill.

A4.2.1.2 Point B

The acoustic fence discussed in sub paragraph A4.2.1.1 above would extend beyond Point 'B' to some 60 metres past the property Aucombe House. The same comments concerning the fence would apply over this section.

#### A4.2.1.5 Point P

Passing between the vertical retaining walls, the Bypass would cross the Bath City boundary at Bailbrook and enter a 70 metre long underpass. Bailbrook Lane would be diverted over the underpass, which would also provide for a private means of access to a number of houses off Bailbrook Lane. In addition, the public footpath severed by the Bypass would be diverted over the underpass effectively linking the footpath network east and west of the Bypass. The provision of the underpass would provide better noise attenuation to adjacent properties in Bailbrook and Lower Swainswick, and would also create a better physical and visual link between Bailbrook in the east and Lower Swainswick downslope to the West.

#### A4.2.2 Supplement to 'Batheaston Bypass'

##### A4.2.2.2 Point F

There was criticism of the original proposal because the width of the Avon viaduct would have created an area of darkness below. This problem has been overcome in the revised Orders, which allow for the Slip Roads to be constructed on separate Structures each side of the main viaduct with gaps in between.

##### S4.2.2.3 Point G

South of the viaduct, the Bypass would be on embankment before turning east to run parallel with the Bristol to London railway line. This embankment would be a maximum height of 6 metres (20 feet) but it is proposed to increase the embankment height to 8 metres (26 feet) in order to create a 2 metre high false cutting and this would significantly reduce the impact of the traffic upon the road. The impact of the embankment itself, would be reduced

by planting trees and shrubs on and beyond the embankment into the valley floor, although planting would be contained within the highway boundary.

#### S4.2.2.5 Point I

After passing beneath the A36 Link Road, the Bypass would be raised on 5 metre (16 feet) high embankment, until the River Avon is crossed on a low bridge at Bathford. When viewed from the south and south east, the Bypass would be screened from view by the Bristol to London railway line embankment which is some 2-3 metres (10 feet) higher than the proposed road. From across the Avon Valley to the north, the Bypass, although seen in the distance and against the backdrop of the railway, would be visible on 5 metre (16 feet) high embankment. It is therefore proposed to increase the embankment height by a further 2 metres and create a 2 metre high false cutting, which would substantially reduce the impact of the traffic upon the road. This would not intrude into views from the south, as it would remain below the height of the railway embankment. Stands of trees and shrubs would be planted to interrupt the strong horizontal lines of the top of the embankment and railway beyond. Existing hedgerows would be reinforced by "off site" planting, by agreement with the land owner. This treatment would reduce the impact of the railway as well as the proposed Bypass and therefore achieve an overall improvement to the landscape in this part of the valley.

#### A4.2.3 Supplement to 'A36 Link'

##### A4.2.3.1 Point J

From the Batheaston Bypass, the A36 Link would loop tightly around over an existing knoll and would rise on embankment to an approximate height of 4 metres (13 feet) to cross the Bypass. A 2 metre high false cutting would create a horizon for drivers and would help screen the view of vehicles from Batheaston. Major

earth shaping would be carried out around the loop of the A36 flyover to mould the engineering embankments into the knoll. The regraded land would, by agreement, be returned to the land owner and the existing field pattern recreated with new hedgerows. Existing hedgerows north of the regraded knoll would be reinforced, subject to land owners agreement. The overall aim is to ensure that views from across the valley would be of a gentle rise in the land form similar to that which previously existed and over which a typical rural scene would develop, helping to blend the junction and moving traffic into the valley landscape.

#### S4.2.3.3 Point L

Having crossed the Bristol to Southampton railway line the Link would descend from embankment down to existing ground level Inpassing some 70 metres (230 feet) east of the Kennet and Avon Canal before rising on embankment again to cross the Canal. In this area a potential conflict would exist between the traffic on the A36 Link and the relative tranquility of the canal setting. To mitigate visual intrusion and noise effects resulting from the Link the land between the Link and the Canal would be landscaped, providing a valuable new area of open space. Earth mounding would ensure an immediate reduction in intrusion by largely blocking views of the road from the canal towpath yet longer distance views across the valley towards Bathford would be maintained. As tree and shrub planting matures, the impact would be further reduced. It is not the intention however to create a dense area of woodland, for this would be alien to the open character of the valley floor. Maintaining the relative openness of this area would therefore permit limited views of the road and traffic upon it, but the large area of open space created would ensure the Link Road is successfully integrated into this valley landscape.



#### S4.2.3.4 Point M

As the Link rises to cross the Kennet and Avon Canal the embankments would be potentially intrusive, especially when viewed from the northern part of the Limpley Stoke Valley, areas of Bathampton and the Canal. It is proposed to extend the embankments to the south of the Canal, shaping them into the existing contours and recreating a natural looking ridge similar to the existing. Additionally, the embankments to the west of the Link Road would be raised by 2 metres in order to create a false cutting, and therefore effectively reducing the impact of the traffic upon the Link from Bathampton. Much of the reshaped land to both the east and west of the Link Road would be returned to pasture with the agreement of the land owner. Trees and shrubs would be planted adjacent to the bridge abutments to mask the junction between the bridge and earthworks.

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S5            EFFECTS ON THE ENVIRONMENT

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S5.1        On the Environment of People

A5.1.1     The changes in routes including access to amenity areas, and alterations to facilities caused by the scheme are discussed in Sections 2 and A2 of this statement.

A5.1.2     The expected redistribution of traffic due to the scheme at opening and 15 years thereafter is presented in the separate Traffic Forecasting Report, April 1990. Amongst other information the report indicates the levels of traffic flow which would be introduced to areas, where currently there are no main roads. In Section S3 of this Statement, there is a brief discussion of the changes in traffic flow to be expected on existing roads as a result of the scheme.

A5.1.3     The expected changes in noise and pollution levels brought about by the scheme are discussed and quantified in the separate Noise Report and Pollution Report, both dated April 1990.

A5.1.4     Perhaps not surprisingly, the conclusions to be drawn from the references in paragraphs A5.1.2 and A5.1.3. above are that against the disbenefits of the introduction of main road traffic into hitherto undisturbed areas, there are significant benefits from the scheme accruing to the communities of Lower Swainswick and Batheaston. These include reductions in noise, pollution and traffic severance and its associated element of danger. Measures in mitigation of the disbenefits are discussed in Sections 4 and A4 of this Statement.

A5.1.5 Annex S5 contains a framework summarising the effects of the Scheme on Residents, Travellers and the Users of facilities by comparison with the 'Do minimum' situation. In addition, in line with the D.Tp's Manual of Environmental Appraisal the framework contains a summary of Financial Effects and an appraisal of the merit of the scheme against Local and National Policies for, on the one hand, Transport, Development and Economic Growth and, on the other hand, Conservation and Enhancement.

A5.2 On the Natural Environment

A5.2.1 Geological

A5.2.1.1 The Site of Special Scientific Interest (SSSI) referred to in paragraph 2.3.3. of the Statement has now been designated. The Hampton Rock Cutting SSSI is of considerable national importance geologically as the best example of a Quaternary calcrete. It is also of regional importance as one element in a series of SSSIs set up to safeguard various components of the Quaternary stratigraphy of the Avon Valley, a critical area for the understanding of the glacial history of the British Isles.

A5.2.1.2 It is not proposed to move the route of the A36 link to avoid the Hampton Rock Cutting, as the new road will only sterilise 10-15% of the site. However because of the potential loss, a geological survey of the area to be covered has been commissioned by the Department of Transport and carried out by Dr C.O. Hunt of the Department of Geography at London University. The Report of that Survey, dated March 1990, together with the covering letter is included at Annex A7. Dr Hunt concludes that, whilst regrettable, the loss of 10-15% of the site for road building can be regarded with some measure of equanimity.

A5.2.1.3 In acknowledgement of the importance of the 85% of site, which would remain upon roadbuilding, special measures would be included in the Contract Documents to safeguard the site from damage by Contractors plant.

A5.2.2 Archaeological

A5.2.2.1 An archaeological survey of the proposed routes within the Scheme has been commissioned by the Department of Transport and carried out by Mr J.P. Roberts, Archaeological Officer of the County of Avon, during February and March 1990. In this instance the area of the Scheme is of particular interest because of the known association of Bath with Romano-British settlement and because it encompasses parts of the Fosseway.

A5.2.2.2 The results of the survey were such as to indicate that, apart from land on either side of Tynning Road, for which access was not available, none of the sites examined would require further archaeological work or should be regarded as necessitating either alteration of the proposed routes or the incorporation of special features into the design of the road.

A5.2.2.3 The letter comprising a brief progress report of the work to date is included at Annex A8. Mr Roberts states that work will need to be carried out in the future in investigation of the fields at Tynning Road and that there should be archaeological observation of all earth movement during construction.

A5.2.3 Ecological

A5.2.3.1 Badgers

A preliminary survey has been carried out by the Avon Badger group and they have located setts on or near the line at Bailbrook and Dry Arch. Following this it is proposed to carry out a detailed survey to establish whether the groups already identified have

subsidiary setts off the line to which they can be moved and also to look for further groups. Badgers will not be disturbed until the late summer or autumn prior to the start of works and further, should it prove necessary to relocate badger groups, then specialists will be employed for this purpose. Within the works will be included all necessary badger fencing and if required, and practicable, badger tunnels.

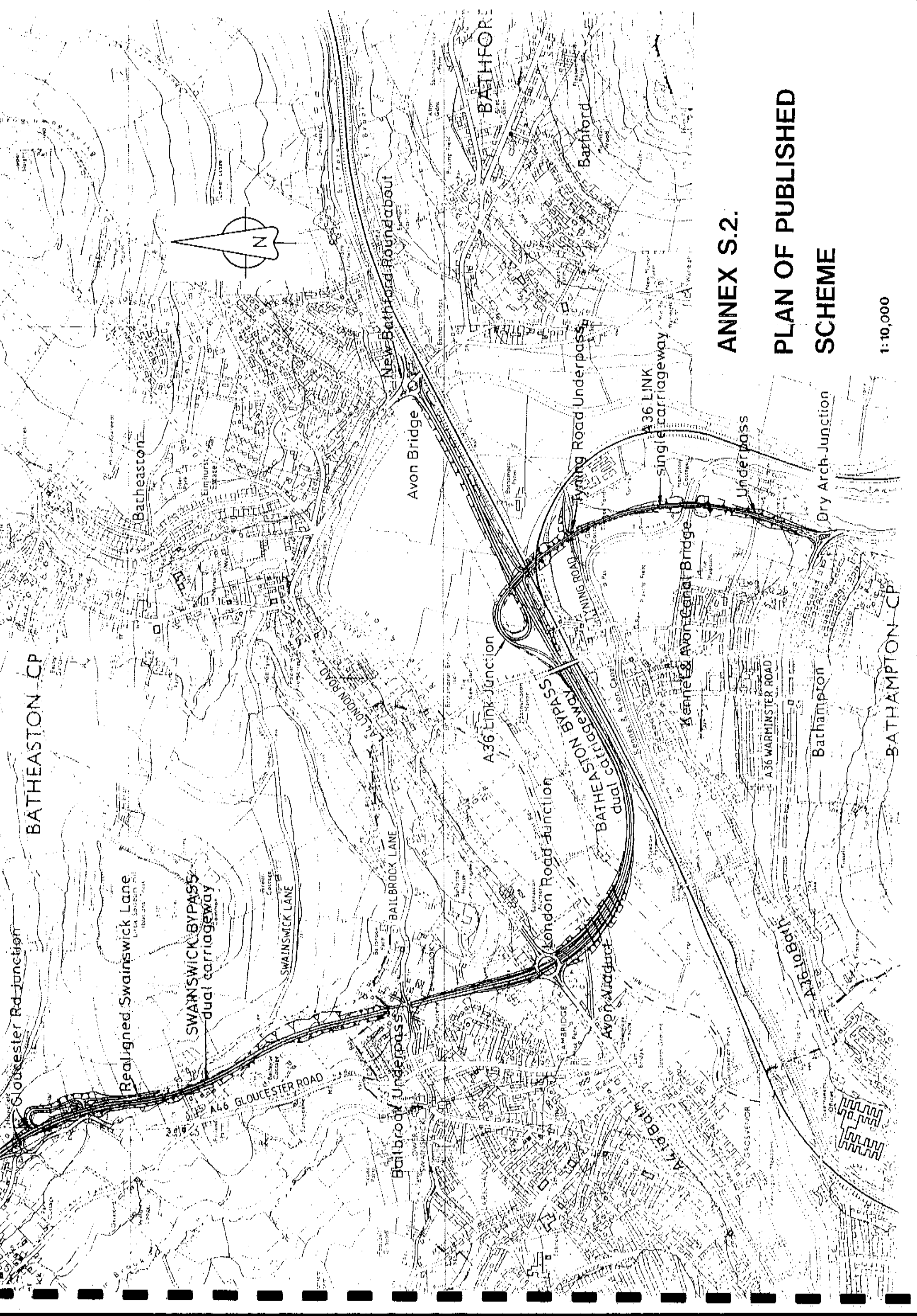
#### A5.2.3.2 Bats

It is not known whether bat roosts would be affected by the scheme, but the Nature Conservancy Council has been given a list of properties, which would be demolished, should works go ahead. They are arranging for the Avon Bat Group to visit each property to establish if bats are present. Where bats are discovered the roofs will be sealed at night during summer months to prevent re-entry.

#### A5.2.3.3 Aquatic Life

There are no ponds which would be lost to the scheme, although the fenceline runs close to one at Upper Swainswick. Should the works proceed care will be taken to ensure that the Contractor does not stray outside the site in disturbance of the pond life.

With regard to the River Avon, interest focuses around the presence or otherwise of Loddon Pondweed. It is therefore intended that an aquatic survey be carried out by ecologists during the late spring period when the weed is to be seen. Where the weed is present, measures will be taken to protect it including fencing the river banks during construction.



BATHEASTON CP

Realigned Swanswick Lane  
SWANSWICK BYPASS  
dual carriageway

A46 GLOUCESTER ROAD

Bathbrook Underpass

BAILBROCK LANE

New Bathford Roundabout

Avon Bridge

A36 Link Junction

London Road Junction

BATHEASTON BYPASS  
dual carriageway

Avon Underpass

Kennet & Avon Canal Bridge

A36 LINK  
Single carriageway

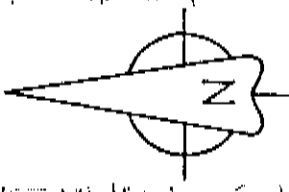
Underpass

A36 WARMINSTER ROAD

Bathampton

Dry Arch Junction

BATHAMPTON CP



ANNEX S.2.

PLAN OF PUBLISHED  
SCHEME

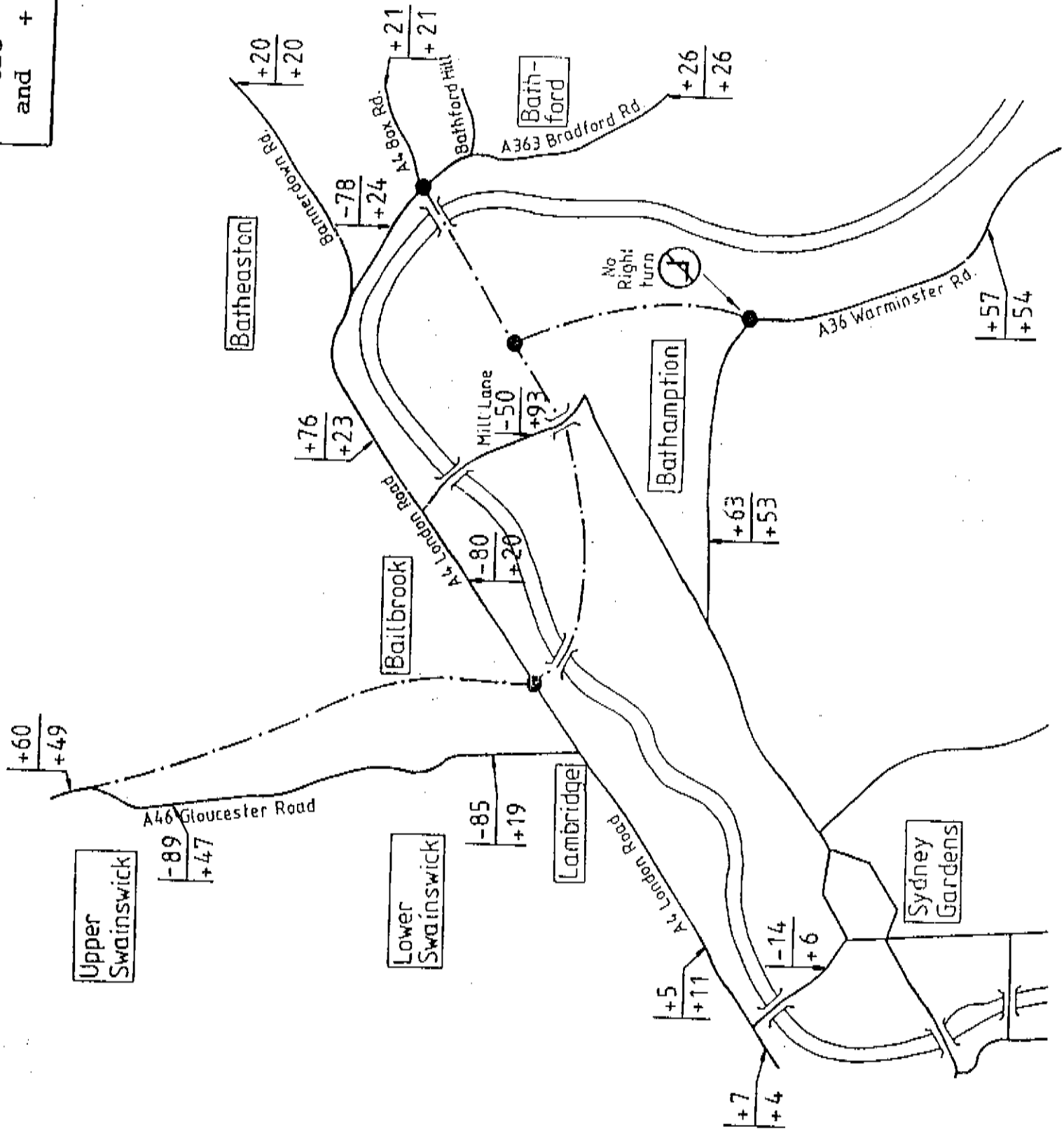
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KEY

The figures show the percentage change forecast in 1995 flows compared with 1988 flows.

$\frac{-89}{+47}$  with the published scheme in place.  
 $\frac{-89}{+47}$  with 'Do Minimum'

Where - 89 represents a percentage decrease and + 47 represents a percentage increase.



ANNEX S3

CHANGES IN  
TRAFFIC FLOW





**KEY**

- +2 Road on Embankment (showing height in metres)
- 3 Road in Cutting (showing depth in metres)
- (A) Points having significant landscape proposals

**ANNEX S4**

**PRINCIPAL LANDSCAPE PROPOSALS**

1:10,000

NORTH



ANNEX S5  
SCHEME FRAMEWORK

A4/A46 BATHURSTON/SMAINSWICK BYPASS & A36 LINK  
PUBLIC INQUIRY FRAMEWORK

Group 1: Travellers

Date Prepared: May 1990

PREFERRED ROUTE      DO MINIMUM

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE		COMMENTS
			HIGH	LOW	
Car Users	Time savings	£M(PVB)	45.067	32.414	<p>Comments A, B and C apply to the first nine lines.</p> <p>A) Each column shows the improvements of the preferred route over the "Do-Minimum. Hence the "Do-Minimum entries are zero.</p> <p>B) Present value of benefits (PVB) are for 30 year period from the expected date of opening and discounted to 1988 prices at 8%.</p> <p>C) National average figures for vehicle occupancy and for accident rates costs from COBA 9 have been used.</p>
	Vehicle operating cost savings	£M(PVB)	0.294	0.082	
	Time savings	£M(PVB)	12.307	6.766	
Users of Light goods vehicles	Vehicle operating cost savings	£M(PVB)	0.111	0.043	
	Time savings	£M(PVB)	4.991	2.884	
	Vehicle operating cost savings	£M(PVB)	0.188	0.055	
Users of other goods vehicles	Time savings	£M(PVB)	3.422	2.449	
	Vehicle operating cost savings	£M(PVB)	0.059	0.057	
	Time savings	£M(PVB)	1.817	1.342	
Bus Operators and passengers	Vehicle operating cost savings	£M(PVB)	0.059	0.057	
	Value of accident savings	£M(PVB)	1.817	1.342	
	Value of accident savings	£M(PVB)	1.817	1.342	
All vehicle travellers	Reduction in casualties:-				
	Fatal	Number	4	4	
	Serious	Number	69	64	
Slight	Number	180	167		

The figures indicate the probable reduction in casualties over the whole of the 30 year assessment period based on national average accident rates.

REVISED (21ST MAY 1990)

Group 1: Travellers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE			COMMENTS
			HIGH	LOW	DO MINIMUM	
All vehicle travellers. (Contd)	<u>Driver stress</u>		Moderate	High		
	View from road		Mainly scenic from A46 and A36. Agricultural from A4.	Residential through Bathampton and Batheaston. Scenic from A46.	Views will be restricted to the south of the A4 and west of the A36 due to the introduction of false cutting to reduce visual intrusion to Bathampton.	
	Traffic delays during construction	£M(PVB)	0	0	0	Figures are calculated using the same assumption on traffic composition as for travel benefits. No detailed survey has been undertaken.
Pedestrians	Change in amenity		Improved amenity due to 75% reduction in traffic in Bathampton High Street and 85% reduction in Gloucester Road.	Reduced amenity in Bathampton due to 25% increase in traffic. Reduced amenity on Gloucester Road due to 50% increase in traffic.		

Group 1: Travellers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Pedestrians (Contd)	Safety		Improved safety due to large reductions in traffic in Batheaston and Gloucester Road.  Crossing points are provided at all connections with existing roads and footpaths. Some footpaths are provided with segregated crossings.	With the large increase in traffic in Batheaston and Gloucester Road the potential for pedestrian accidents will increase.	
	Severance (New)		Severe severance to villagers of Swainswick. Moderate severance to the villagers of Bathampton. Generally all footpaths crossing the new road are provided with alternative diversions which will induce a slight increase in severance.	Severance will increase with traffic growth on existing roads.	
	Change in amenity				
Cyclists (330 cyclist movements per day will be affected)			Traffic reduction of 75% in Batheaston will benefit 330 cyclists movements per day.	Amenity will reduce as traffic increases by 25%.	

Group 1: Travellers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Cyclists (Contd)	Safety		Reduced traffic flows on Gloucester Road and through Bathaston will improve safety. Cycle tracks to be provided at A4 London Road and Bathford junctions.		The danger of accidents will increase as traffic increases with growth.
	Severance (New)		Slight severance to cyclists on A4 London Road West due to proposed junction.		No change.

Group 2: Occupiers

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Residential	Propertles Demolished	Number	9	0	The cost of property acquisition and demolition is included in Group 5.
	Noise	Number of houses experiencing an increase of more than 15 dB(A)L10 10 - 15 dB 5 - 10 dB 3 - 5 dB	10 52 89 36	0 0 0 0	The changes in noise are the difference between the forecast for the preferred route for 2010 and the 1993 Do Minimum situation. The units are dB(A)L10 18 hr. 6 am - midnight. Allowance has been made for the presence of a noise barrier at Swainswick in calculating these figures. Of those properties experiencing an increase 14 have been identified as provisionally eligible for secondary glazing.
	Number of houses experiencing a decrease of more than 15 dB(A)L10 10 - 15 dB 5 - 10 dB 3 - 5 dB		0 34 277 19	0 0 0 0	

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Residential (Contd.)	Pollution		The scheme provides considerable improvement for the A46 through Lower Swainswick and High Street through Batheaston, reducing carbon monoxide levels to below 3 ppm over an 8 hour period.	Carbon monoxide levels will exceed recommended maximum levels.	EEC standard for recommended maximum level of carbon monoxide is 9 ppm over an 8 hour period.
	Visual obstruction.	Number of properties subject to:			Number of properties affected by visual obstruction has increased from the publication of Draft Orders, due to the provision of false cuttings in order to mitigate visual intrusion. Therefore increasing embankment heights
		High	7	0	
		Moderate	32	0	
		Slight	104	0	
	Visual intrusion.		High visual intrusion to 12 properties adjacent to the bypass at Upper Swainswick due to road on embankment and bridge structure.	No change	Intrusion reduced by the provision of screen fencing and new planting.

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Residential (Contd)			Moderate intrusion from east side of Bath and Avon Valley as the bypass crosses the River Avon on embankment and viaduct and to some properties in Bathampton as the A36 crosses the railways and canal and climbs to Dry Arch.		Landscaping, false cuttings and new planting will minimise the impact.
			Slight intrusion to properties at Bailbrook and Lambridge.		Intrusion has been minimised by the provision of a cut and cover tunnel and use of diaphragm retaining walls.
			Slight intrusion to properties south of London Road as the bypass runs adjacent to the railway and to some properties at Batheaston and Bathford on the A36 ascends the Avon Valley to Dry Arch.		Landscaping, false cuttings and new planting on and off site will minimise the impact.



Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Residential (Contd)	Severance (a) Relief to existing severance		Substantial due to reduction of traffic flows on the A4 through Batheaston and the A46 through Swainswick.	There will be a deteriorating situation for pedestrians when crossing the existing roads, particularly through Batheaston and Upper Swainswick, due to the increase in traffic.	
	(b) Imposition of new severance		Slight	None	The provision of a 70 m underpass overcoming the imposition of new severance at Bailbrook.
	Disruption during construction		118 housed within 100 m of the works of which 46 will be directly affected for varying periods of up to 10 months duration.	No effect	
Commercial and Amenity Premises: including Industrial Buildings, Offices, Shops, Hotels, Pubs, Cafes.	Buildings Demolished	Number	2	0	Bailbrook Nursery and Dry Arch Nursery to be demolished. The cost of property acquisition is included in Group 6.

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Commercial and Amenity Premises (Contd)	Noise increase	Number subject to increase of more than 5dB(A) L10	0	0	'Do Minimum' shows the number of premises fronting the existing A4, A46 and A36 within the limits of the scheme
	Noise decrease	Number subject to decrease of more than 5dB(A) L10	33	0	
Visual obstruction	Number of premises subject to:	High	0	0	
		Moderate	0	0	
		Slight	4	0	

Severance

a) Relief to  
existing  
severance

Substantial  
improvement on the A4  
through Batheaston  
and the A46 through  
Swainswick.

No improvement

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Commercial and Amenity Premises (Contd)	b) Imposition of new severance		None	Deteriorating situation for pedestrians when crossing the existing A46 at Upper Swainswick due to increase in traffic.	The Preferred Route opens up new avenues of communication for commercial traffic across the Avon Valley.
Schools, Hospitals and Residential Homes	Disruption during construction		Slight disruption to commercial and amenity premises for varying periods up to 10 months.	No effect	
a) Grosvenor High School (18 senior and 135 junior school pupils)	Noise	dB(A)L10	No change	No change	
Visual			None	No change	
Severance			Severance increases with the 5% increase in traffic on the A4.	Severance increases with the 11% increase in traffic on the A4.	

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Schools, Hospitals and Residential Homes (Contd)	Disruption during construction		Slight disruption during the construction of the new London Road junction for 8 months	No effect	
b) Bathampton Primary School (95 pupils)	Noise	dB(A)L10	5-10dB(A) increase	No change	Maximum predicted noise levels will not exceed 60dB(A) which can be considered a better than acceptable standard.
	Visual		Slight visual intrusion and slight visual obstruction from road on embankment	No change	
	Severance		Moderate improvement due to reduced traffic flow along Mill Lane of 50%.	Severance increases as traffic increases on Mill Lane by 90%.	
	Disruption during Construction		Slight disruption due to construction traffic carrying out diversion of Tynning Road for 5 months	No Change	

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
c) Bathampton Manor Residential Home for Elderly Women (22 residents)	Noise	dB(A)L10	5-10dB(A) increase	No change	Maximum predicted noise levels will not exceed 60dB(A) which can be considered a better than acceptable standard.
	Visual		Moderate visual intrusion due to new road crossing previously unobstructed valley floor - No visual obstruction	No change	
	Severance		Moderate improvement due to reduced traffic flow along Mill Lane by 50%.	Severance increases as traffic increases on Mill Lane by 90%.	
	Disruption during construction		Moderate disruption particularly during construction of Mill Lane overbridge for 10 months.	None	
d) Oriel Lodge Residential Home for the Elderly	Noise	dB(A)L10	5-10dB(A) decrease	No change	

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Oriell Lodge (Contd)	Visual		None	No change	
	Severance		Significant relief due to reduced traffic flows on existing A46.	Severance increases and safety and accessibility reduce as traffic on the A46 increases.	
	Disruption during construction		Moderate disruption during the construction of the Swainswick Bypass for 12 months.	No effect	
e) Ballbrook College (Residential college with 120 rooms)	Noise	dB(A)L10	5-10dB(A) increase on west facade. 5-10dB(A) decrease on east facade.	No change	Maximum predicted noise levels will be 60-62 dB(A) which can be considered an acceptable standard.
	Visual		Slight visual intrusion No visual obstruction	No change	
	Severance		Significant improvement in access off old A4 due to reduced traffic flow.	Severance from the A4 will increase with traffic growth.	

Group 2: Occupiers (contd)

SUB GROUP	EFFECT	UNITS	PREFERRED ROUTE	DO MINIMUM	COMMENTS
Bailbrook College (Contd)	Disruption during construction		Moderate disruption during construction of Swainwick Bypass for 12 months.	No effect	
Farming		Number of farms affected by land take	8	None	3 of these farms are currently owned by the Department of Transport.
	Land take	Hectares of Land			Land is graded on the MAFF classifications.
		Grade II	3.74	0	Areas include land taken for landscaping.
		Grade III	36.76	0	Compensation included in Group 6.
		Grade IV	1.82	0	
Public Buildings	Land take	Hectares	Complete grounds of Oriel Hall 0.08.	0	Effect on users appears in Group 3.
Open Space a) Quaker burial ground, Batheaston.	Land take	Hectares	Complete burial ground 0.0265.	0	Effect on users appears in Group 3.

Group 3: Users of Facilities

SUB GROUP	EFFECT	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Batheaston High Shopping Centre	Reduction of vehicle/pedestrian conflict	Substantial reduction in pedestrian/vehicle conflict due to a 75% reduction in traffic on the A4. The reduced flow will ease servicing problems.	Pedestrian/vehicle conflict and servicing problems increase along the A4 as traffic growth increases.	Batheaston is the most important local centre in the Wansdyke Environs of Bath District Plan (WEBDP) area.
London Road Shopping Centre (South west of the A45 Gloucester Road Junction)	a) Reduction of vehicle/pedestrian conflict	Slight reduction in pedestrian/vehicle conflict due to a reduction in HGV flows on the A4.	Pedestrian /vehicle conflict increases as the traffic flows increase along the A4.	
	b) Noise decrease	5-10dB(A)L10 reduction	No change	
Congregational Church, Batheaston Community Centre	Noise decrease	5-10dB(A)L10 reduction with safer access due to a 75% reduction in traffic on A4.	Noise, pollution and difficulties of access increase with traffic increase of 25% on the A4.	
Oriel Hall Upper Swainswick Community Centre (70 users per week)	Loss of amenity	To be demolished	Noise, pollution and difficulties of access increase with traffic.	Number of users supplied by the Treasurer to the Oriel Hall Committee.



Group 3: Users of Facilities (contd)

SUB GROUP	EFFECT	PREFERRED ROUTE	DC-MINIMUM	COMMENTS
Public Footpaths	Severance	Several footpaths are severed by the new routes and although new crossings are proposed, most require additional travel length.	No change	
River Avon (200 visitors per week)	Reduction in amenity	The peaceful river setting is substantially disturbed with 2 major bridges crossing the river.	No change	Landscape measures will reduce the impact. Number of visitors is based upon a 1 hour Sunday count.
Little Solsbury Hill (20 visitors per week)	Noise Increase	Less than 3dB(A)L10 increase	No change	The summit of Little Solsbury Hill is the site of an ancient hill fort and is an ancient monument owned by The National Trust. The fort is situated 500 m east of the A46 route. Number of visitors supplied by the National Trust.
	visual intrusion	Slight visual intrusion	No change	As new planting matures visual intrusion will be reduced.

Group 3: Users of Facilities (contd)

SUB GROUP	EFFECT	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Alice Park (3000 visitors per week)	Noise Increase	Less than 3dB(A)L10 increase.	No change	Number of visitors to the park is based upon a 1 hour Sunday count.
Severance	a) Relief to existing severance	Substantial improvement to access from the A46 due to a 85% reduction in traffic.	No relief	Alice Park is an important public recreational area
b) Imposition of new severance	Slight deterioration in access from the A4 due to a 35% increase in in traffic.	Access generally will deteriorate as traffic flows increase.		
Kennet and Avon Canal (530 towing path and 600 boat users per week)	Noise Increase	5-10dB(A)L10 increase	No change	
Visual intrusion	High visual intrusion for canal and towpath users due to the A36 canal under- bridge and embankments.	No change	Landscape planting will reduce the visual impact. Number of towing paths users supplied by British Water- ways Board. Boat usage figures are based upon a 1 hour Sunday count.	

Group 3: Users of Facilities (contd)

SUB GROUP	EFFECT	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
King Edward School Playing Field	Noise increase	5-10dB(A) L10 Increase	No change	
	Visual intrusion	Slight	No change	
Quaker burial ground	Loss of amenity	Complete burial ground for which exchange land will be provided.	No change	

Group 4: Policies for Conserving and enhancing the area

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Bath Conservation Area	DOE Bath CC	Improvement of the environmental quality of the conservation area, including a reduction in pedestrian/vehicle conflict, noise and pollution.	The environment deteriorates as traffic flows increase by 5%. However, there will be a reduction in HGV flows.	The environment deteriorates as traffic flows increase by 11%.	Environmental impact and land take at Bailbrook has been minimised due to the introduction of a cut and cover underpass and road running at a low level between diaphragm retaining walls.
Batheaston Conservation Area	DOE Wansdyke DC	Improvement and preservation of the conservation area.	There will be a substantial improvement in the environment along Batheaston High St. due to a substantial reduction of 75% in traffic.	The environment deteriorates as traffic flows increase by 25%.	Batheaston Conservation Area was designated in 1979.
Bathford Conservation Area	DOE Wansdyke DC	Preservation of environmental quality of the conservation area		No change	

Group 4: Policies for Conserving and enhancing the area (contd)

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Bathampton Conservation Area	DOE Wansdyke DC	Preservation of environmental quality of the conservation area.	Moderate noise and visual intrusion caused by the new routes.  There will be a reduction in traffic flow of 50% along Mill Lane and Tynning Road. This will improve safety by reducing vehicle/pedestrian conflict and also improve the environment.	There will be an increase in traffic along Mill Lane and Tynning Road of 90%. This will reduce safety and the environment will deteriorate.	Bathampton Conservation Area was designated in 1984.
Upper Swainswick Conservation Area	DOE Wansdyke DC	Preservation of environmental qualities of conservation area.	There is substantial traffic relief of 90% on the existing A46 Gloucester Rd at the eastern edge of the conservation area.	The environment deteriorates as traffic flows increase by 47%.	Upper Swainswick Conservation Area was designated in 1983.
Listed Buildings	DOE Avon CC Wansdyke DC Bath CC	Protection of listed buildings to ensure quality/character of urban fabric. a) Demolished	0	0	The natural increase in traffic will bring increased levels of pollution and vibration to buildings adjacent to existing roads. (The Do-Minimum figures

Group 4: Policies for Conserving and enhancing the area (contd)

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Listed Buildings (Contd)	b) Number of buildings near the route.	6 Grade 2 within 50m 17 Grade 2 within 100m 60 Grade 2 within 200m	25 Grade 2 within 50m 31 Grade 2 within 100m 32 Grade 2 within 200m	represent the number of listed buildings adjacent to existing roads within the bands shown which will benefit from the reduction in traffic).	
Little Solsbury Hill Ancient Monument. County Conservation Site (Area of Archaeolo- gical significance)	DOE Avon CC Wansdyke DC	Preservation of conditions.	The monument is within 500m of the route and would suffer a slight increase in noise and visual intrusion.	No change	
Proposed extension to the Cotswold AONB	Countryside Commission Avon CC	Preservation of the natural beauty of the countryside.	Most of the scheme lies within the proposed extension to the Cotswold AONB with the consequent impact of visual intrusion, noise, and air pollution.	No change	
Protection of Archaeology	Avon CC Wansdyke DC Bath CC	Investigation of sites undertaken before development takes place.	Where the route crosses sites recorded as being of Archaeological signif- icance surveys have been carried out.		

Group 4: Policies for Conserving and enhancing the area (contd)

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Statutory Green Belt	DOE Avon DC Wansdyke DC	Preservation of Green Belt.	Most of the scheme lies within the statutory Green Belt with consequent impact of visual intrusion, noise and air pollution.	No change	Development is not encouraged in the Avon Structure Plan.
Kennet & Avon Canal	British Waterways Board	Presevation of the quality of waterways.	The scheme is bridged over the Kennet and Avon Canal, preserving the waterway and towpath.	No change	
Trees and Woodland	Avon CC Wansdyke DC Bath CC	Preservation of woodlands, trees and hedgerows.	Loss of numerous mature trees, especially within the valley floor.	No change	No trees covered by TPO affected. Substantial replanting to be undertaken.
Definitive Footpaths	Avon CC	Preservation of definitive footpaths.	The route crosses several definitive footpaths and all would be provided with alternative routes although most of these would be longer.	No change	

Group 4: Policies for Conserving and enhancing the area (contd)

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Landscape Improvement Area	Wansdyke DC	Enhancement of the local environment.	Landscaping will reduce the adverse effect of the visual intrusion made by this route.	Wansdyke DC plan to carry out landscape improvements in due course.	The new road scheme will incorporate landscaping and planting.
Environmental Improvement Area - London Road	Bath CC	Enhancement of local environment.	Reduction in HGV's along London Road will improve the immediate environment.	Bath CC plan to carry out landscape improvements in due course.	The new road scheme will incorporate landscaping and planting.
River Avon & Kennet & Avon Canal	Avon CC Bath CC Wansdyke DC	Protection of waterside environment by enhancement and improvement of wildlife/public access.	The route bridges the River Avon twice and the Kennet & Avon Canal once. Public access will be maintained. The crossings have been kept as low as possible to reduce visual impact.	No change	Substantial landshaping and planting will reduce impact further.



Group 5: Transport, Development and Economic Policies

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
To assist economic growth	DTP	Reduction of transport costs.	This route will reduce delays and assist economic growth by lower transport costs.	Increased delays as traffic increases with growth. Hence costs will increase and reduce economic growth.	
To maintain a balanced citywide transportation system	Avon CC Bath DC	Removal of through traffic.	Traffic flows on existing roads within the central area of the City will generally change only slightly. There will be a moderate reduction at Cleveland Bridge due to the rerouting of north south through traffic.	Increased traffic delays particularly at Cleveland Place and Lambridge.	Avon CC as the Highway Authority is principally responsible for traffic management in Bath.

Group 5: Transport, Development and Economic Policies (contd)

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
To remove unnecessary through traffic from Bath particularly 'HGV's	DTP Bath CC Wansdyke DC Avon CC	Convenience of local traffic.	The north-south through traffic, in particular HGVs, are removed from bottlenecks such as Cleveland Bridge.	Increased traffic congestion and delays.	
To remove traffic from residential and environmentally sensitive areas	DTP Bath CC Wansdyke DC Avon CC	Effect on local residents.	Residential areas of Swainswick and Batheaston will benefit significantly from a substantial reduction in traffic flow on existing A46 and A4 respectively.	Traffic will increase with natural growth causing greater congestion and an increase in noise pollution in these areas.	
Safeguard the "Park and Ride" scheme for Bath especially the Lambridge Site	Avon CC Bath CC	Effect on Users of the service.	The new route passes well to the east of the site and would not conflict with "Park and Ride" scheme.	No effect	Bath City Council have considered the site for parking but will review the situation.

Group 5: Transport, Development and Economic Policies (contd)

POLICIES	AUTHORITY	INTEREST	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
To remove Batheaston High Street (A4) and the Gloucester Road (A46) from the national primary road network:	Wansdyke DC	Improvement of the environment.	Considerable environmental benefits in the Batheaston Conservation Area as the traffic reduces and the present A4 and A46 lose their primary road classification.	Further deterioration as the existing trunk roads carry increasing traffic.	
To allocate land for housing development in the Ballbrook area	Bath CC	Area housing requirements.	The route cuts through the proposed housing site, limiting the scope for new housing.	Proposed housing schemes will proceed.	Landtake has been kept to a minimum through use of diaphragm retaining walls rather than natural cutting slopes.

Group 6: Financial Effects

POLICIES	INTERESTS	UNITS	PREFERRED ROUTE	DO-MINIMUM	COMMENTS
Department of transport	Construction Costs	£M (PVC)	33.746*	0	Costs are discounted from year of expected expenditure to 1988 prices at 8%. PVC = Present value of costs
	Land Costs	£M (PVC)	8.371**	0	PVB = Present value of benefits
	Compensation Costs	£M (PVC)	**	0	NPV = Net present value
	Maintenance Cost	£M (PVC)	0.234	0	Excess maintenance cost due to additional length of road.
	Total Costs	£M (PVC)	42.352	0	
Total quantified monetary benefit		£M (PVB)	HIGH 68.150	LOW 45.933	Includes savings in time, vehicle operating costs and accidents. Taken from Group 1.
	Net present value compared to Minimum	£M (NPV)	25.798	3.581	

This figure includes preparation and supervision costs.  
\* Compensation costs are included in the land costs.

REVISED (21ST MAY 1990)

ANNEX A7

GEOLOGICAL SURVEY REPORT

A4/A36/A46 BATHEASTON-SWAINSWICK BYPASS

GEOLOGICAL SURVEY AT HAMPTON ROCK CUTTING SSSI

by

Christopher Owen Hunt B. A., M. Sc., Ph. D., F. G. S.

Report commissioned by the Department of the Environment and Transport,  
Bristol.

22. 3. 1990

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5.	Synthesis. Conclusions.
6.	References.
8.	Tables.
12.	Figures.



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28th March 1990

Mr H.S. Jones,  
Room 512A,  
Department of the Environment & Transport,  
Tollgate House,  
Houlton Street,  
BRISTOL BS2 9DJ

DIRECTOR  
BRISTOL  
- 2 APR 1990

Dear Sir,

A4/A46 BATHEASTON-SWAJNSWICK BYPASS  
HAMPTON ROCK CUTTING SSSI

The Hampton Rocks Cutting SSSI is of considerable national importance as a scientific site, as the best example (out of two remaining in the UK) of a Quaternary calcrete. It is also of regional importance as one element in a series of SSSIs set up to safeguard various components of the Quaternary stratigraphy of the Avon valley, a critical area for our understanding of the glacial history of the British Isles.

In view of the importance of the site, its total loss would be extremely deplorable. Since, however, the proposed development of the bypass would affect approximately 10-15% of the site, road building can be regarded with some measure of equanimity, so long as the rest of the site is adequately safeguarded. The laying of an earth bank across the site for road construction effectively sterilises the deposits covered. These deposits can therefore only be regarded as lost.

Yours sincerely,

DR C.O. HUNT

cc Dr W.A. Wimbledon, GCR, NCC



## A4/A36/A46 BATHEASTON-SWAINSWICK BYPASS

### GEOLOGICAL SURVEY AT HAMPTON ROCK CUTTING SSSI

by

Christopher Owen Hunt B. A., M. Sc.; Ph. D., F. G. S.

#### INTRODUCTION

The valley of the Bath Avon has an extremely important series of Quaternary (0-2 million years) sites, known since the last century (Dawkins, 1865; Moore 1870) but not investigated in any detail since. A regional network of Sites of Special Scientific Importance (SSSIs) was set up under the Nature Conservancy Council's Geological Conservation Review to protect a representative sample of sites in the valley. Most of these sites are gravels of the various river terraces of the Avon, many of which are recorded in the literature as richly fossiliferous. The area is also important because in it are preserved remains of an extensive Middle Quaternary (more than 400000-600000 years ago) glaciation. The margins of this glaciation, and even its existence, are still a subject for scientific controversy (Kellaway, 1971; Kidson & Bowen, 1976; Andrews, Gilbertson & Hawkins, 1984). The Hampton Rocks SSSI was designated as part this regional network of sites.

The Hampton Rocks SSSI was selected as an area of river gravels from the lowest (and therefore probably youngest) river terrace of the Avon. In the Regional Memoir published in the last Century the deposits of the site were described as consisting of plane-bedded, unfossiliferous gravels. It may be regarded as typical, because similar descriptions have been given for other deposits of the lowest terrace (Davies & Fry 1929).

In 1989, the Department of the Environment and Transport finalised plans for the construction of the A4/A36/A46 Batheaston-Swainswick Bypass. The proposed route passed through the Hampton Rocks SSSI. The author was asked to prepare this report, describing the geology of the SSSI. Work was carried out on the 6th to 10th of February 1990. The cooperation of the landowners, Mr & Mrs Marshall of Station House, Bathampton, and Mr Candy of Manor Farm, Bathampton, is gratefully acknowledged.

## METHODS

The proposed route was marked by Mr W. Mackinnon and Mr R. Young from Sir Alexander Gibb and Partners and two trial excavations were made to the base of the Quaternary deposits by JCB. One of the excavations was placed near the highest point in the proposed route, near Tynning Lane, the other was placed at the lowest point in the proposed route, on the edge of the old railway cutting (Fig. 1). Cleaned faces of 2 to 3 m width and approximately 2 m high were produced, from which measured sections, hand and visual sediment and Munsell colour determinations (Tables 1 and 2) and clast orientation measurements (Fig. 3) were made and from which representative bulk samples were taken. The units distinguished at each excavation are of significance only in that excavation. No correlation is intended.

The bulk samples were dried and subjected to standard analytical procedures. The gravel samples were weighed and passed through a set of sieves calibrated in  $\phi$  units. (The  $\phi$  scale is an inverse scale, with  $0\phi$  being 1 mm,  $4\phi$  being 0.063 mm and  $-4\phi$  being 16 mm.) Each sieve fraction was weighed and the results are presented as cumulative percentage frequencies in Fig. 2.

Sample 2/1 was subjected to clast lithological analysis on the  $2\phi$  and  $3\phi$  fractions. The lithology of each pebble in these fractions was determined and is shown in Table 3.

Sample 1/2, a clayey sand, was subjected to palynological and macrofossil analysis. The palynological analysis contained only pre-Quaternary palynomorphs, mostly Jurassic dinoflagellate cysts and spores, so is not considered further. The macrofossil analysis yielded some indeterminate plant fragments and a small number of mollusc fragments. These are listed in Table 4. Bone fragments from the samples were picked and determined and are shown in Table 5.

Sample 2/2, a calcrete, was sent for thin sectioning. At the time of writing, the slides are not yet available for analysis.

## STRATIGRAPHY

The Bathampton gravels are a terrace deposit of the River Avon. They lie at around 30-35 m OD and are thus part of Davies & Fry's (1929) 'Lower Terrace'. The chronological significance of this unit is unclear.

The detailed stratigraphy of the trial excavations is set out in Tables 1 and 2. In brief, the deposit consists mostly of trough cross stratified sandy gravels, overlying thin planar-bedded sandy clays in excavation 1 and overlain in both excavations by homogeneous sandy silts, although in excavation 1 these are disturbed by ploughing. The gravels are relatively well-sorted and show a strong imbrication. Their upper parts are somewhat disturbed by cryoturbation and contain irregular masses of calcrete.

The stratigraphy can be interpreted in the following way. The trough cross bedded gravels and basal sandy clays are the product of deposition by a braided (multichannel) stream. Such streams are typical of environments with little vegetation cover and a seasonal precipitation pattern, such as deserts and arctic-alpine areas (Briggs & Gilbertson, 1980). This environmental diagnosis is supported by the mollusc data (below). The top part of the deposit was disrupted by frost action, which led to the stones being turned into an upright position.

Subsequently, the climate became very warm and dry and the masses of calcrete formed. Calcrete does not form at the present day in the British Isles, but is forming in the Mediterranean basin. The last time it was sufficiently warm for calcrete formation in this country was during the Ipswichian Interglacial Period, about 120000 years ago.

Following this episode, the climate deteriorated and wind-blown 'coversands' were laid down. In more recent times, the climate has become warm again and 10000 years of temperate soil development and many centuries of agriculture have led to the modern soil profiles which cap the site.

## CLAST ORIENTATION

The clast orientation data is heavily dominated by eastward dips. (Fig. 1). This is consistent with deposition by a westward-flowing river.

## CLAST LITHOLOGICAL ANALYSIS

The clast lithological analysis (Table 3) contains two main groups of materials. The most numerically important includes the oolitic and micritic limestones, Jurassic fossils, phosphate, flint, beef, greensand and greensand chert. All these lithologies have parent outcrops in the solid geology upstream of Bathampton. The other lithologies either have outcrops downstream in the Bristol District (the yellow and red sandstones of the Carboniferous and the Devonian or Permo-Triassic, the Carboniferous limestone, the Bunter Quartzite, possibly the igneous rocks) or further afield. (the metamorphosed siltstones and mudrock are probably from the Midlands or Wales) or are untraceable, like the limonite.

As noted above, the clast orientation data suggest deposition by a river flowing westward, like the present Avon. The clast lithological data suggest the input of erratic material into the catchment, probably by the glaciation which laid down the reputed glacial deposits at Bath University BSEI and on the Failand Ridge (Gilbertson, 1977; Hawkins & Kellaway, 1971).

## MOLLUSC ANALYSIS

The small mollusc assemblage (Table 4) is typical of cold-stage mollusc assemblages in the British Isles (Hervey in Shotton, 1977). The molluscs present have well-known environmental tolerances at the present day and the environment of the time can therefore be deduced. *Puzosia muscorum* prefers dry, exposed habitats, while *Succinea ciliata* prefers wet muddy places and *Trichia hispida* is a generalist with a particular liking for wet grassy places. The genus *Fisidium* are all aquatic. A dry landscape, with little vegetation except near watercourses is suggested. The climate was probably arid and rather cold.

## MAMMAL REMAINS

The terraces of the Bath Avon are famous for their mammal remains, so the few fragmentary finds from this project (Table 5) are disappointing, though expected in the light of previous work on the 'Low Terrace' (Davies & Fry, 1929). There is a high probability that these durable fragments are

recycled and therefore of little geological significance. Their presence, however, raises the possibility that other, larger fragments of greater significance may be preserved elsewhere in the deposit.

#### SYNTHESIS

The gravels at Hampton Rocks were laid down during a cold (glacial) period, sometime before the 120000 years ago, by a westward-flowing braided stream. The climate was arid and cold. The river recycled many pebbles brought into the area by a glacial advance at some time before 400000-600000 years ago, together, probably, with a number of mammal bones. The climate was cold enough for frost to partially disrupt the fabric of the gravels. The climate became warmer during the Ipswichian Interglacial, around 120000 years ago, and calcretes formed in the gravels. The river Avon cut below the level of the gravel deposit at Hampton Rocks at this time, and left it isolated as a river-terrace. When the climate then became colder, during the Devensian (last) glacial period, sand and silt were blown onto the site. During the last 10000 years of the Holocene the modern soil profile formed.

#### CONCLUSION

The Hampton Rocks SSSI was selected to represent the 'Low Terrace' of the Avon in the network of geological SSSIs in Somerset and Avon. The present study shows that it is important for a number of reasons as well as its stratigraphical position, which was the original reason for designation. On the site are preserved good regional examples of cold-stage fluvial and aeolian sedimentation and a cold-stage mollusc assemblage. There are fragmentary mammal remains. More significant are the calcretes, which are known to the author from only two other sites (Langport Cutting and Stanton Harcourt) in the British Isles. The calcretes at Hampton Rocks are the most fully developed and the best preserved - indeed most of the material at Stanton Harcourt has been lost by quarrying. The total loss of the Hampton Rocks SSSI would therefore be extremely regrettable, though the proposed scheme does not involve this.

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TABLE 1: STRATIGRAPHY OF TEST EXCAVATION 1

TOP OF SECTION: 33.049 m OD		
UNIT 1	0-0.20 m	Dark brown (10YR2/2) silty sandy clay with occasional pebbles and extremely rare 'blue and white' (19th-20th Century) potsherds and modern sheep bones. Old plough soil.
UNIT 2	0.20-0.35 m	Strong brown (7.5 YR5/6) slightly clayey fine sandy silt with occasional stones, some vertical; stones become more common downwards, passes into next unit. 'Cover sand' of dominantly aeolian origin, similar to those reported in the Bristol district (Gilbertson, 1977), subsequently disturbed by frost.
UNIT 3	0.35-1.70 m	Pale brown (7.5 YR4/4), mottled strong brown (7.5 YR 5/5) trough cross bedded sandy gravel and gravelly sand. The trough cross beds are 0.05-0.15 m deep and 1.0-3.0 m across. Maximum clast size 0.03 m at top, coarsening to 0.15 at base. The bedding is disturbed at the top, probably by cryoturbation and irregular masses up to 0.6 m across of calcrete (pedogenic calcium carbonate induration) have formed, respecting the disturbed bedding. Sharp junction at base. Gravels of a braided stream, subsequently disturbed by frost and then partially indurated as a result of soil formation in hot, dry conditions. (SAMPLE 1/1)
UNIT 4	1.70-2.05 m	Pale brown (10YR5/6) trough cross bedded sandy gravels, coarsening upwards. Gradual transition to unit below. Gravels of a braided stream.
UNIT 5	2.05-2.20 m	Pale brown (10YR5/6) plane bedded sandy silty clays with occasional pebbles and extremely rare mollusc remains. Transition to underlying unit over 0.05 m. Pool or pond deposits. (SAMPLE 1/2)
UNIT 6	2.20-2.30 m	Brown (10YR6/6) mottled black (N7/0) sandy fine gravel, fining upwards, strongly manganese indurated. Sharp junction with bedrock. River gravels, indurated by minerals from the groundwater.
UNIT 7	2.30 m and deeper.	Fullers Earth (Bedrock).
BASE OF SECTION		



TABLE 2: STRATIGRAPHY OF TEST EXCAVATION 2

TOP OF SECTION: 31.726 m OD		
UNIT 1	0-0.20 m	Dark brown (10YR2/2) highly organic sandy clayey silt. Soil profile.
UNIT 2	0.20-0.80 m	Strong brown (7.5 YR5/6) slightly clayey fine sandy silt with occasional stones, some vertical. Sharp but extremely irregular junction with next unit. 'Cover sand' of dominantly aeolian origin, similar to those reported in the Bristol district (Gilbertson, 1977), subsequently disturbed by frost.
UNIT 3	0.80-1.60 m	Pale brown (7.5 YR4/4), sandy gravel. There is no bedding and many stones are vertical as the result of cryoturbation. Irregular masses up to 0.6 m across of calcrete (SAMPLE 2/2) have formed in this layer. Sharp junction at base. River gravels, subsequently disturbed by frost and then partially indurated as a result of soil formation in hot, dry conditions.
UNIT 4	1.80-1.90 m	Pale brown (10YR5/6) sand lense. Sharp junction with unit below. A braided stream deposit.
UNIT 5	1.90-2.30 m	Pale brown (10YR5/6) trough cross bedded sandy gravels, some openwork lenses, generally fining upwards. Trough crossbeds 0.05-0.10 m deep, 2- more than 3 m wide. Maximum clast size 0.25 m. Sharp junction with bedrock. Gravels of a braided stream.
UNIT 6	2.30 m and deeper.	Fullers Earth (Bedrock).
BASE OF SECTION.		

TABLE 3: CLAST LITHOLOGICAL ANALYSIS - BATHAMPTON 2/1

LITHOLOGY	2φ		3φ	
	no.	%	no.	%
PALE BROWN OOLITIC LIMESTONE	1221	44.61	346	71.49
PALE BROWN MICRITIC LIMESTONE	817	29.85	64	13.22
YELLOW AND BROWN SANDSTONE	297	10.85	27	5.58
JURASSIC FOSSILS	174	6.36	6	1.24
PHOSPHATE NODULES (LYDITE)	102	3.73	6	1.24
WHITE AND PALE GREY QUARTZITE	46	1.68	12	2.48
FLINT	38	1.39	9	1.86
CARBONIFEROUS LIMESTONE	9	0.33	6	1.24
BLACK METASEDIMENTARY	9	0.33		
RED SANDSTONE	8	0.29	3	0.62
GREENSAND CHERT	4	0.15	1	0.21
GREY METASEDIMENTARY	4	0.15	3	0.62
IVORY AND BONE	3	0.11		
BASIC IGNEOUS	2	0.07		
'BEEP'	1	0.04		
RED JASPER	1	0.04		
YELLOW MUDROCK	1	0.04		
GLAUCONITIC SANDSTONE (GREENSAND)	1	0.04		
LIMONITE			1	0.21
TOTAL	2737		484	

TABLE 4: MOLLUSC ANALYSIS - BATHAMPTON 1/2

SPECIES	NUMBER
<i>Pupilla muscorum</i>	2
<i>Trichia</i> cf. <i>hispidia</i>	1
<i>Succinea</i> cf. <i>oblonga</i>	1
<i>Fisidium</i> sp.	2

TABLE 5: VERTEBRATE REMAINS

SPECIES	PART	NUMBER	SAMPLE
ELEPHANT OR MAMMOTH	TUSK IVORY	3 FRAGMENTS	2/1
UNIDENTIFIED MAMMAL (SHEEP SIZE)	RIB	1 FRAGMENT	1/1

FIGURE 1: LOCATION OF HAMPTON ROCKS CUTTING, THE PROPOSED RAIL (APPROXIMATE) AND THE TRIAL EXCAVATIONS.

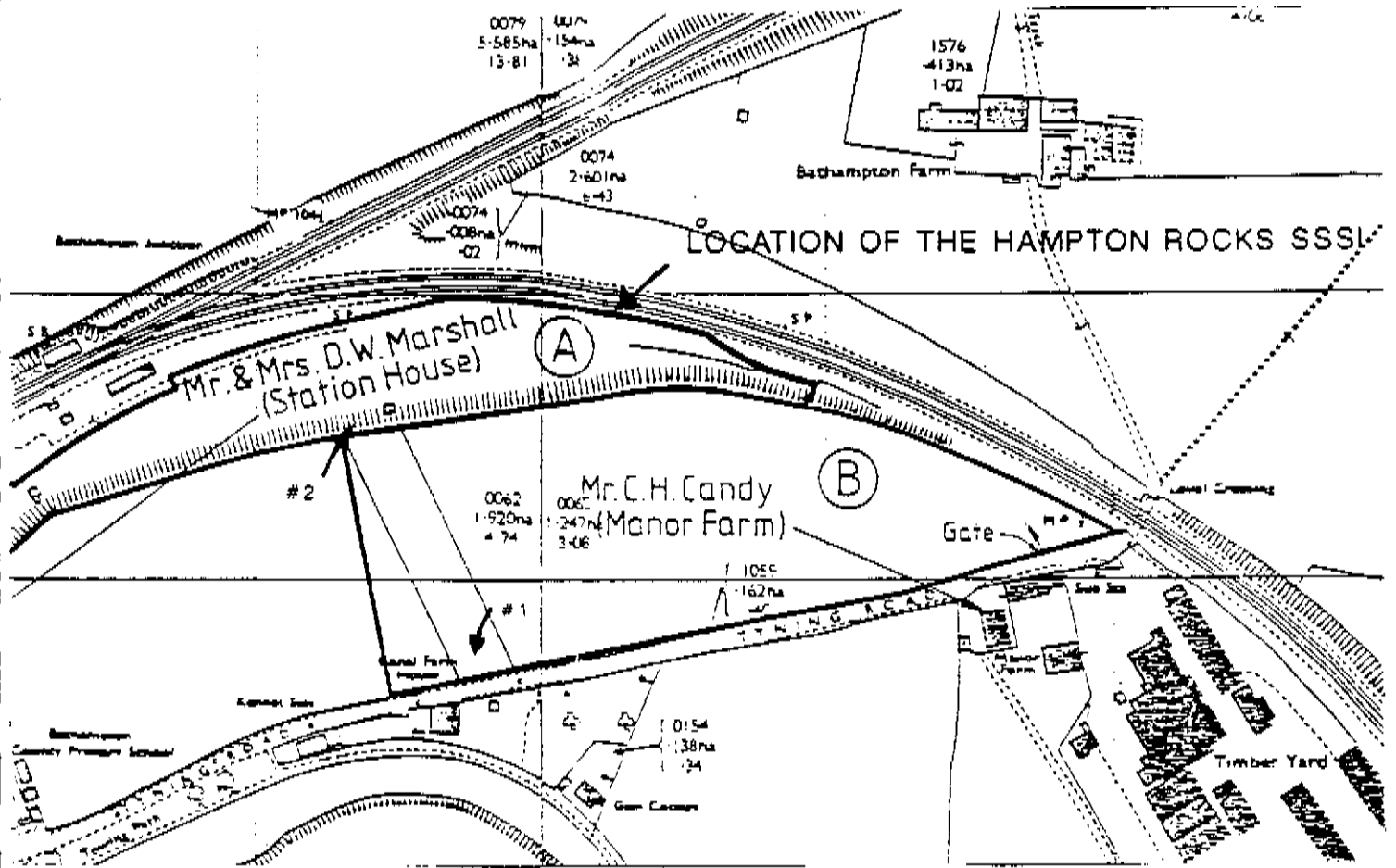


FIGURE 3: GLAST ORIENTATION AND INCLINATION DATA, SECTION 1 (UPPER) AND SECTION 2 (LOWER), WITH ORIENTATION PLOTTED RADially AND INCLINATION PLOTTED CONCENTRICALLY. CIRCLES REPRESENT 'A' AXIS ORIENTATIONS, SQUARES REPRESENT 'B' AXIS ORIENTATIONS.

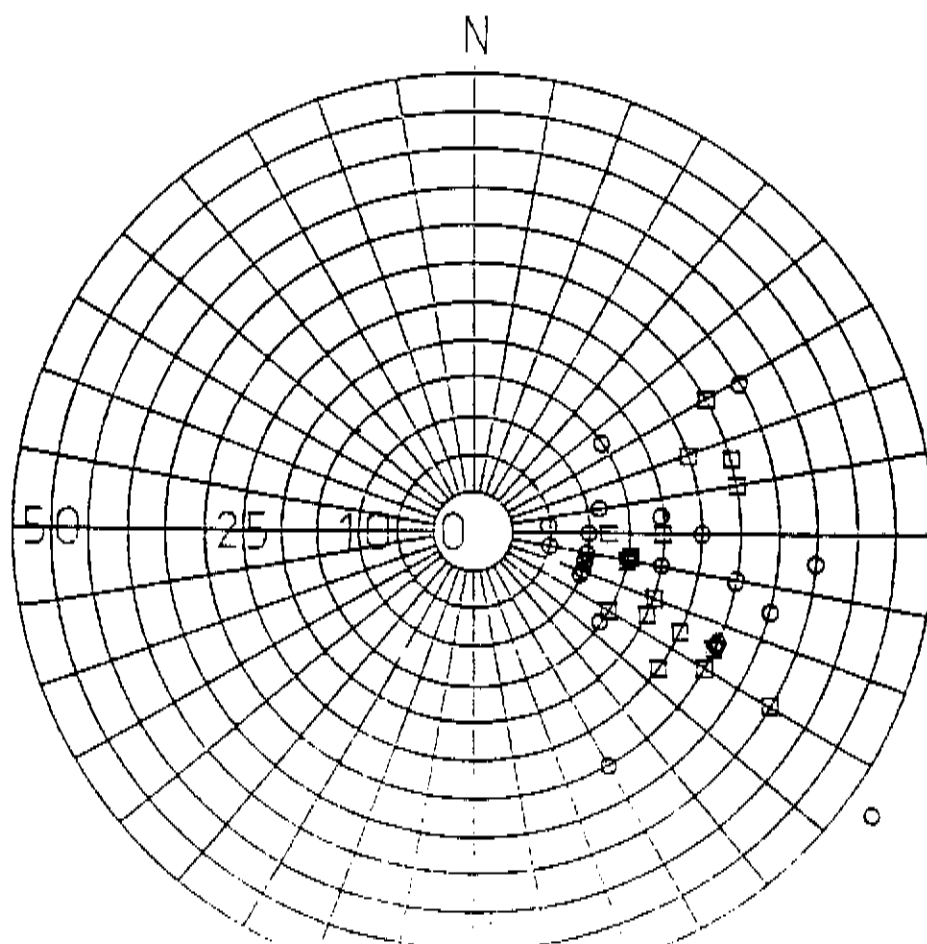
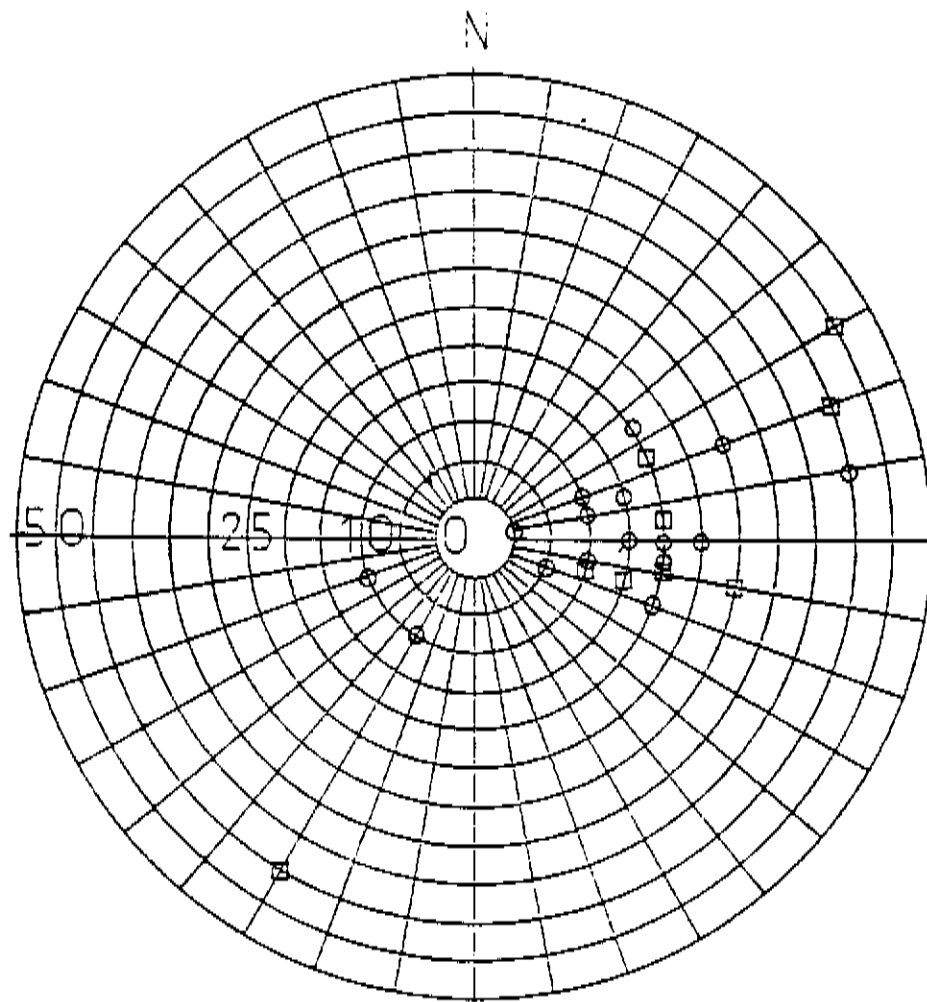
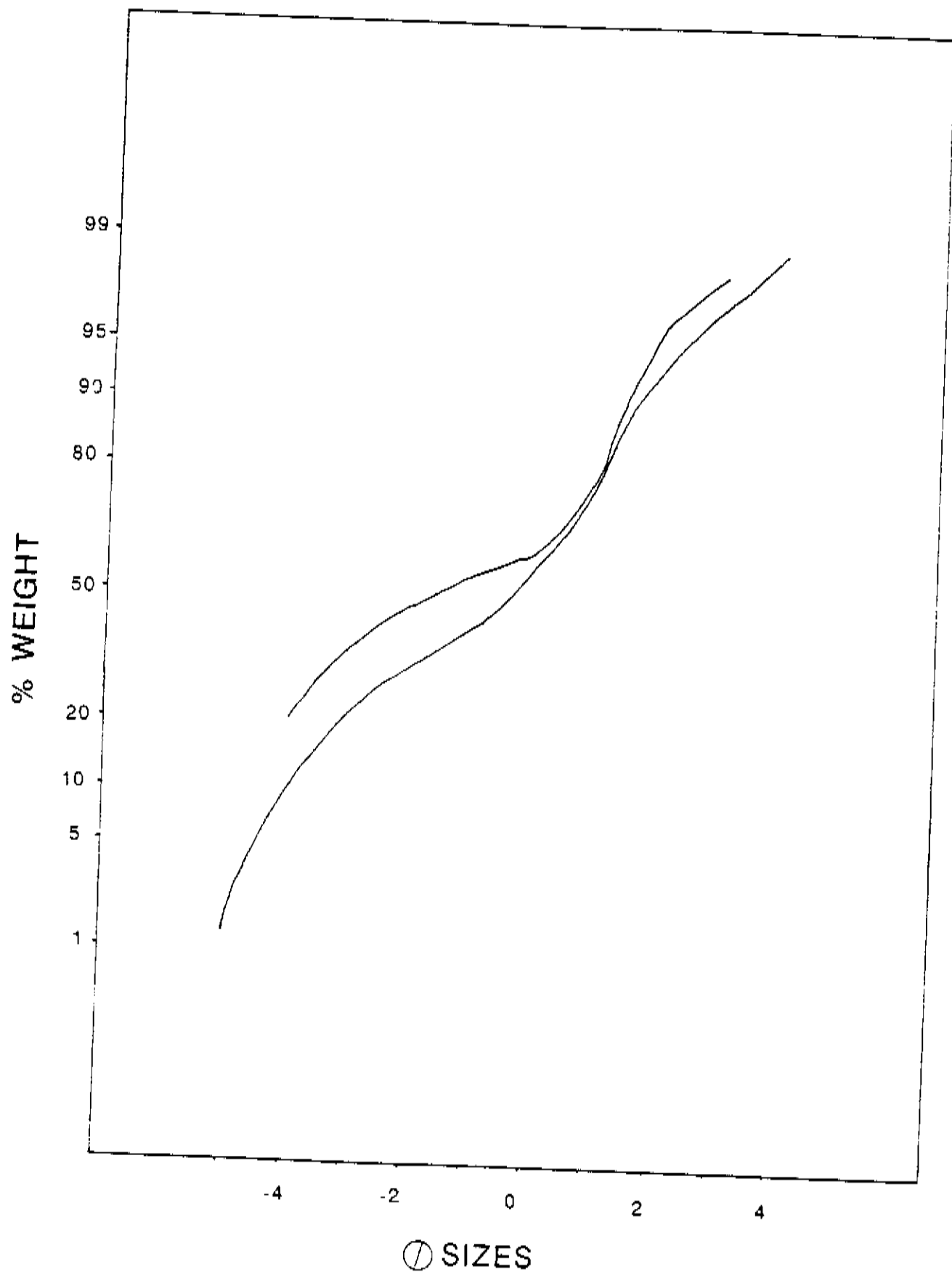


FIGURE 1. GRAIN SIZE ANALYSIS OF SAMPLES 171 AND 2711. PLOTTED BY LOGICAL PERCENTAGE FREQUENCIES.



ANNEX A8

ARCHAEOLOGICAL SURVEY REPORT

Date: 4 April 1990  
Your Ref:  
Our Ref: 657/3f/JPR  
Extension: 530  
Direct Line: Bristol 226528



County of Avon

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Dear Mr Jones

A46 IMPROVEMENT: BATHEASTON BYPASS: SITE SPECIFIC ARCHAEOLOGICAL EVALUATION

Further to our telephone conversation earlier today I am writing concerning the site specific evaluation which was undertaken in February and March 1990 of the the route of the proposed A46 Batheaston bypass.

As you will know the evaluation consisted of field survey and limited trial excavation. The Project Supervisor, Jonathan Erskine, will be producing a report on the evaluation project when his analysis of the data recovered is complete. This will set out in full the archaeological conclusions to be drawn from the work together with our recommendations for the future treatment of the archaeology of the bypass route. However I am aware of your need for an interim statement of the results of the evaluation and its implications for the road scheme, and I am therefore writing to provide you with this.

With the exceptions noted below none of the sites examined will require further archaeological work or should be regarded as necessitating either alteration of the proposed route or the incorporation of special features into the design of the road.

The most significant exception is the land on either side of Tynning Road, OS parcel 0062 (ST78086662) and 0948 (ST78096650), which is farmed by Mr C H Candy and to which your consultants Alexander Gibb and Partners were unable to secure access for the evaluation to be carried out. This site is of interest because it may be crossed by a Roman road linking the known Romano-British



settlement in the Bathampton area with the main Fosseway near Batheaston and also because it is likely, as is suggested by the field name "The Chessalls", to be itself the site of Romano-British settlement. Our recommendation for this site will be that it should be archaeologically evaluated as soon as access to it can be guaranteed by the Department of Transport (which will require a separate project to be organised) and that the implications of the evaluation, whether involving preservation in situ or full archaeological recording, should be incorporated in the final design of the road at that point and in its programme of construction.

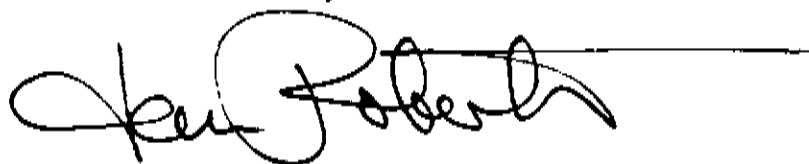
It was of course not possible to examine the Fosseway itself under the existing A4 London Road. Recording of this, if significant archaeological evidence has survived post Roman use of the route, will need to be undertaken between closure of the A4 and the commencement of construction at this location.

Our recommendations, apart from these, will not include any stage iii work (full archaeological recording) to be undertaken in advance of the construction of this road. However, as in the case of any civil engineering project of this size, we will recommend that there should be archaeological observation of all soil movement associated with the construction of the road and provision in the construction programme (and the contract) for archaeological features which are exposed in the course of construction to be recorded (stage iv); and that provision should be made for the appropriate analysis and reporting of the data from this and from work undertaken at Tynning Road (stage v).

In the case of a "normal" development these operations would be funded from the budget of the development but I acknowledge that at present the Department of Transport considers that it would be able to support only stages i and ii of an archaeological programme and the analyses and reporting arising from these.

I hope this brief progress report will be suitable for your present purposes. Please let me know if there is any further information which you will need in advance of the production of the full report on the stage ii evaluations.

Yours sincerely

A handwritten signature in black ink, appearing to read "J P Roberts", written over a horizontal line.

J P Roberts  
Archaeological Officer