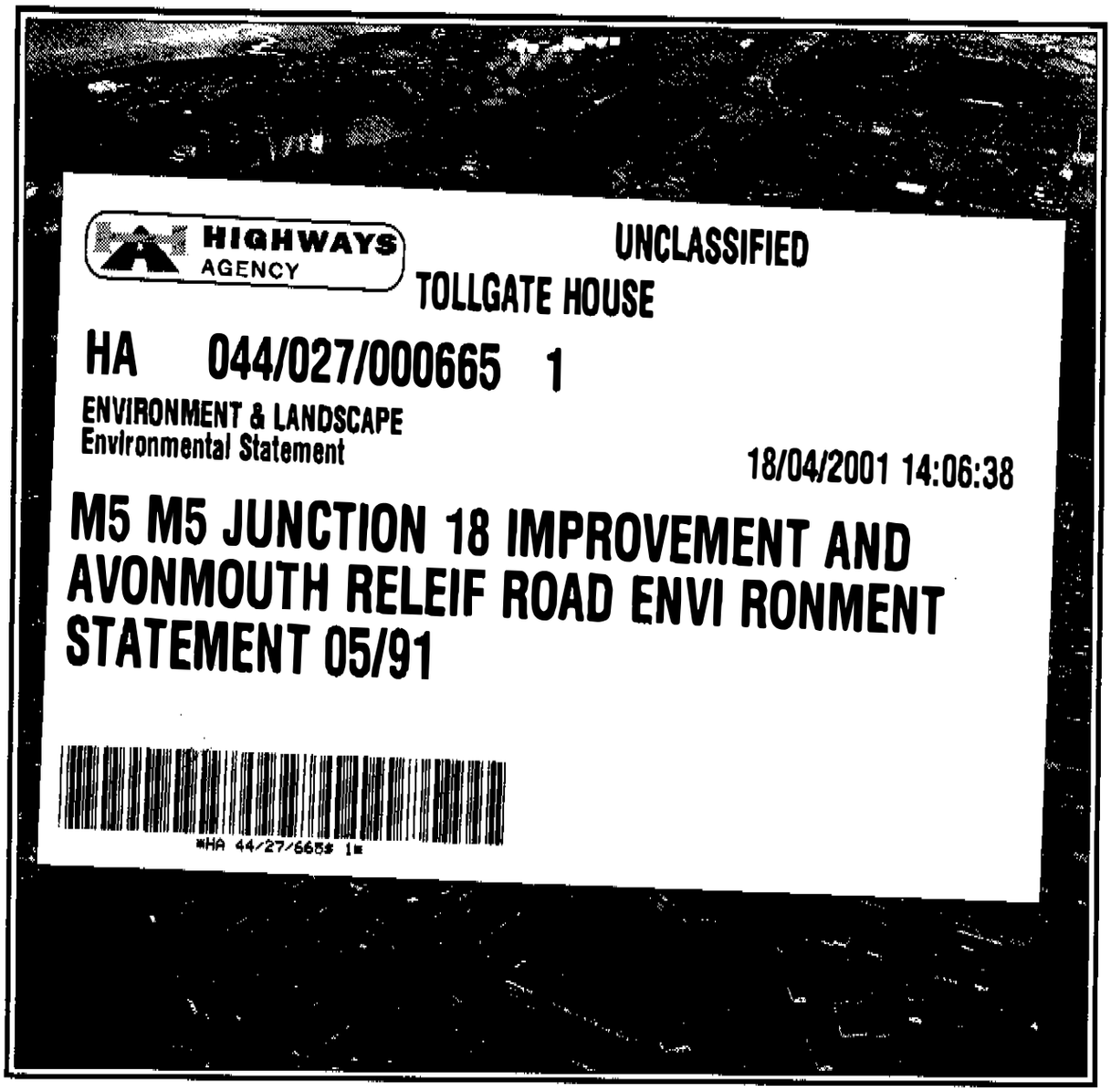
THE DEPARTMENT OF TRANSPORT

M5 Junction 18 Improvement and Avonmouth Relief Road



Environmental Statement

COPY FOR REFERENCE

May 1991

DEPARTMENT OF TRANSPORT
SOUTH WEST REGIONAL OFFICE

ENVIRONMENTAL STATEMENT

M5 Junction 18 Improvement and

Avonmouth Relief Road

WS ATKINS

MAUNSELL

May 1991

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CHAPTER 1 - INTRODUCTION

1.1 This environmental statement has been prepared in accordance with subsection 105 A(2) of the Highways Act 1980. The EEC Directive on environmental assessment, 85/337/EEC is implemented by the Highways (Assessment of Environmental Effects) Regulations 1988, and part V A of the Highways Act 1980.

1.2 The format is based upon the Department of Transport standard HD18/88. This standard requires that the Environmental Statement will include descriptions of the existing site, the proposed road scheme and the measures needed to mitigate any adverse environmental effects. A summary of these environmental effects will be presented in the appraisal framework.

1.3 Subject to satisfactory progress through the statutory procedures, construction of the Published Scheme might begin in January 1993, opening to traffic approximately 2 years later.

CHAPTER TWO - SITE DESCRIPTION

COMMUNITY

2.1 Avonmouth is a mainly industrial area bounded by the River Severn and the M5 Motorway (see Figure One). The residential area known locally as Avonmouth village, is close to Junction 18 (see Figure Two). Much of the traffic leaving the motorway passes through the centre of the village. As a result, the village is badly affected by noise, dust and vibration.

2.2 Housing is concentrated to the south of the trading estate adjacent to Avonmouth Road and Portway. There is a mixture of brick terraces on the southwest of Avonmouth Road and concrete panel semi-detached properties next to the Portway. All are two storey with pitched roof.

2.3 Avonmouth village is served by local shops on the Avonmouth Road, but the nearest large shopping centre is at Shirehampton, located to the east of the Portway and M5. Due to the high traffic levels currently using the Portway junction and subsequently passing through the village, residents of Avonmouth experience a considerable degree of disturbance and community severance.

2.4 The Avonmouth industrial area consists of storage and distribution warehouses, interspersed with light industrial units. The area supports some 4,500 jobs around Avonmouth Way and around 2,000 related to the docks. The major industrial sites are to the north of the Avonmouth village and include the Commonwealth Smelting Plant (RTZ), ICI and the Severnside and Chittening Industrial Estates.

2.5 Before recently completed improvements to the motorway slip roads, traffic queues built up at the Portway roundabout to the point where tailbacks onto the motorway occurred, increasing the likelihood of accidents. The recent improvements to the slip roads are a short-term measure to alleviate this problem.

LANDSCAPE AND VISUAL AMENITY

2.6 Avonmouth is situated upon former flood plains and marsh lands of the Rivers Severn and Avon, and as a result the topography is generally flat. A line of wooded hills runs north-east/south-west, approximately 1.5 km to the south-east of the village. There are no areas of scheduled landscape value nearby.

2.7 The area is visually dominated by the M5 Motorway bridge over the River Avon, the tall grain storage silos of Avonmouth Docks and the industrial chimneys to the north. Two high voltage power lines run parallel to the M5 and cross over the northern end of the A4 Portway and the existing slip roads to Junction 18.

2.8 Public open space is limited to a small park in the centre of the village (Church Park), which consists of a grassed area surrounded by shrub beds and trees. There is also a children's play area with grassed mounds and young trees to the south-west of Portway roundabout.

2.9 Planting within the trading estate is limited to tree and shrub beds around car parking areas and industrial units. There is also some tree and shrub planting next to Portway and the Portway roundabout.

ECOLOGY

2.10 There is very little natural vegetation within the Avonmouth area and it is therefore of very limited ecological value.

2.11 Discussions about nature conservation were held with the Nature Conservancy Council and the Avon Wildlife Trust. Neither were aware of any sites of ecological value within the area.

2.12 A survey of the roadside verges likely to be affected by the scheme was undertaken, which indicated that they were of low ecological value. The vegetation primarily consisted of coarse grasses, common weeds and occasional shrubs. A list indicating the main species occurring is presented in Table One. The function of the verges as wildlife corridors is limited as they are narrow, exposed, and suffer from constant disturbance from the road on one side and the warehouse traffic on the other. They do not connect to any larger areas of wildlife habitat which might have increased their ecological importance.

Table One: Species List

Common Name	Latin Name
Bristly ox-tongue	Picris echoides
Scentless mayweed	Tripleuospermum maritime
Mugwort	Artemisia vulgaris
Clustered dock	Rumex conglomerate
Great willowherb	Epilobium hirsutum
Bramble	Rubus fruticosus
Elder	Sumbucus nigra
Hawthorn	Crataegus monogyna
Hedge bindweed	Calystegia sepium
Spear thistle	Cirsium vulgare
Soft rush	Juncus effusus
Ragwort	Senecio jacobea
Herb robert	Geranium robertianum
Nettle	Urtica dioica
Dock	Rumex sp
Hogweed	Heraclem sphondylium
Hedge Mustard	Sisymbrium officinale
Coarse grasses	

GROUND CONDITIONS

2.13 Soil investigations have been undertaken along the route corridor. No evidence of seriously contaminated ground has been found. The site investigation generally found fill up to 2 metres thick, overlying soft silty alluvium between 7 and 14 metres below ground level with Keuper marl below this.

2.14 The water table in the area is high. During the investigation for soil quality it was generally found between 2-4 m below the surface. Surface water drains towards the River Severn or the River Avon. There are no significant watercourses or drains directly affected by the new roads.

NOISE

2.15 A survey of traffic noise was undertaken within Avonmouth village to confirm the existing noise levels. Noise levels relating to traffic are expressed in terms of L_{10} dB(A).

2.16 The study found L_{10} levels in the St. Andrews Road area to be in the mid to upper 70's dB(A) for most of the day. Measurement at the front of properties on Avonmouth Road, to the west of the Portway roundabout, found L_{10} levels in the low 80's dB(A). Noise levels at the front of properties on Avonmouth Road, to the east of the Portway roundabout, were in the low 70's dB(A). Similarly, noise levels on Portway were typically in the low 70's dB(A).

2.17 Properties fronting Portview experienced L_{10} levels in the mid to upper 60's dB(A).

AIR QUALITY

2.18 The existing air quality was determined from published information as well as a brief survey of the area.

2.19 Existing concentrations of Nitrogen Dioxide (NO_2) are high, but are below the EEC limit value (an annual 98th percentile 200 $\mu g/m^3$). The highest levels were found along Avonmouth Road and Portway, with 98th % values between 149 and 173$\mu g/m^3$. Sites further away from this heavily trafficked route are some 30% lower.

2.20 Carbon monoxide concentrations measured at ten sites across the area were generally less than 1 part per million (ppm), with peaks around 2 ppm on Avonmouth Road. These levels are well below World Health Organisation guidelines of between 10 to 50 ppm.

2.21 Lead was not re-surveyed as averages previously measured by the Bristol and District Environmental Pollution Technical Committee were found to be around 0.5 $\mu g/m^3$, well below the EEC limit of 2 $\mu g/m^3$. This figure may reflect the operation of the lead/zinc smelter rather than exhaust emissions, but atmospheric concentrations should be greatly reduced with the lowering of lead levels in petrol and the continued increase in the use of unleaded fuel.

2.22 There is currently no recommended air quality standard for hydrocarbon concentrations. A spot check on hydrocarbon levels showed the concentration in the village to be below 1 ppm (below the lower limit of detection of the portable analyser). This hydrocarbon level is very low and a full survey was considered to be un-necessary.

HERITAGE

2.22 Discussions were held with the County Archaeologist to determine if there are any sites of historical and archaeological interest within the area of the proposed scheme. The County Sites and Monuments Record confirmed that there are no designated sites of archaeological importance directly affected by the line of the road.

2.23 The only known site of interest in the area is the old sea wall which runs parallel to the River Avon below the existing Portway roundabout in a south-east to north-west alignment. These post medieval flood prevention banks are completely buried beneath present developments and are no longer considered significant as they have already suffered considerable disturbance. The location of the old sea wall is marked on Figure Three.

2.24 Finds of prehistoric artifacts, a prehistoric barrow and a Romano-British occupation have been recorded nearby. Similar sites may have existed beneath the road line but whether they still survive, their present condition and the extent to they might be affected by the proposed road cannot be assessed.

2.25 There are no conservation areas in the Avonmouth area. The only listed building is the old bus depot on Avonmouth Road some 300 metres west of the Avonmouth Road/Portway roundabout. This building is grade II listed.

CHAPTER 3 - DESCRIPTION OF THE PUBLISHED SCHEME

SCHEME DESCRIPTION

3.1 The M5 Junction 18 and Avonmouth Relief Road is part of the National Roads Programme and is intended to improve access to the Avonmouth industrial areas and reduce congestion at Junction 18 of the M5 motorway. It will also remove heavy traffic from Avonmouth village.

3.2 The Published Scheme would mainly consist of a replacement dual carriageway connecting Junction 18 with an improved Portway Roundabout and a separate connection from Junction 18 to a new Avonmouth Way roundabout. From the Avonmouth Way Roundabout the existing road would be upgraded to dual carriageway and link with a new St Andrews Road Roundabout, see Figure Four.

3.3 The proposed roads would generally be at ground level except for the northbound slip road to the M5 from the Portway roundabout which would incorporate a new flyover within the trading estate. The improved Portway roundabout would be traffic light controlled.

3.4 In order to provide a detailed description, the Published Scheme can be set out as five elements:

I) The first involves the realignment of the existing slip roads linking the M5 to the M5 spur. The point where these slip roads connect with the M5 remains unaltered but, in order to maximise the length of carriageway available for motorists to weave, the point of connection onto the M5 spur has been moved east. The slip roads are 7.3m wide with a 2.75m hardshoulder and their realignment is within the existing highway boundary.

II) The second uses the existing M5 spur and is aligned about its centre line. The existing road is dual 7.3m carriageways with 2.75m hardshoulders. In the Published Scheme this is widened to dual 14.6m carriageways with minimum 2.75m hardshoulders. The outer two lanes are connected directly to the A4 Portway roundabout. Apart from a strip of land 150m by 1m on the southern side of the spur the road widening is accommodated within the existing highway boundary. Its vertical alignment is virtually the same as the existing highway which is predominantly flat.

III) This element is the continuation of the centre two lanes of the M5 spur as a new road up to a new roundabout next to Avonmouth Way, 400m east of its junction with St Andrew's Road. It is a Motorway Link Road consisting of a dual 7.3m carriageway with 2.75m hardshoulders. The central reserve is widened to allow for adequate visibility past the safety fence and lighting columns. The vertical alignment of this road is virtually at existing ground level.

IV) The fourth is an upgrading to dual carriageway of Avonmouth Way between the new Avonmouth Way roundabout and a further new roundabout replacing traffic light controlled crossroads at the junction of St Andrew's Road and Avonmouth Way. Avonmouth Way is widened on the south side with local deviation at the roundabout approaches, to provide an all purpose dual 7.3m carriageway with no hardshoulder. Its vertical alignment is virtually as the existing road level. On the north side, the existing properties are serviced by a new collector road running west to east, reducing the number of accesses onto the road and improving safety.

V) The last includes two slip roads from the M5 spur to the roundabout at the junction of Avonmouth Road and the Portway. These slip roads join to the outer two lanes of the M5 spur and are 7.3m wide with a 2.75m hardshoulder. In order to maximise the weaving length on the M5 spur while maintaining acceptable horizontal radii, the new slip road is aligned slightly west of the existing carriageway. Its vertical alignment is virtually at existing ground level, except that the northbound slip road climbs at a gradient of 6% from the Portway roundabout to cross on the short flyover the motorway spur, to and from Avonmouth Way, at about 7m above ground level before falling at a gradient of 6% to join the M5 spur. The design of the short flyover has not yet been finalised but it is likely to be a concrete, three span structure about 60m long and 20m wide. The road climbing to and falling away from the bridge section will be supported on earth embankments and stepped walls. The new Portway roundabout involves slight realignment of the existing one and the introduction of traffic lights incorporating pedestrian crossings.

TRAFFIC EFFECTS

3.5 Traffic currently dominates the environment of Avonmouth Road due to the high traffic volumes and relatively high proportion of goods vehicles. Construction of the scheme is predicted to lead to a 60% reduction in daily traffic using Avonmouth Road in the year of opening.

3.6 The trunk road traffic between the M5 and the port or industrial areas would be diverted onto Avonmouth Way. This would provide improved access and additional highway capacity required for expansion of the industrial area.

LIGHTING

3.7 The standard of lighting required for the scheme is high and full cut-off high pressure sodium lighting would be used throughout.

3.8 In general, the lighting would be mounted on single or twin arm 12 metre high columns. The flyover section would require 18 and 25 metre high columns, giving a height above the road level of between 12 and 17 metres.

CHAPTER 4 - MITIGATION OF ADVERSE ENVIRONMENTAL EFFECTS

INTRODUCTION

4.1 Decisions on the road layout, location and alignment have taken into account the local community and landscape as well as ecological, archaeological and air quality implications. The Published Scheme has been designed to minimise environmental problems by careful choice of road structures and route.

COMMUNITY

4.2 The current use of Avonmouth Road as an access route to the docks and industrial area effectively divides Avonmouth village. The diversion of the motorway traffic away from the village would improve pedestrian access and the enjoyment of community facilities such as Church Park by reducing noise, fumes, dust and traffic disturbance.

4.3 The new layout of the Portway roundabout and the use of traffic lights to control the traffic flow would improve the pedestrian movement between Shirehampton and Avonmouth village. There would be little change in vehicular access between the two areas.

LANDSCAPE AND VISUAL AMENITY

4.4 The Published Scheme uses a small flyover, to avoid conflicting movements on the motorway spurs but its visual impact would be minimised by locating it within the industrial area, at least 250 metres from the nearest houses.

4.5 The visual impact of the scheme is largely limited to views from the rear of properties on the north of Avonmouth Road and to those nearest to the Portway roundabout. The proposed landscaping and planting scheme improve on existing views by partially screening the trading estate from the houses on Avonmouth Road (see Figure Four), and further reduce the visual impact of the scheme.

4.6 Planting around the Portway roundabout would include various tree and shrub species on earth mounding. This would mitigate the visual impact of the junction on surrounding properties and provide some visual containment and coordination of the road network.

4.7 Screen planting would be undertaken next to the M5 link and on the sloping embankments of the elevated sections. This would soften the impact of the link and create a feature visible to road users as they approach from the M5.

4.8 Avonmouth Way roundabout would be planted with similar tree and shrub species to those currently found within the trading estate. This would ensure a consistent planting style within the area.

4.9 A "park land" style of planting would be developed next to the M5 Portway Link. This would consist of a grassed area with groups of trees which would provide an attractive foreground to the Avonbridge Trading Estate, as well as an improved view for road users.

4.10 Details of the proposed planting are shown in Figure Four.

ECOLOGY

4.11 The restriction of the road scheme to industrially developed land would ensure that no planted areas would be affected. There are few opportunities to add significantly to the wildlife interests in the area.

GROUND CONDITIONS

4.12 Appropriate highway drainage would be included to ensure the Published Scheme would not alter surface drainage patterns or affect groundwater levels.

NOISE

4.13 Reductions in traffic movement through Avonmouth village would lead to a general reduction in noise levels within the residential areas of 3 to 4 dB(A). In particular there would be reductions in noise levels at the front facades of around 85 properties in Avonmouth Road and St Andrews Road. Minor improvements would also be experienced at residential properties and other buildings close to St Andrews Church.

4.14 The short flyover within the industrial area may give rise to localised increases in noise levels. Overall traffic noise will continue to be controlled by the predominant use of ground level roads. There will be no noticeable increases in noise from the new roads at any residential property.

AIR QUALITY

4.15 The Published Scheme would bring significant reductions in traffic pollution along Avonmouth Road as traffic will be diverted away from the village. These reductions will be most apparent further west towards the shops along Avonmouth Road, where levels of some parameters could be halved. Pollution from traffic will also be reduced at the Portway junction and further east on Avonmouth Road.

4.16 Concentrations in the industrial area close to the existing M5 spur would remain largely unchanged. There would however, be a small improvement on present levels because of higher standards of vehicle emission control.

4.17 The diversion of some of the motorway traffic through the industrial area is likely to bring about an increase in some traffic pollutants in the trading estate and Avonmouth Way. Concentrations would be lower than those presently experienced along Avonmouth Road. The predicted concentrations would however still be well within UK and EEC standards.

4.18 The proposals would bring about a general improvement in air quality, and Government schemes to reduce emissions from vehicles by the compulsory use of catalytic converters will introduce further improvements.

HERITAGE

4.19 The position, depth and condition of the old sea wall suggest that the Published Scheme would have little or no direct effect upon it.

4.20 Observations during future geotechnical survey excavation would provide relevant information regarding the survival and condition of archaeological deposits and the depth of modern disturbance. A preliminary statement of the archaeological needs

could then be made. More extensive survey and excavation is considered unnecessary in view of the large scale ground disturbance that has already taken place in this area.

4.21 Due to the removal of heavy traffic from Avonmouth village, the Published Scheme would reduce disturbance and possible damage caused by traffic vibrations to the old bus station on Avonmouth Road.

LIGHTING

4.22 The level of lighting required for the illumination of motorways and their associated link roads is covered by a Department of Transport standard. In order to mitigate the effects of high levels of illumination on properties nearby, full cut off high pressure sodium lamps would be used throughout the Published Scheme to limit the lateral spread of light.

INDUSTRY AND COMMERCE

4.23 Industrial land in the trading estate would need to be purchased in order to accommodate the new road scheme and some has already been acquired. About 10 businesses may need to revise operations on site or relocate. However, the road scheme would enable the planned development of further industrial land, presently restricted due to access problems, to proceed.

CONSTRUCTION

4.24 The proposal has been developed to minimise environmental impact and traffic delay. The overall construction programme is expected to take about two years.

4.25 The Published Scheme would entail relatively little construction work near residential properties. The piling and other works to construct the overbridge section of the flyover could have a moderate noise effect on the rear of some properties in Avonmouth Road. The retaining wall sections nearest the housing would use a reinforced earth technique and will not require piling. Any noise effects would be relatively short term.

4.26 Construction methods, hours of working and construction noise standards would be the subject of discussion and agreement with the local Environmental Health Department. These discussions would take into account the existing noise conditions and the practicability of particular construction methods.

4.27 Construction dusts would be generated from a number of sources, particularly if existing road foundations are exposed and disturbed. During exceptionally dry weather, or if particularly dusty surfaces are exposed, measures would be taken to control dusts. These measures could include dampening down surfaces, or laying chemical agents to bind such surfaces. These measures would be included within the construction contract.

4.28 Wheel and road cleaning would take place on a routine and regular basis in order to limit mud on roads.

4.29 Although there are no watercourses in or near the site, the storage and siting of materials would be reviewed to ensure that accidental spills or emissions (including vandalism) could not leak to groundwater or the Rivers Avon and Severn. Fuel stores and other chemical storage areas would be bunded.

4.30 Diversions and traffic controls would occasionally affect the area particularly during rush hour. Works would be scheduled such that delays and disturbance to traffic would be minimised. Two lanes would always be open on the M5 link roads, though they might sometimes be of a reduced lane width.

CHAPTER 5 - DATA ON ENVIRONMENTAL EFFECTS (APPRAISAL FRAMEWORK)

5.1 A summary of environmental and other effects of the Published Scheme is provided in tabular form in this Chapter. The format follows that of the appraisal framework specified in the Department of Transport's Manual of Environmental Appraisal. The framework summarises the overall effects of construction and operation of the Published Scheme. The framework also describes the implications of not constructing the scheme within columns headed "Do-Minimum".

5.2 The appraisal framework has been derived from more detailed work comprising consultations with Statutory Authorities and other bodies, desk studies, fieldwork and computer modelling. Reports will be produced giving detailed information used in the assessment of landscape, noise and air quality aspects.

5.3 The frameworks are sub-divided into six groups which consider the effects on

- travellers;
- occupiers of property;
- users of facilities;
- policies for conserving and enhancing the area;
- policies for transport and development; and
- financial effects.

5.4 The effects on travellers are considered in Group 1. This includes an economic appraisal of the savings associated with the scheme, an estimate of the reduction in road traffic casualties and estimates of changes in driver stress and quality of views from the road.

5.5 Within Group 2 the effects of the scheme on occupiers are assessed including residential, industrial, commercial and other interests. The effects considered relate to changes in the noise, air quality, the visual environment, severance and loss of land or buildings.

5.6 The implications of the scheme for users of facilities which will be affected are addressed in Group 3, followed in Group 4 by a description of the effects of the scheme on policies for conserving and enhancing the area. This group is concerned with the change in the general environmental quality of the area, rather than the direct effect on individuals. Where policies would be affected by not constructing the scheme the effect is referred to in the "comments" column.

5.7 The degree to which the scheme complies with transport policies and with central and local Governments' policies relating to land use and economic development is outlined in Group 5.

5.8 Group 6 considers the economics of the scheme by balancing the scheme costs against the benefits derived within Group 1, resulting in the Net Present Value (NPV). Groups 1 and 6 are considered only within the overall framework for the scheme as financial benefits are dependent on the scheme in its entirety. The effects of the scheme on transport and development policies are also considered within the overall framework but not within the sub-frameworks.

5.9 Certain issues listed within Annexe III of the European Community Directive on environmental assessment (85/337/EEC) have not been considered within the framework (such as effects of the scheme on climatic factors) as they are not relevant. The effects of consequential development have not been considered either as these will be subject to the policies of the relevant Planning Authorities.

APPRAISAL FRAMEWORK

M5 Junction 18 Improvement and Avonmouth Relief Road

GROUP 1: TRAVELLERS			PUBLISHED ROUTE		DO MINIMUM		COMMENTS
Sub-Group	Effect	Units					
			High	Low	High	Low	A. Each column shows the improvement of the Published Route over the 'Do Minimum'. Hence the 'Do Minimum' entries are zero.
Car Users	Time savings	£m (PVB)	18.87	9.28	0	0	
	Vehicle Operating Cost Savings	£m (PVB)	1.47	1.46	0	0	B. Present value of benefits (PVB) are for a 30 year period from the expected date of opening and discounted to 1988 prices at 8% pa using COBA.
Users of Light Goods Vehicles	Time savings	£m (PVB)	8.84	3.93	0	0	
	Vehicle Operating Cost Savings	£m (PVB)	0.63	0.62	0	0	C. It is assumed that national average figures for vehicle occupancy and for accident rates and costs will apply.
Users of Other Goods Vehicles	Time savings	£m (PVB)	6.50	3.20	0	0	D. Traffic forecasts used were partly restrained including partial local development generations.
	Vehicle Operating Cost Savings	£m (PVB)	1.62	1.52	0	0	
Bus Operators and Passengers	Time Savings	£m (PVB)	0.68	0.42	0	0	
	Vehicle Operating Cost Savings	£m (PVB)	0.05	0.05	0	0	
All Vehicle Travellers	Time Savings	£m (PVB)	34.67	16.83	0	0	
	Vehicle Operating Cost Savings	£m (PVB)	3.83	3.66			
	Accident Savings	£m (PVB)	1.18	0.78			The figures indicate the probable total reduction in casualties over the whole of the 30 year assessment period if the national average rates and distribution between groups apply.
	Reduction in Casualties:-						
	Fatal	Number	3	2	0	0	
	Serious	Number	38	31	0	0	They take no account of the safety implications of the detailed design of the new route.
	Slight	Number	171	141	0	0	
	View from the road		Mainly industrial.		Mix of residential and industrial.		
	Driver stress		Moderate at peak times otherwise low.		High along Avonmouth Road.		See journey times, network speeds and traffic flows below.
	Accessibility to motorway network		Access to junction 18 of the M5 improved for industrial and port areas.		Access between the motorway and the port and industrial areas continues through Avonmouth village.		The changes in road user costs resulting from these reroutings are included in the economic analysis. See journey times, network speeds and traffic flows below.
	Traffic delays during construction		Some delays identified during construction. At all times two lanes will operate on the M5 Spur road, though sometimes this will be of substandard lane width. QUADRO disbenefits are negligable.		Some delays incurred while singnalising the M5/A4 roundabout.		A 2 year construction period will be stipulated for the main works contract.
	Traffic Queues (off M5 traffic) at:						Based on SATURN simulation AM and PM peak-hour model runs for design year 2009 with High Growth forecasts, incuding full local development trip generation and peak-spreading (10% for AM, 5% for PM).
	- M5 Spur / A4 Junction		Moderate		Unacceptable		
	- M5 Spur / Avonmouth Way Junction		Moderate		-		
	Journey Times	Seconds (Two-Way Average Peak-Hour)	AM 2009	PM 2009	AM 1989	PM 1989	Journey Times refer to existing conditions (1989 base year), in the Do Minimum column and traffic model design year conditions (2009) for the scheme network.
	between the M5 and:						
	- Port		133	134	285	702	
	- Industrial Area		95	95	278	154	
	- Avonmouth Village		116	114	254	136	
	- Portway		163	159	190	75	
	between Portway and:						
	- Port		245	237	212	765	
	- Industrial Area		295	277	225	217	
	- Avonmouth Village		185	178	137	138	

M5 Junction 18 Improvement and Avonmouth Relief Road

GROUP 1: TRAVELLERS			PUBLISHED ROUTE		DO MINIMUM		COMMENTS
Sub-Group	Effect	Units					
	Average Speeds Network-wide	km/h	AM 2009	PM 2009	AM 1989	PM 1989	Do Minimum Average Speeds refer to existing conditions (1989 base year). Published route speeds refer to traffic model design years conditions (2009).
	- Terminating Traffic only		32.6	27.9	37.6	50.4	
	- Total Traffic during peak-hour		26.9	21.3	36.2	49.3	
	Traffic Flows	Passenger Car Units (PCUs) Two-Way Total Peak-Hour	AM 2009	PM 2009	AM 1995	PM 1995	Do Minimum Flows refer to 1995 opening year because on some links and junctions the demand flows exceed capacities during the peak periods.
	- Avonmouth Road		2866	2944	4822	3546	
	- A4 Portway / Avonmouth Way Link		Not Applicable		Not Applicable		
	- M5 Spur Portway		5884	5386	5972	4361	
	- M5 Spur Avonmouth Way		3419	2153	Not Applicable		
	- St Brendans Way		729	689	925	5268	
	- Portway A4		5351	4886	3215	3224	
	- Avonmouth Way		2933	2389	1798	784	
Pedestrians	*Change in amenity*		General improvement in amenity within Avonmouth due to the diversion of trunk road traffic from Avonmouth Road.		Pedestrian amenity in entire urban area will continue to deteriorate due to increasing traffic congestion.		Construction of the scheme is predicted to lead to 60% reduction in daily traffic using Avonmouth Road in the year of opening.
	Safety		Diversion of trunk road traffic from Avonmouth Road will improve pedestrian safety.		Traffic growth on existing roads will lead to increased risk of vehicle / pedestrian conflict.		
	New Severance		Severance increase on Avonmouth Way due to an increase in traffic volume.				
	Relief from existing severance		Moderate relief. Diversion of trunk road traffic from Avonmouth Road will reduce existing community severance of Avonmouth.		Existing community severance caused by trunk road traffic through Avonmouth will worsen as the growth of traffic leads to peak hour traffic conditions extending.		Pelican crossing is only means of creating gaps in traffic stream of Avonmouth Road in DM. Pedestrians crossing Portway have to use subway or bridge.
Cyclists	*Amenity and Safety*		Diversion of trunk road traffic from Avonmouth Road will reduce the conflict between cyclists and other road traffic.				

GROUP 2: OCCUPIERS			PUBLISHED ROUTE	DO MINIMUM	COMMENTS
Sub-Group	Effect	Units			
Residential	*Properties demolished*	Number	1	None	
	Noise	Change in 18-Hr L10 dB(A) level.			Noise assessment based on 1996 traffic flows with constant HGV proportion. Only roads with predicted changes of at least 3 dB(A) (18-hour L 10) are included.
	Dwellings experiencing a decrease:	No. of dwellings			
	Location				
	- Avonmouth Road between Portway and St Andrews Road	35 dwellings	-3dB (A) 18hr L10	-	
	- Avonmouth Road between St Andrews Road and Richmond Terrace	25 dwellings	- -	-	
	- St Andrews Road between Avonmouth Road and McLaren Road*	25 dwellings	-3 dB(A) 18hr L10	-	
	- St Andrews Road between Mc Laren Road and Avonmouth Way	25 dwellings	-4 dB(A) 18hr L10	-	
	Dwellings experiencing an increase:	No. of dwellings 0 dwelling	- -		
	Visual Impact Visual Obstruction	Number of properties subject to	None	No Change	Gantries, signing and lighting will have a visual impact.
	Visual Intrusion		High 9 Medium 60 Low 86 Total 155	No Change	
	Air Quality		Reduction in pollution levels on Avonmouth Road as traffic (especially HGV's) is diverted to Port / Industrial area.	Increased pollution on Avonmouth Road.	Air Pollution estimates affected by the proportion of HGV's and national estimates of catalytic converters for cars.
	Relief from existing Severance		Severance decreases along Avonmouth Road with an increase along Avonmouth Way.	High traffic flow in village would create severance due to physical difficulties.	
	Access		Improvement due to reduction in congestion through village.	No Change	Removal of trunk road traffic from Avonmouth village provides opportunities for traffic calming.
	Disruption During Construction		Moderate. Noise, visual intrusion and dust for dwellings near the M5 / A4 junction on Portway and Avonmouth Road.		A two year construction period will be stipulated for the main works contract.
Industrial	*Land Take*		10 buildings demolished 3 seriously affected	None	
	Noise and Vibration		Increased noise and vibration levels experienced by establishments bordering new roads and by establishments between new Avonmouth Way Junction and King Road Avenue Junction.		
	Accessibility		Provision of scheme roads will improve access to / from Port and Industrial Area from / to the M5.	Congestion of M5 / A4 junction and low speeds on Avonmouth Road will reduce accessibility for industry. Alternative routes will also become congested as these are tortuous and have low capacity. The "image" of the industrial area will suffer.	
	Disruption During Construction		Moderate. Noise, visual intrusion and dust for industry near the M5 Spur and Avonmouth Way. Some minor traffic delays.	Some delays during signalisation of M5 / A4 roundabout.	

GROUP 3: USERS OF FACILITIES			PUBLISHED ROUTE	DO MINIMUM	COMMENTS
Sub-Group	Effect				
Shops/ Post Office/ Churches/ Park/ Community Centre/ Library	*Reduction in Vehicle/Pedestrian Conflict*		Transfer of traffic from Avonmouth Road will: reduce the number of pedestrian/traffic conflicts, reduce noise levels, reduce levels of air pollution, reduce community severance.	High traffic volumes on Avonmouth Road/St Andrews Rd will cause difficulties of access, parking etc for local residents. High noise and pollution levels will cause severe discomfort for users of these local facilities.	
School	*Accessibility from east of A4 Portway*		No Change		
GROUP 4: POLICIES FOR CONSERVING AND ENHANCING THE AREA			**PUBLISHED ROUTE**	**DO MINIMUM**	**COMMENTS**
Authority	Policy				
Avon CC	*Encourage landscape improvements*		Possible landscape improvements associated with new roads.	None	Avonmouth is designated a priority improvement area in Avon CC StructurePlan.
English Heritage Avon CC Bristol CC	*Safeguard structure and setting of listed buildings*		Decrease in traffic movements past listed building on Avonmouth Road, enhancing its setting and assisting in the structural maintenance	Increase in heavy traffic past the listed building may lead to structural damage in long term	
GROUP 5: TRANSPORT, DEVELOPMENT AND ECONOMIC POLICIES			**PUBLISHED ROUTE**	**DO MINIMUM**	**COMMENTS**
Authority	Policy				
Department of Transport	*To improve trunk roads to ports*		Scheme will provide direct trunk road access from M5 to King Road Avenue entrance to Docks.	Access to the Port will be severely affected by congestion at M5 / A4 junction prolonged by peak spreading.	
	To assist economic growth by reducing transport costs		Improve the economic movement of people and goods through the transport network.	Growing congestion resulting in increased transport costs	
	To improve the environment by removing through traffic from unsuitable roads in towns and villages		Trunk road traffic removed from Avonmouth Road / St. Andrews Road.		
	To enhance road safety		Road safety enhanced by minimising queueing on M5 Spur.	Decreasing road safety due to congestion effects.	
Avon County Council Bristol City District	*To concentrate HGVs on suitable roads*		Scheme will provide access to port and industrial area which avoids residential areas of Avonmouth village.		
	To promote industrial development	Effect on access to industrial estate. Demolition of existing industries	Improvements remove access constraints on industrial development in Avonmouth. Access provided by the new roads and improved M5 Junction 18 releases about 100 ha of land for development. Greater impact on existing establishments.	Further development in the area constrained by the poor road network	Industrial development in Avonmouth has previously been constrained by traffic problems. The scheme may enable an additional 100 ha to be developed. (Avonmouth's development potential is put at 200 ha).
	To relieve congestion in Avonmouth village		Diversion of heavy and other traffic reduces congestion in Avonmouth village.	Increased congestion in Avonmouth village.	

GROUP 6: FINANCIAL EFFECTS			PUBLISHED ROUTE		DO MINIMUM	COMMENTS
Sub-Group	Effect	Units				
Department of Transport	Costs		High	Low		
	Construction Costs	£ m (PVC)	11.67	11.67	0.39	Costs are discounted from years of expected expenditure to 1988 at 1988 prices (PVC = Present Value of Costs PVB = Present Value of Benefits NPV = Net Present Value).
	Land Costs*	£m (PVC)	6.11	6.11	-	
	Maintenance Costs*	£m (PVC)	0.04	0.04	-	
	Total Cost	£ m (PVC)	17.82	17.82	0.39	
	Total Quantifiable Monetary Benefit	£ m (PVB)	High 39.70	Low 21.28	0	Includes savings in time, vehicle operating costs and accidents. Taken from Group 1.
	Net Present Value Compared to Do Minimum	£ m (NPV)	21.88	3.46	0	
		£ m (NPV)	Weighted 10.83		0	

CHAPTER 6 - ALTERNATIVES AND CHOICE OF THE PUBLISHED SCHEME

THE CONSULTATION SCHEME (1989)

6.1 In early 1989 the Department of Transport commissioned consultants to investigate the problems and identify solutions. A number of preliminary options were proposed, the essential elements of which were refined as the Consultation Scheme. This scheme included:

- a flyover over the A4 Avonmouth roundabout to connect the Portway directly to the M5 spur;
- a direct motorway link between the new Avonmouth Way roundabout and the M5;
- a dualling of Avonmouth Way between St Andrews Road and the new roundabout;
- a direct motorway link between the new Avonmouth Way roundabout and the M5;
- a link between the A4 roundabout and the new roundabout at Avonmouth Way.

6.2 The public were invited to respond to the Consultation Schemes during a local exhibition in late 1989, see Figure Five. Although many were keen to see village congestion relieved, there was strong opposition to the flyover, especially from the residents of Portway. Businesses objected to the loss of part or all of their premises. Similarly, there were concerns about the encroachment of one slip road onto the baker site.

6.3 As a result of the public consultation a number of alternative solutions which avoided the need for a long flyover at the Portway junction were investigated. These were subsequently refined to give three alternatives.

6.4 The three new alternatives (the B options) were compared with two variants of the Consultation Scheme (the A options) in a detailed evaluation of all 5 options as follows:

- o A1; very similar to the Consultation scheme (with two way flyover) but with weaving section replacing slip roads on the north side of the M5 spur.
- o A2; a variant of the above with one-way flyover for southbound traffic off the M5 spur only.
- o B1; a short one way flyover in the industrial area north of Portway roundabout with all roundabout intersection control.
- o B2; as B1 with all signal intersection control.
- o B3; hybrid of B1/B2 with roundabouts on Avonmouth Way and traffic signals at Portway junction.

6.5 Traffic flows for the five options were tested for the morning and evening peaks by means of SATURN simulation model.

6.6 In terms of traffic operational performance, option A1 would provide the best solution, with B3 a close second-best. Options A2 and B1 would incur more delays and the 'Do Minimum' results in unacceptable queues and delays.

6.7 During construction the A options would require a greater degree of traffic control affecting a wider area than B options, and extending into residential areas adjacent to the Portway.

6.8 As all of the possible options would be largely restricted to the industrial areas the greatest variation in environmental impact between them was visual intrusion.

6.9 The visual impact of the B options were lower than the A options. The A options had the elevated sections extending in part over the Portway junction and the Portway, affecting the view from over 200 properties. The A options would cause visual obstruction at about 163 properties, and a high degree of visual intrusion at 92 others. The B options have a short one-way flyover section which is located within the trading estate. This flyover would not obstruct views, and would have a high visual intrusion at only 11 properties.

6.10 There are no significant differences between the options in terms of impact on heritage buildings, ecology, and community severance. The A options may be perceived as creating psychological severance because of the visual bulk of the flyover. However, pedestrian and vehicular access between the village and Shirehampton would be improved in comparison with the B schemes.

6.11 Three schemes A1, B1, and B3 provided substantial noise reductions for the Avonmouth Road/St Andrews area of Avonmouth.

6.12 In terms of air quality there was little difference between the options, all being better than the 'Do Minimum' situation.

THE PREFERRED SCHEME (1990)

6.13 As a result of the above considerations, Option B3 was selected as the Preferred Scheme, see Figure Six. This scheme would have the advantage over the Consultation Scheme of affecting a smaller land area during construction, less visual impact, significant noise reduction in the village, and lower construction costs.

6.14 An exhibition was held in December 1990 to show the Preferred Scheme. The public expressed concern about the visual impact of the proposed Portway junction as well as the safety implications for drivers and pedestrians.

6.15 The junction arrangements were subsequently reconsidered and as a light controlled roundabout at Portway would provide similar traffic efficiency, improved pedestrian access and allow for better landscaping, this option was subsequently adopted as the final Published Scheme.

6.16 The Published Scheme does not include the section of road between the existing A4 Portway roundabout and the new Avonmouth Way roundabout. As a result of other elements of redesign, this section would no longer serve a trunk road function and the Department of Transport does not have the legal powers to construct it. The local highway authority, Avon County Council, will decide whether or not to proceed with this section.

6.17 The Published Scheme is consistent with Avon County Structure Plan Transport Development Policies:

- "the A4 Avonmouth relief road will be programmed for construction in the period to 1996; although not likely to be carried out before 1995, the following major improvement to the primary road network will continue to be safeguarded - the A4 Avonmouth Bypass (Revised M5/A4 Motorway interchange)". (TR3(0) and TR4(f))

- "heavy lorries, wherever possible, will be encouraged to use lorry routes or roads which avoid residential and environmentally sensitive areas". (TR18)

- "development proposals, particularly for industry will be resisted where there is insufficient access to a suitable road system which avoids the movement of traffic, especially heavy lorries, through residential and environmentally sensitive areas". (TR19)

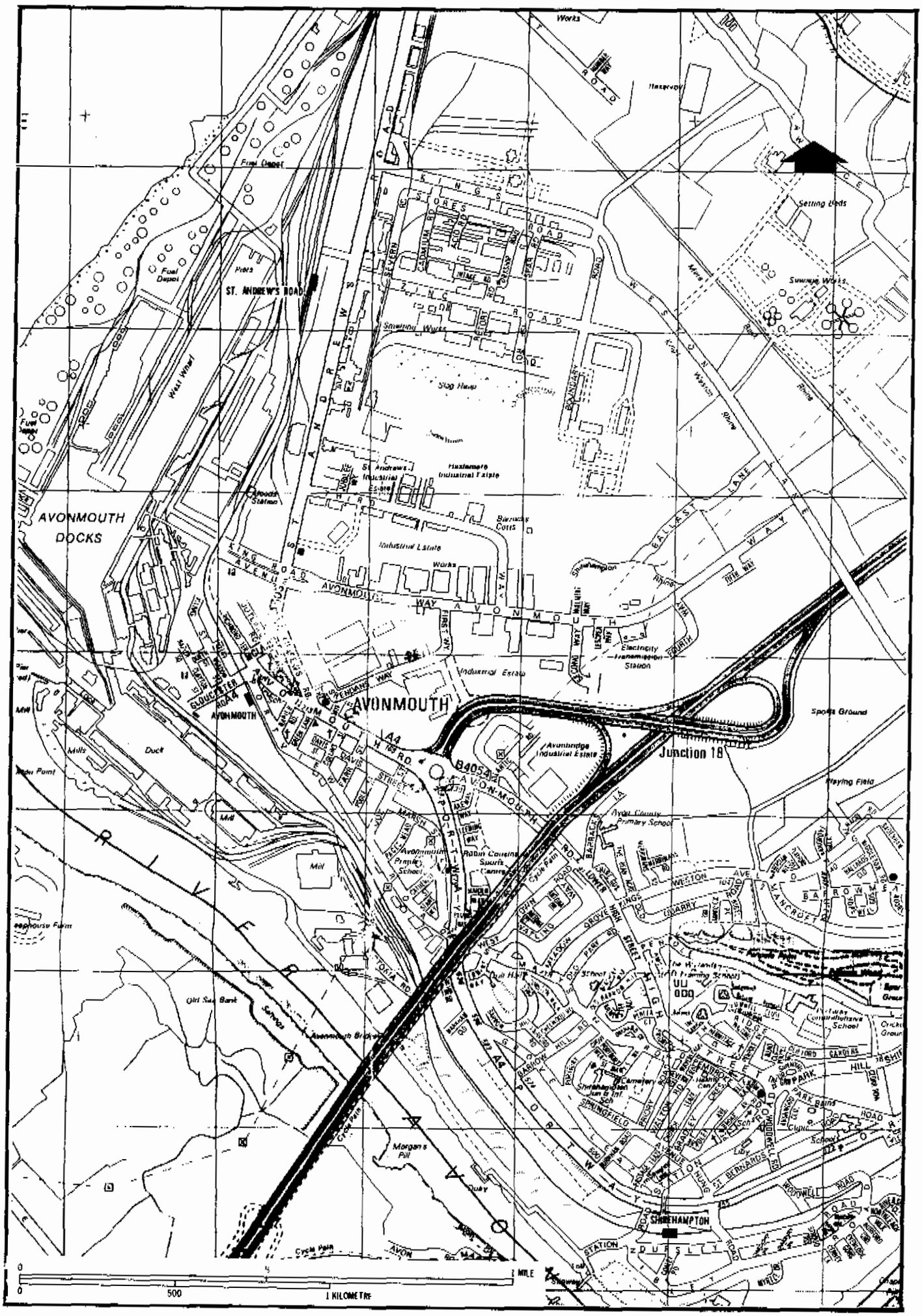


Figure 2. The Avonmouth Area

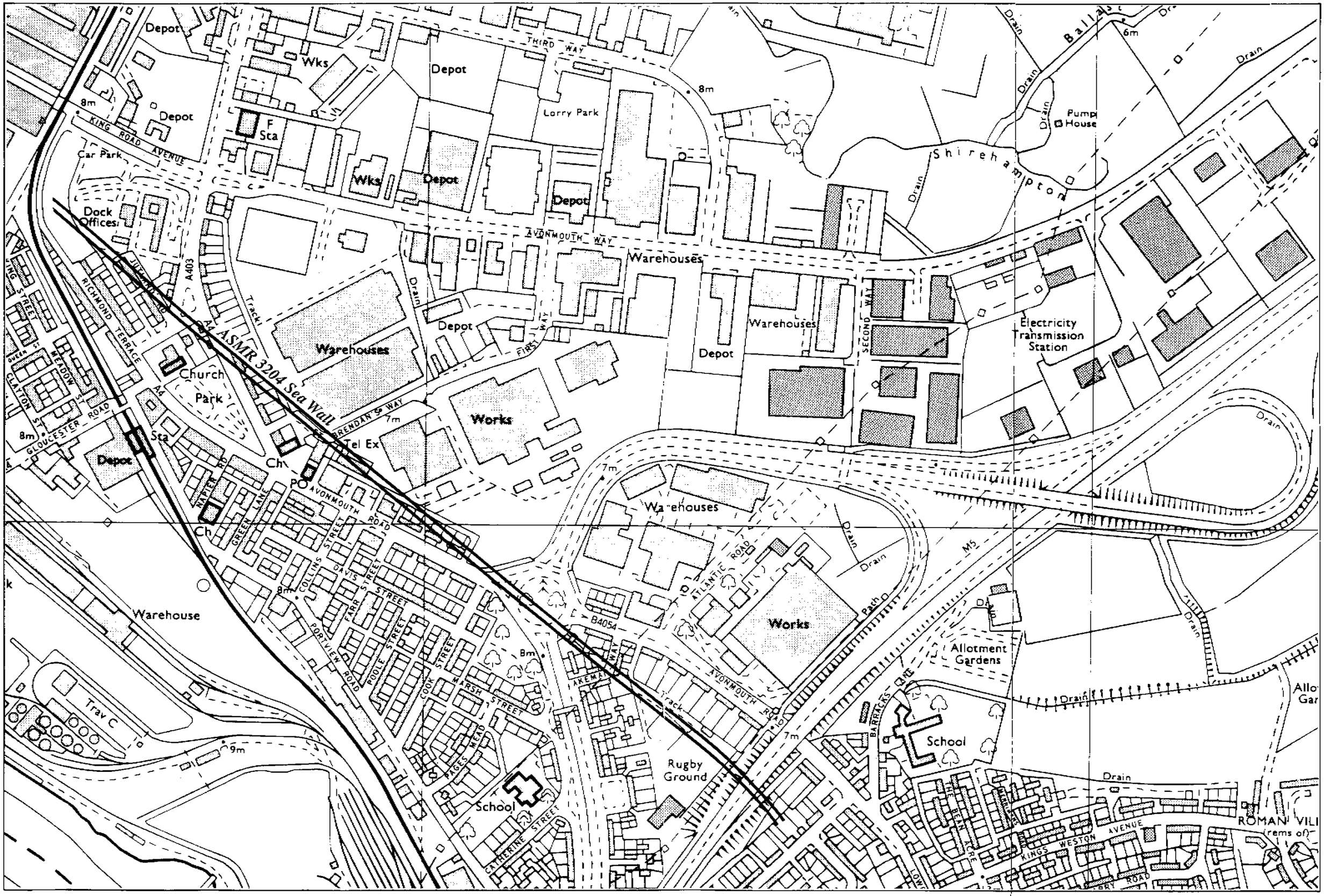
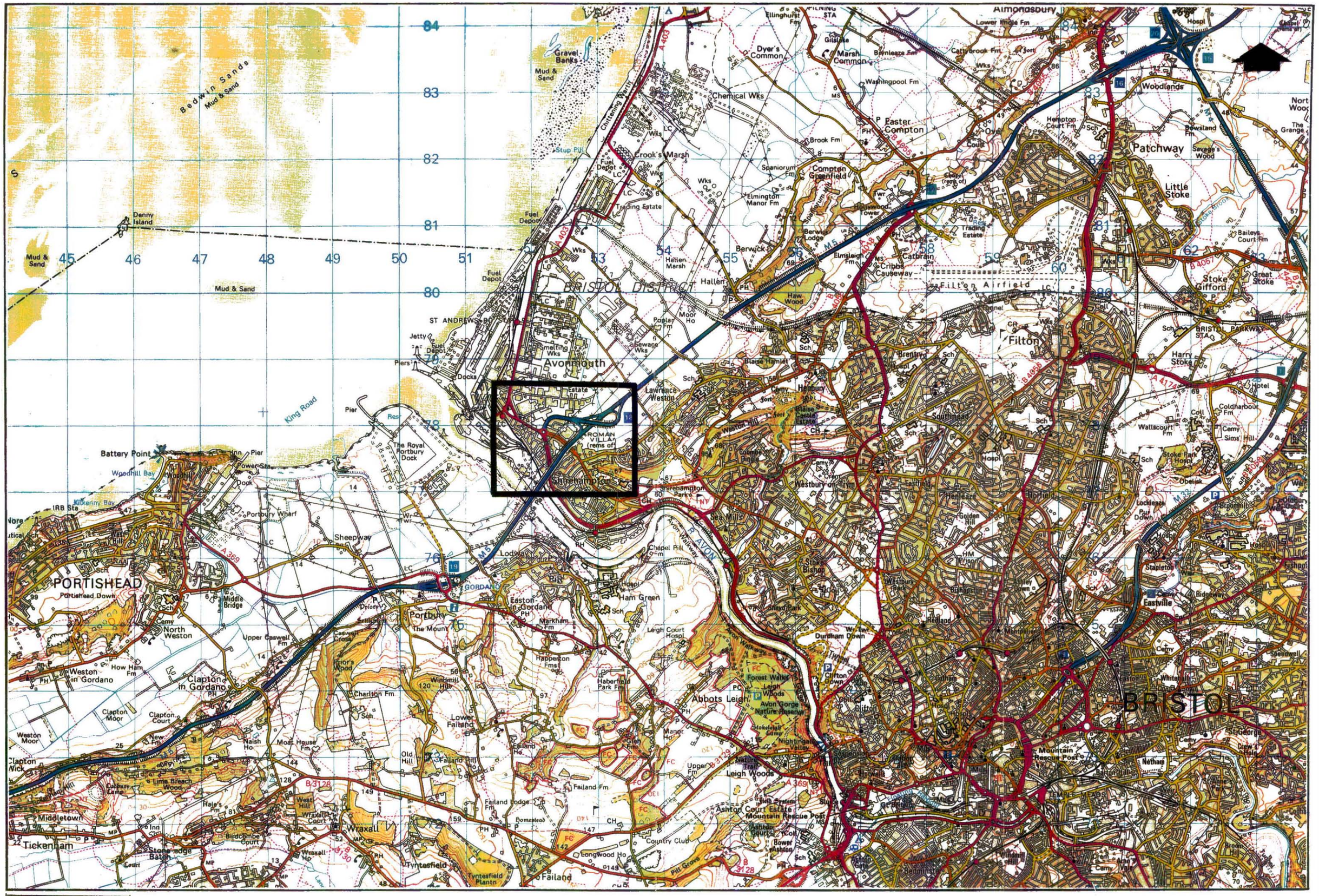


Figure 3. The Old Sea Wall



Scale 1:50000

Figure 1. The Location of the Avonmouth Area

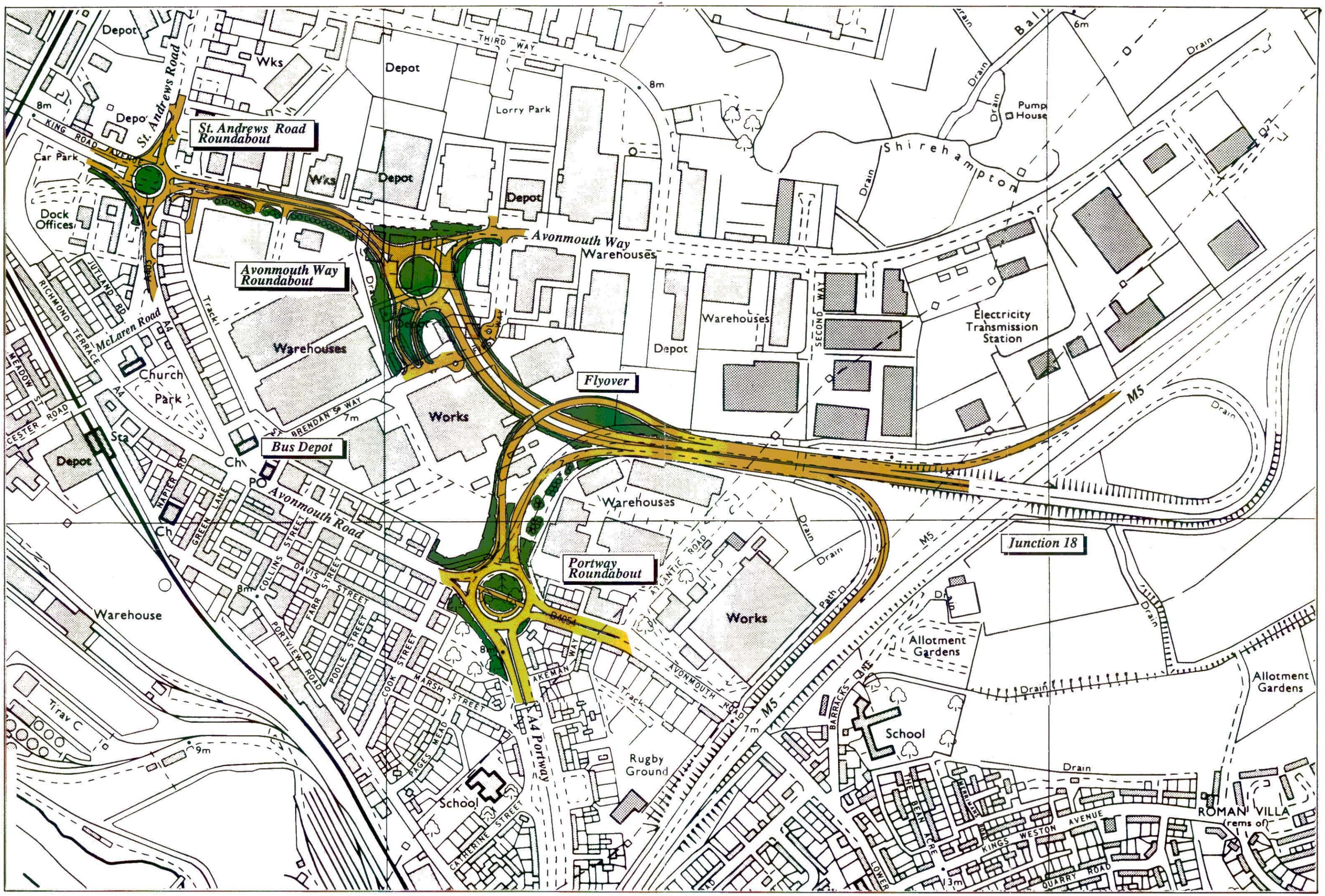


Figure 4. The Published Scheme, 1991

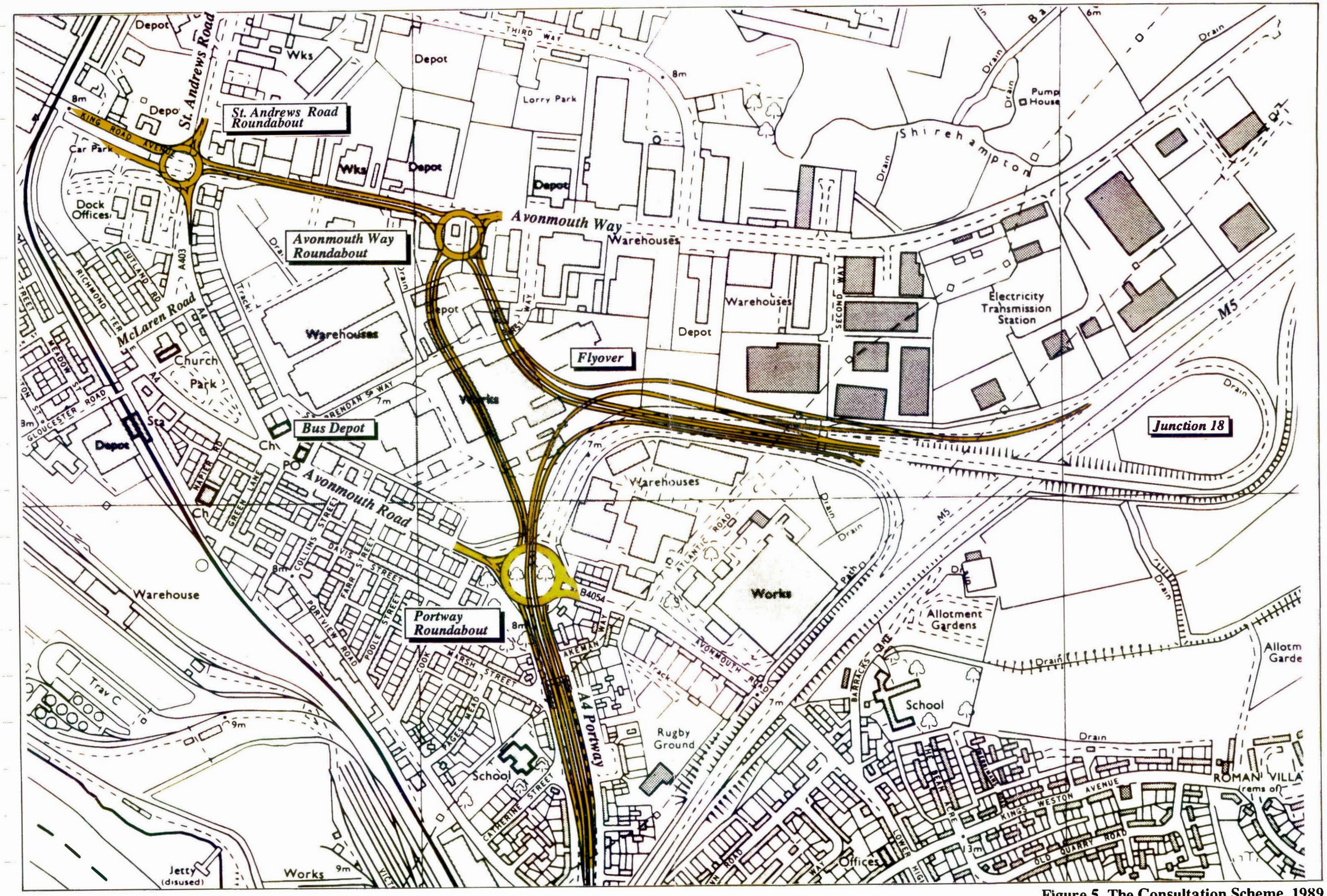


Figure 5. The Consultation Scheme, 1989

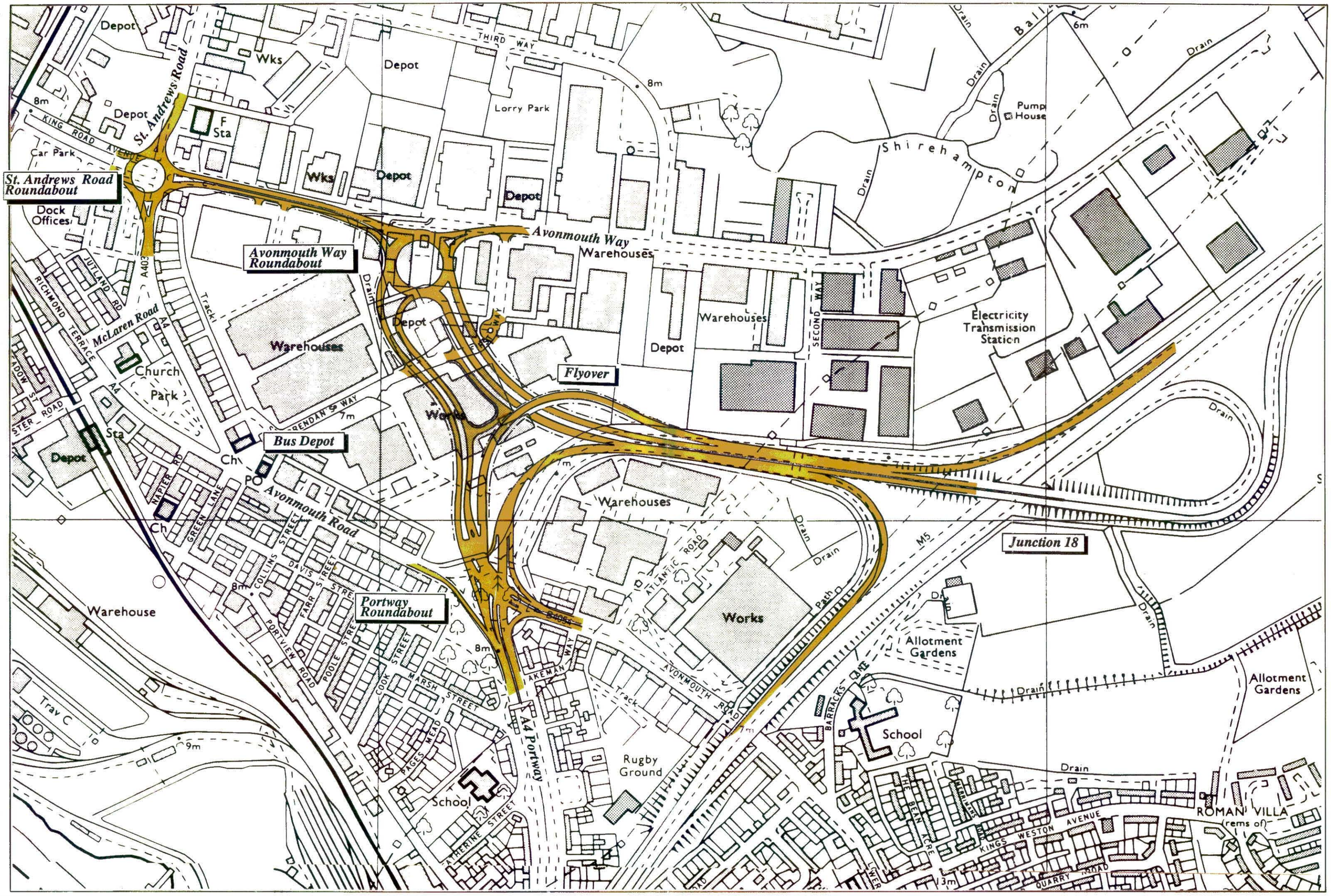


Figure 6. The Preferred Scheme, 1990

ALTERNATIVE PROPOSALS AND REASONS FOR CHOICE OF PUBLISHED ROUTE

In early 1989, the Department of Transport commissioned consultants to identify schemes to take heavy traffic away from the village and to prevent queues forming on the motorway. The problem was studied and a new road layout was proposed. The Consultation Scheme (see Figure Two) was presented to the public in November 1989 for comment. The scheme included:-

- a long flyover to connect the A4 Portway to the M5,

- a direct motorway link between the M5 and a new roundabout on Avonmouth Way,

- improving Avonmouth Way to dual carriageway between St Andrews Road and the new roundabout,

- a new road from the A4 roundabout to the new roundabout on Avonmouth Way.

Although the Consultation Scheme would bring considerable environmental improvement in Avonmouth Road, there was significant adverse comment from the public regarding the perceived environmental impact of the flyover. This element was subsequently dropped from the scheme.

Alternative solutions, omitting the long flyover, were then developed with the major construction works located within the industrial area. These subsequent options would have required the virtual closure of Avonmouth Road. They included the construction of a considerably shorter flyover, for the outbound M5 traffic, on the edge of the industrial area in conjunction with the following alternatives for the Portway junction:

- an improved roundabout,

- a traffic-light controlled junction to replace the roundabout,

- an improved roundabout with traffic-light control.

Initial assessments indicated that a traffic light controlled junction would provide the best operational solution and this was incorporated in the Preferred Scheme (see Figure Three). When compared with the Consultation Scheme this scheme would have the advantage of affecting a smaller area during construction, a lower visual impact and lower construction costs.

An exhibition was held in December 1990 to show the Preferred Scheme. The public expressed concern about the visual impact of the proposed Portway junction as well as the safety implications for drivers and pedestrians. Accordingly, these junction arrangements have been reconsidered. As a light- controlled roundabout would provide similar traffic efficiency, improved pedestrian access and allow for better landscaping, this alternative option has been adopted for the Published Scheme (Figure One).

The Published Scheme does not include the proposed section of road between the existing A4 Portway roundabout and the new Avonmouth Way roundabout. The Department of Transport does not have the legal powers to construct it since it would not serve a trunk road function. The local highway authority, Avon County Council will decide whether or not to proceed with this section. The Published Scheme would allow the addition of this road if Avon County Council should decide to proceed.

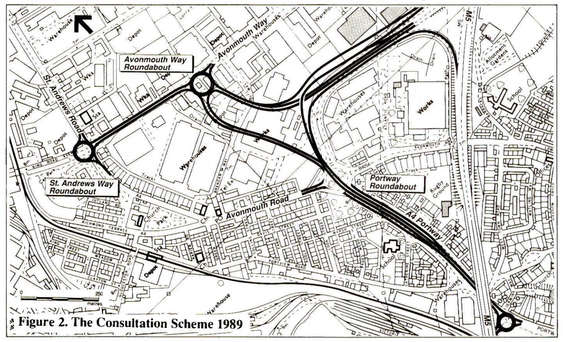


Figure 2. The Consultation Scheme 1989

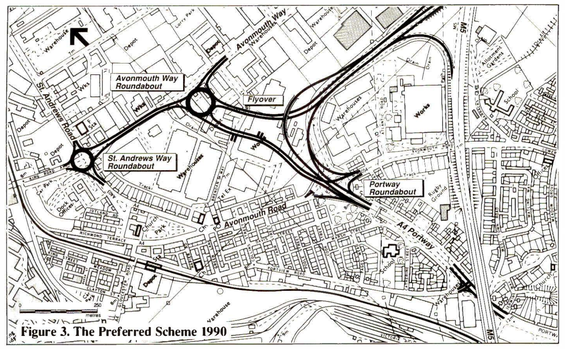


Figure 3. The Preferred Scheme 1990

CONCLUSIONS

Although some disruption is unavoidable with schemes of this nature, efforts have been made to minimise the environmental effects.

The Published Scheme would bring about improvements in road safety and environmental quality, including substantial improvements in Avonmouth village in noise, air quality, traffic disturbance and community severance.

FURTHER INFORMATION

The full Environmental Statement may be inspected at the addresses shown below.

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Shirehampton Library
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Bristol
BS11 9JN

Shirehampton Post Office
Station Road
Shirehampton
Bristol
BS11 9TS

Robin Cousins Sports Centre
West Town Road
Avonmouth
Bristol
BS11 9EB

Avonmouth Library
Avonmouth Road
Avonmouth
Bristol
BS11 9EN

Mace Stores
(Avonmouth Post Office)
195 Avonmouth Road
Avonmouth
Bristol
BS11 9EG

The City Planning Officer
Bristol City Council
Brunel House
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BS1 5UY

The Chief Executive
Avon County Council
Avon House North
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BS99 7SG

This project is being designed for the Department of Transport by WS Atkins and G Maunsell.

THE DEPARTMENT OF TRANSPORT

M5 Junction 18 Improvement and Avonmouth Relief Road

Environmental Statement Non-Technical Summary

May 1991

INTRODUCTION

The Secretary of State for Transport has published an Environmental Statement which describes the assessment of the environmental effects of the proposed M5 Junction 18 Improvement and Avonmouth Relief Road. This document is the Non-Technical Summary of the statement.

BACKGROUND

Avonmouth is a mainly industrial area bounded by the River Severn and the M5 Motorway. The area is dominated by the M5 and the bridge over the River Avon, the silos in the docks and the industrial chimneys to the north. The residential area, known as Avonmouth village, is situated adjacent to Junction 18 and a large proportion of the traffic leaving the motorway passes through its centre. As a result, the general environment of the village is badly affected.

Improvements to the slip roads from the M5 have recently been completed. This is a short-term measure to prevent traffic queues tailing back on to the motorway. The Published Scheme is the long term solution for the improvement of Junction 18 and to reduce traffic through Avonmouth village.

THE PUBLISHED SCHEME

The scheme (see Figure One), consists of two sections of dual carriageway connecting to the existing Junction 18 of the M5.

The first section would be a direct motorway link to an improved junction at the intersection of Avonmouth Road and A4 Portway. Much of this section consists of the widening and improvement of the existing slip roads. Most of the route would be at ground level except for the northbound slip road to the M5 which incorporates a new flyover within the trading estate to avoid conflicting traffic movements. Traffic flow on the Portway roundabout would be controlled by traffic lights. These lights would also provide a crossing facility for pedestrians.

The second section would be a new motorway link across the trading estate to join Junction 18 to a new roundabout on Avonmouth Way. The section of Avonmouth Way between the new roundabout and a second roundabout on St Andrews Road would be upgraded to dual carriageway standard but this section would be an all purpose trunk road.

ENVIRONMENTAL EFFECTS AND HOW THESE WILL BE REDUCED

Introduction

Decisions on the road layout, location and alignment have taken into account the local landscape and community, as well as ecological, archaeological and air quality implications. The Published Scheme has been designed to minimise environmental problems by careful choice of road structures and route.

Landscape and Visual Amenity

The scheme is situated mainly within industrial land between Avonmouth Road and Avonmouth Way. There are no areas of scheduled landscape in the immediate vicinity.

The Published Scheme utilises a small flyover but the visual impact is minimised by locating it within the industrial area, at least 250 metres away from the nearest houses.

The proposed landscaping and planting scheme will further reduce the visual impact and will improve existing views by partially screening the industrial premises.

Community

The use of Avonmouth Road as an access route to the docks and industrial area effectively divides Avonmouth village and reduces general road safety. The diversion of the motorway traffic would improve pedestrian access and the enjoyment of community facilities, such as Church Park, by reducing noise, fumes and dust.

Ecology

An ecological survey of the area was undertaken. No sites of wildlife or ecological interest were identified.

Noise

Reduction in traffic volumes will bring about improvements to noise levels at residential properties in Avonmouth Road and St Andrews Road between Portway and Avonmouth Way. Elsewhere there will be little change in noise levels, although minor improvements are anticipated on the southern side of Church Park.

Air Quality

The existing air quality in Avonmouth Road is poor, largely due to traffic. The Published Scheme will bring about significant beneficial effects to residents and users of Avonmouth Road as traffic would be diverted from the village on the new motorway spur.

The diversion of motorway traffic through the trading estate and along Avonmouth Way would bring about a worsening of air quality in these areas. However pollution levels will remain within acceptable levels, and are expected to be lower than now experienced in Avonmouth Road.

Heritage

Reductions in traffic will bring relief to the nearest listed building, the bus depot, in Avonmouth Road. However, the old sea wall, which runs from the existing docks offices in an almost straight line to the football ground adjacent to Avonmouth Road, may be disturbed where it passes under the existing A4 Portway junction. The site has already suffered disturbance from the existing road.

Observations of future geotechnical survey excavation would provide relevant information regarding the survival and condition of archaeological deposits and the depth of modern disturbance. A preliminary statement of the needs of archaeological conservation could then be made.

Industry and Commerce

Around 10 businesses in the trading estate would need to revise operations on site or relocate because of land taken for the new roads. However the road scheme would enable the planned development of further industrial land, now restricted due to access problems, to proceed.

Construction

The main impact during construction will be noise from the piling operations for the flyover and other similar sources, and some general traffic disturbance. Noise may be noticeable at the rear of properties on Avonmouth Road, but will generally be below existing traffic noise levels.

Traffic diversions and controls will at times affect a large area and could lead to delays during rush hours (perhaps over several months on more than one occasion). Construction scheduling will aim to minimise any disturbance and delays.

The construction contract would require measures to control dust, and protect soils and surface/ground waters. Significant impacts on the community are not likely to arise.

Erratum:

Figures 1, 2 and 3:
St.Andrews Way
Roundabout should read
St.Andrews Road
Roundabout

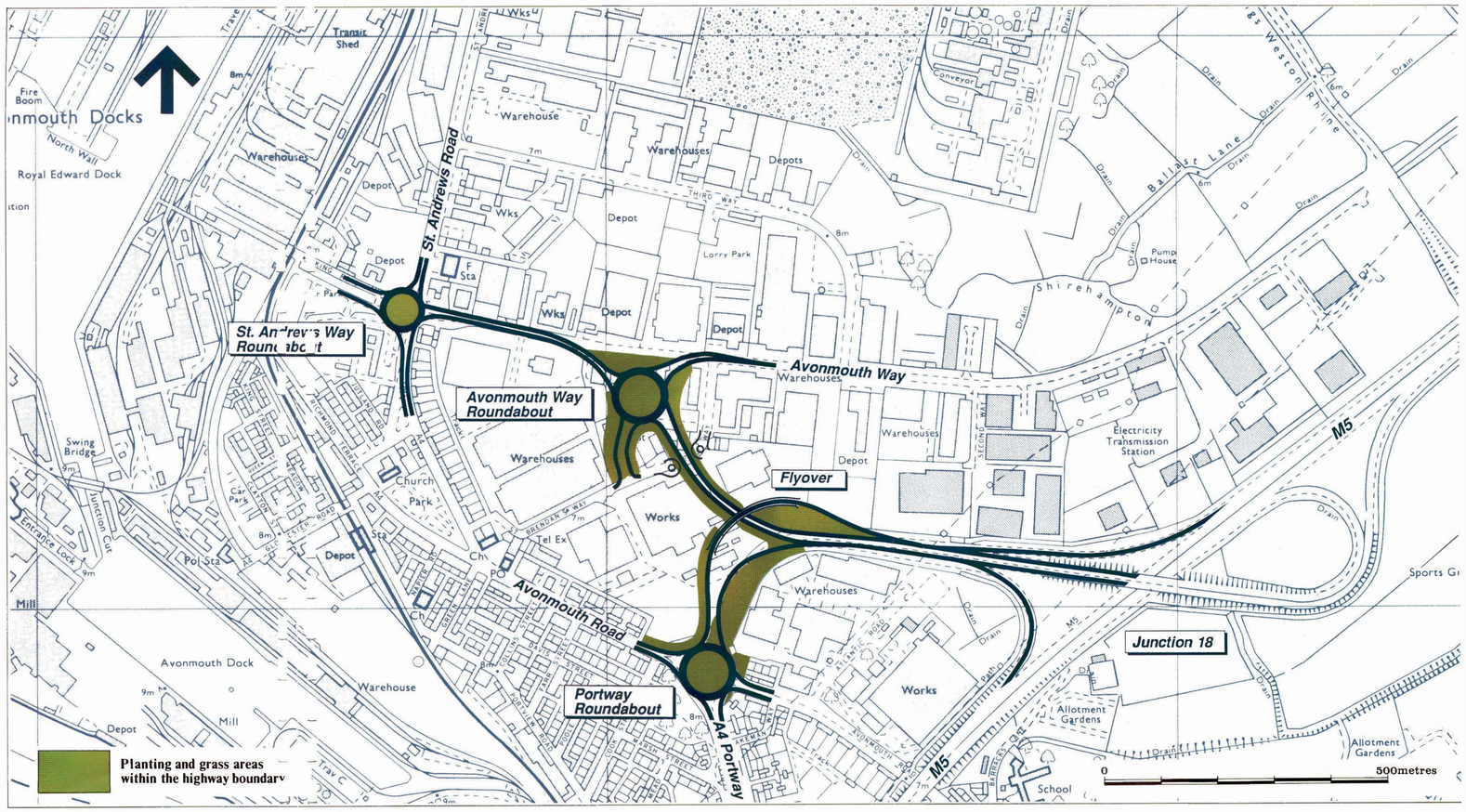

Figure 1. The Published Scheme