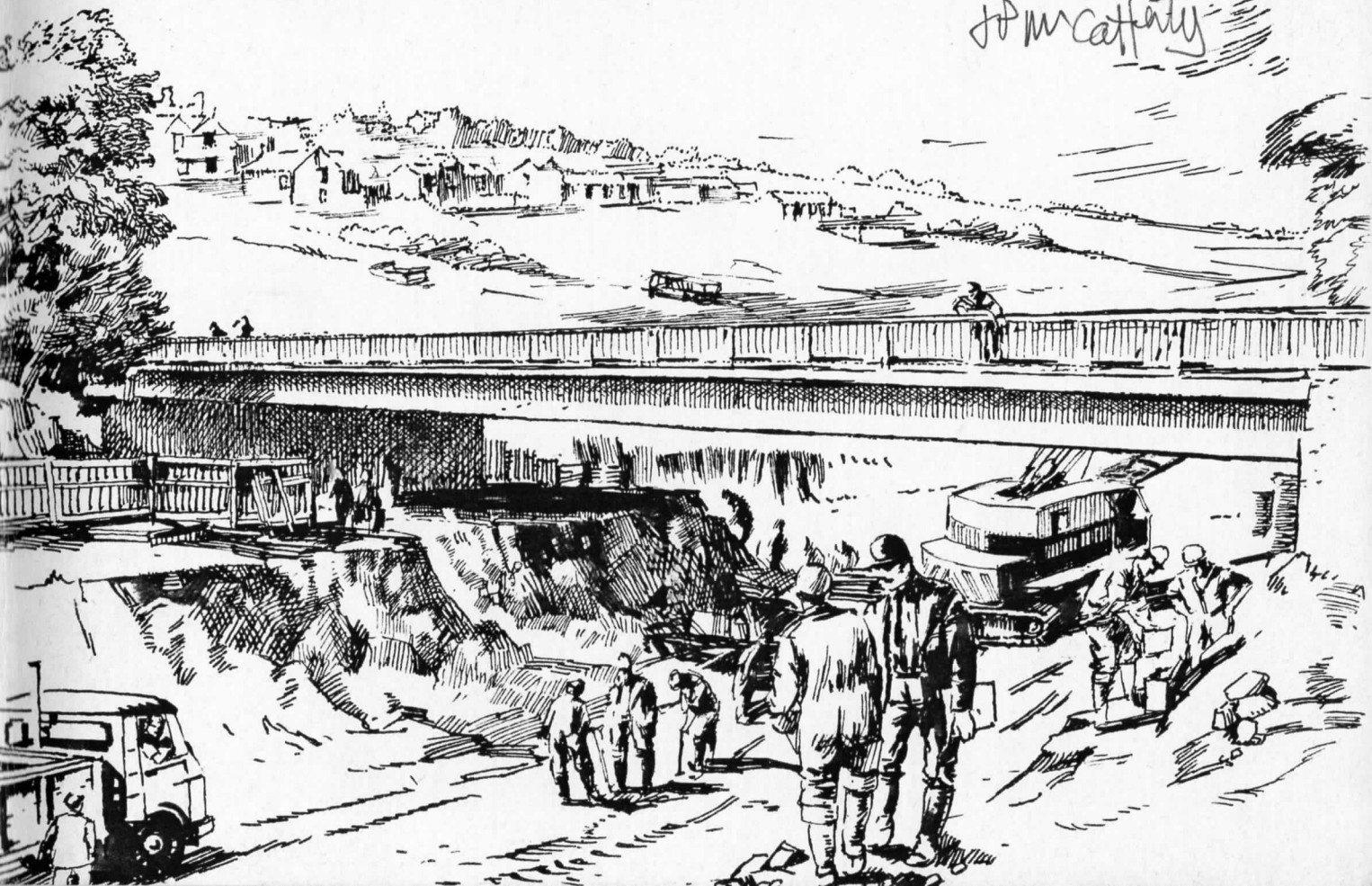


DUMBRECK ROAD CONNECTION

J. McCarty

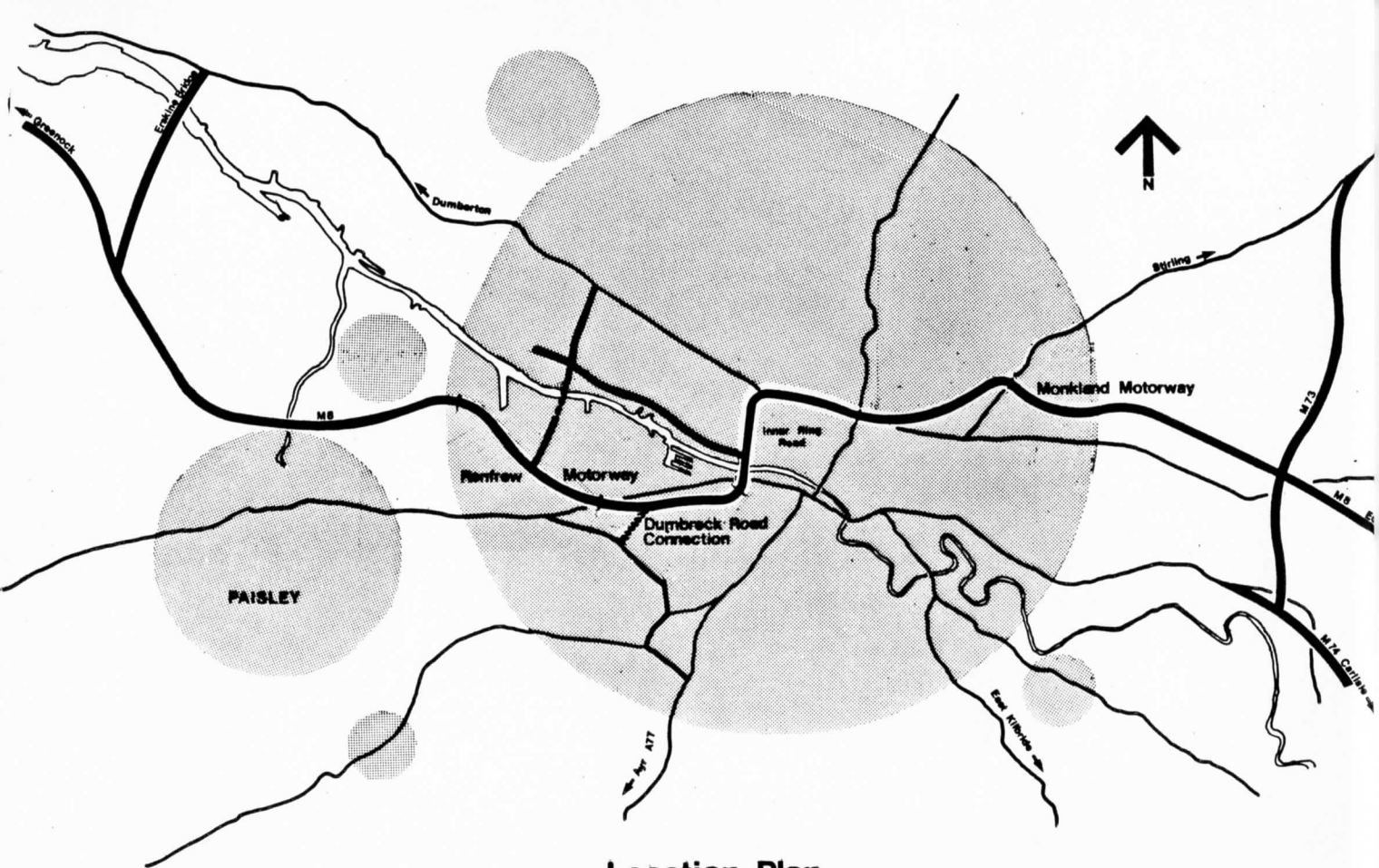


DUMBRECK ROAD CONNECTION

CLIENT : Strathclyde Regional Council
W S McAlonan MSc DipTP C Eng FICE FIMunE
Director of Roads

ENGINEER : Scott Wilson Kirkpatrick & Partners (Scotland)
Consulting Civil and Structural Engineers

CONTRACTOR : Whatlings (Civil Engineering) Limited
Civil Engineering Contractors



Location Plan

PROJECT DATA	Approximate construction cost	(£m)	4.3
	Length of Road	(km)	1.4
	Earthwork Excavation	(m ³)	170,000
	Number of Structures		4
GEOMETRIC DESIGN CRITERIA	Design Speed	(km/h)	80
	Radius Desirable	(m)	400
	Radius Minimum	(m)	230
	Maximum Gradient	(%)	5
	Minimum Sight Distance	(m)	140
	Maximum Superelevation	(%)	7
	Minimum Vertical Curve (K value)		
		Crest	25
	Sag	25	
ADVANCED CONTRACTS	Consolidation of Mine Workings	(£m)	0.09
	Trunk Surface water Sewer	(£m)	0.42

BACKGROUND

Between 1960 and 1963 Scott Wilson Kirkpatrick & Partners produced for the Corporation of the City of Glasgow a comprehensive plan for future highways in the City. The main feature of the plan was a system of motorways and expressways centered about an Inner Ring Road.

It was proposed that the first phase should be an east-west motorway across the City incorporating the North and West Flanks of the Inner Ring Road and Monkland and Renfrew Motorways. Construction started in 1965 at Townhead Interchange.

The opening of Dumbreck Road Connection linking with Renfrew Motorway which was opened in 1976 marks the completion of the Ten Year Programme envisaged in the Highway Plan. Along with Monkland Motorway which was completed last year the new road forms part of an extensive and continuous urban motorway system of some 20 miles throughout the City. The new road has been constructed to take account of the future extension of the route south as part of Strathclyde Regional Council's Ayr Road Route Proposals.

Dumbreck Road Connection is the final link in the ambitious planning project started some 21 years ago.



THE PROJECT

The Dumbreck Road Connection project commences at the existing Ayr Motorway Interchange on Renfrew Motorway crosses and then runs parallel to the Paisley - Canal Railway to link with Dumbreck Road at Haggs Castle Golf Course.

It consists of 1.4 km of dual two lane carriageway, three bridge structures with associated retaining walls and includes a roundabout section at Dumbreck Road.

A 1050 mm diameter surface water sewer was constructed in advance of the main works connecting to the existing Renfrew Motorway sewer.

ROADWORKS

Ground Conditions.

The sub soil conditions consist of marine and glacial alluvial deposits. A fault line traverses the area adjacent to Laburnum Road.

The presence of coal and associated mine workings made ground treatment necessary prior to tunnel works for the sewer and the construction of the bridge over the railway. The treatment consisted of locating the coal seams by waterflush drilling and infilling with a cement/pfa grout. The coal workings to the south of the railway were investigated but were considered to be at a depth not likely to induce damaging strains to either the carriageway or the bridgeworks at Nithsdale Road.




AERIAL VIEW

ROADWORKS (cont) Drainage and Services

The deep cut under Nithsdale Road necessitated the construction of a surface water sewer prior to the main works. The sewer is an extension of the Renfrew Motorway Sewer which discharges to the River Clyde. Construction was in rock tunnel the rock being removed by way of controlled blasting. The sewer has been designed to cater for future southward extensions of the Ayr Road Route.

The normal complex service diversions associated with urban roads did not occur. However local diversions were necessary at Nithsdale Road and Dumbreck Road and were programmed within the main works.



DUMBRECK TRUNK SEWER

ROCK TUNNEL HEADING THROUGH COAL WORKINGS

ROADWORKS (cont) Pavement Construction

A flexible pavement construction has been adopted as best suited to the ground conditions and the varying cross sections of an urban road.

The depth of sub base is 150 mm to 750 mm depending on the sub-grade conditions.

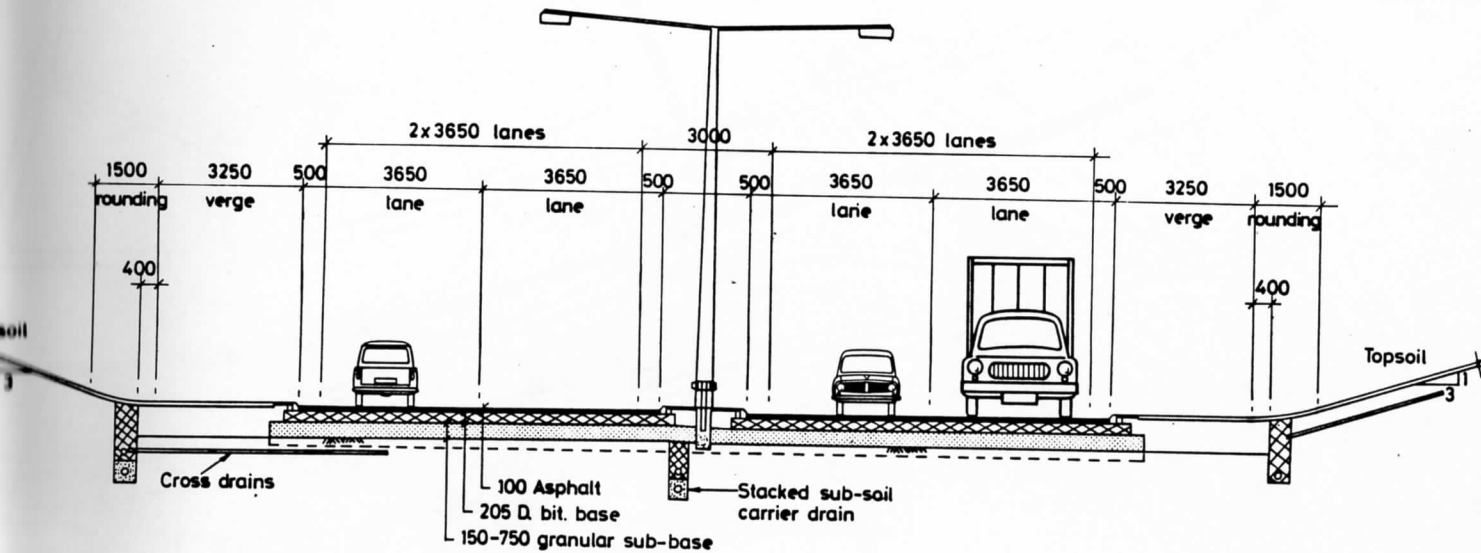
The road base is dense bitumen macadam. The 205 mm thickness of this layer takes account of increased traffic flows when the road is extended. The surfacing is hot rolled asphalt.

Signing and Lighting

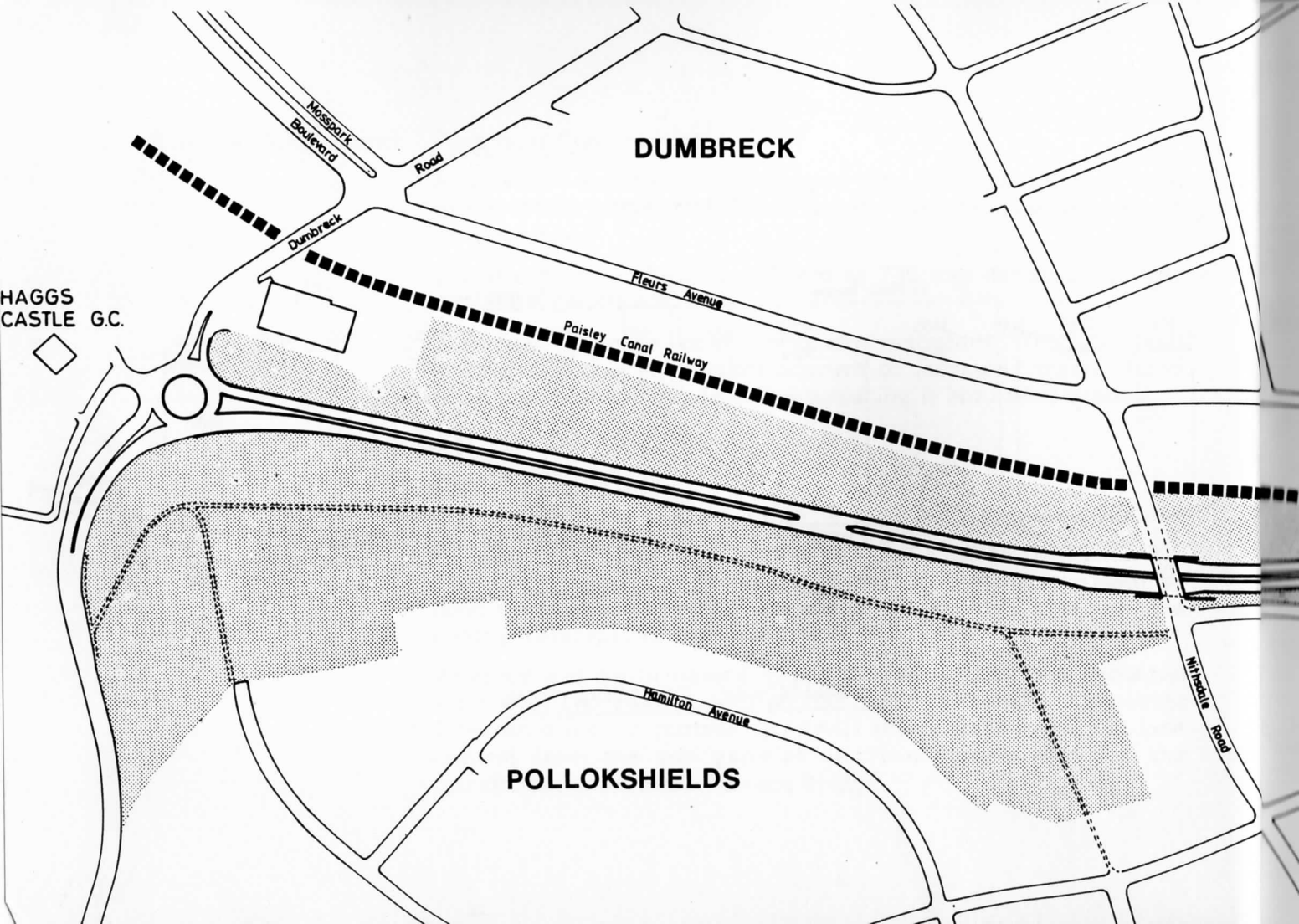
Lighting has been designed by Strathclyde Regional Council Lighting Section.

The carriageways are being lit by sodium lighting mounted on double out-reach lighting standards 12 m high sited in the central reservation.

Advance and confirmatory direction signing is by pole mounted signs with two gantry signs on the Renfrew Ramps. Computer integrated traffic control (CITRAC) will operate by way of lane control from the two gantries and two camera sites at the roundabout and Gower Terrace Bridge.



CARRIAGEWAY CONSTRUCTION



DUMBRECK

HAGGS
CASTLE G.C.

Mosspark
Boulevard

Road

Dumbreck

Fleurs Avenue

Paisley Canal Railway

Wilton
Road

Hamilton Avenue

POLLOKSHIELDS



Bellahouston
Academy

RENFREW
MOTORWAY

Paisley
Road West



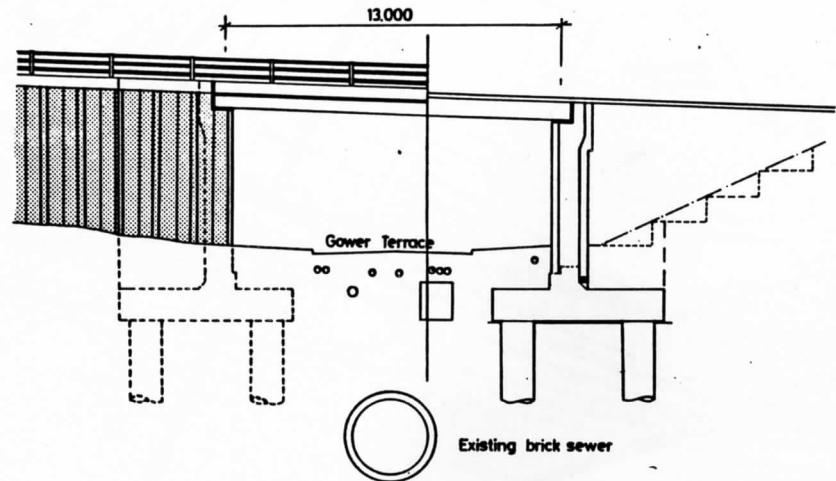
Maxwell Drive

Gower Street

Whitehall Road

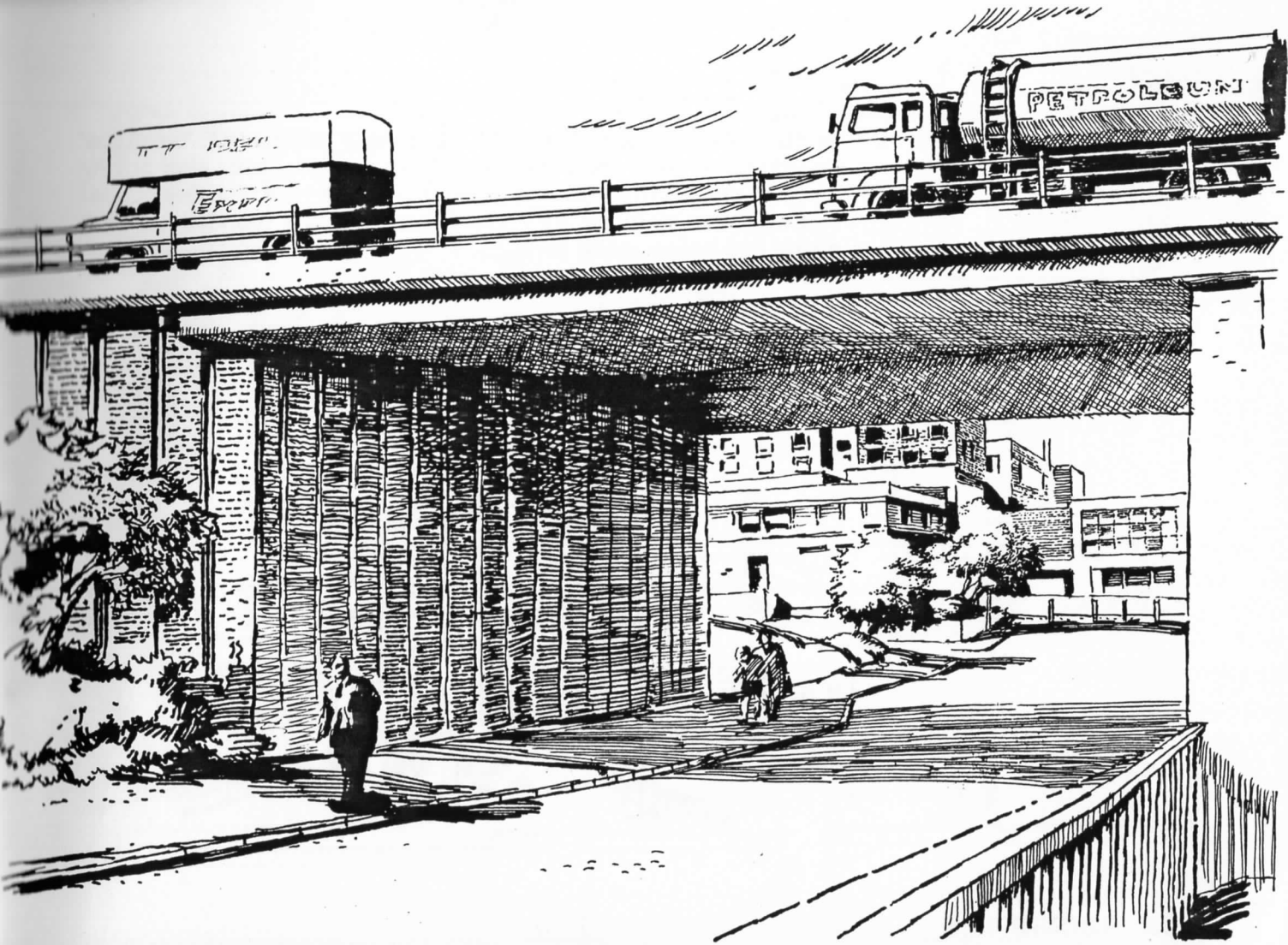
STRUCTURES

There are three bridges and a substantial length of retaining wall on the project



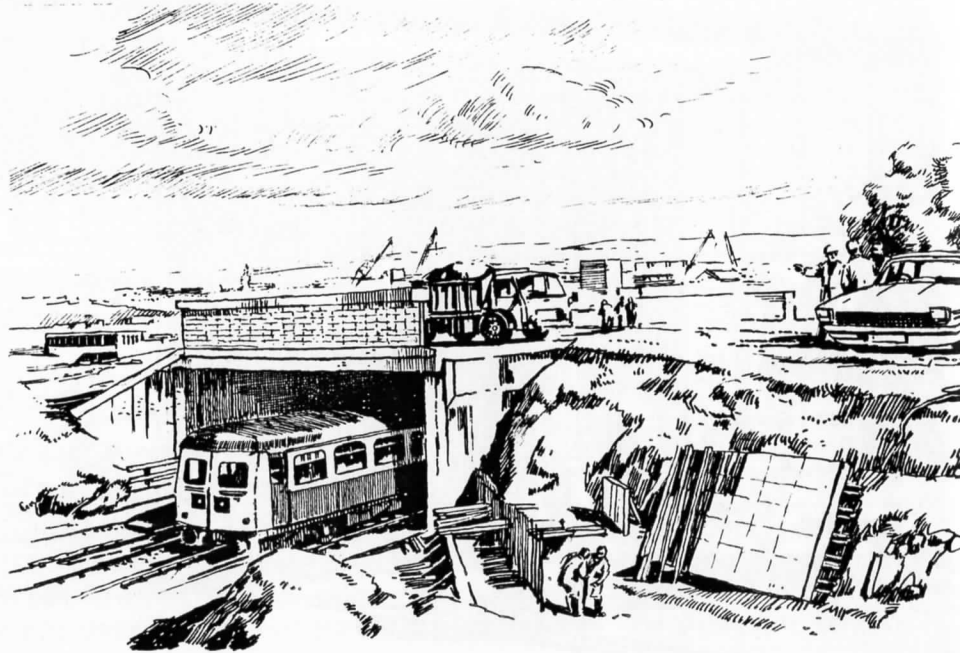
Gower Terrace Bridge is a simply supported cast in situ flat slab in reinforced concrete.

At Gower Terrace protection is required for the existing 2.74 m diameter foul sewer. The abutment footings are therefore supported on bored piles which are located so that the embankment does not surcharge the sewer. The piles are taken to sound rock.

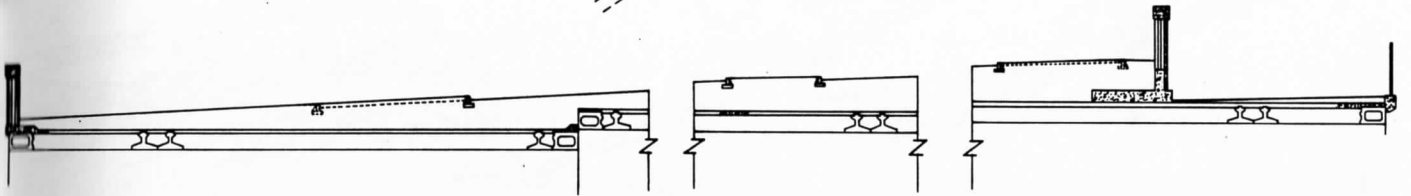
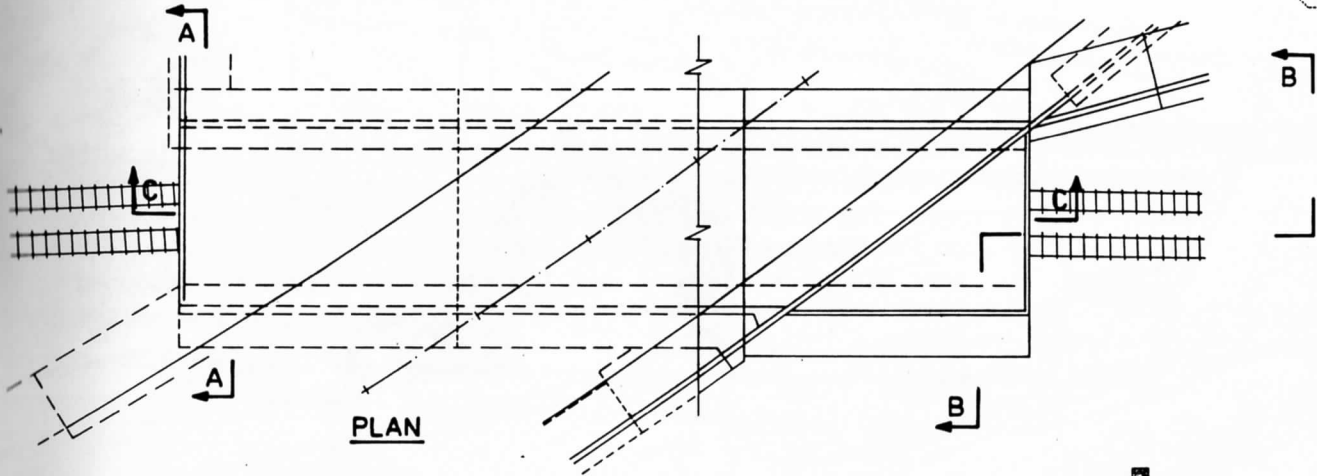
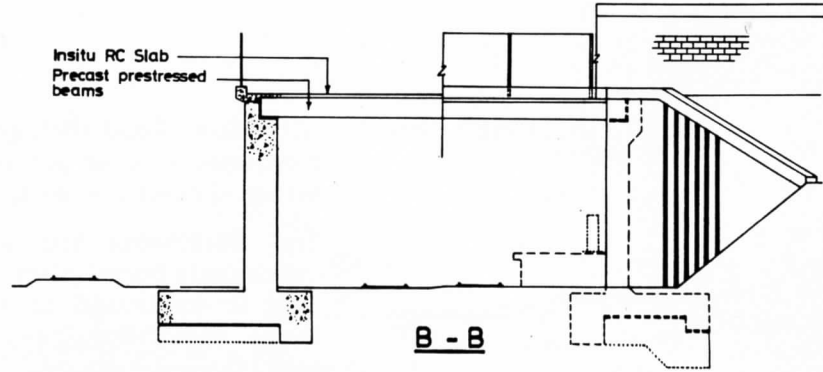
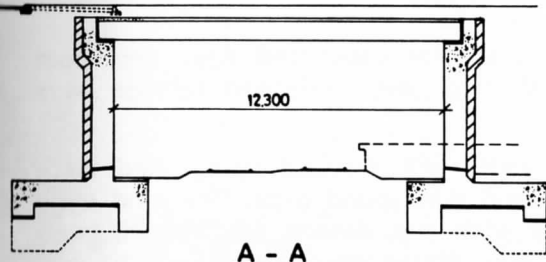


STRUCTURES (cont)

British Rail Bridge No 5 is of simply supported 'box-type' construction with pre-tensioned M beams and insitu slab acting as the deck. This carries the road over the Paisley Canal Railway at a skew of 60° . The abutments are founded on rock about 1 m below track level.



In situ RC Slab
Precast prestressed
beams



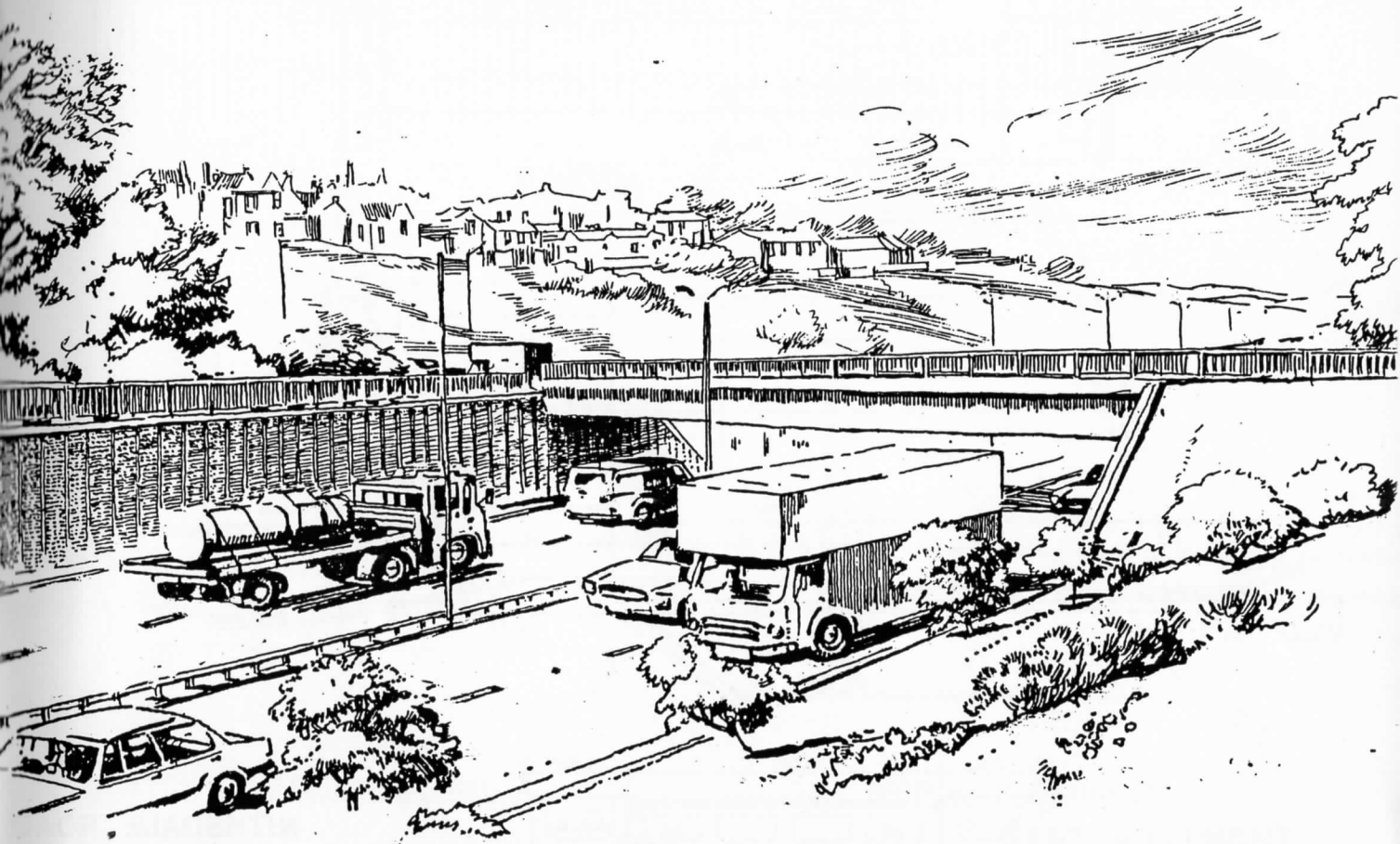
B.R. BRIDGE No. 5

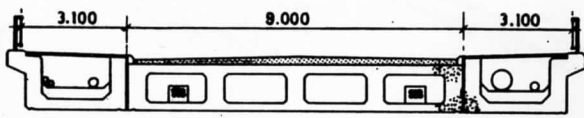
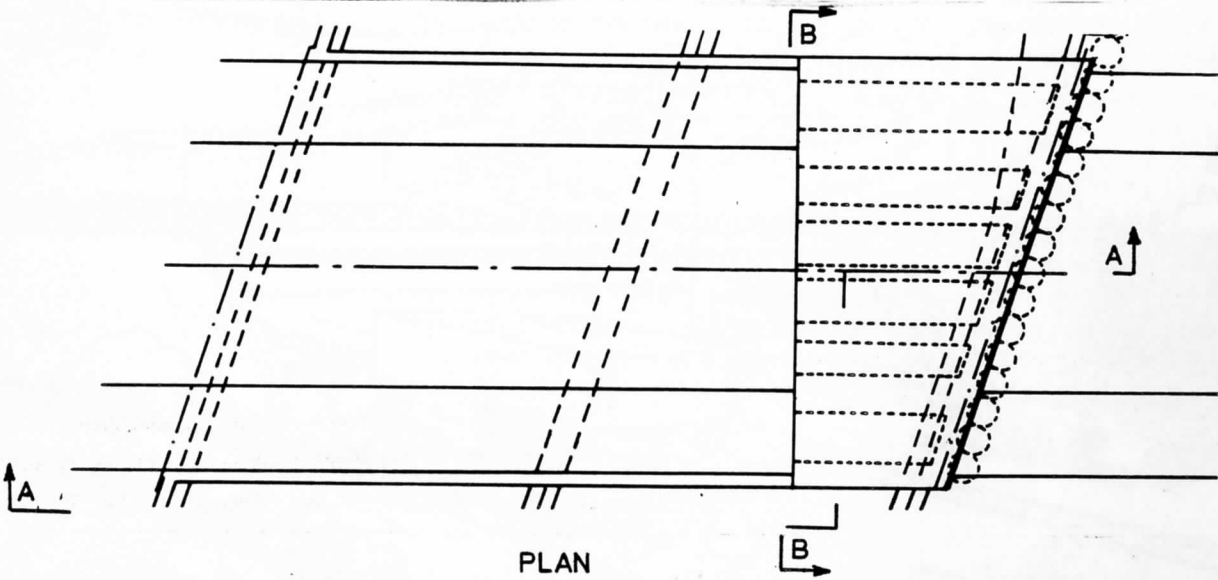
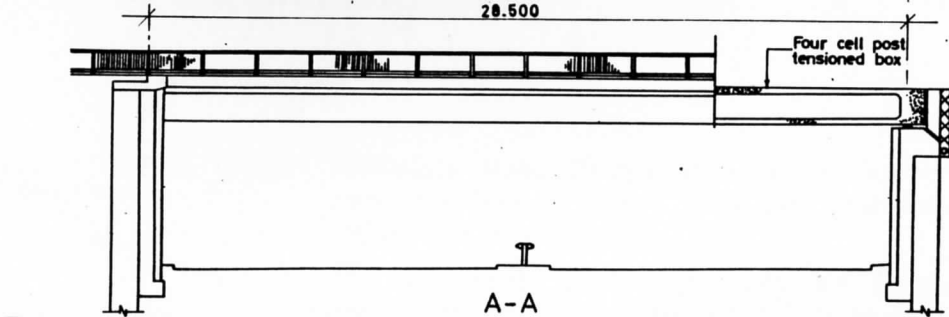
STRUCTURES (cont) Nithsdale Road Bridge is a simply supported four cell post tensioned box structure with two post tensioned service bays either side of the deck.

The abutments and wing walls are formed using tied back contiguous bored piles socketed into sound rock. The east wing wall is continued to tie in with the screen wall at Maxwell Drive and the railway parapet giving the appearance of one continuous structure.

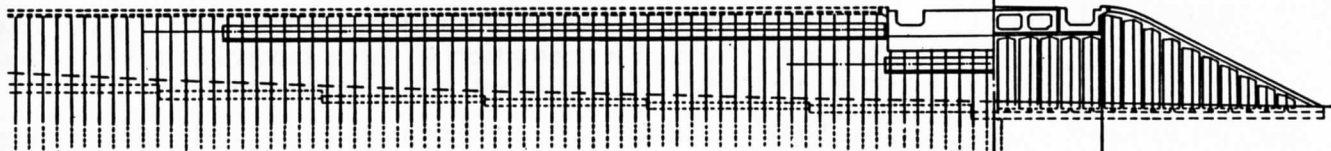
Finishes

The retaining walls are clad with precast concrete panels with an exposed aggregate finish which form an integral part of the wall. The finish and colour are compatible with the other walls on the Glasgow Urban Motorway System. At Maxwell Drive the rear of the walls have been finished in red sandstone coloured block work which is in keeping with the other buildings in the area.

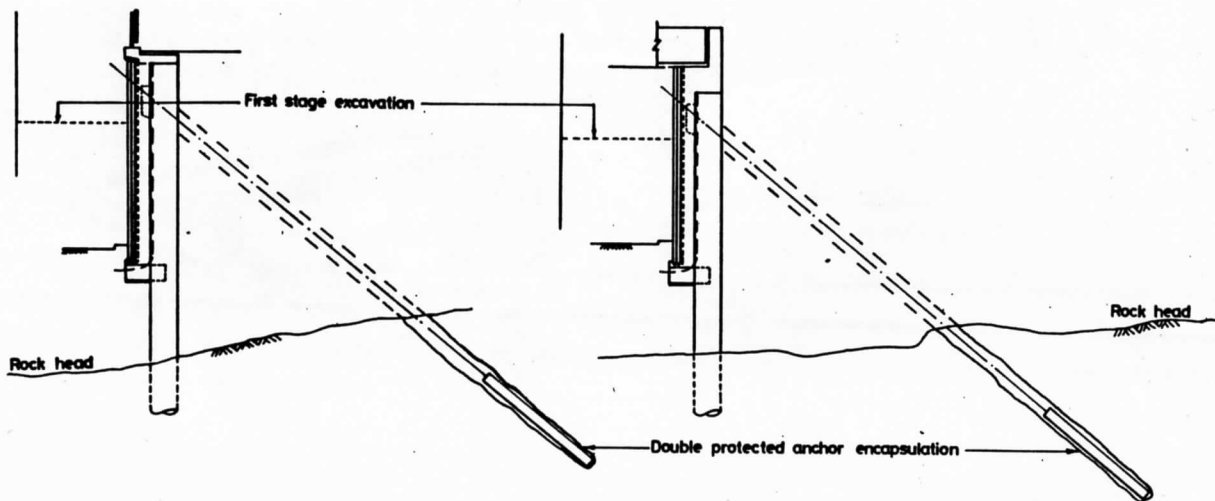




NITHSDALE ROAD BRIDGE



ELEVATION



SECTION ON WALL

SECTION AT ABUTMENT

**EAST ABUTMENT
AND WING WALLS**

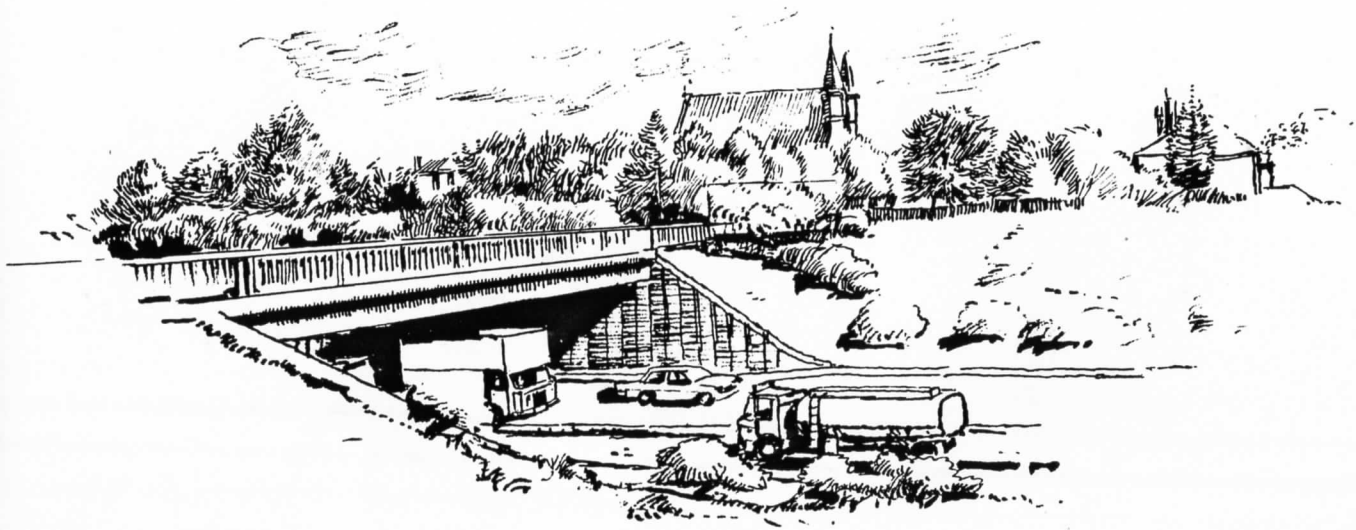
LANDSCAPING

Maximum use of all excavated material within the Contract has been achieved by the formation of large landscape areas below Hamilton Avenue and adjacent to BR Bridge No 5.

This has the dual purpose of improving waste land while causing least disturbance to the environs with the subsequent reduction construction plant on the surface streets.

Some of this land will be given over for playing fields and possible development while the remainder will be landscaped.

A separate Landscaping Contract will commence after the completion of the main works and will include the planting of shrubs and both deciduous and coniferous trees.



DUMBRECK ROAD CONNECTION

Resident Engineer	H Leitch MSc CEng MICE MIHE
Main Works	Whatlings (Civil Engineering) Ltd
Site Agent	J R T Carson BSc CEng MICE W G Montgomery CEng MICE
Trunk Sewer	George Leslie Ltd
Mining Consolidation	Wimpey Laboratories Ltd
Landscape Consultants	Holford Associates
Cover & Illustrations	Ernest B Hood