MANCHESTER – PRESTON MOTORWAY M.61

HORWICH LINK – PRESTON BY-PASS
OPENING BY
THE MINISTER OF TRANSPORT
THE RT. HON. FRED MULLEY M.P.
28th NOVEMBER 1969

MINISTRY OF TRANSPORT

NORTH WESTERN R.C.U.
Director: T.D. Wilson, B.Sc., F.I.C.E.,
F.I. Struct. E., F.I. Mun. E., F. Inst. H.E.

LANCASHIRE C.C. SUB-UNIT
Chief Engineer: James Drake, C.B.E.,
B.Sc., F.I.C.E., F.I. Mun. E.,
P.P. Inst. H.E.

The Manchester—Preston Motorway M.61

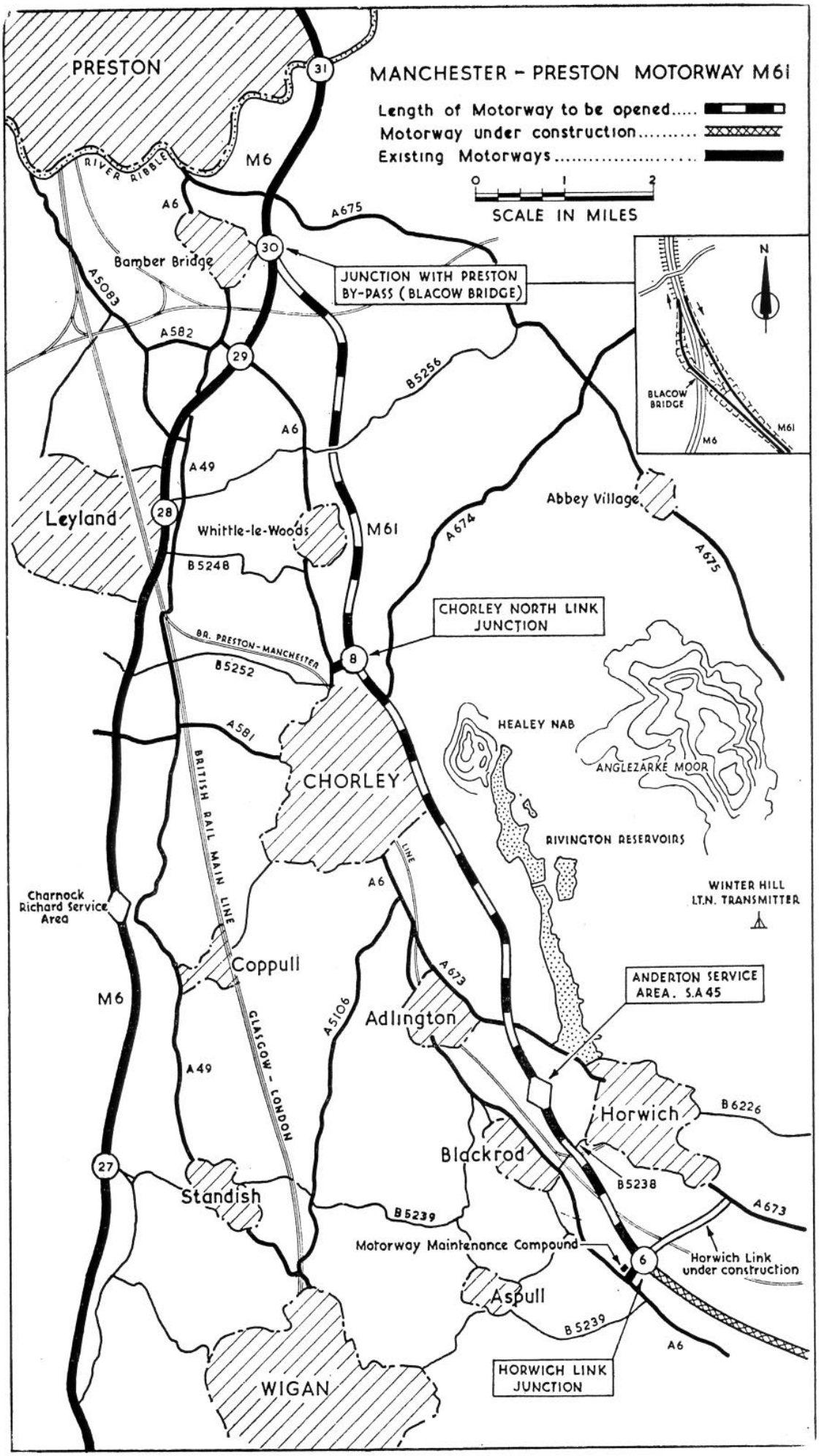
Introduction

The M.61 Motorway will constitute one of the principal routes in the national motorway system within Lancashire. Linking the Lancashire – Yorkshire motorway M.62 and the M.6 motorway near Preston it provides a route for traffic between the south-east Lancashire conurbation and Yorkshire, and the Fylde Coast, north-west England and Scotland.

The need for such a route has long been recognised and it was included in the 'Road Plan' for Lancashire, published in 1949 as an Express (1st Group) Route. At that time it was envisaged that the need could be met by the provision of dual carriageways on about nine miles of the existing A.6 Trunk Road, with by-passes and diversions at Chorley, Adlington and Wingates. The Worsley By-Pass was, however, to be a motorway linking to the proposed motorway system in the Manchester area at the western section of the Manchester Outer Ring Road (now the Lancashire – Yorkshire Motorway).

In 1962 a revised assessment of future traffic indicated that the whole of M.61 should be constructed as a motorway. The formal invitation by the Minister of Transport to the Lancashire County Council to prepare a Scheme under Section 11 of the Highways Act 1959 was made on the 29th November, 1963, and the proposed line was submitted on the 10th April, 1964. The line of this motorway was confirmed in three lengths, the final section during October, 1967. The last of the Variation Orders for side road alterations and diversions was made in October, 1968. In addition to the section of motorway between Horwich Link and M.6 which is to be opened to traffic work is in progress on the remaining section between Horwich Link and the Worsley Braided Interchange. This is included in Contract M.61/7 which comprises the construction of 6·5 miles of dual three-lane motorway and the completion of works over a length of two miles in the Worsley Braided Interchange. This Contract commenced on the 1st January, 1969, and is scheduled for completion on the 31st December, 1970. The whole of the 22 miles length of M.61 will then come into use, one year in advance of the original programmed date.

At the Horwich Link Interchange a Contract is in progress for the construction of a length of principal road connecting the Horwich – Bolton Road A.673 at Horwich with the M.61. It is 1·10 miles in length, of which 0·74 miles is within Bolton County Borough, and has dual 24' wide carriageways. The scheme has been designed by the Lancashire County Surveyor and Bridgemaster who is also supervising the construction. Work commenced on the 4th November, 1968, and is scheduled for completion on the 3rd May, 1970, but the Contractors The Sir Alfred McAlpine & Son Limited – Leonard Fairclough Limited Consortium hope to complete it at an earlier date.


MANCHESTER – PRESTON MOTORWAY M61
Length of Motorway to be opened.....
Motorway under construction.....
Existing Motorways.....
0 1 2
SCALE IN MILES
PRESTON
31
M6
RIVER RIBBLE
A6
A675
Bamber Bridge
30
JUNCTION WITH PRESTON BY-PASS (BLACOW BRIDGE)
A5083
A582
29
B5256
A6
A49
Leyland
28
Whittle-le-Woods
M61
B5248
A674
Abbey Village
A675
CHORLEY NORTH LINK JUNCTION
BR. PRESTON-MANCHESTER
B5252
8
A581
HEALEY NAB
ANGLEZARKE MOOR
CHORLEY
BRITISH RAIL MAIN LINE
RIVINGTON RESERVOIRS
WINTER HILL L.T.N. TRANSMITTER
A6
Charnock Richard Service Area
Coppull
M6
A673
A5106
Adlington
ANDERTON SERVICE AREA. S.A 45
A49
GLASGOW - LONDON
Horwich
B6226
Blackrod
27
B5238
Standish
A673
B5239
Motorway Maintenance Compound
6
Horwich Link under construction
Aspull
B5239
A6
HORWICH LINK JUNCTION
WIGAN
N
BLACOW BRIDGE
M6
M61

Horwich Link to Preston By-Pass M.6

The 13 miles of Motorway runs generally parallel and to the east of the A.6 Trunk road. Commencing to the north of Westhoughton it passes between the towns of Blackrod and Horwich, and by-passes Adlington and Chorley, skirting the moorland to the east. Continuing northwards, the motorway avoids the residential and industrial development in Whittle-le-Woods, and finally joins the Preston By-Pass at Bamber Bridge at a point approximately two miles south of the junction of M.6 and A.59 at Samlesbury.

The route of the Motorway north of Chorley crossed the south end of the Lancaster Canal at three points. As the canal was already disused and rapidly deteriorating, it was agreed by the Ministry of Transport and British Waterways Board that the expense of bridging the canal was not justified. The Board therefore promoted a Bill in Parliament to denavigate the canal between Town Lane, Whittle-le-Woods and Walton Summit, a distance of three miles. A scheme was then prepared by the Board to reinstate the canal with a view to returning it to agriculture where possible, and the Ministry agreed to meet the cost of providing unsuitable material from the Motorway cuttings for the purpose of filling in the canal, where it was required by the Board.

A prominent feature along the line of the Motorway was the 100 year old Botany Railway Viaduct, which had carried the Chorley – Cherry Tree railway line over the Leeds – Liverpool Canal at Chorley. This viaduct had an overall length of 385′ and the width between spandril walls was 28′ 6″. It consisted of nine masonry faced semi-circular arches each of 33′ clear span carried on 4′ 6″ wide masonry piers. This was demolished on the 10th November, 1968, by means of explosives.

A total of 51 houses had to be demolished and of these 44 in the Botany Brow area of Chorley were due for demolition by 1970 under a re-development scheme. Arrangements were made with the Housing Authorities concerned for the re-housing of tenants where required.

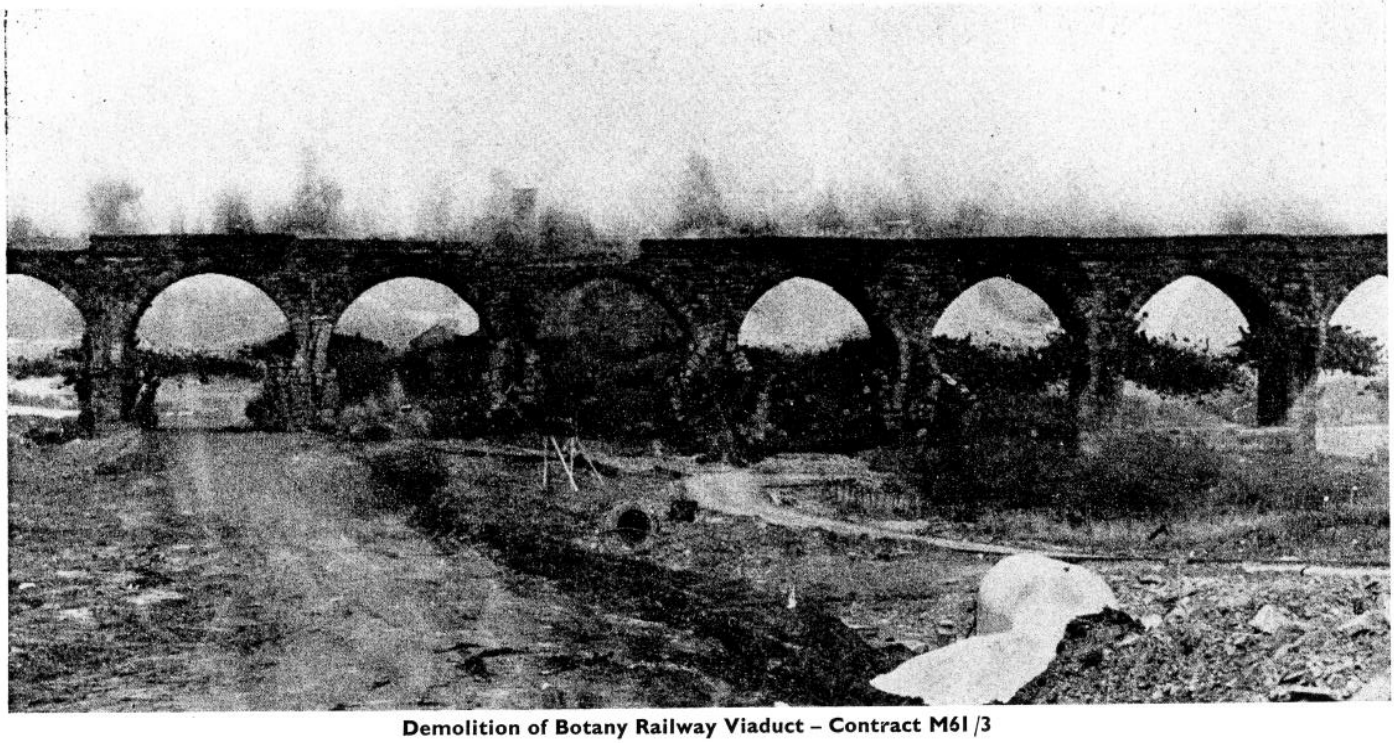
Contracts Further details are given in Appendix A.

Advance Works

(i) Certain works if carried out as part of the main contracts would have seriously affected the smooth progress of earth moving operations and these were, therefore, included in advance works contracts.
North of Westhoughton the diversion of Pearl Brook and the Rivington Aqueduct were essential to allow earthworks operations to be carried out at the start of Contract M.61/3.

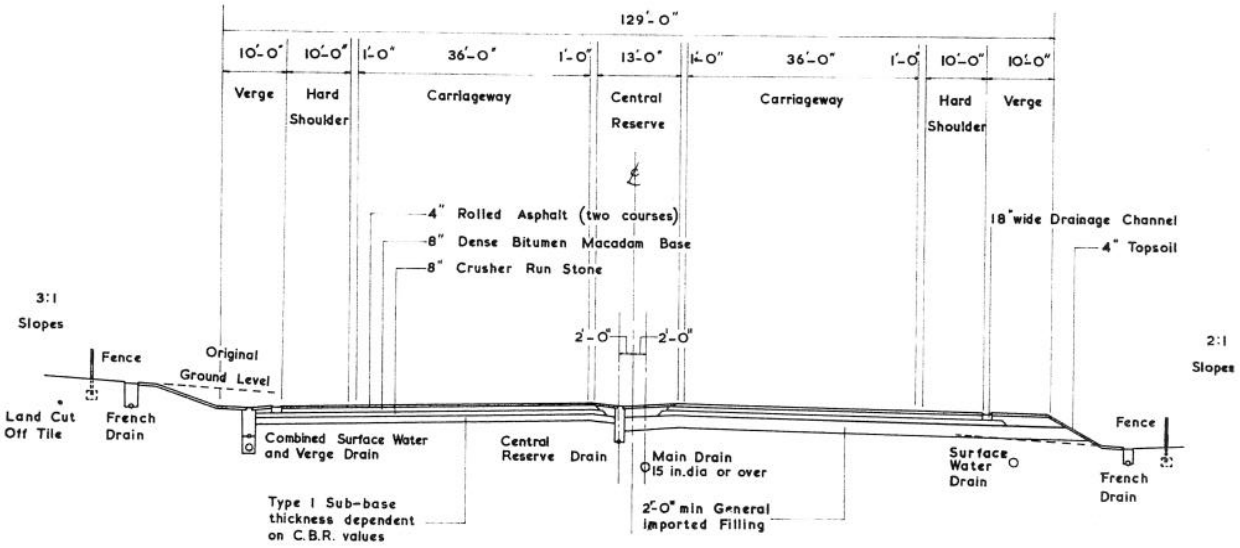
Pearl Brook passed under Crown Lane on the centre line of the motorway and lay within the motorway land-take for a distance of approximately 350 yards. The motorway at this point is on embankment with a maximum height of 35 feet and due to the poor nature of the ground it was considered necessary for this embankment to be constructed during the first nine months of the main contract to enable any settlement to take place. The Pearl Brook Diversion consisted of the construction of two reinforced concrete box culverts connected by an open concrete paved channel of a total length of 550 yards.
The diversion of the Rivington Aqueduct where it passed under the line of the motorway consisted of the laying of twin 42″ diameter steel pipes surrounded with concrete and with chambers at each end. This work was carried out on behalf of the Liverpool Corporation Waterworks Department.

(ii) The connection of M.61 with the Preston By-Pass section of M.6 at Bamber Bridge involved the construction of Blacow Bridge which carries the northbound carriageway of M.61 over M.6. In view of the time required to construct this bridge over a motorway which was open to traffic it was considered necessary for it to be carried out in advance. Contract M.61/5

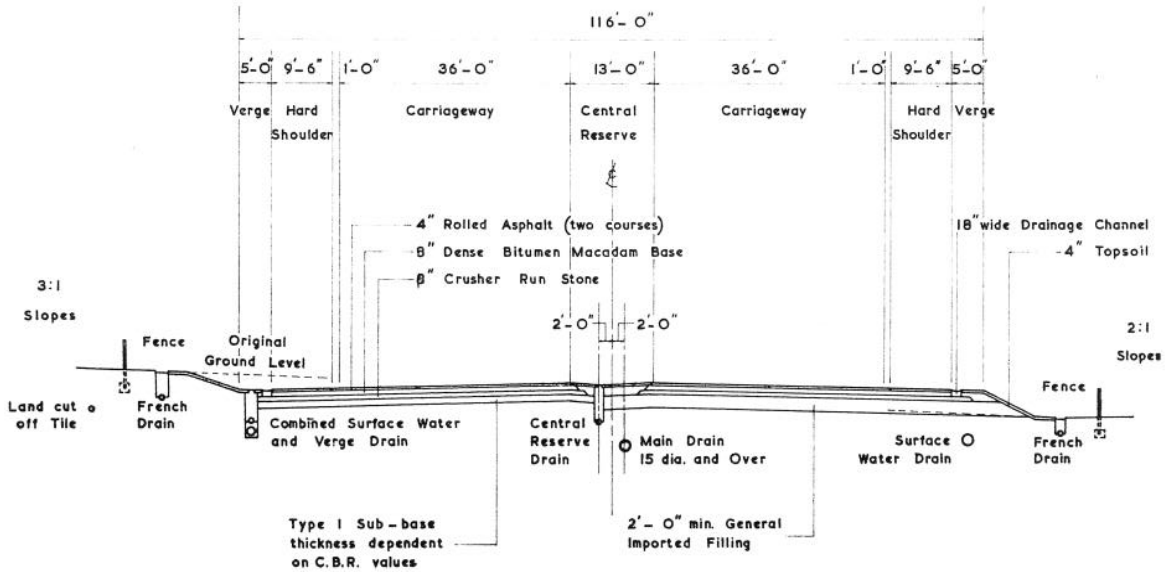


Demolition of Botany Railway Viaduct – Contract M61/3

TYPICAL MOTORWAY CROSS SECTIONS



CONTRACT M 61/3



CONTRACT M 61/6

included earthworks, drainage and ancilliary works in addition to the construction of the bridge.

(iii) Other advance works included the permanent diversion of overhead cables by the North Western Electricity Board and diversions of the Thirlmere Aqueduct by the Manchester Corporation Waterworks. The aqueduct which carries over 40,000.000 gallons of water daily to the Manchester area passed under the motorway. The diversions consisted of the laying of twin 72″ diameter steel pipes surrounded with concrete.

Main Works

Work on the 8 miles length of dual three-lane carriageway between Horwich Link and Chorley North Link, included in Contract M.61/3, commenced on the 1st January, 1968. Included in this contract are two-level interchanges at each extremity with dual carriageway link roads connecting the Motorway to A.6.

The length of Motorway to the north of Contract M.61/3, comprising 4·2 miles of dual three-lane carriageway together with single carriageway link roads connecting to the M.6, has been constructed under Contract M.61/6. Work on this contract commenced on the 1st June, 1968.

Both contracts were scheduled for completion on the 30th November, 1969.

Layout and Construction

The overall effective width of the motorway in Contract M.61/3 is 129′ made up of 36′ wide carriageways, with 1′ wide marginal strips on each side, 10′ wide paved hard shoulders, 10′ wide grassed outer verges and a 13′ wide grassed central reserve.

During the design period for Contract M.61/6 the Ministry introduced revised standards. The overall width on this section of the motorway is 116′, and complies with the latest standard, the reduction being due to the omission of 1′ wide marginal strips adjoining the central reserve, the reduction of widths of the hard shoulders and grassed outer verges to 9′ 6″ and 5′, respectively.

Surface water run-off from the carriageways and hard shoulders is collected into concrete channels and then discharged via gullies into the main piped surface water drainage system. The run-off from slopes, grassed verges, and land sloping towards the motorway in cuttings, is intercepted by French drains.

On both contracts alternative tenders were invited for differing types of carriageway construction as follows:

(1) Flexible construction with a base of 8″ dense bituminous macadam;

(2) Flexible construction with a base of 7″ hot rolled asphalt;

(3) Composite construction with a base comprising a 3″ thickness of dense bituminous macadam laid on a 7″ thickness of lean concrete.

In both contracts alternative (1) proved to be the cheapest. The carriageway construction therefore consists of:

1½″ hot rolled asphalt wearing course with pre-coated green granite chippings;

2½″ hot rolled asphalt base course;

8″ dense bituminous macadam base;

8″ crusher-run limestone sub-base;

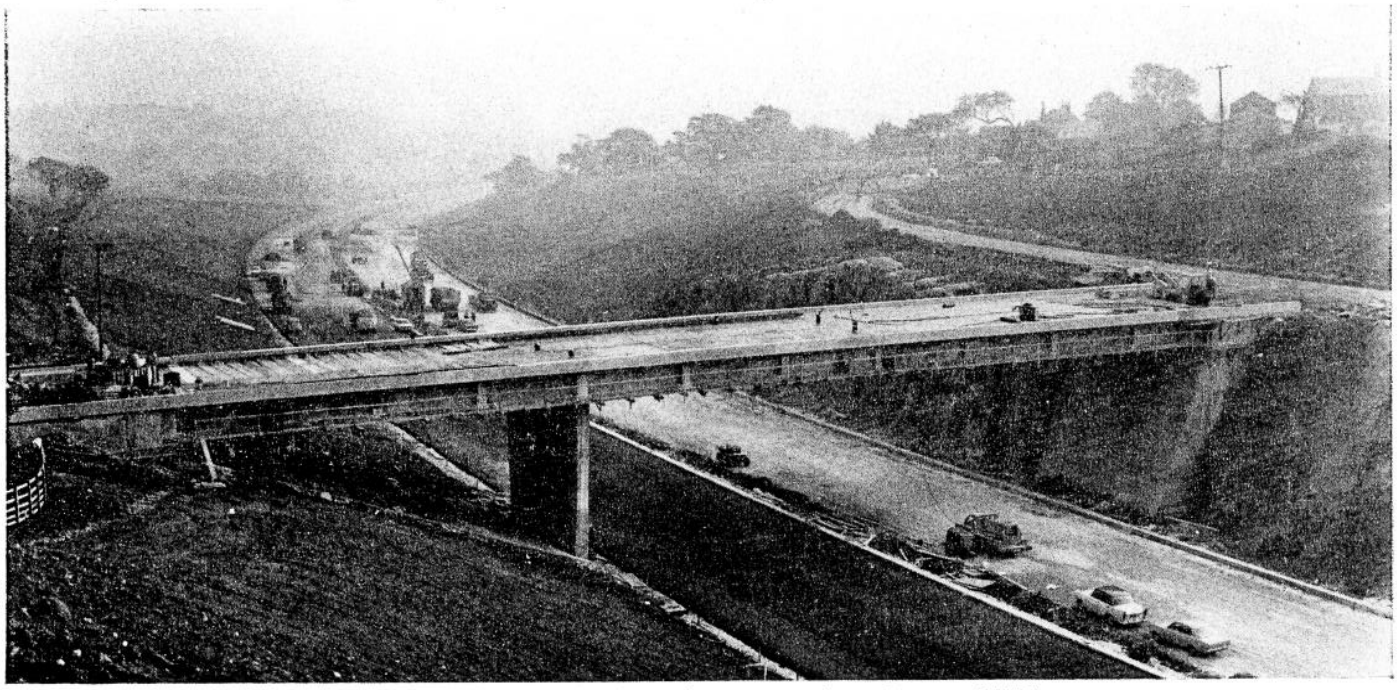
A lower layer of sub-base of variable thickness.

The surface of the hard shoulders consists of 4″ depth of dense bituminous macadam treated with red 'Schlamme' to give a contrasting colour to that of the carriageways. This consists of a mixture of sand, filler, bitumen and water, to which a red pigment is added.

'Schlamme' cannot be laid during the winter months and although a limited area of hard shoulder was covered in the late summer and early autumn it will not be possible to complete the work until the spring. At that time it will be necessary to temporarily close the slow lane during the hours of daylight over a period of a few weeks.

Approximately 500,000 tons of bituminous material have been laid on the two contracts.

The white painted lines marking the edges of the carriageways are reflectorised.



Hill Top Bridge and Cutting under construction – Contract M61/6

Seed Lee Bridge – Contract M61/6

Road studs with four different coloured reflectors are incorporated as follows:

The nearside and offside edges of the carriageways are generally marked by red and amber reflectors respectively. At junctions, however, the edge of the carriageway alongside the acceleration and deceleration lanes is marked by green reflectors. White reflectors are used to indicate the carriageway lanes.

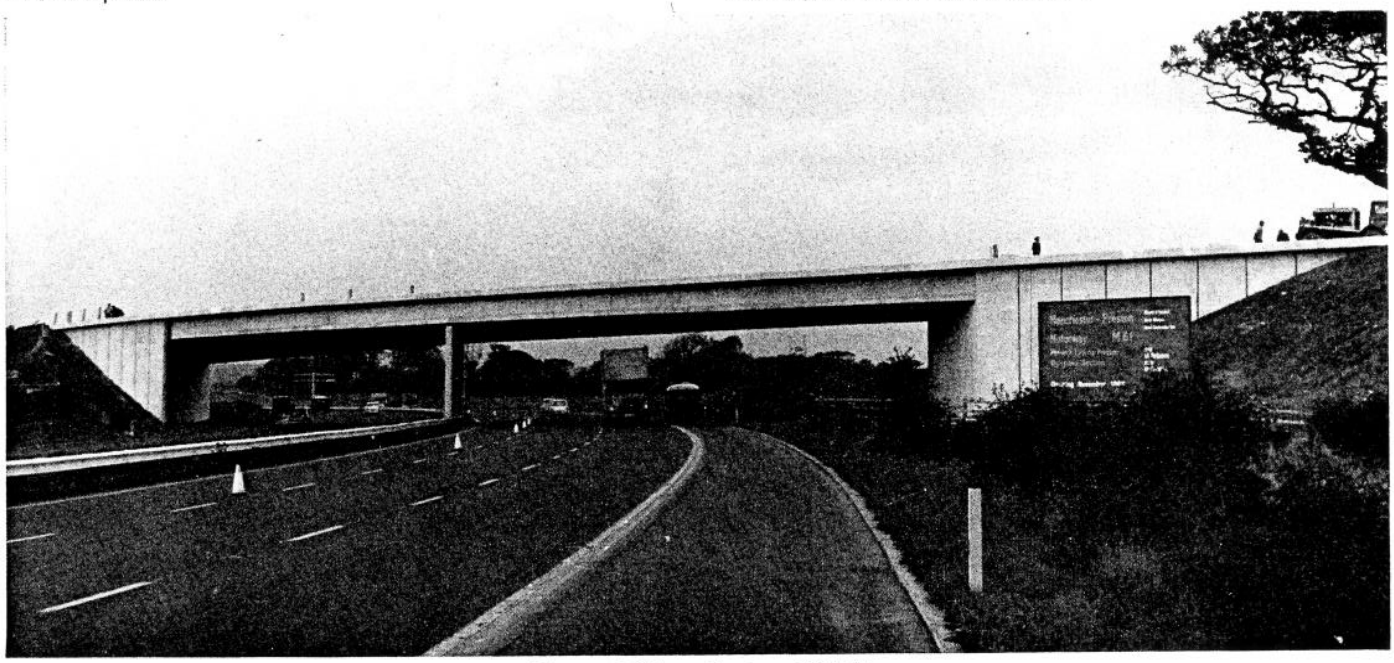
Earthworks

Soils encountered along the route consisted of boulder clay of varying plasticities, sand, silt, peat, shale and gritstone. Over a length of 800 yards immediately north of Red Moss Railway Bridge, a deposit of peat, average depth 13′ was dug out and replaced with granular materials, before the motorway embankment could be formed. At the north end of Contract M.61/3, at Gale Moss a deposit of waterlogged peat, reaching a maximum depth of 42′, was encountered, and was dealt with by a combination of excavation and displacement techniques so as to replace the peat with granular material. Test bores were taken through this granular material to prove that the displacement of the peat was complete.

To the north of the River Lostock at Whittle-le-Woods, the route of the motorway passes through a valley between hills, from which gritstone has been quarried. This valley was found during site investigation to be an old glacial channel and, although rock appears on both faces of the motorway cutting, peat, silt and other soft materials were found at motorway formation level. These conditions combined with a water table which was virtually at existing ground level, made excavation extremely difficult.

Shallow mine workings were found in the cutting near Nick Hilton Lane and where the top of the seam was within 17′ of finished motorway level, all material was excavated out to the bottom of the seam, and the excavation back-filled with granular material. Where the depth varied between 17′ and 32′ a 8″ thick double reinforced concrete raft was provided in the carriageway construction, extending 4′ beyond the outer edges of each carriageway.

Eight old mine shafts were exposed and these were proved for the depth of fill. The shafts were then covered either with a substantially reinforced concrete slab at rockhead level or, where not feasible to found at rockhead level, with a thick concrete plug. One of these shafts proved very difficult to locate due to dredgings from the canal overlying it to a depth of approximately 30′.



Blacow Bridge – Contract M61/5

In all, approximately six million tons of material were excavated and more than five million tons of fill imported to make up the deficiency of suitable material required to form the embankments and also to backfill the peat excavations. The imported material has mainly been obtained from four sources. The most important of these is Healey Nab, where by shaving off the top 30′, approximately 2,500,000 tons of material have been obtained. When final reinstatement has taken place, the resulting appearance of the hillside should be very little different from the original. 300,000 tons of unburnt colliery shale were also obtained from an old tip at Scot Lane, Blackrod.

Bridgeworks

Forty-two bridges have been constructed on this length of motorway in Contracts M.61/3, 5 and 6. Twenty carry the motorway over road, railways, a canal, rivers, footpaths and streams; sixteen carry other roads over the motorway; four carry footpaths over the motorway; and two carry roads over streams.

The bridges carrying the motorway are generally of one or three spans, whilst those over the motorway are mainly four-span, the elevations being necessarily asymmetric in a few instances.

Piled foundations are provided for 21 of the bridges. To suit the differing design requirements, prestressed concrete, reinforced concrete, steel girders and preflexed girders are used to form the decks. For most prestressed and steel deck bridges, standard I-section beams are used.

Although most of the overbridges are of the four-span type, in certain instances site conditions require the provision of bridges having unusual elevations, adding interest to the motorway.

Generally plain concrete finishes have been adopted but precast block facework and treated concrete surfaces have been provided in a few special cases. Open type parapets have been used throughout.

All the road bridges are designed to carry the Ministry of Transport Standard Loading and those carrying the motorway have been checked for the abnormal (heavy) loading. Occupation bridges are designed for half of the Ministry Standard Loading.

The very considerable amount of bridge construction required careful planning by the Contractors in order to maintain adequate progress in the contract periods allowed. This involved the continuance of work at many key bridge sites throughout the winter months (1968/1969) to phase in with the overall programming of the Contracts.

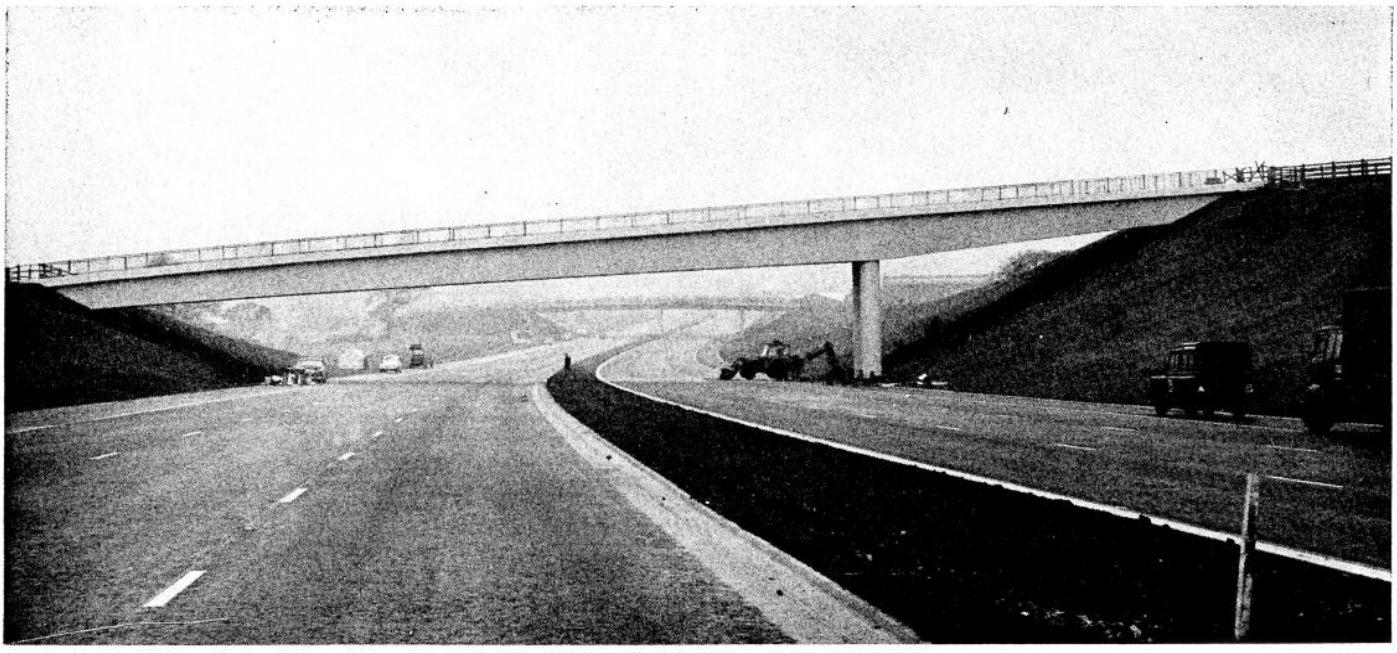
A few of the more interesting bridges are described below:

Blacow Bridge the construction of which was included in Contract M.61/5 has a 50′ wide deck, curved in plan, carrying the northbound carriageway of the M.61 motorway over the M.6 motorway in two spans approximately 148′ long at a skew of about 45°. The deck comprises 10 concrete-encased continuous welded high yield steel plate girders with a composite R.C. deck slab. Each girder has a central non-preflexed section 80′ long and curved in plan, and two straight preflexed sections each approximately 108′ long. The centre pier has a piled foundation. The plain concrete finish to the abutments, wing walls and piers is relieved by the provision of deep vertical groves at 8′ intervals.

Botany Brow Bridge has six continuous spans of 56′, 3× 80′, 82′ and 48′. The 54′ wide deck consists of six welded steel plate girders with a reinforced concrete deck slab. The bridge is curved in plan and has a small skew. It carries the Chorley – Blackburn Road A.674 over the motorway and the Leeds – Liverpool Canal. The abutments and two piers have piled foundations, the remaining three piers have spread foundations. The columns of the open type piers are precast.

Crosse Hall Lane Bridge has two square spans of 79′ and 168′. The 18′ wide sloping deck, which is of prestressed (post-tensioned) concrete of hollow box sections, is supported by twin circular reinforced concrete columns and bank seats, on spread footings, and carries an occupation road over the motorway. A 24″ dia. and two 12″ dia. water mains are carried inside the hollow box, as well as a number of other services.

Bibbys Farm Footbridge is an asymmetric reinforced concrete winged portal. The portal frame, approximately 163′ between centres of hinges, spans the motorway, which is in sidelong ground, and the side span, monolithic with the frame, projects approximately 83′ to the top of the slope of the motorway cutting. The tension piles of one of the footbridge foundations are post-tensioned with rock anchors.



Crosse Hall Lane Bridge – Contract M61/3

Seed Lee Bridge has curved soffits, is 36′ wide, and has three spans of 63′, 141′ and 83′. The deck comprises cantilever side spans of cellular reinforced concrete with a centre suspended span of prestressed inverted tee beams, and carries Brindle Road over the motorway. The east bank seat has a piled foundation, and the west bank seat and piers have spread foundations.

Hill Top Bridge, located in an attractive rock cutting, has two square spans of 141′ and 74′, and carries Huggarts Lane over the motorway. The 40′ wide deck is formed by eight concrete-encased continuous welded steel plate girders with a composite R.C. deck slab. Each girder has a non-preflexed high yield steel section 64′ long over the pier, a non-preflexed mild steel section 43′ long in the shorter span, and a preflexed high yield steel section 111′ long in the main span. Guniting was adopted to obviate the use of formwork for web encasement of the girders. The east bank seat and pier have piled foundations, and the west abutment is founded on rock.

Service Area and Maintenance Compound

Service Area

The Area is not due to come into operation until spring 1971, and, then, only the restaurant building on the northbound side of the motorway will be open.

Bulk earth moving operations in connection with the Service Area and the construction of the footbridge and service road have been carried out in Contract M.61/3. The Developer's works and the remainder of the Minister's works involving perimeter roads, hard standings, etc., will commence in the spring of 1970. Advance works in connection with perimeter roads have been carried out in Contract M.61/3A negotiated with the motorway contractors.

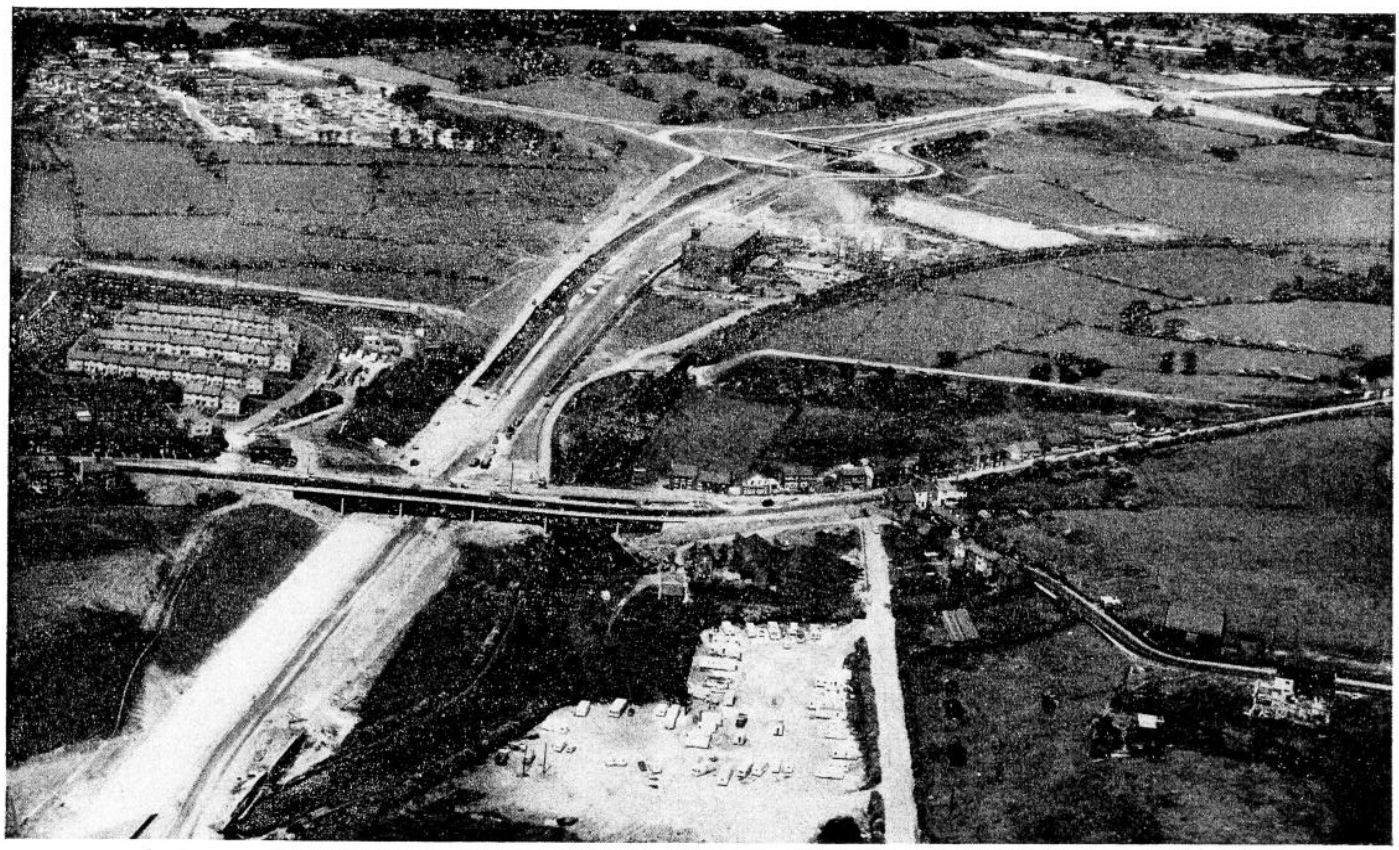
Police Post

The Police Post which is sited in the service area has been designed by the Lancashire County Architect and will be the patrol control centre for the motorway network in Lancashire. Construction will start in spring, 1970.

Maintenance Compound

Contract M.61/3 also included the works necessary for the construction of the hardstanding in the Maintenance Compound at Westhoughton, which is situated adjacent to the link road at A.6 at the Horwich Link Interchange.

The maintenance buildings have been designed by the Lancashire County Surveyor and Bridgemaster. One of the buildings will house the computer, which will in due course actuate the proposed signalling system on the motorways in Cheshire, Lancashire, Westmorland and Cumberland. This computer will be controlled at the Police Headquarters at Chester, Hutton and Penrith.



Aerial View – Motorway under construction showing Chorley North Link Junction in the background

Staff

The Lancashire County Council acted as the Agents of the Minister of Transport in the planning and design of the motorway up to April, 1967. Subsequently on the formation of Road Construction Units by the Ministry of Transport these functions were carried out by the Lancashire County Council Sub Unit of the North Western Road Construction Unit.

Mr. James Drake, as County Surveyor and Bridgemaster was responsible for the initial planning and design of the motorway until he was appointed Director of the North Western Road Construction Unit on its formation on the 1st April, 1967, and in this capacity became the Engineer responsible for the various Contracts as there were let. He was succeeded as County Surveyor and Bridgemaster by Mr. J. H. Dean, O.B.E., B.Eng., F.I.C.E., M.Inst.H.E., who also became the Chief Engineer of the Lancashire County Council Sub Unit responsible for the design and the management of the contracts, until his retirement on the 30th November, 1968.

On the 1st December, 1968, Mr. Drake returned to the appointment of County Surveyor and Bridgemaster and automatically became the Chief Engineer of the Sub Unit and on the 1st January, 1969, Mr. T. D. Wilson succeeded him as Director of the North Western Road Construction Unit.

The Resident Engineer was Mr. R. Greatrix, M.I.C.E., A.M.Inst.H.E.

The Agent for the Sir Alfred McAlpine & Son Ltd. part of the Consortium was Mr. W. Brown, B.Sc., A.R.T.C., M.I.C.E., A.M.Inst.H.E., and for Leonard Fairclough Ltd., Mr. P. J. Smythe.

Acknowledgments

Grateful thanks are extended to all concerned in the carrying out of the scheme and in particular to the District Valuers at Preston, Wigan, Blackburn and Bolton; the Local Authorities through whose areas the motorway passes; the Lancashire River Authority; the Mersey and Weaver River Authority; the Lancashire Constabulary; the Statutory Undertakers concerned; the District Engineer of British Railways; the National Coal Board; the British Waterways Board and the Lancashire Branch of the National Farmers' Union.

The co-operation of all the owners and tenants affected is gratefully acknowledged and the forbearance of residents in the area concerned, who have suffered inconvenience during the progress of the works, is much appreciated.
Having regard to the difficult ground conditions the Main Contractors, The Sir Alfred McAlpine & Son Ltd. – Leonard Fairclough Ltd., Consortium, are to be congratulated on finishing the work on time.

Appendix A

Contract Details

Horwich Link-Preston By-Pass M.6

	Scheme	*No. of Bridges*	*Contractor*	*Tender Sum £*	*Completion Date*
	Advance Works – Demolition of Bagganley Hall	–	Jack Case Ltd.	450	July, 1967
M.61/2A	Advance Works – Rivington Aqueduct	–	Leonard Fairclough Ltd.	24,106	August, 1967
M.61/3	Horwich Link to Chorley North Link	26	The Sir Alfred McAlpine & Son Ltd. – Leonard Fairclough Ltd Consortium	6,788,807	28th November, 1969
M.61/3A	Advance Works – Anderton Service Area	–	The Sir Alfred McAlpine & Son Ltd. – Leonard Fairclough Ltd. Consortium	54,623	October, 1969
M.61/4	Advance Works – Pearl Brook Diversion	2	A. C. Brew Ltd.	57,400	November, 1967
M.61/5	Advance Works – Blacow Bridge	1	The Sir Alfred McAlpine & Son Ltd. – Leonard Fairclough Ltd. Consortium	271,087	March, 1969
M.61/6	Chorley North Link-M.6	13	The Sir Alfred McAlpine & Son Ltd. – Leonard Fairclough Ltd. Consortium	3,589,362	28th November, 1969
				10,785,835	

Motorway
Main Contractors

The Sir Alfred McAlpine & Son Limited – Leonard Fairclough Limited Consortium.

Principal Sub-Contractors

Robert Watson & Company (Constructional Engineers) Limited, Bolton	Structural Steelwork
Teesside Bridge & Engineering Works Limited, Middlesbrough.	Pre-flexed Beams
John Booth & Sons (Bolton) Ltd., Bolton	
Propile Ltd., Finningley, Nr. Doncaster	Bored Piling
William Coulson Limited, Wolverhampton	
Pressure Piling Co. (Northern) Ltd., Bamber Bridge, Preston	
United Asphalt Co. Ltd., Hooton, Cheshire	Base construction and surfacing
Limmer & Trinidad Co. Ltd., Preston	Hard Shoulder, Surface Treatment.
J. A. Holgate Ltd., Whittle-le-Woods	Fencing.
Franco Traffic Signs Ltd., London N.W.9.	Traffic Signs.

Motorway Maintenance Compound Buildings, Westhoughton

Main Contractor

Leonard Frankland (Contractors) Limited, Oswaldtwistle.