
# NEW WATERWAYS

*Interim Report of a Development Committee appointed by the Council of the Inland Waterways Association Limited*

LONDON
1965

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Cover: Gunthorpe Lock. (Photo: Motor Boat and Yachting.)

## DEVELOPMENT COMMITTEE

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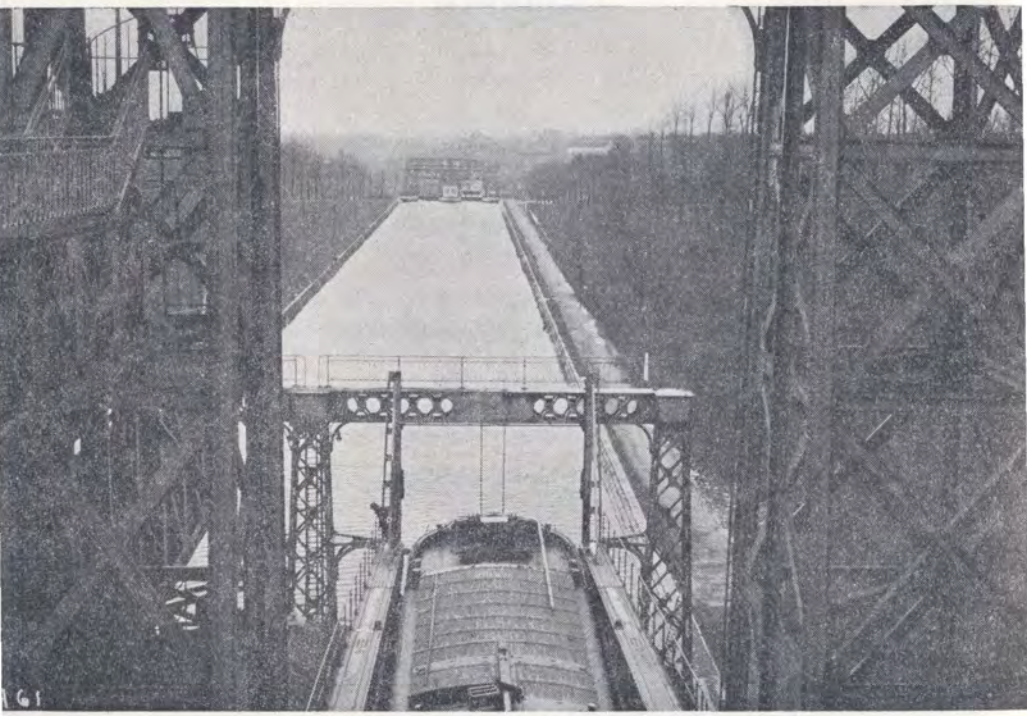

Canal du Centre, lift No. 2, Houding. (Photo: Belgian Embassy, London.)

## Chapter 1

## INTRODUCTION

1. Throughout most of its existence the Inland Waterways Association has been forced, by the attitudes of succeeding Governments and waterway authorities, to concentrate upon the defence of the present system of navigable rivers and canals.

2. Such a defence has resulted in the identification of the Associa- by the general public as a preservationist body, looking to the past. It has never been the Association's wish to become such a a body.

3. One of the primary purposes of the Inland Waterways Association has always been to advocate the extension and development of the inland waterways system. The acceptance of one of the major principles devised and advocated by the Association, that of " multifunctional utilisation ", by the new British Waterways Board and the fresh approach that they have brought to the problems of the existing waterway network have allowed the Association a respite in the campaign of defence.

4. The Council of the Association therefore decided, in August 1963, that a study could begin into the type of waterway system that is required in the second half of the twentieth century and the first half of the twenty-first. The Council thus set up the Development Committee to investigate the relevant factors. This booklet sets out the first part of the Committee's findings.

5. The Committee set itself several tasks; these were
   (a) to determine the need for a new transport system;
   (b) to examine the other uses to which a new waterway system may be put;
   (c) to recommend routes and dimensions for new waterways should it be found that the economic and social advantages warrant the building of such waterways.

6. After a considerable period of research and investigation the Committee found that the need for such a waterway system was overwhelming. The urgency of the situation, coupled with the appointment of Lord Hinton to advise upon the co-ordination of transport during 1965, has made it necessary for the Committee to make an interim report, in which its preliminary findings, coupled with a great deal of evidence, but without many of the details that must be gathered for the final report, are set out.

## Chapter 2

## INLAND WATERWAYS AS A MEANS OF TRANSPORT

### The Past

7. The waterways system of Great Britain came into being by a haphazard process; having been built largely to serve individual local interests. Such matters as gauges and draft were the subject of local, and different, decisions and the system which evolved did so rather by chance than as an overall plan. A notable exception to this rule was the concept of "The Cross", that is, the system of waterways linking the Trent, Mersey, Severn and Thames.

8. With the arrival of the railways the development of inland waterways was halted and their decline in use began. This decline was actively encouraged by the railway companies, who took over about one-third of the navigable system. By raising tolls and reducing maintenance, as well as imposing absurd regulations such as the prohibition of stoves aboard boats, the railways succeeded in disrupting the system, largely by preventing through traffics between the independent canal companies. It is most interesting to realise that canal traffic had to be throttled. It did not decline on its own. Had the latter occurred the railways would not have had to spend money buying the canal companies up; the truth is that the competition was far too strong for the railways and had to be eliminated by the creation of a monopoly. It is a remarkable vindication of this viewpoint to realise that goods can still be carried competitively on the narrow canals without any major change, save for the worse, in the condition of these waterways since 1840.

9. With the passing of the Transport Act 1948 the bulk of the inland waterways system, including all those waterways that had belonged to the railways companies, came into the hands of the British Transport Commission. This move did not, however, remove the waterways from railway control. In fact the reverse was the case, as several waterways, which had previously been independent and had carried the bulk of the remaining inland waterway traffic, came under the control of a body predominantly concerned with the railways and without any incentive to encourage the use of the waterways. Traffic continued to decline, except on that 20% of the system capable of carrying large craft.

10. It was not until the passing of the Transport Act 1962, which came into force on 1st January, 1963 that the nationalised waterways were placed under the control of a governing body, the British Waterways Board, which was independent of the railway interest.

11. Since its creation the Board has been carrying out an investigation into the present state of the inland waterways system.

In January 1964, it issued an interim report. This report makes no specific recommendations for the development or enlargement of the existing system or for the construction of new waterways.

12. In the past there have been many recommendations for the enlargement of waterways and for new construction, especially since the publication of the Report of the Royal Commission of 1906. The most notable of these is Mr. J. F. Pownall's project for the construction of a Grand Contour Canal capable of carrying vessels of up to 1,500 tons capacity and also of being used as a water grid. This waterway would extend to nearly 1,000 miles on a single level within England and Wales.

During the 1939-45 war, Brigadier-General Sir Osborne Mance, then Director of Canals, Ministry of War Transport, put forward proposals, which he later summarised in an address to the Midland Section of the Institute of Transport, for the enlargement of certain waterways. More recently, the Committee of Inquiry into Inland Waterways, known as the Bowes Committee, in 1958 recommended once again that the Grand Union Canal, linking London and Birmingham, should be enlarged to 90 ton standard and that a new route, linking the Mersey and Wolverhampton, and utilising the River Weaver, should be investigated.

Plans for the construction of a Grand Northern Canal, from the West Riding to London, have been proposed by Mr. Patrick Saunders. A number of smaller, local, schemes have been devised, in particular the canal links between colleries and the Sheffield and South Yorkshire Canal advocated by Mr. S. V. Sands.

**The Present**

13. The Development Committee considered that it was indeed remarkable that, apart from a survey recently authorised by British Waterways on the Sheffield and South Yorkshire Canal, no plans whatsoever are being considered by the Government for the construction of up-to-date waterways within the United Kingdom, whereas overseas the building of ever larger and more modern waterways continues apace.

14. The lack of growth of waterways in Great Britain is frequently considered to be due to the high lift per mile of existing British canals compared with those of other countries. The Committee did not consider this contention, which is a historical rather than a contemporary comparison, to be relevant to the construction of new waterways.

Modern earth-moving equipment would enable waterways to be constructed on far easier gradients (in the case of the Grand Contour Canal gradients would be eliminated altogether). The eighteenth century canal engineer, using primitive equipment,

was forced to follow the route which required the least construction work. The relevant comparison is thus between the topography of routes to be followed by new waterways in Great Britain and the routes being followed by present plans and construction abroad. The Committee found that plans and actual construction work were in hand for canals through and over mountain ranges in U.S.S.R., Bavaria, Austria, Switzerland and Italy, far higher, and in some cases on steeper gradients, than has been contemplated in Great Britain. For example, the gradient of the Volga-Don canal from its summit to the River Volga is steeper than that of the canal from Birmingham to Worcester, generally regarded as the steepest stretch of waterway over a comparable distance on the existing waterways of the United Kingdom.

15. Examples of plans and new building in Europe, the U.S.A. and the U.S.S.R. are:

The St. Lawrence Seaway
The Trans-Florida Waterway
The Rhine-Main-Danube Canal
The Moselle River
The Volga-Baltic Waterway
The Canal du Nord
The Rhine-Rhône Canal via Lake Geneva
The Cremona-Milan Canal
The Nord-Sud Canal
The Brussels-Charleroi Canal

**The Future**

16. The Inland Waterways Association believes that the interests of this country require a co-ordinated transport policy, whereby each type of merchandise is carried by the most suitable means of transport. To that end developments must be considered to bring our waterway system up to the standards which are proving economic elsewhere.

17. Greater use of waterways serving docks would help to prevent the delays caused by road congestion which result in so much disruption to exports and imports.

18. The Association also believes that certain comparatively minor work should be carried out on the present system. Such improvements would extend the system's usefulness both for transport purposes and for use by the rapidly expanding pleasure traffic. This work would be analogous to the road widening and staightening which is going on throughout the country. No detailed economic justification is therefore included in this report.

Chapter 3

## THE NEED FOR NEW WATERWAYS

### Transport

19. The present (1965) Government has restated its determination to achieve and surpass the 4% annual growth rate predicted by the National Economic Development Council as necessary for the survival of Great Britain as a major industrial nation. This rate of growth implies a doubling of total production within the next twenty years.

20. The group under Sir Robert Hall, which reported to the Minister of Transport in 1963 on "The Transport Needs of Great Britain in the Next Twenty Years", envisaged the increase of commercial transport to be the same as that of production.

21. The group also expected a threefold increase in both the number of passenger cars and the total passenger car mileage. Provision must therefore be made, within twenty years, for twice the commercial traffic and three times the motor car traffic.

22. Suggestions have already been made that there is a need for the construction of single-purpose commercial routes, usually roads. Such routes would be used exclusively by commercial vehicles. However, these routes would be inordinately expensive and would serve no other useful purpose. The Committee is convinced that before any such routes are constructed the economics of building other types of track must be investigated.

### Specific Transport Requirements

23. Particular problems are posed by the need to transport low value bulk commodities, such as building materials and fuels. Road and rail transport of such loads require the provision of numerous and expensive vehicles and rolling stock, the capital and running costs of which are high in relation to the value of goods transported. The most economical form of transport for such commodities is in the largest possible quantity with the minimum of transport equipment. Continental experience shows a marked preference for inland water transport, where available, for the carriage of bulk goods. These might be expected to form the greater part, by tonnage, if not by value, of the total goods carried on a modernised system of waterways.

24. Transport of large, though often light, loads of over 8′ 2½″ in width require police escort on the road and, by reason of gauge, loads over 9′ 3″ wide are usually unacceptable on the railway. Their movement over long distances is thus very expensive and extremely slow, besides causing a great deal of inconvenience to other road users.

25. With the increasing size of industrial plant the problem of transport of heavy, often indivisible, loads is becoming acute.

In the electrical transformer field British manufacturers are finding that they will shortly be unable to offer the largest and most up-to-date equipment for export simply because it will be impossible to transport to the docks the heavy loads which will be required.

26. The construction of modern power stations in Great Britain is rendered increasingly difficult by the impossibility of transporting the heavier components to the site. Facilities are now having to be made available for large-scale assembly on site, with consequent additional costs. Instead of concentrating upon the most efficient designs, vast amounts of time and labour are spent in design offices tailoring units to fit the transport possibilities.

### Water Supply

27. Consumption of water for domestic and industrial purposes is increasing continuously. Demand is greatest, and is likely to increase at a still greater rate, in just those areas where supplies are most scarce, especially in Manchester, Birmingham, East Anglia and the South-East. The traditionally dry area of County Durham, at present a somewhat depressed region, is also in need of extra industrial water to permit the expansion of its productive resources.

28. The average rainfall, and consequent water available, in Great Britain is about eight times the present consumption. Reasonable methods of conservation and distribution should therefore be able to contain any increase in demand for the foreseeable future without difficulty.

29. Much of the present increase in demand comes from agriculture. New methods of farming require artificial irrigation, as a result of which enormous increases in output per acre may be expected. Much of the water used in this way is returned to the ground and may help to replenish underground supplies. A great deal, however, is lost to the atmosphere via heavy transpiration.

30. The Sub-Committee on the Growing Demand for Water, which reported in 1962, stated that the yield from all existing public sources was 2,486 million gallons per day in 1960. Demand for normal purposes is expected to increase at the rate of 2.3% per year. New irrigation demand, however, will increase far quicker, reaching a consumption of between 2,000 and 3,000 m.g.d. when the area irrigated attains 1½ million acres.

## Chapter 4

## A COMPARISON OF VARIOUS MEANS OF TRANSPORT

### Introduction

31. The Committee has made a comparison of the various means of transport. It considered both economic and social factors

and the various alternative purposes for which different transport media may be used.

### Economic Factors

32. Whereas the majority of transport systems are capable of only one use, i.e. transporting goods or persons, this limitation does not apply to waterways. The Inland Waterways Association has long contended that the usefulness of a waterway must be assessed by considering all its potential uses. This view is increasingly shared by the British Waterways Board. Examples of possible commercial uses, other than the transport of goods, are: —

Water supply
Power Generation
Pleasure Boating
Angling
Land Drainage.

In making a comparison of the economic value of the various transport systems the Committee has taken into account the multifunctional uses of waterways.

33. The cost of transport by road, rail and waterway was therefore compared. The cost of the provision of each means of transport may be divided into:

(a) That part attributable to transport of the cost of servicing the capital involved in providing the track and the other necessary permanent installations.
(b) That part attributable to transport of the cost of maintaining and running the facilities referred to in (a) above.
(c) The cost of carrying.

34. Against the cost of maintaining and running a waterway and of servicing the capital involved has been set the income which a waterway would derive from its other uses.

35. No details of the cost of building waterways in the United Kingdom are available, since no new waterways are being built. The Committee, therefore, considered the costs of waterway construction in Western Europe and compared them with the costs of building motorways in Europe. It was found that the cost of constructing waterways was very similar to the cost of motorways in the same country, though actual rates varied very widely. Examination of foreign waterway projects showed that the routes followed were not, as is often suggested, over flat and easy country, but included more difficult terrain than is likely to be encountered in this country. Estimates of waterway construction costs in Great Britain have therefore been based upon motorway construction costs in Great Britain.

36. Concern is frequently expressed over the extent to which inland water transport is susceptible to bad winter conditions, periods of delay due to ice being usual at least once a year. It is interesting to observe, however, that British winters are far less severe than those in Northern and Central Europe, where waterways are frequently out of use for three months of every year. Any new waterways that might be constructed in Great Britain would be expected to provide returnable water to industry, especially power stations, which heated water could be expected to help to keep the waterway ice-free in cold weather.

37. Considerable success has been experienced abroad in the use of perforated air pipes for ice prevention. The rows of bubbles stop ice forming on the surface until the water is well below normal freezing point. It is anticipated that the management of the new waterways will experiment with all such modern devices, as well as maintaining an adequate fleet of ice-breakers. It is also possible that high voltage electric cables could economically be laid in a special trough beneath the bottom of the canal. The heat developed, the removal of which is one of the chief problems preventing cables being carried below ground, would serve to warm the water and prevent the formation of ice.

38. The trough along the bed of the canals could be developed to take pipelines of all types, as has already been suggested by the author of the Grand Contour Canal project.

**Road Transport**

39. Part of the cost of road transport is borne directly by the tax-payer and part by the consignor of the traffic.

40. It will be argued by the proponents of the road transport interests that the taxation which they pay in terms of licence and fuel tax more than pays for their share of the costs of providing and maintaining the track which they use. The Committee doubts the validity of this argument, which omits important considerations, but in any case did not pursue it, as the investigations had led them to believe that a waterway provided a track of greater capacity at less cost and that the actual costs of carriage were very much less by water. However, it is interesting to note the recent experiments by the American Association of State Highway Officials, which showed that road wear varied as the fourth power of the axle weight of vehicles using it.

41. The average cost of constructing a dual carriageway three-lane motorway in Great Britain is £700,000 per mile in open country, rising to sums which are extremely high and almost infinitely variable in urban areas.

42. Information recently published by the British Railways Board shows that such a dual carriageway has a capacity of 24,000,000 capacity tons per year, assuming the exclusion of all passenger vehicles.

43. The cost of maintenance and administration of such a motorway carrying present-day mixed private and commercial traffic is £27,000 per mile per year, of which it has been contended that £20,000 is attributable to heavy vehicles. This figure would therefore rise sharply if the road was to be used to capacity by vehicles of heavy axle weight only.

44. In order to achieve a fair comparison of the annual system costs of roads against the other forms of transport, an interest charge on the capital involved has been added at a similar rate to that charged to the railways for their modernisation projects.

45. The average cost of road transport to the operator, carried in articulated vehicles of 16 tons capacity by motorway is 3.39d. per ton mile from door to door for a journey of 100 miles. The cost for abnormal loads may rise as high as 5 shillings per ton mile. It is fair to assume, however, that these costs would fall slightly if all road transport was by motorway and if vehicles of greater axle weight were permitted.

46. The cost of providing road transport within Great Britain is very difficult to determine, owing to the large number of variables. However, the cost of carriage exclusively by motorway may be assessed, and is composed of:

    (a) The cost of providing and maintaining the road.

    (b) The operating cost of carriage.

The interrelationship between these costs and the total volume of traffic carried is shown in Appendix III.

**Rail Transport**

47. The true cost of rail transport is rather easier to assess than that of road transport, as all facilities, track, maintenance, control and signalling and the actual carriage of goods are provided by a single authority.

48. The costs of rail transport have been taken from the British Railways Board's publication "A Study of the Relative True Costs of Rail and Road Freight Transport over Trunk Routes".

49. The cost of carriage by the liner trains envisaged in the "Beeching Plan" is 2.85d. per capacity ton mile for a journey of 100 miles from door to door.

50. The capacity of a rail route with four tracks is 24,000,000 capacity tons per year.

51. The cost of the provision of rail transport relative to the total volume of traffic carried is shown in Appendix III.

## Water Transport

52. Water transport in the United Kingdom may be divided into two types:

(a) Coastal.
(b) Inland Waterway.

53. The cost of coastal transport consists entirely of the cost of providing, maintaining and operating the shipping itself, there being no track charges other than charges levied at docks. Extremely low overall costs are experienced, but the service provided is very inflexible, since there are few inland waterways in Great Britain capable of taking normal coastal vessels. Loading and delivery must therefore take place on or near the coast. By comparison the Swiss barge port of Basle handles more cargo than the port of Bristol.

54. Traffic on inland waterways more nearly resembles that on road than on rail in that the track is provided and maintained by the navigation authority, whilst carrying is usually conducted by private firms licensed by or paying a toll to the navigation authority.

55. The standard Western European waterway is capable of passing pusher barge trains with a capacity of 1,500 or 3,000 tons, dependent on length of locks, or self-propelled barges of 1,350 tons. The dimensions of the standard barge are 80 metres x 9.50 metres (263 feet x 31 feet), with a loaded draft of 2.50 m. (8 feet) and a height above water level of 4.40 m. (14 feet).

56. The Committee decided to base their investigation on a barge of this size. It was also considered desirable that any new waterway should be of such a depth and headroom that it can pass those coasters and sea-going vessels which fall within the length and width dimensions of the standard barge, in order to encourage the direct transport of goods between the inland ports of the Continent and those of this country.

57. The average overall cost of construction of such an artificial waterway has been taken to be £700,000 per mile, including navigation works. This figure has been estimated as described in paragraph 35. It is realised that costs will depend to a large extent upon the type of waterway and the method of construction. The cost figures used in this report are based upon the actual types of waterway recommended for Phase 2 (a).

58. The capacity of such a waterway is limited by the time taken to pass through the locks or lifts. By building additional locks in parallel the capacity can be increased without difficulty. Traffic originating and finishing between two locks or lifts is not, of course, affected by the limits on capacity imposed by locking. The possible annual capacity of the waterway

envisaged is considerably in excess of the 24 million tons quoted for a four-track railway line, but, for the purposes of this study, it will be assumed that only 24 million tons are available.

59. The total cost of carriage of goods on such a waterway, assuming the need for delivery and collection by road at each end of the journey (which frequently may not be necessary) is 2.30 pence per capacity ton mile for a journey of 100 miles.

The cost of the provision of water transport relative to the total volume of traffic carried is shown in Appendix III.

## Chapter 5

## USE OF TRANSPORT MEDIA FOR PURPOSES OTHER THAN TRANSPORT

60. Certain transport media have a value other than that for transport.. The three major media already discussed in the preceding chapter are considered here in this respect.

### Roads

61. In addition to the carriage of vehicles for goods and passengers, roads are useful and necessary for social reasons. Various recreations, including walking, riding and cycling, are usual, though diminishing, activities, especially in rural areas. New motorways, however, and especially the single purpose routes already mentioned, specifically exclude such activities. For the purposes of comparison between the types of transport media considered in this report, therefore, there are no other uses for roads.

### Railways

62. Railways are provided for the exclusive use of the railway authority for the carriage of their own rolling stock. Mere presence of an unauthorised person constitutes a trespass and may lead to prosecution. There are no uses of a railway line other than for transport.

### Waterways

63. An inland waterway has many uses in addition to transport, of which those listed in paragraph 32 should be mentioned. These other uses are discussed in the ensuing pages.

### Water Supply

64. One of a waterway's major uses is for water supply, both as a reservoir and as a water distributing grid. Since water in an open channel can only flow downhill, ingenuity is required to construct a waterway that is suitable for commercial transport and also for water supply to a large number of widely separated parts of the country. Any discontinuities in the downward flow of the waterway, such as could be provided by an inter-

vening range of hills, would prevent the passage of water from one part of the country to another, without the installation of pumping machinery. It has thus often been assumed that navigation canals are only useful for water supply on a purely local basis.

65. These difficulties have been overcome by the design of the Grand Contour Canal, mentioned in paragraph 12, which would be constructed at a single level (310 feet), but with spaced-out installations capable of inducing a slow current, delivering 2,000 cubic feet of water per second along each of its branches. This rate of supply is equivalent to 1,080 million gallons per day on each branch and should be compared with the potential demand by agriculture of at least 2,000 million gallons per day for irrigation purposes and the total consumption of water, other than for cooling purposes, of some 5,000 million gallons per day at present.

66. Assuming that this waterway is constructed in such a way that its level may be reduced by a few feet without hindrance to navigation, the reservoir capacity available is 3,500,000 gallons per mile per foot lowered.

### Power Generation

67. Rivers in Great Britain are not in most cases as large as those to be found in Europe and, except for certain cases in Scotland, few major hydro-electric schemes have been attempted. Within recent years, however, advances in the technology of power generation, coupled with the growing scarcity of suitable hydro-electric sites throughout the world, have enabled use to be made of far less promising sites, especially by pumped storage schemes for peak generation. The construction of parts of the Grand Contour Canal would present engineers with a useful volume of water at a head of up to 300 feet above possible discharge. The possibility of power generation from this and other sources must not be discounted.

### Land Drainage

68. Ever-increasing areas of Great Britain are becoming covered with asphalt and buildings. Surface water draining from these non-absorbent surfaces must be conducted away. Frequently this water is diverted into the normal sewers, thus reducing the capacity available to deal with noxious effluents and sending the water to waste. The provision of new waterways provides an outlet for this surface water which should provide a reasonable income, especially in built-up areas.

### Recreation

69. Waterways are being used for recreational purposes on an ever-increasing scale. In the United States inland boating is already the nation's most popular outdoor pursuit, on which

thousands of millions of dollars are spent annually. It is certain that the present income from inland pleasure boating in this country will steadily increase by at least 10% per annum.

70. There are said to be over 2 million anglers on inland waterways in Great Britain. A small licence fee for fishing, paid direct to the waterway authority, could provide a substantial income.

## Chapter 6

## SOCIAL FACTORS

### Increase in Road Traffic

71. The increase in road traffic, commercial and pleasure, is causing great delay and frustration. Much further increase in the amount of commercial road traffic will make private motoring very difficult and unpleasant.

72. As has been demonstrated by the Buchanan Report on Traffic in Towns, road vehicles, and especially heavy road vehicles, are damaging our towns and their buildings most alarmingly. Private motor transport in towns is altering our whole concept of living and is bringing man into imminent danger of subservience to the machine. Both in town and country the noise, vibration and smell of vehicles is becoming intolerable. Road casualties continue to rise at about the same rate as the number of vehicles.

73. It is estimated that by 1980 traffic on our roads will have doubled its 1960 volume. The new motorway building programme is unable to keep pace with this rate of increase.

74. The Committee believes that popular pressure will be so powerful by 1980, when every householder will own at least one motor car, that it will be politically unacceptable for commercial road transport to be permitted to increase further. Indeed, it is probable that strenuous efforts will have to be made to reduce it, even if increased costs result.

### Provision of New Water Supplies

75. Opposition to new schemes for water supply involving the flooding of valleys and the reduction of amenity by lowering water levels in lakes is growing fast. A number of alternative schemes are being put forward, some of which have considerable merit.

76. Most of the new proposals involve the erection of a barrage across an estuary or bay, e.g. The Wash, Morecambe Bay, the Thames, the Severn, the Solway Firth, and the retention of a large area of fresh water behind it. It is further contended that these large areas of water would be suitable for recreation.

77. The Committee has considered these proposals and finds that, although they possess advantages, they do not perform the

many functions of the Grand Contour Canal. It may be accepted, however, that several such barrage schemes could be complementary to the functions of the Grand Contour Canal as a water grid; water being drawn from the barrage reservoirs in times of low rainfall and distributed to other parts of the country by the canal.

78. The value of the barrage schemes for recreational boating and other water pursuits would be considerable, but the location of the water, necessarily on the coast where opportunities for such pursuits are already well above average, will not serve the majority of the population, who live inland; whereas the new waterways will, by design, pass through or near all the large industrial areas, bringing the opportunity of such recreation to those who really need it.

### General Amenity

79. The provision of a waterway can, if properly designed, add considerably to the visual attractions of the countryside. The introduction of a water motif into town and country planning is usual abroad and much overdue in Great Britain. Signs of a growing awareness of the advantages of such attractions are at last apparent.

80. Several active uses of waterways may be classed as amenities, including pleasure boating and the provision of boating facilities, fishing and walking beside the water. All these activities help to provide for the increased leisure time that is becoming a feature of the age.

## Chapter 7

## BASIS OF RECOMMENDATIONS

81. In making recommendations for the development of our inland waterways, the Committee found itself faced with two quite separate problems.

82. The foregoing chapters lead to the realisation that a completely new waterways system is required if the British economy is to continue to expand and if British industry is to remain in the forefront of technological advance. Such a waterway network would link into the existing canal and river navigations, feeding boats and water to them and drawing others from them. By encouraging the use of water transport in general, new waterways would encourage the extension of commercial traffic on the smaller, existing system. The recreational and amenity advantages of the present waterways would be unimpaired.

83. The detailed planning and construction of new waterways will take time, though the situation is urgent and action must be taken swiftly. While the country remains without adequate waterways and in order to ensure that the best possible service is given by the old system, both within itself, and, in the future, to the new waterways, the Committee is of the opinion that certain relatively minor works must be carried out as soon as possible.

84. The recommendations in the ensuing pages have, therefore, been divided into two principal sections:

1. *Existing system*
   (a) Minor alterations and improvements.
   (b) Minor extensions.
2. *New system*
   (a) First stage construction.
   (b) Projects for consideration at a later stage.

**Chapter 8**

## RECOMMENDATIONS—PHASE 1 (a)

## MINOR ALTERATIONS AND IMPROVEMENTS

85. The existing waterways, of which the majority come under the authority of the British Waterways Board, have an annual revenue expenditure of some 5 million pounds. The annual trading deficit of the British Waterways Board is running at about £700,000. The Committee feels, as does the Board, that this deficit can be reduced considerably by better salesmanship, better internal administration and a changing climate of public and industrial opinion. The Board in its Interim Report, has proposed a prescribed system of navigation, in which the majority of the existing navigable waterways are included. The Committee does not agree that there can be any economic or social saving from the closure or elimination of those canals that the Board rejects from its prescribed routes. It is not, however, the task of this report to discuss such disagreements.

86. Study of the prescribed system indicates a number of anomalies. These anomalies, together with some of the major known defects of the system as it stands, are discussed in this chapter.

87. One of the factors that has caused the decline of commercial transport on the narrow and semi-narrow waterways has been the silting up of the canal bed. The enlargement of the Grand Union Canal in the 1930s envisaged deeper narrow boats, carrying 65 tons per pair. Today these boats are able to carry less than 50 tons, and then are on the bottom for much of the way. Larger pleasure boats are also hampered by lack of

depth on many routes. Frequently silting is caused by factory discharge, coal washing, gravel washing, road silt and other reasons for which outside bodies or authorities could and should be charged. Payment for drainage, under the new Land Drainage Act, should be investigated and a considerable income derived from this source.

88. A glance at the waterway map shows three groups of locks, opening off the Grand Union Canal, which effectively prevent boats of over 7-foot beam ranging throughout the Eastern half of England. They are:

(a) The 17 locks at Gayton, on the Northampton arm, which prevent access to the River Nene and the Fenland waterways.

(b) The 7 locks at Watford, Northamptonshire, and the 10 locks at Foxton, on the Leicester section, which, together with one sub-standard lock between Leicester and Foxton, prevent access to the Rivers Soar and Trent.

(c) The 3 locks at Hillmorton, on the Oxford Canal, which prevent access to the 50-mile level to Coventry, Atherstone and the Ashby de la Zouche Canal.

89. Two important canal links, shown on waterway maps and not finally closed by appropriate legislation, the Kennet and Avon Canal and the route followed by the lower Peak Forest and Ashton Canals, are not at present navigable. A further vital connection, the Dudley Canal and Tunnel and the Stourbridge Canal, is in the process of restoration by volunteers and other interested parties, including the British Waterways Board. Without prejudice to any action or discussions already in hand between the appropriate authorities and those interested in restoration, the Committee has considered the claims of these waterways to a future as commercial and recreational navigations.

90. As the waterways were one of the first interests to require large-scale water supply, the eighteenth and early nineteenth century engineers who designed the original system were able to select the best reservoir sites in the country. These reservoirs still feed the existing system and, from it, the industrial users of canal water. Unfortunately, the general neglect of the waterways over the past century has allowed many of these reservoirs to silt up badly, greatly restricting the volume of water conserved and thus forcing the closure of certain canals during dry periods. A conflict of interest had also arisen with the sailing and fishing clubs who have leased many of the reservoirs for their own activities. Lack of depth and weed encroachment has ensured that they cannot continue to operate if the level is lowered appreciably.

91. A fresh approach to the problem of the sale and use of water is required. Revenue from water sales by British Waterways alone amounts to over £700,000 per year, but, on average, is sold at only one penny per thousand gallons. Legislation would be required to enable certain fixed rates to be increased from levels agreed at the time of construction of the waterways, but a complete analysis of the problem must be carried out. Raw water prices vary throughout the country but are usually in excess of one shilling per thousand gallons. The increase of British Waterways' average selling price to only sixpence per thousand gallons would enable the nationalised waterways to operate at a handsome profit.

92. The continuous use of canals by motor boats has caused considerable damage to the banks. Dredging and the further encouragement of traffic will continue this erosion. A programme of bank protection by concrete piling was initiated by the British Transport Commission on a number of narrow canals in addition to main transport waterways. This programme has recently been very much curtailed, although many hundreds of miles still require protection.

**Proposals**

93. The Committee therefore recommends:

(a) Complete redredging, rechargeable to outside interests where possible and appropriate, of the reservoirs and present navigable system to statutory depth.

(b) Continuation of the bank protection programme on the narrow canals with a reasonable commercial use or potential use.

(c) Enlargement or rebuilding to 14 ft. width of:

(i) the 17 locks at Gayton ;

(ii) the 7 locks at Watford (Northamptonshire) and the 10 locks at Foxton ;

(iii) the 3 locks at Hillmorton ;

(iv) the stop locks at Marston (Ashby Canal) and Sutton (Oxford Canal).

(d) The restoration of the Kennet and Avon Canal for full commercial use.

(e) The restoration of the Ashton Canal and lower Peak Forest Canal for full commercial use.

(f) Legislation to enable the complete revision of charges for water abstracted from the existing waterway system.

94. These points are illustrated in Map A.

## Chapter 9

## RECOMMENDATION—PHASE 1 (b)—MINOR EXTENSIONS

95. It is often said that, in many cases, industry has moved away from the waterways, thus rendering the waterways redundant. The Committee found that this was so in only a minority of cases and that usually, when a canal had been closed in the past on these grounds, the old industry had recovered or new industry had grown to take its place. A number of waterway closures may thus now be seen to have been ill-advised.

96. The vast increase in the consumption of electricity is being provided for by the construction of ever larger power stations. These power stations are, largely for political reasons, fuelled by coal and, for technical reasons, sited on large rivers. The simplest and least expensive means of providing access for fuel supplies is to use these rivers for the transport of coal.

97. Many collieries are served by river or canal loading stations, though, as indicated in paragraph 95, these facilities have in several cases been withdrawn while the colliery continues in use. Examples include the largest colliery in the East Midlands, Cotgrave, on the abandoned Grantham Canal, Eastwood, on the recently (1962) abandoned Cromford and Erewash Canals, and Manvers Main on the Dearne and Dove Canal, also recently abandoned.

98. Certain new collieries, especially in Yorkshire, have been opened within a few miles of well-used waterways, including the River Trent and the Sheffield and South Yorkshire Canal.

99. Members of the steel industry in Sheffield, together with the civic authorities, have been pressing for some years for the enlargement of the Sheffield and South Yorkshire Canal between Bramwith and Sheffield, at least to the size of the present waterway to Bramwith, and British Waterways have recently authorised a study of the problem. Many of those pressing for this action see the need for a considerably larger waterway from Sheffield to the sea.

### Proposals

100. A new spirit of co-operation should be engendered between the Central Electricity Generating Board, the National Coal Board and the British Waterways Board. In this way the fact that a power station must be sited waterside could be used to ensure that every consideration was given to bringing fuel by water. The cheap removal of power station ash by water for land reclamation or conversion into building materials should also be taken into account.

101. New branch canals, to carry vessels of 250 tons capacity, should be built in specific cases. The plans for construction of this type of canal drawn up by Mr. S. V. Sands and reproduced in Map B, should be implemented.

102. Short lengths of formerly abandoned canals should be re-opened. In particular the Grantham Canal to Cotgrave, the Dearne and Dove Canal to Manvers Main and the Erewash and Cromford Canals to Eastwood. The new power station at Ratcliffe on Soar would benefit particularly from the latter.

## Chapter 10

## RECOMMENDATIONS—PHASE 2 (a)
## FIRST STAGE CONSTRUCTION

103. The Committee decided that the need for new waterways on a scale commensurate with those in use and under construction in Europe, both for transport and other uses, was proven. It also considered that the original plan of a Cross of waterways to connect the four main estuaries of England, conceived by James Brindley and largely realised by him in the mid-eighteenth century, was still the best.

104. In the light of the Report of the Committee of Inquiry into the Major Ports of Great Britain, the Committee accepted the need for better communications between the Midlands and the North-West and the ports of Tilbury and Southampton. It also took into account the growth of traffic passing through the East Anglian ports and the wish of the Central Government to encourage industry in the North-East of England.

105. In general, the presence of locks is the major restriction to the quick passage of boats through a canal. If a canal locks upward, moreover, it becomes impossible for water to continue to flow along it unless pumping is utilised. The Committee therefore decided that the need was for a waterway without locks and having only types of current-inducing installations which do not impede navigation. As the main requirement for water was in the East of the country, while the main rainfall was in the West, it was accepted that the delivery of the new waterways must be from West to East.

### Proposals

106. The concept of Mr. J. F. Pownall's Grand Contour Canal should be adopted. This plan envisages a canal entirely on one level on the 310-foot contour, which is found to run nearly continuously through the country. This waterway would be capable of carrying vessels of at least 1,350 tons capacity and could become the primary water distributor of the country. It was never contemplated by its designer that the Contour Canal should be built as one unit; several of its parts are therefore capable of standing on their own. The Committee believes that the water supply function of the canal is at least as important as the transport function, though the benefits obtainable are more difficult to measure.

107. Taking into account the increasing demand for water in the South-East and in industrial Lancashire, the possibility of the construction of the Morecambe Bay and Solway Firth barrages and the overwhelming need for better transport facilities, especially for heavy and bulk loads, between London, Birmingham and the North-West, the Committee recommends that the following parts of the Grand Contour Canal should be constructed.

(a) Between the entry of the Lonsdale water feeder near Preston and a connection with the River Lee near Hertford, passing by Manchester, Stoke-on-Trent, Stafford, Nuneaton, Rugby and Bletchley, with a lift connection with the River Weaver near Alsager, Cheshire, leading to the Mersey and Liverpool.

(b) From a point near Ellesmere, Salop, to a junction with the main line of the canal near Market Drayton: this being primarily a water feeder from the Rivers Dee and Severn intakes, but capable of extension to the Dee estuary.

(c) From a junction with the main line near Newport, Salop, to a port at Brierley Hill serving the Birmingham-Wolverhampton conurbation, this branch being continued to a junction with the River Severn in the neighbourhood of Stourport.

(d) A branch from the main line near Tamworth to a port at Erdington serving the Birmingham conurbation.

(e) A branch from the main line near Nuneaton to a junction with the River Trent near Burton-on-Trent.

108. In addition to the channel navigable by 1,350-ton vessels the following water feeders should be constructed:

(a) The Lonsdale feeder from the Solway catchment area through Cumberland and Westmorland to a junction with the main line near Preston.

(b) The Dee intake from above Llangollen to a junction with the Dee branch near Ellesmere.

(c) The Severn intake from near Newtown, Mongomeryshire, to a junction with the Dee branch near Whitchurch, Salop.

(d) The Suffolk branch, taking water from the main line of the canal, mainly for irrigation purposes, from a junction with the main line near Hertford, through southern Suffolk towards Ipswich.

109. (a) The enlargement of the Suffolk branch to full navigational standard should be actively considered as an additional means of communication with the North Sea via the port of Ipswich.

(b) If it is considered desirable for a water connection to be taken further into the centre of the Birmingham conurbation, communication should be established between the ports of Brierley Hill and Erdington by adaptation of the existing waterways through Birmingham at a height of 453 feet: transfer to this level being by lift.

110. In order to provide connections between the Grand Contour Canal and seaports in the four main estuaries of England and Wales the following reconstructions to a minimum of 1,350-ton standard are recommended:

(a) The River Weaver.

(b) The River Trent.

(c) The River Lee.

(d) The River Severn.

(e) The Gloucester and Sharpness Canal.

111. Communications between waterways at lower levels and the Grand Contour Canal will be by lift, the design and method of construction depending upon the configuration of the land in each case. An example of this type of structure is under construction at Ronquières on the Brussels-Charleroi Canal in Belgium. Lifts would represent a considerable saving in capital outlay compared with conventional flights of locks, are far speedier in operation and save nearly all the great quantity of water used in a lock. The Grand Contour Canal is designed as a self-contained system for water supply: the four rivers with which the first stage of the canal will connect, listed above, all possessing a natural flow sufficient to operate the locks that will be necessary between the lifts and the sea.

112. The following additional construction is also recommended:

(a) The reconstruction of the River Aire, Yorkshire, to a minimum of 1,350-ton standard, to a temporary terminal or port near Bradford; with a view to a further short extension to join a future transpennine line of the Grand Contour Canal.

(b) The Sheffield and South Yorkshire Canal should be reconstructed to a standard to be determined by an extensive survey of the requirements of the city. It is not envisaged that traffic to and from Sheffield would be other than to Humber ports; there is thus no overriding need for the gauge of this waterway to be standard.

113. A ship canal for coastal and small sea-going vessels and for barges of a minimum of 1,350 tons capacity should be built from the port of Avonmouth, Bristol, to a connection with the Gloucester and Sharpness Canal.

114. An outline of the proposed routes is given in Map C.

## Chapter 11

## RECOMMENDATIONS—PHASE 2 (b)
## PROJECTS FOR CONSIDERATION AT A LATER STAGE

115. The recommendations in the preceding chapter give the immediate requirements for a new water supply and transport line. In this chapter two other major projects are considered in the light of future requirements.

116. The Rochdale Report recommended the expansion of the port of Southampton and the improvement of its communications with the rest of the country. The South-East Study, published by the Government in 1964, envisaged an increase in population of 3 million in the South-Eastern area of England. Grave doubts have been expressed over the probable lack of water supply for this increase. The Committee, therefore, recommends that serious consideration should be given to the construction of the Southern Main of the Grand Contour Canal, from the River Test to a connection with the Midland Main near Rugby. Connected with this branch should be the Devon intake and feeder arm and two lined tunnels for water supply to Kent and Sussex.

117. The Government's concern over the development of the North-East of England is deepened by the comparative remoteness of the area from the rest of industrial England and its lack of good water supplies. The Committee, therefore, recommends that serious consideration should be given to the construction of the Northern Main of the Grand Contour Canal, from the junction with the Lonsdale feeder arm to connections with the Tees and Tyne. Connected with this branch should be the Tweed intake and feeder arm.

**Appendix I**

## SOURCES OF INFORMATION


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10. Die Neckarkanalisierung. Abschnitt Morbach—Stüttgart: 1958.
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19. The Future of the Waterways. British Waterways Board. H.M.S.O.
20. Annual Report and Accounts—1963. British Waterways Board. H.M.S.O.
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## DERIVATION OF COSTS

### Waterway Annual System Cost per Mile

| | £ |
|---|---|
| Interest | 33,000 |
| Minimal Maintenance | 3,000 |
| | 36,000 |
| *Less*—other uses 40% | 14,000 |
| Transport—60% | 22,000 |
| Maintenance due to Transport Use | 4,000 |
| | £26,000 |

### Waterway System Costs per Capacity Ton Mile

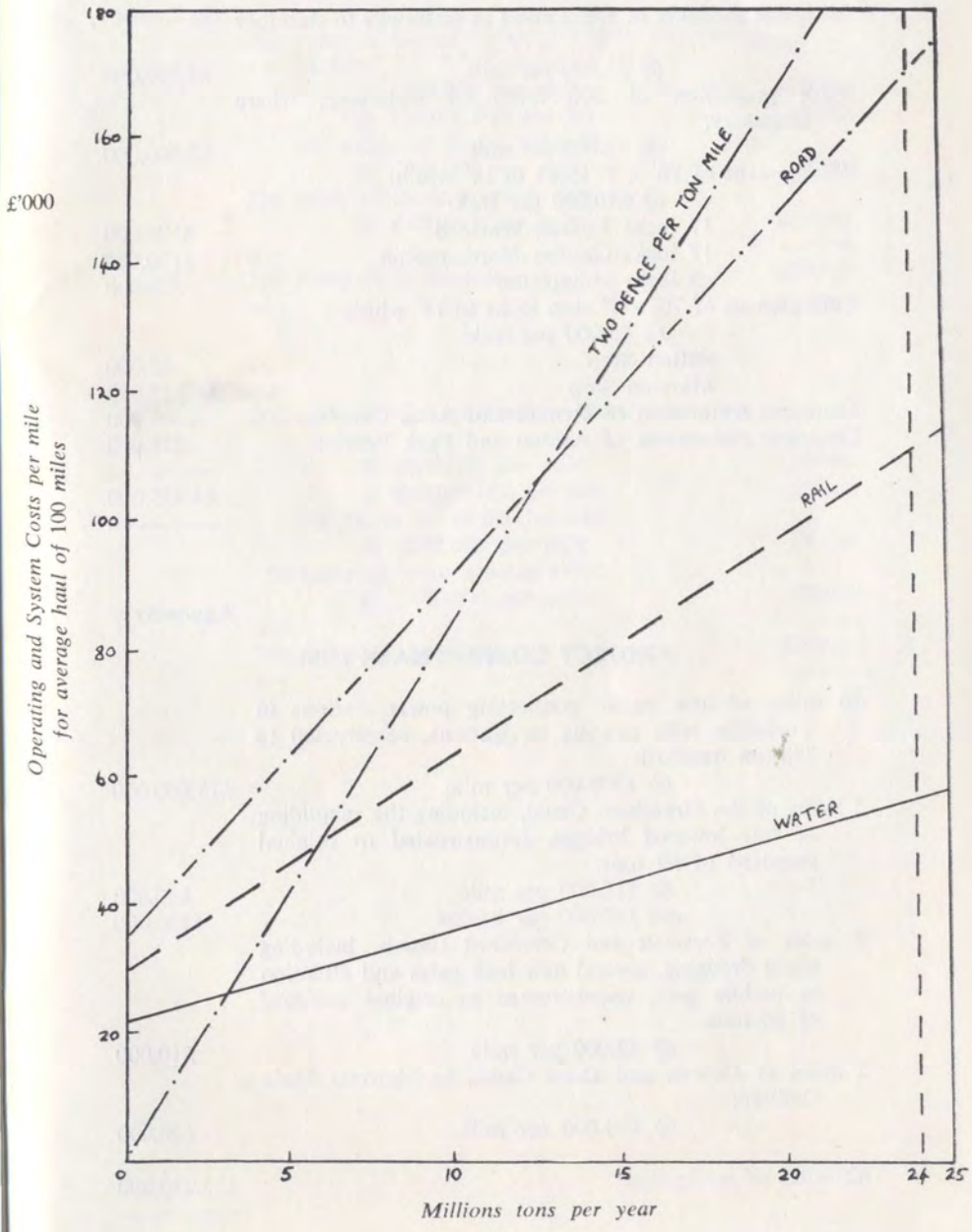
| | |
|---|---|
| Annual cost per mile | £26,000 |
| Annual Volume of Traffic per mile | 24 m. net ton miles |
| Cost per Capacity Ton | 0.26 pence |

### Relative Costs per Capacity Ton

| *For a Haul of 100 miles* | *Waterway 1,350-ton Barge* | *Railway Liner Train* | *Motorway 16-ton Vehicle* |
|---|---|---|---|
| Operating | 2s. 6d. | 6s. 6d. | 8s. 9d. |
| System | 2s. 2d. | 2s. 9d. | 5s. 6d. |
| Total | 4s. 8d. | 9s. 3d. | 14s. 3d. |

**Appendix III**

## COMPARATIVE COST/VOLUME RELATIONSHIP OF DIFFERENT TRANSPORT MEDIA



**Appendix IV**

## PROJECT COSTS—PHASE 1 (a)

| | |
|---|---|
| Adequate dredging of 1,000 miles of waterway to statutory depth: | |
| @ £1,000 per mile | £1,000,000 |
| Bank protection of 500 miles of waterway, where necessary: | |
| @ £5,000 per mile | £2,500,000 |
| Enlargement of 70′ x 7′ locks to 14′ width: | |
| @ £10,000 per lock: | |
| 17 locks Foxton–Watford | £170,000 |
| 17 locks Gayton–Northampton | £170,000 |
| 3 locks Hillmorton | £30,000 |
| Enlargement of 70′ x 7′ stop locks to 14′ width: | |
| @ £5,000 per lock: | |
| Sutton Stop | £5,000 |
| Marston Stop | £5,000 |
| Complete restoration of Kennet and Avon Canal: | £600,000 |
| Complete restoration of Ashton and Peak Forest: | £75,000 |
| | £4,555,000 |

**Appendix V**

## PROJECT COSTS—PHASE 1 (b)

| | |
|---|---|
| 50 miles of new canal, connecting power stations in Yorkshire with existing navigations, constructed to 250-ton standard: | |
| @ £300,000 per mile | £15,000,000 |
| 5 miles of the Grantham Canal, including the rebuilding of five lowered bridges, reconstructed to original standard of 80 tons: | |
| @ £10,000 per mile | £50,000 |
| and £30,000 per bridge | £150,000 |
| 5 miles of Erewash and Cromford Canals, including slight dredging, several new lock gates and attention to paddle gear, reconstructed to original standard of 80 tons: | |
| @ £2,000 per mile | £10,000 |
| 2 miles of Dearne and Dove Canal, to Manvers Main Colliery: | |
| @ £10,000 per mile | £20,000 |
| 62 miles of navigation | £15,230,000 |

## PROJECT COSTS—PHASE 2

**Phase 2 (a)**

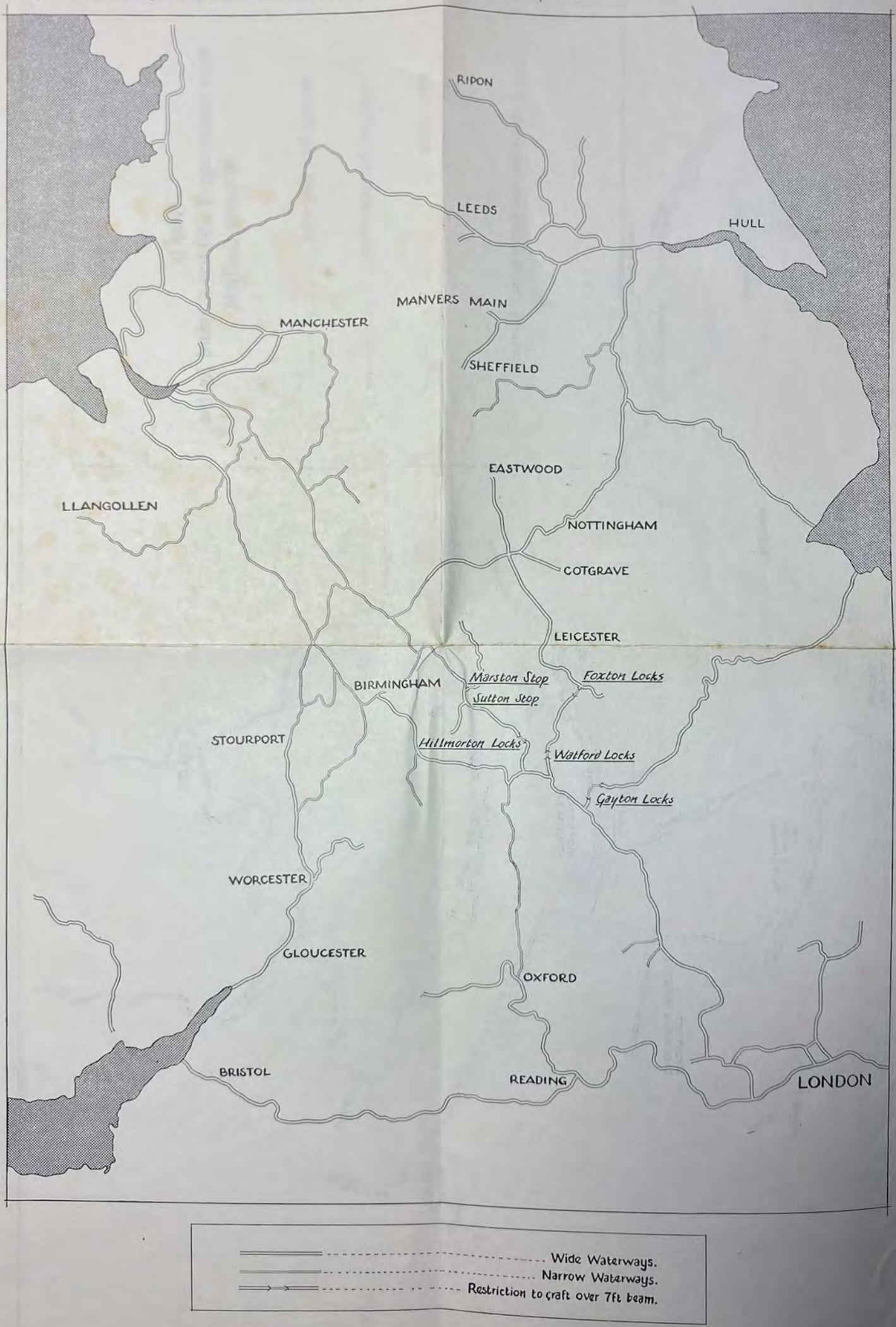
| | |
|---|---|
| 300 miles of Grand Contour Canal, including 4 lifts: | |
| @ £600,000 per mile | £180 m. |
| @ £10,000,000 per lift | £40 m. |
| 300 miles of feeder branch: | |
| @ £200,000 per mile | £60 m. |
| 275 miles of reconstructed river: | |
| @ £400,000 per mile | £110 m. |
| 575 miles of navigation | £390 m. |

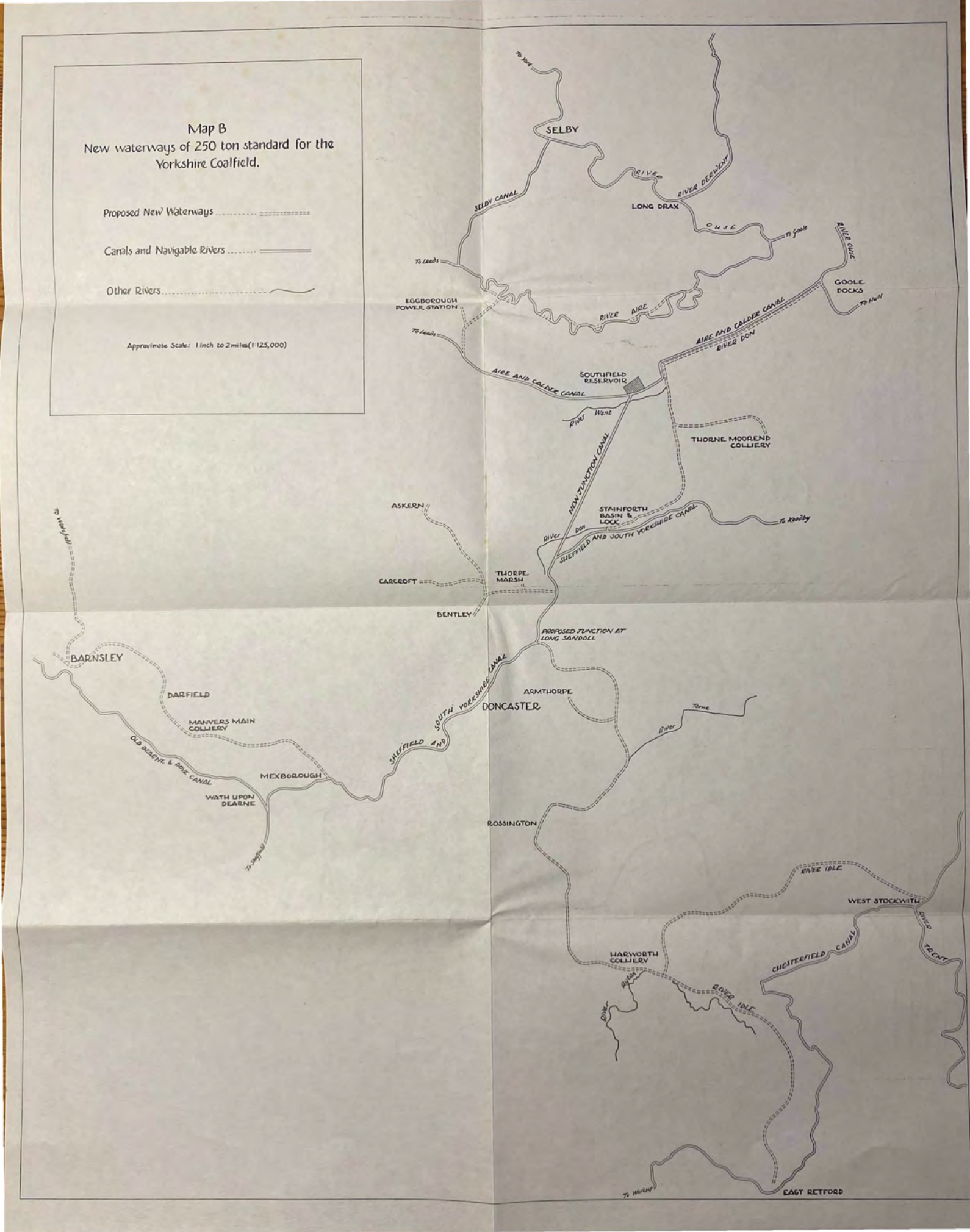
**Phase 2 (b)**

| | |
|---|---|
| 300 miles of Grand Contour Canal, including 6 lifts: | |
| @ £600,000 per mile | £180 m. |
| @ £10,000,000 per lift | £60 m. |
| 200 miles of feeder branch: | |
| @ £200,000 per mile | £40 m. |
| 50 miles of reconstructed river: | |
| @ £400,000 per mile | £20 m. |
| 350 miles of navigation | £300 m. |

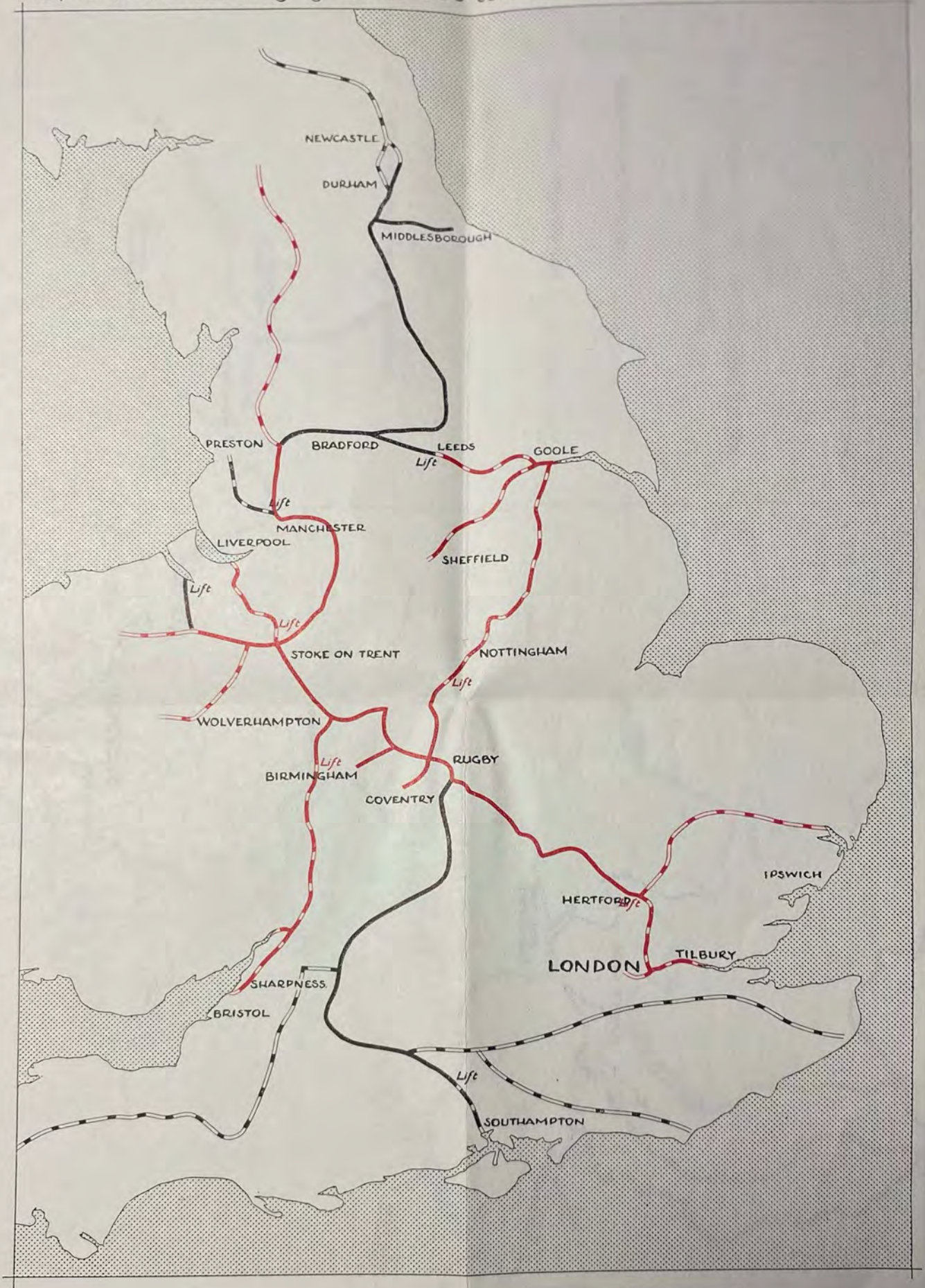
*Watford Printers Ltd.*

Map A: (existing waterway system with proposed amendments)




Map B
New waterways of 250 ton standard for the Yorkshire Coalfield.
Proposed New Waterways
Canals and Navigable Rivers
Other Rivers
Approximate Scale: 1 inch to 2 miles (1:125,000)
To York
SELBY
SELBY CANAL
RIVER
RIVER DERWENT
LONG DRAX
OUSE
To Goole
RIVER OUSE
To Leeds
GOOLE DOCKS
To Hull
EGGBOROUGH POWER STATION
RIVER AIRE
To Leeds
AIRE AND CALDER CANAL
RIVER DON
SOUTHFIELD RESERVOIR
AIRE AND CALDER CANAL
River Went
NEW JUNCTION CANAL
THORNE MOOREND COLLIERY
ASKERN
STAINFORTH BASIN & LOCK
River Don
SHEFFIELD AND SOUTH YORKSHIRE CANAL
To Keadby
To Wakefield
CARCROFT
THORPE MARSH
BENTLEY
PROPOSED JUNCTION AT LONG SANDALL
BARNSLEY
DARFIELD
MANVERS MAIN COLLIERY
OLD DEARNE & DOVE CANAL
MEXBOROUGH
WATH UPON DEARNE
To Sheffield
SHEFFIELD AND SOUTH YORKSHIRE CANAL
ARMTHORPE
DONCASTER
River Torne
ROSSINGTON
RIVER IDLE
WEST STOCKWITH
RIVER TRENT
CHESTERFIELD CANAL
HARWORTH COLLIERY
River Ryton
River Idle
River Poulter
To Worksop
EAST RETFORD

# Map C (new waterway system of 350 ton standard. Phases 2a & 2b)




310 ft = 94.488 m

Phase 2a

Phase 2b

Grand Contour Canal

River

Feeder