

**BRITISH
WATERWAYS
BOARD**

**THE
FACTS
ABOUT
THE
WATERWAYS**

**LONDON
DECEMBER 1965**

FIFTEEN SHILLINGS

BRITISH WATERWAYS BOARD

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SIR JOHN HAWTON, K.C.B. (*Chairman*)

ADMIRAL SIR FREDERICK PARHAM, G.B.E., K.C.B., D.S.O. (*Vice-Chairman*)

MRS. J. DOWER, O.B.E., J.P., HON.M.T.P.I.

E. C. R. HADFIELD, C.M.G.

HON. ALEXANDER HOOD

J. MATTHEWS, O.B.E.

A. M. ALLEN (*General Manager*)

Melbury House, Melbury Terrace, London, N.W.1,

FOREWORD

Towards the end of our first year of office—that is to say in December 1963—we submitted an interim report* to the Minister of Transport. In that report we reviewed the scope of the waterways undertaking and its various potential uses, and we sketched out some alternative patterns of future policy. But we also—and this was more important—outlined in general terms the large amount of work that would have to be done to lay sound foundations on which a clear and durable policy could be built.

The work which we thought needed to be done has now been done. We believe it would be helpful to publish a description and summary of it.

As far as the commercial aspects of the undertaking are concerned, what emerges from our work is, in our view, a clear picture of how much is truly and realistically commercial in this day and age. We think that it is in the interest of all concerned with transport, with the waterways, and indeed with economy and efficiency in public administration, to set out the position forthwith as a step towards dissipating the uncertainties which have damaged the waterway carrying industry for so long.

As far as the wider aspects of waterways problems are concerned, it has been impressed increasingly upon us that there is a steady and rapid growth of interest in (and perhaps anxiety about) the use of leisure, out-door recreation and the future of the countryside. Moreover, as will be seen, our studies have led us—regretfully—to judge that there is no hope of many of the waterways balancing income and expenditure—at any rate for many years to come. Clearly, therefore, the question of the future is not one that can be resolved simply on commercial grounds; it brings in broad social questions as well. As far as these broader questions are concerned we realise that we form only a part—we think a unique part—of a bigger subject, the subject of general future policy towards recreation.

So we think we ought to make the facts generally available for consideration by all concerned. We for our part are very conscious of the fact that if the Board's system did not exist it would involve vast expenditure to create it now. Equally, if the system fell into decay, it would require great expenditure to restore it. But we have deliberately restrained ourselves from making proposals of policy in this field. We have resisted temptations—real as they are—to go at this stage beyond the facts.

This is not another interim report. The ground which it covers, it covers, we believe, thoroughly. But equally it makes no attempt to discuss afresh some of the broader issues ventilated in the interim report of December 1963.

Our study of what is viable and what is not has, inevitably, led to a study of the problem of the balance sheet. To ignore this would be artificial and we have, therefore, felt that we ought to set out the capital structure to which the facts seem to point. It will, of course, be for Ministers

* *The Future of the Waterways*, H.M.S.O.

and for Parliament to decide whether, in the light of our assessment, the present statutory liabilities should be amended.

This leads to a more general point. The Minister of Transport and his advisers have, of course, been aware of the work we have been doing. We on our side have naturally and in the normal course of business kept them in touch. But responsibility for what is said in the report is our own and nothing in it implies any commitment by Ministers to a view on policy or on future action.

A summary of the outcome of our studies will be found in paragraph 202 on pages 39 and 40.

December, 1965.

BRITISH WATERWAYS BOARD

THE FACTS ABOUT THE WATERWAYS

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MAPS (in pocket)

The Board's Waterways—England and Wales

—Scotland

CHAPTER I

THE WATERWAYS AND THE BOARD: THE STORY SO FAR

1. It has been a long story—nearly 200 years since the first wave of canal-building enthusiasm (and indeed the best part of 2,000 since the Romans built the Fossdyke). Many hundreds of miles of the Board's waterways were built in a time when the competitor was—or was believed to be—the carrier's wagon and the pack-horse, not the railway. All (save one) were built before the internal combustion engine became a transport challenge.

2. Let it be stressed at once that not all the waterways have stayed as they were when they were first built. There are, of course, broad waterways which link with the main ports and have been improved by their owners from decade to decade. These, in our view, have a transport role and this is described in the next chapter. But as far as the smaller inland canals are concerned there has not been this progressive renewal and it is not surprising that they have problems of old age.

3. Now a word about the Board and the history of the last few years. The Board was set up by the Transport Act 1962, and from vesting date (1st January 1963) took over the ownership and management of the inland waterways which previously had been owned and managed by the British Transport Commission. Related to these waterways—and also vested in the Board—are a number of warehouses, a smaller number of docks, certain fleets (though it is very important to bear in mind that about four-fifths of the traffic on the waterways is carried by independent carriers) and a large number of small parcels of land connected with the waterways.

4. The Board's duties under Section 10 of the Act are to manage the undertaking with "due regard to efficiency, economy and safety of operation" and, secondly, to review the whole problem of waterways which are no longer self-supporting and to formulate proposals with the object of putting these waterways to the best use.

5. On finance, the key practical point about the last decade is that there was a steadily increasing deficit from 1954 to vesting date (1st January 1963). In fact it grew sevenfold in those years. For the year 1962 the actual level of deficit taking interest, etc., into account was about £2m. (that is to say over 40% of gross revenue).

6. In 1963 the deficit was cut by 26%. In 1964 the position was broadly speaking "held", substantial increases in costs being absorbed. The deficit before interest was very slightly lower than the 1963 figure, but this was rather more than offset by an increase in interest payments. Of 1965 it is, of course, too early to speak definitively. It is likely that the continuing search for extra revenue and for economies where possible will again bring it about that the wage and other cost increases have been, broadly speaking, contained.

7. Such is the practical financial position. The statutory financial position is this. The 1962 Act provided for no capital reconstruction for the Waterways undertaking. The opening capital debt was determined under a formula laid down by the Act (the figure so determined involves an annual interest payment of £726,000). For their revenue account, the Board were not exempted from the provisions of Section 18 of the Act (wherein the Boards are required to secure that "their revenue is not less than sufficient for making provision for the meeting of charges properly chargeable to revenue, taking one year with another"). But the provision of Section 18(1), with which there has never been any hope of the waterways undertaking complying, was suspended for five years. For those five years (which end on 31st December 1967) Section 23 enables the Minister of Transport to make grants to meet the revenue deficit. This same section requires the Board during this period so to conduct their business as to keep the deficits at the lowest possible level.

8. On the physical side, also, the 1962 Act provides for an interim period. Again this period is for the five years ending on the 31st December 1967. During that interim (and under Section 64 of the Act) the Board are safeguarded against any proceedings having the object of requiring them to maintain an inland waterway in a navigable condition if it was not navigable at any time in a "base line" period, which is in fact the six months ending in November 1961. But, after 1967, they would be required to put all those waterways where relief from the obligation to maintain as navigations had not been obtained (i.e. in more familiar—although misleading—words, all those waterways which are not "closed") into a fully navigable condition.

9. So, unless there is amending legislation of some kind, the Board will, at the end of 1967, be faced with increased obligations but with resources quite inadequate to meet them. It is not surprising, therefore, that Ministers during and after the passage of the 1962 Act have indicated from time to time that it was likely that further waterways legislation would be necessary. While the problem will become acute in 1967 it is chronic already. Questions of practical day-to-day management (for instance, those involving expenditure and budgeting) are inevitably made more intractable and obscure by uncertainty about the future. This is what lies behind the need for urgency to which we have referred both in the interim report and in the Annual Report on the year 1964.

CHAPTER II

THE STRUCTURE OF A COMMERCIAL DIVISION

10. We have naturally begun by considering the related questions:—

- (i) How much of the undertaking can effectively in present circumstances be treated as “commercial”? and
- (ii) What sort of financial structure would be most in the interests of efficiency and sound management?

11. In our study of these matters we have been much assisted by the financial advice of Messrs. Cooper Brothers and Company, Chartered Accountants, whose independent help we thought it wise to enlist so as to be sure of an objective opinion.

12. What parts of the undertaking can be run on a commercial basis? This—as we see it—is basically a question of fact. To answer it means to decide which parts of the undertaking show—and can be expected to continue to show—a reasonable and healthy surplus of income over expenditure. This surplus should be a surplus after the payment of interest; for it is entirely right that the commercial part of the undertaking should be charged a reasonable rate of interest on a reasonable value for its assets. At present the whole situation is confused both from the balance sheet point of view and from the revenue account point of view by the financial inter-weaving of commercial and non-commercial elements.

13. It is—in our view—essential that the foreseen surplus of income over expenditure should be neither too low nor too high. As a generality that is a platitude, but we give it arithmetical form later on. Briefly, the problem is this. To make the maintainable surplus too low would be to repeat a mistake of the past—in essence the mistake of prescribing an impossible task and watching the perhaps protracted but eventually inevitable failure. To make it too high (by the over-ruthless exclusion of some items) would involve placing as a burden on the Exchequer certain elements of the undertaking which it would be reasonable to expect the commercial part to carry.

14. We have therefore assessed what a commercial part, or “Commercial Division”, of the undertaking should comprise and what capital value should be attributed to it. In assessing capital value we have not found it constructive or fruitful to work from the basis of the highly stylised statutory formula that led to the present so-called balance sheet.

15. The inadequacies of the inherited balance sheet from the point of view of the sort of studies we have made are set out in Appendix I. Our approach has been to base our studies on the concrete question “What are the things which fall to be considered worth in a commercial sense?”

16. In studying what each commercial element is “worth” we, and our advisers, have taken the view that the essential thing is to judge what level of performance can be sustained—what, in other words, is the net maintainable revenue. In determining net maintainable revenue we have had regard to the out-turn for the Board’s two completed years of operation (1963 and 1964), to the results of the current year to date, to the short term forecasts which are a normal part of business administration and also to all the more general considerations which are likely to affect the future.

17. The various types of “asset” which make up the undertaking are, of course, historically closely interlinked with each other. They are interlinked in day-to-day management in ways which are touched on later in this chapter and in Chapter III. But, to avoid misunderstanding, let it be clearly stated now that what we are examining in this chapter is the broad problem of how much of the totality of the mixed bag of assets which are our inheritance can be run in a

commercial way. We are not confining ourselves to the rather narrower question of how much of this same mixed bag is commercial in a strictly and exclusively water transport context.

ADMINISTRATIVE OVERHEADS

18. We must begin with a prefatory word about overheads or they will continually crop up and confuse the analysis. For the reasons explained in the next chapter, our studies of the practical management problem have led us to the view that—while many forms of administration are doubtless possible—the one that makes the most efficient and economic way of proceeding is to have a single management organisation responsible for both the commercial and the other parts of the undertaking.

19. If a Commercial Division is established with its own balance sheet and financial targets, then there would clearly have to be the most careful arrangements for the future, not only to ensure that both the Commercial Division and the remaining parts of the undertaking are properly directed and controlled, but also to ensure that neither side benefited at the expense of the other by an unfair allocation of central administration charges. We need not here deal with the detailed procedures and mechanisms which would have to be (and which could be) set up to ensure due fairness in attribution of the various types of overhead expenditure in the future. But it is necessary to assess how much should be debited against the Commercial Division when assessing—as an initial problem—what the extent and financial structure of that Division should be.

20. A summary of our study of this matter is set out in Appendix 2. It leads to the conclusion that the total of these centralised charges reasonably attributable to a Commercial Division, as described in the later paragraphs of this chapter, is £120,000 a year divided as follows:—

	£'000
Waterways (in commercial group)	40
Waterways (in special group)	5
Fleets	10
Warehouses	20
Docks	15
Estates	30
	<hr/>
	120
	<hr/> <hr/>

How these charges are brought into the general calculation will be described in the paragraphs which follow.

WAREHOUSES

21. The waterways themselves, rather than the related warehouses, docks and estates, are the nub of the Board's undertaking; but as will be seen, the financial treatment of the waterways gives rise to special problems. So let us start with the relatively straight-forward cases of warehouses and docks. Obviously the Board's warehouses would be within the Commercial Division: nobody is going seriously to argue that warehouses have an amenity value. In 1963 the surplus of income over expenditure was £139,000. In 1964 it was £110,000. 1963 was a bumper year when all went well above the average; 1964 was disappointing. For 1965 a modest improvement on 1964 is expected.

22. Some of the Board's warehouses are new, others small and old. The business is perhaps more vulnerable to fluctuations in the general level of trade activity than are some

other forms of commercial enterprise. In three cases—but only three—significant capital expenditures were undertaken by the Board in 1963 and 1964. In the light of all this the appropriate figure to take as the net maintainable revenue would—in our view—be £130,000 a year.

23. This figure should, of course, be reduced by the £20,000 for overheads assessed in paragraph 20 above.

24. It should also be reduced for further depreciation. The figures already set out cover depreciation of vehicles, plant and equipment, but not depreciation on structures. Renewals of structures are charged to revenue in full in the year in which they occur. In considering what arrangements it would be most businesslike to establish for the future, we think it would be prudent to make a charge for depreciation and obsolescence as well (save, of course, for those assets already covered by depreciation). Having regard to the nature of the warehouses (some steel-framed and asbestos-clad, some very old and solid) we consider that a reasonable charge would be $1\frac{1}{2}\%$ per annum of the assessed capital value.

25. What should the assessed capital value be? After careful thought and in accord with the advice we have received from Messrs. Cooper Brothers and Company, we have concluded that a fair and reasonable basis is that of “years’ purchase” of the net maintainable revenue and that a reasonable multiplier to take would be 10. Surplus income over expenditure of £99,000 (i.e. the £130,000 referred to in paragraph 22 after allowing for central charges at £20,000 and extra depreciation as described in paragraph 24 at £11,000) thus leads to a capital value of £990,000.

26. We have also given careful thought to the rate of interest which it is appropriate to assume for this present analysis. In our opinion it would be appropriate under present conditions to work on the basis of 6%. Interest at that level would amount to £59,000, thus leaving £40,000 future net maintainable revenue after interest.

DOCKS

27. The Board’s three main docks are Regent’s Canal Dock (at Stepney in the Port of London) where the Regent’s Canal joins the Thames; Sharpness Docks where the Gloucester and Sharpness Canal joins the tidal Severn; and Weston Point Docks (near Runcorn) where the Weaver Navigation joins the Manchester Ship Canal and the Mersey. The docks, like the warehouses, would clearly fall within the Commercial Division. The working surplus in 1963 was £43,000 and in 1964, £41,000. These were two years which were significantly better than their predecessors in certain respects. But future prospects—which are not uniform as between the Board’s three main docks—have to be considered, and account must also be taken of the Board’s share of profits of Ellesmere Port (appropriated to special renewals in recent years).

28. For the docks activity the reasonable figure for a maintainable surplus of revenue over expenditure is—in our opinion—£50,000. From this £15,000 should be deducted for central charges, and £1,000 for extra depreciation and obsolescence charge on the “non depreciation type” assets (for the same general arguments as mentioned in the case of warehouses). This gives a net maintainable revenue before interest of £34,000. Again a multiplier of 10 would be appropriate, giving a capital value of £340,000. The interest would be £20,000 (at 6%) and the surplus after interest would be £14,000.

WATERWAYS

29. We now come to the crucial matter of proposing which waterways could appropriately be included in a Commercial Division as outlined in this chapter, with what that implies in the

way of having an attributed capital value, interest liability, and so on. In considering all this we have endeavoured to keep in double harness both financial considerations and transport ones. If one's sole touchstone had been whether a particular waterway currently had a surplus of income over expenditure, one would have got a curious answer. For instance, the most important Sheffield and South Yorkshire Navigation would have been "out" and the entirely unnavigable Manchester, Bolton and Bury Canal would have been "in". In other words a purely financial approach would have yielded an answer which would not have made any sort of transport sense at all. So what we have tried to do is to produce a group of waterways which both give promise of a reasonable financial performance and which seem to us to have a significant transport contribution to make.

30. In our Interim Report we provisionally classified twelve waterways as "Major Transport Waterways". Taking this group as a whole, it made a loss in 1963 and a somewhat greater loss (though the increase was due to special factors) in 1964. By loss is meant an excess of current expenditure over income—even before including capital charges. So this record gives no basis at all for treating the group as a whole as "commercial" in a realistic sense.

31. The classification of the Major Transport Waterways was indeed provisional and the further studies we have made have led us to the view that certain modifications—mainly reductions—should be made. The Fossdyke, the Caledonian, the Crinan, the lower Grand Union, the western part of the Calder and Hebble, and the Sheffield-Rotherham length of the Sheffield and South Yorkshire Navigation would be excluded. The treatment of these excluded waterways is discussed at the end of this chapter. The upper Lee, however, should be added as it is not realistic to treat the Lee other than as a whole.

32. The waterways which remain on the commercial side are therefore:—

Aire and Calder Navigation (including the New Junction Canal)
Calder and Hebble Navigation (Greenwood Lock to Wakefield)
Sheffield and South Yorkshire Navigation (Rotherham to Keadby)
Trent Navigation (Gainsborough to Nottingham)
Weaver Navigation
Lee Navigation
Gloucester and Sharpness Canal
River Severn (Gloucester to Stourport).

33. Before we come to the financial appreciation let us consider the waterways in this list from a transport point of view. The waterways which were provisionally classified as Major Transport Waterways but are not in the list are similarly commented on in paragraphs 69 to 76 below.

34. All of these waterways carry craft of substantial dimensions and are capable in most cases of taking seagoing ships or estuarial craft. They have (though not all equally) been improved over the years. Improvement has taken forms such as enlargement and mechanisation of locks and channel improvements designed to increase the capacity of the waterway itself. It has also involved extending the associated waterside terminal and handling facilities. These processes have continued, and are continuing, under the Board's management.

35. In the north-east, the Aire and Calder, the Calder and Hebble (Greenwood Lock to Wakefield), the Sheffield and South Yorkshire and the Trent comprise an interconnected group of major waterways linking the industrial areas of the West Riding and East Midlands to the Humber Ports. Craft using these waterways operate regularly to Goole, to Immingham and to Hull.

36. The *Aire and Calder Navigation* extends from its junction with the River Ouse at Goole to Leeds. There is a branch from Castleford to Wakefield. And there are two other

branches. The New Junction Canal provides an important connection with the main line of the Sheffield and South Yorkshire Navigation leading to Doncaster and Rotherham. The Selby Canal links with the River Ouse. The total length is 63 miles. The main line has a capacity for normal craft of up to 300 tons, for specialised craft approaching 500 tons and for trains of compartment boats moving a total of about 700 tons. The principal traffic is coal; about three-million tons are conveyed each year, both by the Board's compartment boat fleet and by private carriers; major power stations alongside the navigation are served from waterside collieries and there is an extensive shipment through the special tippler coal hoists at Goole. Extensive waterside facilities developed in recent years include the handling and storage of waterborne general merchandise at Leeds (Knostrup), where also an adjoining site has been developed for the storage and distribution of petroleum. Successive improvements to the navigation itself have been carried out over the years and are continuing at the present time. The *Calder and Hebble Navigation* is the subject of individual study in Appendix 5. Of its total length of about 21 miles from Wakefield to Sowerby Bridge, the lower length of 9½ miles from Wakefield to Greenwood Lock (near Dewsbury) is considerably used for commercial traffic, much of which passes to or from the Aire and Calder Navigation, while there is also a useful internal tonnage from loading staiths to Thornhill Power Station. It is reasonable, therefore, to consider this lower length as an extension of the Aire and Calder system.

37. The *Sheffield and South Yorkshire Navigation* extends some 43 miles from Sheffield to Keadby on the River Trent and has a connection via the New Junction Canal to the Aire and Calder system and Goole. It thus links the heavy industries of the Sheffield, Rotherham and Doncaster area to the Humber Ports. Trains of compartment boats (moving a total of about 700 tons) and craft of up to about 250 tons can navigate via the New Junction Canal to Hexthorpe, just above Doncaster. Upstream of this point the short (63 ft.) locks and other limiting factors restrict navigation to craft of about 90 tons. This navigation has not had the benefit over the years of development on the same scale as the Aire and Calder, but in recent years the Board have developed extensive waterside terminal and storage facilities at Rotherham to serve the Rotherham and Sheffield areas. An economic survey was commissioned by the Board to help them assess the case for major expansion of this waterway. The survey has given rise to a number of interesting possibilities, but to be weighed against these were significant reservations as to the future of some of the coal traffics. Serious problems are associated with the heavily-locked top five miles between Rotherham and Sheffield; this section is the subject of an individual report in Appendix 5.

38. The *Trent Navigation*, extending some 68 miles from Gainsborough to Shardlow, provides a rapid direct route from the Humber Ports to Nottingham, with good facilities for the movement of craft of up to about 200 tons. The main traffics are petroleum to the distribution centres at Torksey and Colwick (near Nottingham) and general merchandise to the Board's depots at Gainsborough, Newark and Nottingham, whence Leicester, Birmingham and the East Midlands are served by road. Dredged gravel forms an appreciable return load traffic. Much work has been undertaken in recent years on lock improvements and the strengthening of weirs. The upper section of the river from Nottingham to Shardlow (13 miles), though popular for its amenity use, is of little commercial traffic consequence; this length is the subject of an individual report in Appendix 5.

39. In the north-west, the *Weaver Navigation*, a substantial river navigation, extends 20 miles from Winsford in mid-Cheshire to the Board's docks at Weston Point, where it connects with the Manchester Ship Canal and the River Mersey. It serves large-scale chemical and other industries, whose products for direct export in sea-going ships of up to more than 500 tons capacity form its principal traffic. Other traffics arise from transshipment at Weston Point Docks, where the handling and storage facilities have been successively extended in recent years

to deal with the increasing traffic, and where ships of up to about 1,600-tons capacity are handled. The navigation also serves the Board's depot at Anderton near Northwich (which has been largely reconstructed within the last 12 months).

40. In the London area, the *Lee Navigation*, extending 28 miles from Hertford to the Thames (which can be joined either by way of Bow Locks and Bow Creek or through Limehouse Cut and Lock), provides an important access to the London Docks and London's river with the increasingly striking opportunity of avoiding congestion in the Port of London and its road and rail approaches. Navigable by craft of about 135-tons capacity as far as Enfield, it carries a substantial traffic in timber, general merchandise, coal and liquids. The navigation has been successively improved over the years. Above Enfield the traffic use diminishes but other uses increase in importance. The Lee Navigation provides the Metropolitan Water Board with large quantities of water, and part also serves as a flood channel. As an amenity it has been proposed by the local authorities that the river and its surroundings should be developed for public recreation and enjoyment—a "Lee Valley Regional Park". It will be essential to ensure that this development—desirable as it is—is so arranged as not to hinder the continued life of the Lee as an important navigation with all that it contributes (and the more that it could) to the alleviation of congestion.

41. In the south-west, the *Gloucester and Sharpness Canal* and the *River Severn* together form a main traffic artery from the Bristol Channel ports through the Board's Sharpness Docks to their Gloucester Docks and onwards to Worcester and Stourport on the threshold of the Midlands industrial area. The Gloucester and Sharpness Canal, extending 16 miles from Sharpness to Gloucester with a lock at either end for passage into the Severn, carries a substantial tonnage of petroleum, timber and general merchandise in both lighters and sea-going vessels of up to about 750-tons capacity. Recent developments include improvements to the general facilities at Sharpness Docks, where ships of up to about 7,000 tons are accommodated, while land in the Board's ownership at Monk Meadow (Gloucester) is being progressively developed as a wharf for timber and other traffics. Above Gloucester, the River Severn continues as a navigation for a further 42 miles to Stourport, and can accommodate craft of up to 400 tons as far as Worcester and 150 tons to Stourport. The main traffics are general merchandise to the Board's Worcester Depot and petroleum traffic to both Worcester and Stourport, though pipe-line developments have adversely affected the volume of business above Worcester.

42. It is highly artificial and theoretical even to think about the implications of "closing" the waterways which have just been described. Nevertheless, the essence of our work has been to subject our operations to realistic financial analysis and so we have thought it necessary to face up to the question whether to keep them as navigations is in fact more expensive than it would be to keep them in some other condition. We have, therefore, studied how much total expenditure could be reduced if there were no navigation and how this would compare with present and foreseen toll receipts.

43. These waterways are big. Quite apart from their traffic role they play most important roles in water control, water supply and land drainage. If there were no navigation there would, of course, be some savings in both operation and maintenance. But, we are convinced, substantial expenditures under both heads would have to continue. Indeed, the result of our examination has been to satisfy us that the general financial situation would be several hundred thousand pounds a year worse if these waterways were closed to navigation. What is equally important is that this answer does not come about because one or two in the group are "carrying" the rest. It is an answer which applies to each and every one of them except the Calder and Hebble (where the answer is just about a break-even—and where, incidentally, the scale both of revenue and expenditure is of a very much smaller size than it is for any of the others in the group). For the rest, naturally, there are variations in relative prosperity but the basic

fact is the same for each of them—namely that the navigation function is justified on a strictly financial basis.

44. We now turn to the question of financial treatment along the lines of that already suggested for the warehouses and docks.

45. It is, of course, essential to distinguish between the matter of actual physical life on the one hand and of attributing a capital value on the other. The crucial nature of this distinction is indeed the first fact which a satisfactory settlement must take into account. The reasons are as follows.

46. On the one hand, security of maintenance for a reasonable period is essential. If investment is to proceed; if firms are to put their businesses by the water and to welcome carrying on the water; if new craft are to be developed and purchased not only by the Board but also by the independent carriers who play so vital a role; if business is to be retained and expanded—then there must be security. The lack of security in the past has been responsible for a significant part of the commercial traffic decline of many miles of waterway. Taking the small group of waterways which are described above, which are a series of transport facilities and which, as a group, have an income which currently exceeds expenditure, we think it is vital that there should be an assurance that these waterways will remain open to navigation for a long time (say 25 years), and that expansion and improvement—when accepted as being commercially justified—can and will be undertaken. This security will maximise the chances of more intensive use and so it will increase the prosperity of the waterways concerned.

47. But on the other hand it is, of course, essential to avoid putting a capital value on these waterways so great as to require tolls at a level so high as to frustrate the objective of increasing use.

48. These waterways as listed in paragraph 32 had an average of about £180,000 surplus of income over expenditure in 1963 and 1964. It would, however, be optimistic—given the fierce competition to which the waterways are exposed for the bulk traffics on which they rely—to assume a continuance of surplus at this level. Some deduction must therefore be made. Expected improvements for some traffics have to be offset against possible decline in others. As a net maintainable revenue it would—in our view—not be prudent to take a figure higher than £120,000. Moreover, from this £120,000 should be deducted £40,000 for central charges. But in all the circumstances it would not be in accord with the facts to provide for extra depreciation. Also, the Board and their advisers have—on the basis of their studies—concluded that in all the circumstances a reasonable multiplier would be 7 years and not 10 years. Thus the £80,000 (i.e. £120,000 minus £40,000) would be converted into a capital value of £560,000. On this, interest at 6% would be £34,000 so that the net maintainable revenue after interest would be £46,000.

FLEETS

49. As already explained, the Board themselves are only one amongst a number of commercial freight carriers on the waterways. On some—even of the most important (the Lee, for instance, and the Weaver)—they do not carry at all. On the major waterways in the north east and south west they do run commercial fleets. In the north east, there is the compartment boat fleet already referred to and there are also a group of fleets (centred administratively at Hull) which operate on the Aire and Calder, the Sheffield and South Yorkshire, and the Trent. In the south west, there is a fleet whose administrative centre is at Bristol, which operates on the Gloucester and Sharpness Canal and the Severn.

50. For fleet operations the average loss in each of the last two years (ignoring the now

disbanded narrow boat fleet) was about £80,000. This gives no basis for valuation. Depreciation is charged against craft on the basis of an imputed capital value of about £600,000 and this depreciation is provided for in the deficit figure mentioned. Such a capital value, however, is quite unrealistic. We have, with our advisers, given particularly careful thought to the assessment of a fair and reasonable alternative figure on the basis of the facts of the present and the foreseen situation. Our conclusion is that the appropriate figure would be £100,000.

51. The problem of establishing the net maintainable revenue of the fleets also is difficult. But it must be done so that this activity can take its place in the general assessment of the commercial future. Tolls of rather more than the revenue loss were paid in 1963 and 1964 and a very acceptable contribution to local overhead expenses was made. But, obviously, the situation in those years has been a cause of much concern. A major management effort is being, and will continuingly need to be, deployed to improve it. The results for 1965 to date indicate that this effort is beginning to make its impact. It is only realistic, however, to work on the basis that it will be some time before the loss is eliminated. For the purpose of the calculation with which this chapter is concerned (and for that purpose only) it is, in our view, appropriate to work on the basis of a reduction of the loss to £40,000 p.a. (after payment of tolls of more than that amount and after due contribution to overheads). The writing down of the capital value of the fleets mentioned in the previous paragraph will assist this improvement to the extent of some £16,000 p.a. by enabling reduced amortisation to be provided.

52. A "net maintainable loss" of £40,000 p.a. must have added to it £10,000 p.a. for central charges. No extra provision for depreciation is required as the assets in this case are already within the "depreciation type assets" field.

53. So, for fleets, the deficit picture on this basis becomes:

Net maintainable revenue (after tolls)	£40,000
Central charges	£10,000
	<hr/>
	£50,000
Interest on capital value	£ 6,000
	<hr/>
	Total £56,000
	<hr/> <hr/>

54. Let it be stressed yet again in concluding our comment on the fleets that the above analysis—necessary though it is for present purposes—does not mean or imply that the Board would rest complacent or inactive with this loss.

ESTATES

55. Lastly, there is the question of the appropriate commercial treatment of land and buildings. Land and buildings not required for operating waterways, warehouses, or docks are put to the most remunerative use which can be secured for them. The problem of assessing a capital value for this estate was examined in the 1963 Annual Report of the Board (paragraph 98) and a capital value of £4m. was attributed on the basis of 12 years' purchase of the surplus of income over expenditure at that date. In the light of present circumstances a fair and reasonable "base line" figure would be one rather higher than the £330,000 then taken as appropriate. An appropriate figure in our opinion is £360,000. Neither the "1963" £330,000, nor the £360,000 just mentioned allow, however, for central charges. When these are deducted—£30,000 (see paragraph 20)—the resultant surplus becomes again £330,000.

56. Although there are some attractions in (and arguments for) adopting a common multiplier of 10, a case for easing the burden by reducing 12 to 10 cannot in our view fully be

made out. We therefore adhere to a multiplier of 12. As far as depreciation is concerned it seems fair to say that the principal element in this aspect of the business (and certainly over long periods) is related to values in land rather than in buildings; and it seems to us reasonable therefore for depreciation not to be charged.

57. Taking £330,000 at 12 years' purchase, the capital value attributable to the Estates part of the undertaking would be £3,960,000 on which interest at 6% would be £238,000 and the future maintainable revenue after interest would be £92,000.

58. But is it "fair", it may be asked, to treat the estate income in this way? Various different treatments can—obviously—be envisaged. For instance; it could be argued:

- (a) that the estate income should not be brought into proposals for a future "commercial" part of the undertaking at all: or
- (b) that it should be organised quite separately—perhaps in the form of some second commercial division; a property company as it were: or
- (c) that the undertaking should divest itself of all non-operational property by a set policy of sale: or
- (d) that the income should be attributed to the individual waterways to which—geographically and historically—the parcels of land now making the estate properties were originally operationally attached.

59. Let us set out our views on these four points one by one. But, first, to get the whole subject in perspective a word must be said about how the estate came—and still comes—into existence, and how it is dealt with. The old canal companies did not, generally speaking, buy lands as property speculations. The present non-operational estate has not therefore arisen from the amalgamation of lands bought by the Board's predecessors for development, renting, or resale. It has mainly arisen from and it continues to arise from constant critical scrutiny of engineering and operational needs and the taking of land not strictly so needed for sale or for letting. The fact that this is a continuing process is most important in considering what course of action for the future is most in the public interest. As a management process it goes on all the time. Even from this current year alone a number of examples could be given—for instance the major part of Wigan Repair Yard, a substantial part of Bulls Bridge Repair Yard in Southall, London, and an area of land at Tyseley Warehouse in Birmingham. In our view an integrated organisation maximises the practical chances of this process of scrutiny and re-use being pursued with vigour (and thus of revenue being obtained or asset values realised wherever possible).

60. A second key point is this. Estate revenue is not an Aladdin's lamp. This is especially so for the canal "estate" because the properties consist not of geographically consolidated and big units but of many bits of land (often in not very "expensive" areas.) Estate revenue, like other revenue, has to be worked for. Renewals and reversions must be dealt with skilfully and against an accumulated background of knowledge if the best is to be obtained from them. The same skill and knowledge is necessary in order to deal with the ever present and most important problem of "sale versus letting" correctly in each individual case. We take the view that an estate department which has inherited many years experience of dealing with these matters, which deals also with the other estate problems described in Chapter III and which has the closest day-to-day contacts with the commercial and engineering sides of the undertaking, is likely to provide the most economical and effective instrument for handling all these management matters. Where special skills are needed (e.g. for major development or for knowledge of Scottish conditions) they can be, and are, brought in *ad hoc*.

61. Now to return to the four points listed in paragraph 58. It seems to us that (a) (i.e. ignore estate income) would only really be a relevant and important point if the estate income were "subsidising" the rest. But this would not be so in the scheme outlined in this chapter. The table in paragraph 66 below shows this. Estate income is, by a big margin,

the largest source of the surplus of income over expenditure. There need be no surprise about that—it is a situation which has developed over the years and has indeed been perfectly plain from the Board's published annual accounts. But that is a quite different state of affairs from subsidising. It could perhaps be argued that in the present entangled situation there is a measure of such subsidisation. There would not be if the structure outlined in this chapter were brought into effect.

62. As far as (b) is concerned (a separate organisation), it is perhaps only necessary to say that this would seem to introduce a further complication, additional cost, and to run fairly directly up against the problems outlined in paragraphs 59 and 60.

63. On (c) it seems to us not only that the relative advantages of sale or letting should be judged on their merits in each individual case, but also that the general framework should be such that this issue can be faced without prejudices. One amongst the many of the important benefits that would—in our opinion—arise from having a realistic commercial balance sheet is that it would provide the right framework for making these judgments impartially and to the best public advantage.

64. Lastly, (d), there is the question of attributing non-operational estate income to individual waterways. This would be "cosy": it would give some nasty financial problems the aspect of being less nasty than they are. But it would not be realistic. From the revenue account point of view it would attribute income to sources from which it did not really arise. From the balance sheet point of view it would mean the re-linking of commercial assets into non-commercial entities; it would thus make impracticable the levying of interest on those commercial assets and would put great obstacles in the way of the most desirable objective of determining a realistic balance sheet so as to have a sound basis for management in the future.

65. Indeed, when we bear in mind that there are likely to be further switches of properties on to the estate side (paragraph 59 above), it seems to us that the right thing is not to (as it were) "redistribute back" the present estate, but to make suitable provision for continuing movement the other way. When a piece of land or a building hitherto used for operational purposes on a waterway other than those in the Commercial Division is judged to be available for selling or letting, the capital value of the commercial part of the undertaking would have to be adjusted upwards by an appropriate amount so as to ensure that there was no unjustified benefit. The basis of valuation should be in line with that adopted for the initial valuation and described above. This problem does *not*, of course, arise when there is a change of use of assets already within the commercial part: in those circumstances no adjustment of capital value would be required.

FINANCIAL SUMMARY

66. The analysis in this chapter leads to the following:—

	<i>Capital value</i>	<i>Net Maintainable Revenue before Interest</i>	<i>Interest</i>	<i>Net Maintainable Revenue after Interest</i>
	£'000	£'000	£'000	£'000
Warehouses	990	99	59	40
Docks	340	34	20	14
Estates	3,960	330	238	92
Waterways	560	80	34	46
Fleets	100	—50	6	—56
Total	5,950	493	357	136

67. There would, in short, be a return on capital value before interest of a little under 8½%. This, of course, is not a glowing financial prospect. But it would—in our opinion and after the most careful thought and assessment of our management experience—constitute a sound basis for setting up a reasonable sector of the totality of the Board's present operations on a workmanlike footing for the future. Moreover, to add further waterways to this part of the undertaking would be to run the danger of re-creating a doubtfully-viable (and therefore potentially-confused) situation.

EXPANSION

68. On the type of financial structure envisaged, opportunities for expansion could be considered readily and clearly. If expansion is found by the Board to be (and in the case of larger schemes—endorsed by the Ministry of Transport as being) justified on a commercial basis, there would be a soundly-based commercial organisation to undertake finance and to maintain the expanded facilities.

SPECIAL GROUP

69. It remains to consider those waterways which were provisionally listed as Major Transport Waterways but are not in the Commercial Division as outlined above. Unless the whole pivot of the commercial structure we have suggested (i.e. the commercial part really having a proper chance of earning a reasonable commercial return on its assets) is to be jolted out of true, then it follows in our opinion that the commercial part cannot safely accommodate any more losing waterways. Some of those already in the list, considered individually, have a deficit but for the reasons we have set out above they have been included as forming part of a reasonable group with other waterways which do have a surplus. Clearly, however, this process cannot be taken too far.

70. What, then, would be a sensible realistic treatment of the lower Grand Union, the Caledonian, the Crinan, the Fossdyke, the Sheffield and South Yorkshire (Rotherham/Sheffield) and the Calder and Hebble from Greenwood Lock to Sowerby Bridge?

71. It is our view that it is only realistic that the first three—the lower Grand Union, the Caledonian and the Crinan—should be treated as commercial navigations. Especially in the case of the first two there is extensive commercial use. But they are not profitable. Not only does expenditure on each of them seriously exceed income, but also when the type of test outlined in paragraph 43 is applied it becomes apparent that the costs incurred on behalf of navigation significantly exceed revenue from that source. They are therefore unlike the waterways listed in paragraph 32.

72. The lower section of the *Grand Union Canal* includes the length from the junction with the River Thames at Brentford to the junction with the Slough Arm near Uxbridge, the Paddington Arm from Bulls Bridge to Paddington, the Regent's Canal from Paddington to Regent's Canal Dock, and the Hertford Union Canal which connects to the Lee Navigation. The total mileage is about 33. The physical and financial problems are reviewed in Appendix 5. Like the Lee, it offers a great potential in avoiding road congestion in and around the metropolis. Maintenance as a transport waterway does not, however, generate sufficient revenue to offset expenditure.

73. The *Caledonian Canal* extends for 60 miles from Clachnaharry (near Inverness) to Corpach (near Fort William). About 40 miles of this route is composed of Loch Ness, Loch Oich and Loch Lochy, providing deep clear water without obstructions. The canal provides a major route for ships of up to about 500 tons, saving 127 miles between the coastal ship lanes and avoiding the exposed passage round Cape Wrath and the turbulent waters of the Pentland

Firth. A substantial timber traffic is being developed at Corpach where the facilities have recently been greatly extended by the Board. Basically, however, though the canal provides an important cross-country route for ships, fishing vessels and yachts, it passes through no industrial area. It incurs—and has for many years incurred—a heavy deficit. It is further discussed in Appendix 5.

74. The *Crinan Canal* links Ardrishaig with Crinan, a distance of nine miles. It provides a sheltered passage for vessels of up to about 150-tons capacity from the Clyde to the west coast of Scotland, enabling craft to save about 80 miles and avoid the circuitous and exposed route round the Mull of Kintyre. Like the Caledonian Canal, however, it serves no industrial area and incurs a heavy deficit. It also is further discussed in Appendix 5.

75. Because of what has already been said about the need for security, it is important—if these three waterways are to stay alive and play a useful transport role—that they should have an assurance of long life, say 25 years, as is proposed for the waterways described in paragraph 46 above. They should also have the same undertaking that improvements would be considered on their commercial merits (paragraph 68). Moreover, if their fortunes improve (to which end our efforts would and should be directed) then the question of any subsidisation would clearly fall to be reconsidered. But for the time being not only is it unrealistic to charge interest on a capital value but it is unrealistic to expect the Commercial Division (if *that* is to pay a proper rate of interest and have a reasonable surplus thereafter) to carry the revenue loss. So—it is suggested—for these three cases there is a strong argument for subsidy. It would be a subsidy specifically related to these cases and not in any sense a general subsidy. It would, on the basis of recent experience, amount to annual figures of the following order:—

Lower Grand Union Canal	..	..	..	£70,000
Caledonian Canal	..	..	..	£50,000
Crinan Canal	..	..	..	£25,000
Central charges	..	..	..	£ 5,000
				£150,000

76. On the Fossdyke and the Sheffield and South Yorkshire (Rotherham/Sheffield) there is, of course, a significant amount of wide boat traffic. Annual toll revenue from the Fossdyke is about £2,000 and from the Sheffield/Rotherham section is just under £2,500. Expenses on both these sections are heavy, however, and they do not have the same transport significance as the waterways listed in paragraph 75 above. On the western section of the Calder and Hebble commercial traffic is negligible. We have felt it necessary to keep the size of the “special group” as small as possible and this has led us to the view that the future of these three waterways falls, therefore, to be considered with that of the many other waterways excluded from the Commercial Division—indeed, as will be shown, some of those others, too, have a certain amount of commercial traffic: the Birmingham Canal Navigations are one example and part of the Leeds and Liverpool Canal is another.

CHAPTER III

MANAGING CANALS

77. Before we come to consider the financial prospects and problems of those parts of the undertaking outside the Commercial Division as outlined in the previous chapter, we think it is important to set down an account of what is involved in the day-to-day running of inland waterways. Indeed we feel that such an account is necessary because there is a good deal of popular misconception about the facts. This must be removed if false judgments about the present, and unreliable plans for the future, are to be avoided.

78. The basic misconception is that canals can satisfactorily be run with relatively little effort by any person or group of people who are minded to apply themselves to the task. Perhaps the familiar summer picture of the tranquil canal scene leads to the belief that canal management is an equally halcyon and uncomplicated affair. The misconception is one which can easily give rise to quite erroneous ideas both about costs and about organisation. So we must—in the interests of realism—try to explain what is involved.

79. Many of the problems peculiar to canal administration spring essentially and quite simply from geography and history. Every mile of canal represents a ribbon of property ownership—with two miles of boundary—stretching across the countryside. At the time of its construction, the route cut artificially both across natural features (streams, ditches, roads and so on) and through the property of other parties. The many and varied conditions upon which the canal proprietors were permitted to build their waterways and to construct works interfering with natural flows of water, were incorporated in the enabling Acts of the canals concerned. The position of artificial canals in these respects is different from that of natural rivers, which normally constitute no ribbon of separate land ownership and have formed since time immemorial a natural boundary between the lands they separate.

80. There are, therefore, very many ways in which the work and interests of adjoining landowners, local authorities and public undertakings impinge on the canals simply because of physical co-existence. Every landowner has, of course, his own responsibilities for boundaries and co-existence, but in the case of canals the difference is not only one of degree but also of historical and legal complexity.

Canal Maintenance

81. Dealing first with the engineering aspects of canal administration, every length of navigation (and this *does* apply to canalised rivers as well as artificial canals)—with its locks and weirs, towing paths, embankments, bridges and tunnels, aqueducts, culverts, reservoirs and feeder intakes—presents its daily batch of problems ranging from simple (but often immediate) tasks of engineering maintenance or water control to relationships with adjoining property owners and the general public.

82. Canal maintenance and operation is a job where those responsible—and this means local staff on the canal bank in the first instance—have to be ready to turn out at any hour of the day and night, winter and summer. That is why there must be a full-time organisation and labour-force, resident in the vicinity and with local community contact and information. It must, moreover, be an organisation which has the collective knowledge and discipline to handle matters with certainty and speed. Troubles can arise from a variety of causes of which wind and weather are not the only ones outside the Board's control. Staff on the spot with the knowledge of when and where to detect impending trouble at vulnerable points can make all the difference between minor inconvenience and—for instance—serious flooding.

83. The normal engineering maintenance work needs also a number of physical services or facilities in its support. Chief among these are the repair yards, which in the Board's organisation are responsible for the maintenance of all plant and equipment, pumping and other machinery, craft and vehicles. They also hold at readiness reserves of plant and equipment for use on special or emergency duties (e.g. breaches, ice-breaking, diving, etc.). There are also the pile-making workshops, at which concrete piles specially designed for bank protection are manufactured very economically, and lock gate workshops specialising in the manufacture and repair of lock gates of all types. Experience has confirmed beyond doubt the advantages in efficiency and economy which lie in organising such facilities on a co-ordinated or regional basis rather than locally.

84. In carrying out programmes of maintenance work the Board have a flexible approach and either perform the work with their own staff, or alternatively, place it to contract where this is appropriate and economic. They have also had the benefit of the co-operation of some voluntary societies in working on some of the relatively neglected waterways. Such ventures in partnership may—subject to what is decided about general policy—become an increasing feature of the canal scene. If they do, it would be welcomed by us and by many people and organisations. It is, however, in no way to underestimate the useful work of this nature that is being—and could be—undertaken, to say that neither contractors nor voluntary private organisations could be expected to be available at all times to meet all the problems of day-in-day-out physical management; nor could they be expected to hold at readiness at all times the reserves of specialised equipment to deal with them.

85. Quite apart from the special problems which arise in an emergency, it is of interest to note that a typical 50-mile length of canal requires a ground organisation to undertake work to the value of some £30,000/£50,000 per annum and deploying the services of some 25/40 men throughout the year. The Board's total maintenance expenditure is of the order of £2 million per annum.

Track Control and Operation

86. Over and above the many aspects of local canal maintenance which—for all their importance and potential urgency—normally pass unnoticed, there is a range of functions inherent in the existence of a navigation (either canal or river) which may best be described as “track control and operation”.

87. Among these are water control in all its aspects; the manning and operation of locks (including mechanised locks on the busy routes), weirs and swing bridges; the arrangement and publication of stoppages for special maintenance and lock repairs, etc.; the physical and statutory arrangements for dealing with craft sunk, stranded or abandoned in the waterway; implementation of the canal byelaws; matters connected with bridge loadings, the routing of heavy loads, and so on, and the safety of the waterway in abnormal circumstances.

88. As regards water control, for example, it will be appreciated that water supplies are drawn in varying quantities from such sources as reservoirs, streams and feeders, pumped sewage effluent and mine waters, and lockage waters from higher levels of the canal itself. These sources are not of unlimited capacity and have to be regulated and husbanded—or on occasion safely disposed of—according to prevailing circumstances. Decisions on water control have therefore to be taken daily—and perhaps hourly—to provide the right amount of water for lockage, industrial and other supplies, compensation water, evaporation and seepage losses, feed to lower levels and so on.

89. Virtually the whole of these track control duties has this factor in common: that in addition to local action there is a need for co-ordination over a far wider area to ensure the

efficiency of the waterway system as a whole and provide the optimum service to its various classes of user. Thus to take water control as an example, it is well known that many of the summit supplies can be routed in opposite directions at will. The growing national importance of the prudent use of water resources means that this flexibility—and the resultant need to make sound practical day-to-day judgments—is tending to become more important—especially perhaps in the Midlands. Similarly, lock-opening times and lock maintenance stoppages need careful pre-arrangement and publication over a wide area to ensure the minimum of inconvenience, not only to craft, but also from the point of view of the maintenance of industrial water supplies. The need for co-ordination of such matters above local level need not be laboured.

Property Management

90. Besides the problem of maintaining and operating the canal track, there are a whole range of matters in which canal administration impinges upon other parties, purely because the canals are there.

91. What wants emphasising here is not the general work of managing the Board's lands and buildings—the importance of that from a commercial point of view is explained briefly in Chapter II. The point to be stressed now is the volume of work—invariably of a time-consuming nature and requiring the exercise of professional skill but usually quite unremunerative—which arises from the problems of the “ribbon of ownership” already mentioned.

92. There is for instance the negotiation of wayleaves, easements or licences to local authorities, statutory undertakings and other bodies or individuals in respect of rights to be granted over or under, across or along, the site of the canal. They include electricity and telephone cables; gas pipes, water pipes and oil pipes; drainage and effluent pipes and discharges; bridge crossings, access, gateways, windows and rights of light; boundary definitions, encroachments, rights of support; in addition there are, of course, minor permits to be granted for such facilities as cycling, walking, filming and so on.

93. In every case suitable arrangements need to be made to safeguard the interests of the Board and the safety of the waterway and its users, both during construction and after. A pipe crossing, for example, may involve detailed arrangements for a temporary stoppage of the navigation; interruption to traffic has to be minimised and the continuity of water supplies assured.

94. Some 500 or more formal agreements of these types are negotiated and completed every year, but the number of enquiries and investigations is much larger. The revenue obtained—usually in the form of a continuing annual acknowledgment which also serves to ensure that the need for the facility and the observance of its conditions are regularly reviewed—is, for a number of reasons, often only small in relation to the administrative effort expended.

95. There is also the important and increasing work of safeguarding the Board's interests in regard to planning and land use. The Development Plans prepared by local planning authorities under the Town and Country Planning Acts need to be examined and kept under review. The planning applications by owners of adjoining lands where development is envisaged must be examined and, if need be, criticised. Questions also arise under the National Parks and Access to the Countryside Act—often relating particularly to public rights of way over the Board's property. Proposed registrations of freehold and leasehold interests in land held by third parties are examined with the co-operation of the Land Registry. With some 2,000 miles of waterway straddling the country, involvement in matters of this nature is very considerable indeed.

96. With the great increase of road construction and improvement, the waterways are—as was explained in the Board's second Annual Report—much involved with the Ministry of

Transport, the highway authorities and consultants acting on their behalf in the study of schemes for new motorways and trunk roads, realignments, bridge widenings and similar works impinging on the canals. Discussions with the authorities or consultants concerned take place throughout the planning and design stages until detailed plans and drawings of the work are approved. When the work is put in hand it is necessary, in collaboration with the contractor, to supervise the detailed arrangements for works affecting the waterway.

97. Similar considerations apply to the examination of other local authority schemes (e.g. sewerage and drainage). Also, construction works on sites adjoining the waterway often have engineering implications to be agreed with the authority and contractor concerned. Again, water undertakings—many of whose supplies derive from the same original sources as those on which the waterways rely—are increasingly looking further afield for means to augment their available resources. Applications for permanent or temporary increases of supply need to be carefully and sympathetically examined in the light of the Board's own requirements and statutory rights. As a final example, special mention must be made of the Board's close and indeed intricate relationships with River Authorities: in addition to water supply the waterways perform important functions with regard to land drainage, fishing and amenities with which the River Authorities are intimately concerned.

98. Constant liaison is needed within the local communities through which the canals pass. Access to the towpath in urban areas gives rise to many problems. Many of the Board's officers are constantly engaged in the very difficult—and very important—problems connected with the safety of children, for whom water has such a strong fascination. There are the problems (often intractable) of vandalism and nuisance; the obtaining of evidence on which to base a prosecution under the Canal Byelaws; and so on. These and many kindred problems, arising particularly in industrial areas and especially on canals no longer in transport use, require investigation in conjunction with local authorities, civil police or others as the case may be, to ensure their solution on a "good neighbour" basis. Liaison is also maintained with local officers of the Nature Conservancy, who are interested in a number of sites (mainly at reservoirs or along the less used rural canals) which have been formally scheduled as Sites of Special Scientific Interest—usually in regard to the conservation of rare species of fauna or flora.

99. It is in the nature of running an artificial waterway through other people's property that claims or complaints—usually of a minor yet not unimportant nature—continually arise on such matters as seepage, flooding, fencing defects, boundary problems and the like. These may require both investigation on the site itself and also a study of the statutory or other relationships governing the Board's liability in the matter. Thus seepage or flooding may be found to have occurred not from the canal but from a water-course whose maintenance is not the responsibility of the Board. At the same time, reference to the enabling Act may reveal that the landowner himself has responsibilities of which he is totally unaware. Sometimes, too, the provisions of the Act may have been rendered meaningless by some change of circumstances that has since occurred. Thus the liability to provide fencing to prevent cattle straying along the towpath is totally inappropriate in an area which has long since been built up, or a factory may now occupy a site where a miller formerly had certain water rights. Invariably, therefore, these matters require prompt and thorough investigation. For every one that gives rise to a claim for or against the Board or some other form of public or private "row", there are many others which are promptly and quietly settled to the satisfaction of both parties. But this would not be so if there did not exist the organisation to deal with cases as they arose.

Supporting Services

100. A variety of supporting services—both technical and administrative—are required. Basically these either involve a skill which it would be uneconomic to provide on a purely local

basis, or they deal with matters which for reasons of efficiency and economy should be handled centrally or at least uniformly. The accounts organisation, which over the last two years has been remoulded to make use of a computer, is a good example of a function to which both considerations apply. Among such services are the three now mentioned as examples. Others, less distinctive though not less important, could be added. Besides the accounts work just mentioned, there is the staff and establishment work (with its valuable Joint Consultation machinery) and there are—for instance—the units for efficiency studies and internal audit.

Legal

101. There is a complex statutory background. There are some 600 local Acts extending back over 200 years yet constantly relevant to the present day. It goes without saying, therefore, that the work of the Board's Solicitor is at once specialised in some respects and widely ranging in others. Apart from the volume of work on conveyancing, litigation and general advice, an aspect of particular importance is the study of existing and new legislation affecting individual canals or the system as a whole. Government legislation and the private Bills introduced by other statutory undertakers require detailed and expert examination to consider their impact on the Board's rights and interests. As the law at present stands, it is also necessary, at not infrequent intervals, for the Board themselves to promote private Bills.

102. The other two examples of essential supporting services were discussed at some length in the Board's second Annual Report. They are so important, however, that they must be mentioned again.

Water Problems

103. It is a commonplace that there is growing national awareness of the need to know and plan the national use of water. The Board—with all the reservoirs, locks, weirs, sluices and other works which assist conservation—and also with their own important stake in the water sales business—are naturally closely bound up in the growing and highly technical work of measurement, assessment and improvement. The administration of the Water Resources Act 1963 touches us at many points (including the provisions for the licensing of abstractions). A long term programme of work is in hand on surveying and assessing the resources of reservoirs, feeders and streams. There is also a continuing programme of installing gauges and other measuring devices and of building up and studying the records based on these. Besides measuring and studying our resources, we have to conserve and manage them. So there has to be a steady flow of projects for new or improved water control devices (such as weirs) and for the carrying out of necessary works at reservoirs to assist the day-to-day work of water control already referred to. Another aspect of water management is water sales agreements. In this current year the Board have further recognised the growing importance of this field of work by making it the special responsibility (on a national basis) of a senior officer reporting directly to the General Manager.

Mining Problems

104. Over seventy coalmines may affect our waterways. Over twenty actually did so last year (and this was not untypical). A lot of money is often at stake in measures to deal with the effects of subsidence, both for the National Coal Board and for us. Constant inspection and studying of plans is necessary; so is constant liaison with the Coal Board. Frequently, the relative merits of purchasing a pillar of support or of undertaking remedial works (on a cost-sharing basis) have to be assessed. The working of gravel and minerals on land adjoining canals has also to be constantly studied in the planning stage, and watched and (when necessary) surveyed in the execution stage.

SOME GENERAL COMMENTS

105. Throughout this chapter little or no mention has been made of the Board's various commercial activities (traffic operation, carrying, warehousing, docks, estates lettings, etc.) The aim has been only to set out the facts about those basic aspects of engineering and property ownership which arise simply because the canals are there. Even from this very restricted standpoint, it will be seen that the complexities inherent in the canals—and the wide variety of bodies and individuals on whom they impinge—require a full-time local organisation and a range of expert technical and professional support that are best provided under a single administration. It may be thought indeed that some of the current problems of national waterways policy derive from the multiplicity of divided ownerships that bedevilled the canals in the face of railway and other competition throughout their long history to 1947.

106. There is one crucial consequential point. Although the efficient management of the system of waterways involves the sort of organisational coverage which has been described above, the undertaking is not a big one in terms of payroll, turnover or the other normal measures of size or wealth. The fact of the matter is, therefore, that there would be severe diseconomies in a future organisation which involved a significant degree of duplication. Such duplication would also tend to the disadvantage of the people who have elected to make their careers with the waterways and who have served us loyally and well. There would be a waste in the use of staff because (as the present undertaking is small) there are not enough people for them to be divided into two groups and still constitute workable organisational units. There would, therefore, be duplication and increase. But there would also be disadvantages for the staff themselves because sub-division would militate against being able to offer the sort of career prospects that it is necessary to offer in order to get the sort of people who are equipped to perform skilfully the duties which have been described.

107. In concluding this description of what is involved in managing canals, we should say a word about the Board's own management organisation—briefly, however, because this has been referred to in the Board's other published reports. At the outset of our stewardship we made a comprehensive review of the organisation with the prime object of increasing efficiency by ensuring that the number of management levels was reduced to a minimum. The resultant organisation is as set out briefly in Appendix 3. The actual process of reorganisation is now virtually complete.

108. To set up a Commercial Division on the broad lines indicated in the previous chapter would necessitate some adjustments to the Headquarters organisation. These could quite easily be made. They would not lead to duplication nor cause any problems of redundancy.

CHAPTER IV

REVENUE AND EXPENDITURE ON THE OTHER WATERWAYS: THE PRESENT AND THE PROSPECTS

109. We have now delineated that sector of the undertaking which can be organised on a commercial basis and have examined the problems of management both of that sector and of the remaining part. This and the remaining chapters are concerned with the facts relating to the other waterways. We begin—in this chapter—by considering the potential of the various kinds of revenue and the scope for economies. In Chapter V we describe in some detail what the financial consequences would be of reducing the waterways to water channel standards or of eliminating them. And in Chapter VI is outlined the part which the Board's waterways and reservoirs play in connection with various uses of leisure. The extra costs of retaining waterways at pleasure boating standards are there set out.

110. It is, at this point in our exposition, necessary to make a number of destructive comments. That is never a pleasant task and the fact that we do it must not be construed as meaning we ignore the social and amenity aspects. But we do it because we believe that if the future is to be built up on a workable basis, the assumptions on which it is founded must be realistic.

TOTAL REVENUE

111. The revenue position in recent years on the waterways other than those included in Chapter II has been as follows:—*

	1962	1963	1964
	£'000	£'000	£'000
Commercial Traffic	80	50	40
Pleasure Craft	50	60	60
Water	470	480	520
Other	160	150	160
	<hr/>	<hr/>	<hr/>
	760	740	780
	<hr/>	<hr/>	<hr/>

COMMERCIAL CARRYING

112. It will be seen that the income from commercial carrying is now minute. Even of the 1964 figure of £40,000 a large amount was made up of traffic on two sections only, the Leigh Branch of the Leeds and Liverpool Canal (£11,000) and the Birmingham Canal Navigations (£14,000). So the income from all the rest was only about £15,000.

113. Before we go any further in the analysis, we must stress the distinction between the economics of canal carrying on the one hand and the economics of providing a track for that carrying on the other. The paragraphs which immediately follow are about carrying (and specifically about carrying on the "narrow canals"); paragraphs 128 and 129 are about the track; paragraphs 130 to 133 are about some canals which, though not "narrow," have been excluded from the commercial part.

* These figures do not correspond exactly with those in the Annual Reports as the waterways included in Chapter II (and thus excluded here) are—as explained in that chapter—not exactly the same as the provisional list of Major Transport Waterways.

Narrow Boat Carrying

114. In the development of industrial processes and methods (including transport media) it is usually and rightly accepted that natural selection works. In other words, it is assumed that if a process disappears or virtually disappears, then that is because it suffered from certain insufficiencies which prevented it from competing successfully with younger and stronger breeds. The history of narrow boat carrying is one of long-continuing decline. But for a variety of reasons, in most of which sentiment plays its part, there has been a great reluctance to accept the decline as inevitable or irreversible. It is necessary, therefore, to realise and accept the basic facts of the situation.

115. The carrying capacity of the boats which ply on the narrow canals (that is to say the bulk in mileage of the Board's system) are determined by the dimensions to which those canals were built. The lock chambers will not accommodate craft of more than 70-ft. length and 7-ft. beam. The bridge-hole widths and indeed the whole physical arrangement of the navigation is based on having craft no bigger than this. Similarly, the narrow canals are constructed on the basis of commercial craft drawing about 3 ft. 6 in. of water (thus implying a total channel depth of not less than about 4 ft. 3 ins.). It would, of course, be possible to alter any of these physical parameters; but it would be costly to do so. That this is so in the case of lock chamber dimensions and bridge-hole depths is obvious. But there have also been recent statements that craft could carry very much more than has hitherto been supposed by increasing the draught. This, as a theoretical statement, is correct; but the canals were constructed on the basis of the draughts previously mentioned. To increase them would involve major programmes of expenditure on dredging, etc.—programmes far above anything currently undertaken. Moreover, one would fairly soon come into difficulties on the actual construction of lock cills, etc.

116. So, unless there is major capital expenditure, the canals are limited to craft of 70 ft. × 7 ft. × about 3 ft. 6 ins. draught. This means that—whatever the craft are made of and however they are built—the waterways are limited to craft carrying about 25 to 30 tons. In the paragraphs that follow the figure of 30 tons is used, and this figure, in fact, is high enough to give the narrow canals the benefit of a certain amount of doubt.

117. Next, there is the question of speed. The Board have had to impose a speed limit of four miles an hour on these canals, and a speed of about that amount has been recognised for many years as the maximum which does not lead to a degree of bank erosion that sends costs spiralling up. The canals were, after all, built for horse-drawn traffic and it can be no surprise that there are serious side-effects of increasing speeds to any great extent. A maximum speed of four miles an hour implies an average speed—allowing for locks and bends—of about $2\frac{1}{2}$ miles an hour. This accords with practice and experience. A fast time for the London/Birmingham run is something slightly in excess of 50 hours.

118. There is no escaping the crucial comparison of productivity in terms of ton-miles per man-hour. It is this comparison which gives the measure of the difficulties under which narrow boats have to work. A narrow boat of 30 tons travelling at $2\frac{1}{2}$ miles an hour “produces” 75 ton-miles per man-hour. A lorry of 10 tons (and we are necessarily concerned with bulk traffics) at an average speed of 15 miles an hour has a productivity of 150 ton-miles per man-hour—that is to say, exactly double that of the narrow boat.

119. We now have to consider what factors bear on this crucial comparison; whether there are any that offset, and whether there are any that make it worse. First, there is the matter of labour costs. One of the ways in which narrow boats have been kept operating (on a reducing scale) to date has been through the acceptance of unusually arduous working conditions. It is well known that when the cold winds of railway competition were felt in the

mid-19th century, the boatmen went to live on their boats. This not only reduced living costs, but provided family labour for the handling of boats. Two people are needed to handle a "pair": these are customarily a man and his wife.

120. It is, in our opinion, a quite unsound basis for future planning to assume that narrow boats could be operated for exceptionally long hours or at exceptionally low rates of pay. The steering of a narrow boat requires skill and attention so that excessive hours are inexpedient as well as undesirable. Moreover, the tradition of the boatmen and their families living on their craft is increasingly unlikely to be followed by the rising generation. At least one of the canal companies tried strenuously to help with the problem of schooling for the travelling families—as did the British Transport Commission with the help of local education authorities. But we understand that many of the children who made use of these schemes made a break with their boating homes and never returned to that way of life.

121. It has been suggested that boats could be worked on a staging system whereby the men could live at home ashore and work different boats each day through their respective lengths. This would have the advantage of freeing the living accommodation for cargo carrying (the figure of 30 tons—i.e. 60 tons for a pair—can be considered to be sufficiently optimistic to make in itself quite an allowance for this). But men working a "stage" of this kind would even less than the traditional boat people be prepared, in the 1960's and thereafter, to accept disadvantageous conditions. So the crucial problem of productivity in terms of ton-miles per man-hour would not be affected in any radical way. The overall effect of staging might well, indeed, be to reduce output. The boat people have a great loyalty towards "their" boats (which, after all, are their homes). If this distinctive and important feature were removed, the effects on real as distinct from theoretical productivity might be bad.

122. It is only to be expected in a relatively slower and less mechanised industry that there would be some elements in cost which favoured the narrow boats in comparison with other methods of bulk carrying. This applies to capital cost (and hence depreciation), the cost of fuel and the cost of maintenance. As far as capital is concerned, the cost of purchasing a pair of narrow boats (one motored and one dumb) would be about £6,500 to £7,000. For this would be obtained a carrying capacity of about 60 tons, and it would be reasonable to depreciate the craft over 20 years. To obtain an equivalent amount of capacity on the roads would cost more than this, so although it can be assumed that the road capacity would be used more extensively, the capital element in costs favours narrow boats to an extent. Similarly, fuel costs are lower. There is room for endless argument about what are "normal" maintenance costs both on the water and on the road. Again it can be conceded that there is some margin in favour of the boats. But this should not be put too high. The boats necessarily operate under arduous conditions, and maintenance charges—if the boats are not to be "run to death"—are considerable.

123. But the relative advantages in point of interest, depreciation, fuel and maintenance are not, in our opinion and experience, of an order to overcome the crippling difficulty of basic low productivity. Moreover, this problem is made worse by two others. First, a lorry can go from door to door: so can a narrow boat if—but only if—one end of its journey is in a dock and the other at a factory which has waterside handling facilities (for a factory site to be alongside the canal but with the goods entrance half a mile away is a quite different thing). Always, except where there are waterside points of loading and unloading, the narrow boat is faced with double handling problems with which its road-borne competitor does not have to contend. And, for traffic from one inland point to another inland point, narrow boat carrying is, of course, faced with triple handling problems.

124. Second, the inevitable rigidity of the waterway routes (compared with the vast network of roads) makes it to be feared that there will be an unusual amount of travelling empty. But

an ineluctable characteristic of narrow boat transport is that travelling empty—because of the low speed—carries unusually heavy penalties in terms of unproductive wages. If a boat has gone from London to Birmingham and has to return without a load back, then a normal working week is taken up in empty travelling.

125. The future does not look brighter than the present. The size of lorries is tending to increase and the state of the trunk roads to improve. The lorry seems likely, therefore, in future, to achieve higher productivity than at present. For reasons already given the capacity of the boats is fixed by the dimensions of the canals themselves.

126. This analysis does not mean that never in any circumstances can narrow boat carrying be economic. There may be special features—for instance urban short hauls to avoid particular points of acute congestion. Or there may be some unusually happy conjunction of waterside loading facilities and return load availabilities which improves the narrow boat's competitive position. But the inherent difficulties are tremendous. The record of history confirms this view: so do many studies by committees of inquiry, etc.

127. In 1963, as is well known, the Board, while withdrawing from narrow boat operating themselves (save for one specialised traffic), allowed certain private operators to license boats for £25 a year each (in substitution for the previous toll payments of about six times that amount) and to hire boats from the Board for an almost nominal sum. We have had no real evidence that the licensed narrow boats have attracted—or shown signs of attracting—significant new traffics to the water in addition to those which the Board themselves carried in previous years. The boats in use are—so far as we have been able to ascertain—all survivors of earlier days, and those which have been hired out have been made available to the firms concerned at a charge far below the cost of current replacement. The existing boats are mostly operated by boatmen living on board in the traditional way. We understand that one operator (newly come into the field) foresees no difficulty in getting crews for the future. Other firms, longer established, take—we understand—the opposite view and perhaps they see the current scale of activity primarily as a means of enabling the present boating families to continue their traditional employment for a few years more. We have watched the unfolding of the licensing arrangement with care and with sympathy but it has not enabled us to feel with any confidence that the future for narrow boat carrying is brighter than we supposed when we withdrew from narrow boat fleet operation.

Narrow Boat Canals

128. We now turn to the other aspect of the subject, namely the position of the Board as providers of the track for narrow boat carrying. The Board spends over a million pounds a year on maintaining and operating the canals in question. As already mentioned, the total commercial tolls and dues revenue from all the “other waterways”, excluding the Leeds and Liverpool Canal (Leigh Branch) and the Birmingham Canal Navigations (which are not within the licensing system), was only about £15,000. The return from the licences themselves, indeed, was only some £2,500. We must say—with much regret but with no hesitation—that a far greater sum than this £15,000 could be saved if the Board did not have to make provision for commercial traffic on these waterways, but continued to provide reasonable facilities for all other forms of use including pleasure boating. For instance, on the bases explained in detail in Chapter V and Appendix 5 we estimate that the saving on the Grand Union Canal between Slough and Tring alone would be about £6,000 a year—that is to say very considerably more than the licence revenue from the total area to which the licensing system applies.

129. It is also argued that the narrow canals could provide an answer to road congestion. We agree that this is a most important subject. And we also would agree that every little helps.

But, it is in this case so very little. The comment of the Bowes Committee* on this point seems to us to be definitive (paragraph 86):—

“We have consulted the authors [of a paper read to the Royal Statistical Society] and asked them to evaluate in terms of road vehicles the equivalent of a hypothetical 50% increase in the ton-mileage performance of the waterways. Their estimate was that such an increase would represent approximately the performance of 300 5-ton lorries, which is only a fraction of one year’s ‘natural’ increase in road goods transport of recent years. This comparison is not intended to disparage the waterways’ value where they are intensively used . . . It is clear to us, however, that suggestions made to us about the greatly diminished congestion and consequently increased safety on the roads which would result from diverting heavy commercial traffic to revitalised inland waterways are over-optimistic.”

Our own studies lead us to corroborate this view.

Other Canals

130. A special word now about the Grand Union Canal above Uxbridge (the remainder of this canal being in the “special group” referred to in Chapter II), and the Leeds and Liverpool Canal and one or two other wide canals.

131. The Grand Union Canal throughout its length presents special features. Some are commented on in Appendix 5. As far as the length from Uxbridge to Birmingham is concerned, the question has often been debated whether it is or is not a “narrow” canal. The facts are these. The canal was constructed for use by wide boats up to Braunston. A substantial scheme on converting the waterway as a whole into a wide canal was put in hand by the former owners between the wars and all the locks can accommodate craft of 14 ft. × 70 ft. But the scheme was never completed and substantial amounts of ancillary supporting work (estimated several years ago to cost several million pounds) would be necessary to enable wide craft to use the waterway in a fully effective way (to pass each other practically wherever they happened to meet, for instance). From the point of view of commercial carrying, therefore, the Grand Union system must be treated as within the group of narrow canals (it is indeed one of the principal navigations to which the licensing experiment has applied).

132. The case of the Leeds and Liverpool Canal is different. It is indubitably a wide canal, the locks permitting craft of 14-ft. beam though—for much of the total length—only of 60-ft. length. This gives a carrying capacity of about 50 tons. The commercial revenue still arising comes virtually all from the short length of the Leigh Branch. There has indeed been a very sharp decline over the last few years. Given the inherent difficulties of getting boats over the Pennines we can find no factual basis for believing that there will be a commercial transport revival on this waterway as a whole, greatly as we should like to see one. For the length running from Liverpool Docks into south-west Lancashire other factors enter the problem and need special study.

133. The same sort of considerations apply, for example, to the Calder and Hebble Navigation between Greenwood Lock and Sowerby Bridge and to the River Soar. There is, as already mentioned, a certain amount of wide boat traffic on the ancient waterway of the Fossdyke.

WATER REVENUE

134. The position of water sales is altogether healthier than that of narrow boat carrying. But, even so, new and additional agreements for water sales do not come automatically and effortlessly: indeed, the market is competitive and cancellations and set-backs must be expected from

*Report of the Committee of Inquiry into Inland Waterways (Cmnd. 486, H.M.S.O., 1958).

time to time. Nevertheless, taking one year with another, there is no question of water revenue being a declining source of income: it is expanding and further increases can be expected. But when we are considering the financial viability of the waterways as a whole the point at issue is solely whether increases in water revenue will come at a speed and on a scale which will bring about viability in the foreseeable future. The facts do not sustain so optimistic a view. We have yet to have experience of how the rigorous procedures of the Water Resources Act relating to new abstractions will work. We hope that they will not, in practice, inhibit our ability to get such revenue as can be got from negotiations between a willing buyer and a willing seller. On that assumption progressive increases can be looked for. But from the point of view of extrapolating a scale of increase, the increase in 1964 as compared with 1963 (an increase of nearly £80,000 for the system as a whole) is misleading because it contained significant elements of retrospective payment. It would take many, many years of increases at the sort of net annual increase (after allowing for cancellations) that we estimate to be likely, i.e. increases of the general order of £30,000 a year, to offset the present deficit—and of course it is to be feared that costs also would rise.

135. A word must be said now about the “statutory abstractions” and the “old agreements”. The “statutory abstractions” are those where the canal companies—usually at the time of the original construction of the waterway—entered into arrangements with riparian owners to let the latter have water free. With the passage of the years and the growth of industry, these commitments have, some of them, become onerous—though it is fair to say that in a number of cases the industrialists concerned have been enlightened enough to make some *ex gratia* payment. The “old agreements” are those in which the railway companies are said to have agreed to water being made available from the canals—in perpetuity or on very long-term agreements—at terms advantageous to an industrialist in order to persuade him to put traffic on a railway owned by the same company. Both statutory supplies and old agreements are real problems and we hope that the situation will be made more equitable when general waterways legislation can be introduced. However, the importance of both of these things has sometimes been exaggerated, and it must be said quite bluntly that they are by no means as numerous as has sometimes been imagined and that there is no question of the finances of the undertaking being revolutionised even if these water abstractions were paid for at a fair current rate.

PLEASURE CRAFT REVENUE

136. Pleasure craft revenue is capable of further expansion as the activity and interest grow. We are sure that the social benefits arising from the facilities which the Board’s system can provide in an age of increasing prosperity and increasing interest in the use of leisure will not be ignored: they are not ignored by us. But in the immediate context we are concerned only with the financial prospects based on the financial facts.

137. What is essential is that the prospects of expansion should be assessed in a realistic light. First, what are the sums of money involved? In the last three years the gross revenue on all the Board’s waterways has been as follows:—

					£’000
1962	..	..	..	..	70.8
1963	..	..	..	..	76.8
Increase 1962/63	..	..	..	..	6.0 (8½%)
1964	..	..	..	..	81.6
Increase 1963/64	..	..	..	..	4.8 (6¼%)

In April 1965 a new system of charging was introduced for boats mooring against the Board’s

property. This exceptional change, coupled with "natural growth", is likely to lead to an increase in revenue of about 10% (1964/1965).

138. To get a true appraisal of the income from pleasure boating two adjustments have to be made. First a deduction has to be made on account of the expenses of collecting the revenue, dealing with enquiries, etc., etc. In the second place, an upward adjustment has to be made to take account of those cases where canal-side rents are enhanced because of a connection with pleasure boating. The former adjustment overweighs the latter and if both are taken into account the 1964 figure would be rather over £70,000 (as distinct from the £81,600 mentioned above).

139. A few years ago there was a lot of room for increase in revenue. The pleasure cruising activity had been traditionally "a bit of jam" on the top of the bread and butter of commercial traffic. This situation was to some extent reflected in the charges. When it became clear that on a number of waterways most, if not all, of the boats were—and were going to continue to be—pleasure boats, then obviously a good deal of re-thinking had to take place. This is reflected in the rate of growth of revenue in the last decade.

140. If the policy decision is that a waterways system of broadly the present scope and size shall continue, then we can be confident that there will be further increases. These will arise both from continuing growth in the number of boats and also perhaps from increased charges and from the provision of more canal-side facilities. We would hope to see an improvement in the Board's statutory charging powers in respect of the so-called free rivers. But there is no evidence that pleasure cruising revenue will continue to multiply as quickly as it has done over the last decade.

141. It would—as Chapter VI will show—approximately have to quadruple (at constant prices) to offset the costs incurred for—and only for—pleasure boating.

"OTHER" REVENUE

142. "Other" revenue can be dismissed briefly. The main elements are wayleaves, licences and easements in respect of operational lands. There are also, each year, repayments in respect of works which the Board does wholly or in part for third parties. There is angling revenue, running now at about £20,000 a year (of which some £17,000 is attributable to the waterways now under discussion). And there are miscellaneous other revenues, including service rentals.

EXPENDITURE

143. It remains in this chapter to look at the other side of the account and to assess whether the situation could be altered by radical changes in the level of expenditure.

144. First, let the expenditure on these waterways in the last three years be summarised:—*

	1962	1963	1964
	£'000	£'000	£'000
Operating	140	120	120
Dredging	180	110	110
Maintenance	1,150	1,000	1,030
Other	380	400	340
	1,850	1,630	1,600
	1,850	1,630	1,600

* These figures do not correspond exactly with those in the Annual Reports as the waterways included in Chapter II (and thus excluded here) are—as explained in that chapter—not exactly the same as the provisional list of Major Transport Waterways.

145. It will be seen that the annual level of expenditure has been cut by about a quarter of a million pounds. The real cut has, of course, been bigger than this because there have been wage and price increases.

146. It is the Board's view that to maintain the system to present standards will entail (assuming constant prices) expenditure at current levels. That opinion is obviously subject to either of two lines of criticism. Put in the form of questions these are:—

- (a) Does the fact that the assets are old—most of them over a century old—mean we are “drifting towards a weir” and that, at some date in the not too distant future, expenditure will cascade into something far bigger than it is at the moment? Or conversely
- (b) Is money being wasted, and by less maintenance or by less orthodox methods of maintenance could a great deal of money be saved?

147. Those questions can only be answered in general terms, and it is the nature of the case that generalisations will not be entirely true; indeed, in Appendix 5 a few cases are specifically noted as requiring a higher rate of spending in the future. But the broad answer to both questions is “no”.

148. That answer to question (a) is confirmed by the results of the detailed management engineering survey—described in the Board's second Annual Report. Moreover, though expenditure has been curtailed by the Board it has been curtailed from a level which was very high in relation to the expenditure of the more distant past.

149. But, conversely, the present level of expenditure cannot be cut if the present system is to be maintained in its present state. That bald statement is not intended to imply complacency. Of course, it is essential to be on the watch for detailed economies. Of course, there is always room for improvement. But the labour force has been cut by 800 (nearly 20%) since vesting day (1st January 1963) and the actual figure of staff directly employed on operation and maintenance (without allowing for supervision) is about 2,000. This means a mile a man. But, the bigger waterways absorb labour at a very significantly higher rate than the smaller ones; and there are repair yards and pile-making workshops to be manned, and there must be chargehands and craftsmen; so what the figures really mean for the smaller waterways is, on average, not more than about one man to every two miles or so. When the tasks outlined in Chapter III are remembered it will be seen that this does not leave room for any “order of magnitude” changes.

150. Could more economical ways of working be introduced? We have experimented—not without success—with a number of forms of light and inexpensive bank protection—and, where practicable, lighter-than-traditional lock gates. Research studies of certain dredging problems are undertaken on our behalf by the British Transport Docks Board's Research Station. Naturally, we keep possible advances under review in such things as (for example) weed-killing techniques. We have reviewed and reduced our holdings of engineering plant and craft. We keep—as any prudent managers would—a careful eye on the relative advantages of direct labour working and use of contractors. But to strike again the key-note of this report, we must be realistic. We are not talking about things which can be developed and redesigned, the progressive improvements being incorporated in new products (aircraft, for instance, or machine tools): we are talking about the operation and maintenance of many miles of waterway. The essential characteristics of the work to be done are such that there are no grounds for believing in cost-saving breakthroughs arising from radically altered maintenance methods.

CHAPTER V

MINIMUM COSTS

151. What is the cheapest thing to do?

152. The study which we now describe has intentionally been limited to financial and engineering facts and judgments. It has not had regard to what may be deemed desirable from the point of view of utilising existing facilities to provide scope for recreation and leisure activities, or what may be deemed desirable from the point of view of preserving industrial archaeology. To stress that the study has been so limited is not to imply that non-financial considerations are unreal. Most certainly it is not to imply that we have no views upon them. But our present purpose is more limited (though, we think, important). It is limited to endeavouring to lay foundations of practical analysis upon which more general judgments—taking both financial and broader social factors into account—can be made speedily and without illusion.

153. The Board's system has been studied length by length. In some cases a "length" is also a whole navigation (for instance, the Lancaster Canal or the River Stort). In other cases a canal has been split up, for instance, the Leeds and Liverpool Canal is split so that the position on the Wigan to Liverpool stretch, the Rufford Branch, the Leigh Branch and from Wigan to Leeds can be shown separately. The analyses that have been made are summarised in Appendix 5. Examples of the detail from which these summaries are derived are given in Appendix 6.

Water Channelling Costs

154. We have studied and assessed the cost, year in and year out, of keeping each canal only as a water channel. It has been assumed that it would not be socially acceptable to have a decayed and decrepit water channel. The expenditure involved is sufficient to keep water flowing by essential dredging, to keep banks, towpaths and hedges in a seemly state and to provide for necessary repairs to bridges and culverts, and so on. There are a handful of cases indeed where this approach involves an increase on present expenditures.

155. It is assumed that the locks have been weired (a very significant part of the savings arise from this). The weiring of locks is estimated to cost about £150 for each lock on a narrow (i.e. 7-ft. beam) canal and about £300 for 14-ft. wide locks. To make a fair comparison interest charges at 6% have been assumed on this capital outlay and have been included in the figures (the financial implications of this are discussed in paragraph 159 below). The small amount of maintenance on lock chambers which would be required after fixed weirs had been substituted for the gates has been assessed at about £10 p.a. for a narrow lock and about £20 p.a. for a wide one.

156. On the revenue side, the income from water is retained, so are fishing revenue and rents and wayleaves. All navigation revenue, including pleasure craft, disappears. Canoes and light unpowered craft could still use water channels to quite a large extent: but the revenue from these is so small (about £5,500 p.a. *for the system as a whole*) that its effect on the finances of each individual waterway is virtually imperceptible.

Elimination Costs

157. We have also studied case by case the costs of elimination (that is to say of restoring dry land to where a canal at present is), where this would be practicable. The basis of the calculation is set out in Appendix 4.

158. It has been assumed that there is not a rigid timetable (if there were, then costs would be greatly increased because one would be continually negotiating at a disadvantage). But it is also assumed that there would be a general obligation to complete the process of elimination within a finite and broadly-defined period. In other words, the navigation would not (in default of agreement with other interests) be allowed just to drift into increasing decay. It is envisaged that the requirement would be to complete the process of elimination within a period of ten to twelve years. This may seem a long time, but there is abundant evidence to show that elimination is, in fact, a very slow process. Very rarely, moreover, could it be dispensed with (see Appendix 4, paragraph 52).

159. Expenditure incurred on eliminating a canal is of course a "once-for-all" outlay, but for comparison both with the present position and with the water channel figures it needs to be expressed as an annual cost. To enable a comparison to be made the once-for-all expenditure has been treated as though it were capital expenditure and an "interest charge" of 6% of its total has accordingly been adopted. This "interest charge" concept has been brought in purely and solely for this one purpose of making the figures comparable. It is not intended to imply any particular accounting treatment and above all, of course, it is most certainly not implied that this once-for-all expenditure, if incurred, should in any way alter the balance sheet of the commercial part of the undertaking (as discussed in Chapter II). The figures headed "Elimination—Final" show, therefore, the equivalent annual cost (at 6%) of the expenditure on elimination as determined by the principles set out in Appendix 4. Direct costs and administration charges would be eliminated, as would receipts from craft and water sales; only small amounts of revenue (rents etc.) would remain.

160. These "final" figures therefore show the position "at the end of the day". But it would be a long day.

161. The figures headed "Elimination—Interim" are significant because of what has already been said about the time necessarily involved in the process of elimination. There would be a long time period when some bits had been eliminated, but where maintenance on the rest would be required and where the expenses would arise partly from continuing maintenance responsibilities and partly from "interest payments" on stretches already eliminated. The "interim" figures show the sort of costs which would have to be incurred year by year for more than a decade. With the passage of the years, the proportion of the running costs to the quasi interest payments (see paragraph 159) would alter. In the figures shown it is assumed that half of the maintenance expenditure is still being incurred and half the elimination expenditure has been incurred. These assumptions produce a figure which errs, if at all, in the direction of underestimating the expense of the elimination process. The nature of elimination work is such that, on the whole, the economies are at the end, i.e. when one could finally disband the Section Office, etc. Until that point is reached, administration overheads and indeed actual use of manual workers tend to become progressively more uneconomic.

162. Moreover, if the policy were to be to embark on a large scale programme of elimination, a quite unprecedented burden of work would undoubtedly be thrown on the legal, estates and engineering departments of the Board. A very considerable increase in the strength of these departments would be necessary for the work to be completed in about a decade. Therefore, in the interim figures administration costs have been increased by 50% over the administration costs element included in the column of "water channelling" figures.

Unremunerative Capital Expenditure

163. Since the 1st January 1963 the full actual cost of renewals has been charged to revenue account. But there have also been necessary expenditures upon the smaller waterways which, though not renewals, were utterly unremunerative. The biggest (and indeed the only

significant) case is bank protection, which has been treated as capital expenditure when the work has to be done in places where there is no former protective work of any kind. Such work amounted to £110,000 in 1964 and to a considerably higher sum in 1963. As it was treated as capital it was excluded from the revenue account. But, of course, it generated no funds to meet the charges on the capital. It seems to us part and parcel of a realistic policy for the future to decide that the only sensible way of dealing with this sort of expenditure is to charge it to revenue in the year in which it occurs.

164. We have had to consider (i) what would the level of such expenditure be in “water channelling” conditions, and (ii) how should this expenditure be treated in the case by case studies. As far as the first is concerned, there would be a big cut. Water channelling would mean far less erosion of banks and it might well permit the lowering of water levels. Thus the need to put in protection in places where none has been needed during the years of navigation would be slight. There will be spots where danger of breaches would arise in unprotected places, but they would probably be few. Expenditure should not exceed £40,000 p.a. (a large sum, but, of course, it is only £20/25 a mile).

165. To allot this £40,000 to individual lengths is impossible. Indeed, as the essence of the case is that these works are “one off” jobs, to do so on the basis of past experience must be outright misleading. Examples of waterways on which this type of expenditure has been incurred and tends to arise are the Grand Union Canal, the Birmingham Canal Navigations, the Trent and Mersey Canal and the Shropshire Union Canal. The main point is that due allowance must be made for this expenditure in arriving at a grand total of expenditure (see paragraph 170 below).

Pleasure Craft Use and Commercial Use

166. Most of the savings between water channelling costs on the one hand and present costs on the other would arise essentially from those economies which are only practicable if navigation (of any kind except rowing boats and canoes) stops. Indeed, on the waterways under consideration the differences between costs of running them for freight-carrying craft like narrow boats and running them for pleasure craft are small. All the same there are some differences and in *some* cases they are significant. On certain waterways dredging could be reduced a bit or the water level dropped a bit—but in both cases only a bit. Wear and tear on lock gates would be a bit less. There need not be *quite* the same urgency in dealing with various operating problems. These considerations will lead to some economies but nothing dramatic—we estimate a tenth. The waterways have, therefore, been divided into three categories:—

- X means that the navigation is now used by some freight-carrying craft and that a deduction of a tenth on the average costs for operating, dredging and maintenance (all forms) is a fair guide to the cost of maintaining to pleasure boating standards only.
- Y means that the navigation is now used by pleasure craft only (or virtually only). This in turn means that the reduction of a tenth is not applicable anyway.
- Z means that the navigation is not now navigable by pleasure craft (save perhaps in part or as a *tour de force*).

Financial Summary

167. It must unhappily be recorded that for all the waterways included in the factual analysis there are only two where the loss of navigation revenue (both commercial and pleasure) would not be more than off-set by the economies which would arise from getting rid of such maintenance and operating responsibilities as arise solely for the purpose of navigation. One exception is the Leigh Branch of the Leeds and Liverpool Canal where the local commercial traffic

is at present extensive. The other apparent exception is the Lancaster Canal, where there is shown a worsenment compared with 1964 of about £1,000. This is principally because it is necessary to plan for the future on the basis of a programme of special maintenance works at about £3,500 p.a. Such expenditure—although it was not incurred in 1964—will certainly be required in at least equal measure on the assumption that the canal is retained for pleasure boating use.

168. Certain other cases show figures above those for 1964. They are cases when the 1964 expenditure was below the reasonable long-term requirements.

169. What is the minimum cost for the nation? It is clear from the detail in Appendix 5 that the loss on the canals covered by the study cannot be wiped out. What the study does show is what the lowest level of expenditure might be; that is to say, for each waterway what is the course of action which gives the minimum cost. To determine “minimum cost” means, of course, amongst other things, to select the water channelling course of action where this is either cheaper than the final costs of elimination, *or* where it is cheaper than the costs during the interim period, *or* where elimination is impracticable anyway for physical reasons.

170. On these bases the surplus of income over expenditure for those canals where there would be a surplus, amounts to about £63,000 but against this must be set an excess of expenditure over income of about £538,000 for other waterways. This gives a net excess of expenditure over income of about £475,000. To this last mentioned figure must be added:—

- (i) a sum of £40,000 for unremunerative capital expenditure (as described in paragraphs 163 to 165 above);
- (ii) a due allowance for that part of the central charges of the undertaking which are attributable to these waterways. A fair figure would be £100,000, that is to say the £110,000 described in Appendix 2 minus a modest reduction to take account of some decline in the volume of work if there were no specifically navigational problems.

Thus the total minimum cost is, approximately, £600,000 a year.

171. Throughout the analysis current prices have been used—this applies to Appendix 4 as well as Appendix 5.

172. The minimum costs length by length are as follows:—

<i>Type (See para. 166)</i>	<i>Waterway</i>	<i>Most Economical Solution</i> £ p.a.	<i>Better than 1964</i> £ p.a.	<i>Worse than 1964</i> £ p.a.
Y	Ashby Canal	−7,500	634	
Z	Ashton Canal	−1,800		1,402
X	Birmingham & Fazeley Canal	−9,100	4,095	
X	Birmingham Canal Navigations	+24,000	8,138	
Z	Bridgwater & Taunton Canal	−3,100	1,390	
Y	Calder & Hebble Navigation (Sowerby Bridge/Greenwood)	−4,300	4,600	
Y	Chesterfield Canal (East of Norwood Tunnel)	−10,300	3,482	
X	Coventry Canal	−4,700	7,417	
Z	Cromford Canal	−7,200		1,520
Y	Erewash Canal	−600	1,650	
Z	Forth & Clyde and Monkland Canals	+2,600	—	—
X	Fosdyke Navigation	−19,000	9,373	

<i>Type (See para. 166)</i>	<i>Waterway</i>	<i>Most Economical Solution £ p.a.</i>	<i>Better than 1964 £ p.a.</i>	<i>Worse than 1964 £ p.a.</i>
	Grand Union Canal—			
X	Slough/Tring	−30,000	23,667	
X	Tring/Buckby	−25,600	23,205	
X	Buckby/Birmingham	−31,300	29,531	
Y	Aylesbury Arm	−2,300	4,104	
Y	Leicester Section	−19,700	24,372	
Z	Grand Western Canal	−4,000	—	—
Z	Grantham Canal	−12,000		2,992
Z	Huddersfield Narrow Canal	+4,000	1,670	
	Kennet & Avon Canal—			
X	Western Section	−4,300	3,402	
Z (mostly)	Centre Section	−26,300		1,542
Y (partly)	Eastern Section	−26,000	1,000	
X	Kensington Canal	—	—	—
Y	Lancaster Canal	+8,000		1,047
	Leeds & Liverpool Canal—			
Y	Liverpool/Wigan	−18,400	13,945	
Y	Wigan/Leeds	−59,400	30,908	
X	Leigh Branch	−1,675	—	—
Y	Rufford Branch	−3,700		471
	Macclesfield and Peak Forest Canals—			
Y	Macclesfield/Upper Peak Forest	−6,200	8,444	
Z	Lower Peak Forest	−2,100		4,230
Z	Manchester, Bolton & Bury Canal	+7,000		1,300
	Monmouthshire & Brecon Canal—			
Z	Newport/Pontypool & Crumlin	−2,200	—	—
Z	Pontypool/Brecon	−9,350	8,961	
Z	Nottingham Canal	−4,200	596	
X	Oxford Canal—North	−9,500	13,945	
Y	—South	−18,000	7,368	
Z	Pocklington Canal	−2,300		764
Y	Ripon Canal	−900		74
Z	St. Helens Canal	+2,100		2,400
X	Sheffield & South Yorkshire Navigation (Sheffield/Rotherham)	−1,000	10,544	
	Shropshire Union Canal—			
Y	Autherley/Barbridge/Middlewich	−26,000	14,000	
Y	Barbridge/Ellesmere Port	−4,400	4,920	
Y	Llangollen Branch	+8,300	1,901	
Z	Montgomery, etc. Branches	−3,300	2,914	
Y	River Soar Navigation	−13,500	1,768	
Y	Staffordshire & Worcestershire Canal—			
	North	+3,300	3,544	
	South	−11,700	3,743	
Y	River Stort Navigation	−7,000	181	

<i>Type (See para. 166)</i>	<i>Waterway</i>	<i>Most Economical Solution</i> £ p.a.	<i>Better than 1964</i> £ p.a.	<i>Worse than 1964</i> £ p.a.
Y	Stourbridge Canal	—2,700		2,977
Y	Stratford on Avon Canal (North)	—3,600	3,847	
Z	Swansea Canal	—2,800		2,298
	Trent & Mersey Canal—			
X/Y	Preston Brook/Burton	—25,100	17,342	
Y	Burton/Derwent Mouth	—5,000	2,000	
Y	Trent Navigation (Upper)	—12,000	12,297	
Z	Union Canal	+3,500	—	—
Y	River Ure Navigation	—1,200	477	
Y	River Witham Navigation	—18,300	1,010	
Y	Worcester & Birmingham Canal	—13,800	8,792	
		+62,800		
		—538,425		
		<hr/>		
	Totals	—475,625	325,177	23,017
	Net		302,160	
		<hr/>		

- NOTES: (i) In the great majority of cases the minimum cost is in fact the water channelling figure.
- (ii) In a few cases, the comparison with 1964 shown above has been based on adjusted figures as explained in the notes on individual canals in Appendix 5.
- (iii) For the Leigh Branch of the Leeds & Liverpool Canal, where traffic income more than offsets the expenditure attributable to maintaining as a navigation, the 1964 actual is therefore included as the most economical solution.

CHAPTER VI

CANALS AND LEISURE: FACTS AND COSTS

173. What would be the extra cost, over and above the £600,000 per annum described in paragraph 170, of preserving facilities for pleasure boating waterway by waterway? Having determined minimum costs it clearly behoves us—to complete this stage of our work—to determine also the extra costs of maintaining for pleasure boating.

174. But although this is a factual analysis only it would be a distortion if before we came to apply price tickets we did not make some general comments to get the perspective right.

175. The first such comment must be that although our analysis is primarily concerned with the costs of operation and maintenance, we are sure that policy (when it comes to be decided) will not be disregarding of the sheer cost of replacement—of building canals from scratch today. It would involve enormous expenditures to create the inland waterways afresh or to restore them from a state of decay. That is a fact; the weight it carries must depend on how much the nation wants to have waterways as part of the leisure scene.

176. And the second general comment must be that pleasure boating on the canals is not the only “service to leisure” which the undertaking provides. There are several others. In particular there is the part played by the Board’s reservoirs; there is angling on many of the waterways themselves; and there is walking and rambling.

177. These three topics, reservoirs, angling and walking, are now commented on one by one as a preface to the discussion of the costs of pleasure boating.

Reservoirs

178. We often find that many people do not appreciate that we own and manage reservoirs at all—still less that many of our reservoirs are already used for recreational purposes. As this whole subject of the leisure use of reservoirs is one of public interest at this time we set out case by case in Appendix 9 what the present position is. Briefly we are in most cases already making available such recreational facilities as (a) belong to us and (b) can be made available without damaging our operational needs for water supply.

179. It is indeed important to bear in mind that, with minor exceptions, the water levels and consequently the area available are subject to considerable fluctuation. To that extent, therefore, the use for recreational purposes must be subsidiary to the essential need for the reservoirs for water feed purposes. Also unless there is on the spot permanent supervision, the only sensible way of controlling the recreational activities is to grant rights to responsible clubs and associations in order to minimise undisciplined behaviour and conflict of interests. Such control over public access to our reservoirs is essential having regard to the vulnerability of our head-banks, sluice gear, weirs and other works, interference with which could cause flooding and loss of water.

180. For similar reasons—and this is important in its contrast with boating on the canals themselves—it would normally be difficult to have power driven craft on our reservoirs, because it is almost impossible to control such an activity and ensure that there will be no possible danger to operational works.

181. It will be seen from Appendix 9 that in a number of cases the fishing and sporting rights are reserved to adjoining landowners and others or, as in the case of the Tring Reservoirs, were conveyed many years ago. In the case of the Tring Reservoirs also, all the surrounding lands have been made available for the purposes of a nature reserve.

Angling

182. Not only many of the reservoirs but also, of course, the waterways themselves are extensively used for angling. The silent impassive line of fishermen spaced out along the bank, with their wicker baskets, their bait and (often) their umbrellas, is a typical feature of many canals.

183. It is important to remember that the waterways are not generally speaking suitable for fly fishing. The coarse fishing which they do provide is not paid for at the same sort of rates as apply to rods on trout and salmon fishing rivers. Nevertheless there is an income and a growing one. Usually the most convenient method of working for all concerned is for the Board to lease stretches of water to clubs or associations of clubs. For the waterways (as distinct from reservoirs) income from these leases now stands at about £14,000 per annum. Small though this figure is, it has more than doubled in the last eight years. Further increases can be expected but it is obvious that they will not be of a size which would alter the general financial picture of the undertaking.

184. It is well known that the Board do not own all the fishing rights on their waterways. In some cases the rights were reserved to the riparian owners. Whether an alteration of this situation is desirable has been debated from time to time—the Bowes Committee, for instance, took the view that a change ought to be made. All we would say now is that this is clearly one of the matters which will fall to be decided when policy and general legislation is in prospect. Our present task is to set out the facts.

185. Briefly, the facts are these. Our system of inland waterways consists, as already mentioned, of about 2,000 miles. Of these about a quarter—roughly 500 miles—are unsuitable for fishing. This is not to say that one will never see an angler on them: anglers—and especially the younger ones—can be seen in the most unpromising and indeed unlikely places along the towing paths. But for these 500 or so miles there is no angling of a kind for which clubs or even individuals are likely to pay significant sums. The 500 miles is not all of one kind. Part of it is made up of busy canals where there is a volume of traffic so great that it is a big hindrance to fishing. Part of it is made up of exactly the opposite—canals which are not used for pleasure boating, water supply, or any other purposes and have become too silted up to be fished. The balance is made up of urban areas where cooling water discharges (and sometimes the polluted state of the canal feeders) make fishing unavailing.

186. Of the balance of 1,500 miles something of the order of another 500 miles sees the fishing rights belonging to others. The position is quite often not clear cut: there are variations both in the original provisions and in the subsequent historical development between one waterway and another. So this 500 miles is not a precise figure at all, but rather a general indication of the extent of other ownership. The vast preponderance of the remainder of the system (about half of the overall total) is let to clubs and associations of clubs.

Walking

187. The towing paths of the lesser used waterways provide delightful and “ready made” footpaths through many of the most pleasant parts of the countryside—with the added attraction that water habitually provides. While policy remains undecided there must inevitably be caution in allowing the towing paths to become rights of way. Once it is clear which waterways are to remain in being this inhibition will disappear. Some local authorities are beginning to consider offering to take over responsibility for hedge cutting and towing path weed clearance. We look upon this as potentially a most valuable development. Solid assured and practical help is likely, it seems to us, to speak louder in influencing the future of an individual waterway than any amount of wordy agitation.

Pleasure Boating

188. In the analysis that follows we are concerned primarily with powered cabin cruisers and similar craft of all descriptions. These mostly are kept moored on the waterways and are used for cruising at weekends and holiday times. For these craft a canal reduced to a water channel would have no significant appeal and our reservoirs are not available to them (as already explained). There is a small but growing industry letting out cruisers for "hire and reward" and indeed one way of describing the sort of pleasure boating with which we are concerned is to call it "holidays on the canals". Canoes and small unpowered boats which can easily be lifted in and out of the water could, of course, continue to paddle up and down on water channel waterways (as already mentioned, the revenue from these is very small).

189. Indeed, when we come to consider recreation and extra costs it is pleasure cruising that we are really concerned with. Water channelling does not drive anglers away—indeed the anglers often say they would be glad to get rid of the boats. It does not drive the walkers away either—though quite a bit of the interest is taken away when there is no possibility of a boat swinging into view. A weired lock, moreover, is not as interesting as one that will work. But it is cruising and only cruising that, on the minimum cost basis, is "out".

190. In making the (far from easy) judgment about the extent—if any—to which "extra costs" can, in the general social interest, justifiably be incurred, regard will obviously have to be had by all concerned to the minimum costs which it is necessary to incur anyway. This is indeed a thing one can argue either way. One can argue that because the minimum is so high it represents also the maximum. Conversely, one can argue that as a considerable sum has to be found by the community anyway there is a case for making provision for pleasure boating as well. Such are the "black" and "white" arguments (and we do not in this report encroach on policy by saying which is which). There is—as this chapter and Appendix 7 illustrate—a complete range of shades of grey from which the desired tint can be chosen.

191. Lastly, there is the problem of revenue potential. This has already been commented on in Chapter IV (paragraphs 136 to 141). The application of extra-cost "price tickets" inevitably presents a dynamic situation in static terms. How dynamic the revenue potential is depends in significant measure on how much of the system is kept open to pleasure craft. If only little bits here and there were left open the situation itself would be static and the possibilities of growth correspondingly small. If a lot is kept open it is reasonable to assume that over the years the revenue will significantly increase—especially perhaps where (as in the case of the Leeds and Liverpool Canal) there is obvious room for expansion.

192. If the policy decision is to retain this main fabric a major and continuing effort obviously would be made to reduce and, if possible, to eliminate the "extra cost" deficit and—again if possible—to make inroads in the "minimum costs" as well. As far as certain rivers are concerned there would be a perceptible (though not dramatic) improvement if the Board were statutorily enabled to make charges on craft not using locks. Apart from this, improvements on a significant scale will have to be won little by little. If the resources to continue a sizeable pleasure cruising system are made available it is reasonable to expect progressive increases in revenue against, however, the background described in Chapters IV and V.

193. To return now to the more immediate problem, the cost of preserving the various waterways for pleasure craft purposes has already been described and assessed in the categorisation of the waterways concerned as X, Y and Z (paragraph 166). What has not been discussed, however, is what the assumption for revenue might reasonably be on the basis of the immediate future and of constant prices. People who have pleasure boats on the canals make their licence and mooring payments for two things. One—and for most people it is in reality the main one—is for having the "home stretch" which they cruise about in, and for having their boats on the

water where they can look after them. The other is that they pay for the ability to take their boats over many hundreds of miles of canal. They may not do this very often; indeed, they may never do it. But they like to know that they could; and part of the attraction of the canal system is the belief that next week (or next year) they are really at long last going to undertake that 400—or 600, or 800 mile round trip which they have so often discussed with their friends. If, therefore, one is considering the retention to pleasure boat standards of individual waterways one has also to consider whether, basically, the individual waterways would form part of a system or whether cuts would be so drastic that there would only be isolated stretches here and there. If the latter is assumed, there would be a deduction from the pleasure cruising revenue (that is to say an increase in extra costs). If the cut of the system were drastic, this reduction in receipts might be of the order of 25%.

194. Assessments have therefore been made on two bases:

- A. only isolated lengths kept available for pleasure boating (25% cut in revenue case by case).
- B. substantial part of system kept so available and modest growth of revenue therefore anticipated (25% growth in revenue case by case).

195. Appendix 7 shows that for the waterways which are now navigable (at any rate in major part) the sum of the extra costs is on present revenues (the mean point between basis 'A' and basis 'B') about £290,000 per annum. Two items require to be added to this. The minimum costs of about £600,000 per annum (described in Chapter V) assumed a modest cut in central charges. In large measure this cut would no longer be achievable. The effect of this is quite small, however—only about £10,000 per annum. More important, the cut in unremunerative capital expenditure (which in the "minimum cost" figure is put as low as £40,000, compared with rather over £100,000 in 1964) would no longer be achievable in full. To estimate how much of this last-mentioned cut would have to be reinstated is difficult but it can be assumed that the £40,000 in the "minimum costs" would have to be doubled. So the total becomes £290,000, plus £10,000 and plus £40,000—i.e. £340,000 per annum. This does not make provision for restoration schemes.

196. Appendix 8 sets out those waterways which are not available for pleasure cruising, together with their mileages. All the canals in Appendix 8 are unnavigable—and for the most part have been for many years past. Several, however, have not been formally closed to navigation; certain of these and, indeed, some of the others in the list as well have been the subject of restoration proposals of varying degrees of firmness. On restoration as on other aspects of the use of the canals for recreation, we shall naturally have our own views to contribute; it will perhaps come as no surprise, however, if we mention, even at this juncture, that we find the proposals of very varying merit.

197. The future treatment of the Birmingham Canal Navigations perhaps requires a special word of explanation. What is dealt with in Appendix 7 is the extra cost of a "through route" linking canals of the north west with those of the south east and also of a connection, through the Stourbridge Canal, with the canals of the south west. We have thought this the appropriate basis to take in relation to assessing pleasure boating costs. The Birmingham Canal Navigations would clearly require special consideration insofar as those parts of them (other than the "through route") are used, and have a reasonable expectation of continuing to be used, for any significant volume of commercial traffic.

198. It should be mentioned that, to minimise the cost of administration, pleasure craft licence revenue is attributed to the waterways on which boats are based—it is not apportioned on any sort of cruising mileage basis. This does create some accounting anomalies (e.g. it is "unfair" to the Llangollen and to the South Oxford too) although these cancel out in the total.

CHAPTER VII

THE FACTS ABOUT THE WATERWAYS

199. Such then, in our view, are the facts about the "mixed bag" of assets which we inherited. The facts have emerged not only from the many special detailed studies which we have made, but also—and the importance of this cannot be overstressed—from our continuing management experience. It is this latter which puts us in a different position from the many external Committees of Inquiry etc., in our work of establishing and weighing the facts in their various aspects. We believe—with due deference—that our position is not only different, but also better.

200. We have benefited from the consultations which we invited in our Interim Report. We have not—inevitably—been able to give credence to all we have heard said. But the process of consultation, besides giving us some insights of positive value, has certainly ensured that we have not overlooked or been unaware of the many views and theories about the waterways which are held and expressed by those who have their interests at heart.

201. We are fully aware that many of our factual findings about the waterways are less optimistic—and will to some therefore be less palatable—than some views and doctrines which are from time to time asseverated. We know this: but we are entirely convinced that optimism based on inadequate and unreliable facts leads only to disillusion and waste. We are equally convinced that on—and only on—a careful, comprehensive, and realistic appraisal of the facts of the situation can a workmanlike, economical, and socially-justifiable pattern for the future of the waterways be drawn out. This report is made in that spirit.

SUMMARY

202. What does it all add up to? In our opinion it adds up to this:—

(A) Part of the undertaking can be run as a viable commercial entity, properly and separately accounted for as a business undertaking with a reasonable expectation of life in its own right and with a reasonable balance sheet. Having its own financial independence, it would form a sound basis for new investment where economically justified. This part is a relatively small undertaking, with a capital value of—in our view—rather under £6 million, with an annual interest liability of about £350,000, and with an expected annual surplus of income over expenditure (before interest) of rather under £½ million.

(B) There is a small scale additional zone of transport activity—mainly in two limited areas—where viability is not at present possible, but where, on general grounds, closure to transport seems to us to be indefensible whatever view is taken about the waterways and "amenity". For this limited part (what we have called the "special group") a subsidy, at present costs, of about £150,000 a year would be needed.

(C) Then there is "the rest". Here there is no "trick answer". The savings and economies which were available have been achieved in the last three years and (apart from relative details) what remains is the basic intractable problem—the problem so frequently investigated in the last half century and (with equal frequency) burked. Water sales revenue can grow—and there will accrue such economies as careful management can produce. But there is no question (it must—in our view—be faced) of solvency, let alone of servicing notional capital. This means, in our opinion, that it would not be meaningful to have a balance sheet for this part of the undertaking.

(D) To help resolve this problem we have made a complete survey, canal by canal and length by length, of all the main facts and costs. This enables us to compare present

minimum running costs with the various alternatives—either complete elimination, or reduction to tidy water channels (unsuitable for any boats save light unpowered craft such as canoes), or maintenance in whole or in part for pleasure cruising.

(E) This survey establishes, in our minds, that—

- (i) at least for a large number of years to come there is no prospect of pleasure craft activities paying for themselves in a true commercial sense;
- (ii) there is no true business future for the “narrow boats”, for which such nostalgic claims are still sometimes made;
- (iii) the most serious and over-riding fact emerging is that, even if the whole of the “rest of the system” were to be ruthlessly treated (without any regard to social welfare) and every possible canal were to be either eliminated altogether or reduced to minimum water channelling flow—*whichever was the cheaper*—the exchequer would still be saddled with a bill equivalent to about £600,000 a year. And this, the survey reveals, is not an optional “subsidy” but an inescapable minimum exchequer charge.
- (iv) it follows that in hard reality the field open to discussion on “amenity” grounds of pleasure boating and leisure use lies between (a) a rock-bottom starting point not of zero but of £600,000 a year; and (b) a figure for using most of the non-commercial system as it is for pleasure boating, which is some £300,000/£350,000 a year higher. The true room for manoeuvre (subsidy, use of volunteer monies, etc.) lies in that latter range. The £600,000 is not optional!

(F) The management “facts of life” have also been examined in detail, and our work on that aspect has convinced us of the diseconomies in the use of skilled manpower, of the damage to staff morale, and consequentially of the waste of money, which would arise from splitting and hence duplicating the organisation as it has emerged from the radical streamlining of the recent past.

203. Such, then, are the essential facts as they emerge from our studies and our management experience. We have no doubt that they will be studied by all who are concerned with waterways policy and with the future of out-door recreation and the British countryside. Upon them, we think, a sound policy can be built. We look forward to playing our own part in building it.

APPENDICES

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APPENDIX 1

(Chapter II, para. 15)

THE INHERITED CAPITAL ACCOUNT

1. The gross book value of land and buildings, waterways, docks and other works transferred to the Board from the books of the British Transport Commission at the 1st January, 1963, under the Transport Act 1962 was £28·1 million. This, broadly, represented the original or "historical" cost of the assets. Against this, there was a provision for maintenance equalisation amounting to £11·8 million, which was very roughly the excess of the book value of the assets over what the Commission had paid for them. So the net book value of the land, buildings, and "civil engineering" assets transferred to the Board was £16·3 million. In addition, there was £3·2 million in respect of craft, vehicles, plant and equipment (at cost, less depreciation) and, on the other side, £0·2 million for provisions, current and other liabilities, less current assets.

2. The total book value of the net assets which the Board took over was, therefore, £19·3 million and this is the amount of their commencing capital debt to the Minister, upon which they are paying interest amounting to £726,000 per annum—and which they will continue to pay until and unless there is some statutory alleviation.

3. In their first Annual Report, for the year 1963, the Board pointed out that, having regard to the great age of the vast majority of buildings, waterways, docks, and other works, the liabilities immediately and potentially attaching to them and the history of increasing revenue deficits, such a value of £16·3 million was, in their opinion, quite unrealistic. As a first step, and pending a more extensive examination of the problem, the Board placed provisional values of £4 million on their non-operational estate and £5 million on their operational land and buildings, including their waterways, docks, warehouses, etc. The proposals in Chapter II would supersede those provisional and incomplete arrangements.

4. The problem which lies at the heart of the matter is that not merely were many of the so-called assets antedeluvian, but also the capital accounts of the former undertakings were founded on widely differing accounting principles. There were, for instance, differences of treatment of the amortisation of capital expenditure. There were even differences in the methods of distinguishing between capital and revenue. Thus, the Lee Conservancy Board, from whom the Commission took over the Lee and Stort Navigations, financed all major works, whether on new assets, improvements or straightforward renewals, out of borrowed money and did not adjust their capital account in respect of the values of assets displaced and replaced. It follows that the total book value of these navigations, as transferred from the Commission, may well include expenditure on a number of renewals of the same assets. Conversely, lesser expenditure of a capital nature which could conveniently be financed out of revenue was from time to time so dealt with. At the other extreme, the Weaver Navigation Trustees had no share capital or outstanding capital debt at nationalisation and the Weaver may, therefore, be said to have no book value in respect of pre-nationalisation assets. Somewhat similarly, the Caledonian and Crinan canals were transferred to the Commission with no book value—but also (this must be said in view of their history) no capital subsidy.

5. Not only were the various book values arrived at by a number of different accounting routes, but there is a further complication arising from the paucity of information as to what actually was included. It would be possible broadly to analyse the total figure over the separate former independent canal undertakings and the ex-railway canals, but there would remain the problem of identifying the values of even the main different types of assets—the waterways, the docks, the warehouses, the estate properties and so on. It was not the general practice of the Board's predecessors to maintain detailed records of the cost of their various assets and in only isolated cases are separate figures now identifiable. Even if this considerable historical research were undertaken where would it get anybody? The information gained would almost certainly be far from complete and the resultant figures would still represent the historical costs of the variety of assets of the former undertakings, built up in most cases over a long period of years, with all the complications arising from the many amalgamations and transfers of ownership (including the buying out of canal companies by the railways) which have taken place during the past 150 years. And still no account would be taken of the many onerous statutory liabilities which the Board have inherited.

APPENDIX 2

(Chapter II, paras. 18 to 20)

OVERHEAD EXPENDITURES (EXCLUDING INTEREST)

1. In the trading returns for waterways, depots, etc.—that is to say in the figures which appear in summarised form in the annually published accounts—the following types of overheads are included:—

- (i) The expenses of line management—Area Engineers: Section Inspectors: Fleet Superintendents' offices and the like.
- (ii) The expenses of the Regional Offices, both of the department directly concerned and of other departments. For instance, a dock trading return includes due allowance for costs incurred not only by the commercial officer concerned, but also by the Regional Engineer's office which is responsible for maintenance and new works at the dock.
- (iii) Provision is also included for those functions (centralised services) which are part of the executive machine, though they are for reasons of economy and efficiency provided centrally. The new accounts office is the simplest example.

2. Provision is not made, however, either for interest payments or for the general Headquarters expenditures known as centralised charges. The vastly preponderant element of the latter (£215,000) is staff expenses and expenses which vary according to the number and grades of staff. The relatively small balance is made up of research, education, welfare, audit fees, publicity, etc.

3. The lesser waterways for all sorts of reasons—popular interest, legal complexity and the brute fact that the sick take up more of a doctor's time than the healthy—impose a heavy call on the Headquarters policy side of the undertaking. It would be entirely inappropriate, therefore, to divide the total of central charges *pro rata* to the income or the direct expenditure. As a result of the management reorganisation referred to in Chapter III the immediate past and the short-term future constitute a period of transition—with transitional charges—and a mild rounding down of the total (from £237,000 to £230,000) is considered justified when the longer term future is considered.

4. This total of £230,000 for centralised charges has been analysed and studied section by section and the following attributions are considered fair and reasonable:—

(a) *Main staff expenses*

<i>Department</i>	<i>Commercial</i> £'000	<i>Other</i> £'000
Commercial (General)	11	3
Commercial (Pleasure Craft Licensing)	2	4
Commercial (Public Relations)	2	3
Estates Headquarters	6	4
Accounts (including Supplies Officer)	15	12
Staff Department Headquarters	5	3
Solicitor	4	8
Chief Engineer	13	13
Redevelopment and Administrative Officers	2	6
Museum (Stoke Bruerne)	—	3
Internal Audit	11	5
	71	64
	71	64

(b) *Central Charges other than staff expenses*

	<i>Commercial</i> £'000	<i>Other</i> £'000
General publicity	3	2
Research	4	1
Education, training and welfare	3	3
Audit fees	3	3
	<hr/>	<hr/>
	13	9
	<hr/> <hr/>	<hr/> <hr/>

(c) *Remaining elements*

The figures set out in (a) and (b) above total £157,000. The remainder of the £230,000 (i.e. £73,000) is accounted for by a miscellany of items—the Board itself, and the senior officers, secretariat, etc. An allocation of these 50:50 between “Commercial” and “Other” is not unduly favourable to the commercial part.

5. *Summary*

	<i>Commercial</i> £'000	<i>Other</i> £'000
Items under sub-heading (a)	71	64
Items under sub-heading (b)	13	9
Items under sub-heading (c)	36	37
	<hr/>	<hr/>
	120	110
	<hr/> <hr/>	<hr/> <hr/>

6. The next step is to divide the £120,000 between the various activities in the commercial part. Because of the nature of the work the Waterways activity takes up a proportion of higher management time disproportionate to its revenue earning ability and—bearing this in mind—the total may fairly be divided thus:—

	£'000
Waterways (in commercial group)	40
Waterways (in special group)	5
Fleets	10
Warehouses	20
Docks	15
Estates	30
	<hr/>
	120
	<hr/> <hr/>

APPENDIX 3

(Chapter III, para. 107)

MANAGEMENT ORGANISATION

1. The principles of the Board's management organisation are, first, to have the fewest possible links in the management chain and, second, to tailor each department to the needs of the work and not to any preconceived idea of symmetry or balance.

Engineering

2. Under the Chief Engineer there are two Regional Engineering organisations, one for the north based on Leeds, and one for the south based on Gloucester. The Board's whole system is divided into seven Areas, four in the north with offices at Wigan, Castleford, Northwich and Nottingham; and three in the south with offices at Birmingham, Gloucester and Watford. The seven Areas are divided into Sections, the size of which varies according to the complexity of the individual waterways to be managed, but about 50 miles is not uncommon. In Scotland all canals except the Caledonian are grouped under a single Engineer in charge. The Caledonian has its own Manager and Engineer (who relies, of course, on Headquarters for specialised services).

3. The Board's workshops are supervised by Mechanical Engineers situated at the Regional offices. Specialised sections exist to deal with the technical problems of water management and mining subsidence.

Commercial

4. The Commercial Department is responsible for getting traffic for the waterways (whether it be carried by the Board or by independent carriers) and is also responsible for the management of the Board's depots, docks and fleets (the individual managers of which, however, have as much autonomy as is practicable).

Estates

5. The Estates Department has an office to deal with the Northern Region (at Leeds) and two offices for the south, one at Gloucester and one (because of the relatively heavy concentration on estates matters in the London area) at Watford.

Water Agreements

6. An officer directly responsible to the General Manager deals with the promotion of water revenues throughout the Board's system.

Accounts and Supplies

7. The Accounts Department and the Supplies section are centralised and are based on a computer installation at Watford.

Other Departments and sections

8. The Legal Department, the Internal Audit, the Public Relations section and the Staff and Management Services functions are all centralised, with "outposted" local officers where appropriate.

APPENDIX 4

(Chapter V, para. 157)

THE COST OF ELIMINATION

1. The purpose of this appendix is twofold: first to discuss in general terms the cost of complete elimination over a specimen ten mile length of canal; and second to describe the costing assumptions made for the study described in Chapter V and Appendix 5. As will be seen, these two things in part overlap, but as far as locks, bridges and aqueducts are concerned, the latter is based on actuals case by case.

2. It is unrealistic to endeavour to cost elimination in the same degree of detail as that of reducing to, and maintaining as, a water channel. If a policy decision to eliminate a particular length is taken, then the carrying out of that decision is like a campaign rather than a single action. You make extremely precise assessments of the need case by case, to do various specific jobs. You negotiate with the people interested in those particular jobs. You feel your way ahead at each and every stage. What the cost will be in detail in an individual case it is impossible to say in advance. But the lessons so far of elimination (based on considerable practical experience) have been carefully studied and it has been concluded that £6,000 a mile is a reliable average figure for a rural narrow canal and about £9,000 a mile for a rural wide canal. The principal purpose of this appendix is to explain the build-up of these figures. A word is said at the end about canals in towns.

3. It must be said at the outset that we have found no validity in the figure of £60,000 which has sometimes been suggested as the average cost per mile of total elimination. It will be seen from the detail that follows that the estimates that have been made (and which, for a narrow canal, come out at about a tenth of the £60,000 figure) do indeed assume elimination, that is to say, a programme of work designed broadly to recreate "pre-canal" conditions.

RURAL NARROW CANALS

4. The expenditures which would or might be incurred in eliminating a rural narrow canal are divided into headings (a) to (l) below. For the purpose of the study in Chapter V and Appendix 5 (and for the reasons explained at the beginning of paragraph 2 above) sub-headings (a) to (g) inclusive and (l) are dealt with on the basis of the "typical example". Items (h) to (k) inclusive, however, are—in that study—dealt with on the basis of actuals. As to time scale, the assumption made is that set out in paragraph 158 of Chapter V, namely that the Board do not operate "with a pistol at their heads", but that on the other hand, they are expected to finish the job within a period of ten to twelve years.

(a) *Dewater the canal and break open approximately 15 culverts to drain the canal bed.*

5. Culverts constructed when the canal was built, in order to pass drainage courses under the line of the canal, remain the responsibility of the Board and therefore require to be dealt with as part of the elimination of the canal or redevelopment of its site. They may also be needed to take any residual natural drainage from the line of the canal bed.

6. The cost of excavating down to the culvert, opening up and forming an open channel across the line of the canal, obviously varies with the depth, length and accessibility (or otherwise) of the culvert. The number of culverts per length of ten miles will vary and so will the depth. For instance, on a sampling of four waterways totalling about 200 miles, the average ran out at 17 culverts per ten miles. To take 15 culverts at £450 each gives a realistic (and not over-high) estimate. This gives a cost for the ten mile stretch of £6,750.

7. It will often arise that the culvert is in fair condition and can reasonably be left *in situ*, the work being deferred (perhaps many years) until it becomes necessary due to a defect arising or the site being developed or for any other reason. In such circumstances, the liability would, of course, remain with the Board unless it were made the subject of payment to an appropriate party as a commuted settlement. For ease of calculation this is treated as being equivalent to the sum given in paragraph 6 above.

(b) Pipe approximately 20 incoming discharges to a nearby ditch or watercourse.

8. The enabling Acts normally required the canal proprietors, where the construction of a waterway intercepted a drainage course or channel, to accept the drainage into the canal, or alternatively to provide other accommodation works. After the initial de-watering of a canal a prerequisite of site development is the diversion of drainage discharging into the waterway.

9. For the protection of River Boards and Drainage Authorities provisions have been written into "closure Acts" or undertakings given with regard to such drainage; the conditions, however, usually provide for alternative works to replace existing arrangements.

10. To drain the canal bed effectively entails picking up all drainage points and diverting the flows by ditching or piping to the nearest brook course or sewer. If the work were carried out by a purchaser of the land for the purpose of developing the site for agriculture it might be the subject of grant-aid, which would not be available to the Board if they did the work themselves.

11. On the typical ten-mile length of rural canal, the figure of 20 such discharges (i.e. 2 per mile) is considered a reasonable estimate. The average distance for re-routing the discharge could be taken as 100 yards, and recent experience has shown a price range of 30/- to £4 5s. 0d. per yard run for a 12-in. concrete pipe, dependent upon the nature of the ground and depth of trenching required.

12. Given the complications mentioned in paragraph 10 and the cost variations in paragraph 11 this is a difficult item to cost. A reasonable basis and price (£3 per yard run) gives an estimate of £6,000 for the ten miles.

(c) Bulldoze banks and import fill.

13. The physical features of a typical narrow rural canal may be roughly divided into the following categories:—

- (i) Level cut (or cutting);
- (ii) Towing path embankment up to 3 feet above adjoining ground level;
- (iii) Towing path embankment up to 6 feet above adjoining ground level.

14. Of course some embankments are very much greater than 6 feet and some embankments exist on both the towing path and the offside. However, they are, in fact, small in number and length when compared with the three categories described in paragraph 13.

15. In the elimination of a rural canal the aim is to restore conditions as near as possible to those which existed prior to its construction. To do this at reasonable cost, the best use must be made of the earth that forms the embankments, so as to minimise the importing of fill.

16. In a typical ten-mile length of canal about three miles will be in level cut, five miles will be in towing path embankment up to 3 feet above adjoining ground and two miles will be in towing path embankment 3 feet up to 6 feet above adjoining ground level.

17. The level cut canal section must be filled to towing path and offside field level and this requires about 12 cu. yds. of imported material per yard run of canal, giving a total of about 63,500 cu. yds. for the three miles. It is estimated that such material will cost 5/- per cu. yd. and the overall cost is therefore about £15,900.

18. The lengths of canal in embankment will be graded to a gentle slope, extending from water level on the offside to field level on the towing path side, by bulldozing the embankment into the canal.

19. An embankment of about 3 feet high contains just about the right amount of earth to fill the canal, and in the five miles of canal the quantity of material to be levelled is about 35,000 cu. yds. (about 4 cu. yds. per yard run). At an estimated cost of 2/- per cu. yd. the cost is therefore about £3,500.

20. In the case of the 6 feet high embankment there is more material in the bank than is needed to fill the canal. Surplus earth will, therefore, be hauled to that portion of the canal in level cut. The quantity required to fill the two miles of canal is about 12,500 cu. yds. (about 3½ cu. yds. per yard run) and at 2/- per cu. yd. the cost of filling is therefore £1,250. The amount to be moved elsewhere

is about 14,500 cu. yds. (about 4 cu. yds. per yard run) and has been included in the cost for restoring the level cut canal.

21. To summarise, the cost of earthworks for the typical ten miles is:—

Level cut	£15,900
Embankment up to 3 ft.	3,500
Embankment 3 to 6 ft.	1,250
	<hr/>
	£20,650
	<hr/> <hr/>

(d) *Hedges*

22. The expenditure on hedges and fencing falls into four parts. First (as explained below) it would be necessary to restore certain gaps in the hedges and to do "layering" where this had not been done. Second, it would be necessary to extend a certain number of fences across where the canal used to be in order to stop stock straying, etc. Third, it would be necessary in certain places to restore fences where they have been demolished as a necessary consequence of the bulldozing operation described at (c) above. Fourth, it would sometimes be necessary to spend a certain amount of money on fencing rights of way.

Restoration of towpath hedges, etc.

23. Under the Canal Acts the canal proprietors were normally required to fence (or hedge) canals on the towing path side to prevent sheep and cattle straying along the towing path.

24. On a disused canal where maintenance has been held at a bare minimum, hedges are likely to have been neglected and to have "run up". They may in places be non-existent.

25. As a pre-requisite of elimination and disposal, therefore, allowance has to be made for a certain amount of fencing, for hedges to be re-layered or made good and so on. This, however, will only be required where the existing fencing or layering is inadequate and indeed may not be required at all if the land on either side of the canal is in the same ownership. Experience indicates that on a typical ten-mile length of rural canal, gaps of a total length of half a mile might require fencing, while general attention to hedges over a total of two miles would also be necessary.

26. For a simple boundary fence of this nature, a post and wire fence is quite adequate and fully meets the Board's statutory liability; recent experience shows that an average cost of 12/- per yard run is realistic. For layering of hedges, £350 per mile is similarly a fair estimate based on experience.

The total cost to be allowed for is thus:—

	£
Fencing, 880 yds at 12/- per yard	528
Layering, 2 miles at £350 per mile	700
	<hr/>
	£1,228
	<hr/> <hr/>

Extension of field hedges across the site of the canal.

27. When the canal is de-watered, the natural barrier on the offside (opposite side to the towing path) is removed, and provision has to be made for extending the dividing hedges of fields on the offside of the waterway across the canal to meet the towing path hedge.

28. On the typical ten-mile length of rural canal, it is considered that about 70 field hedges would need to be extended across the site of the canal in this way. A total of 910 yards (70 × 13 yds) at 12/- per yard would cost, say, £550. (It is possible that, as a safeguard to cattle during the period when the canal is drying out after de-watering, temporary fencing may be required along the offside bank to prevent cattle becoming bogged down in the canal bed. This, however, is unlikely to arise to any substantial extent, and no allowance has been made in the estimate).

(e) Fence as a consequence of bulldozing.

29. There will, as a result of the bulldozing of the banks and infilling, be large lengths of canal with no barrier between one side and another. This would create no problem—indeed it would marginally be an advantage—where both sides are in the same ownership. But, of course, it is a long time since the canals were built and this is quite often not now the case. If much of the ten-mile stretch had to be refenced, the cost might be, say, £5,000. It has, however, been considered quite unrealistic to put in a figure of this kind. It should be possible, in practice, to negotiate with one owner or another so that he accepted the liability for fencing without payment (as well as accepting the need for importing top soil). It is assumed that on the ten-mile stretch there would be relatively small lengths where, for reasons such as public safety, fencing of this kind would have to be provided, and £1,000 is therefore included.

(f) Fence approximately one mile to define existing rights of way.

30. Some towing paths are scheduled as public rights of way under the National Parks and Access to the Countryside Act. On occasion, local authorities and transferees have insisted, as a condition of disposal, on fencing being provided co-extensive with the towing path hedge, to preserve the right of way and prevent trespass.

31. While it is recognised that such additional fences will sometimes be desirable to preserve the right of way and prevent trespass, it is not considered that there should be any general need for them, since rural footpaths are so often fenced on one side only.

32. It is a reasonable supposition that on the typical ten-mile stretch of rural canal, one mile of such additional fencing might be required. This, at 12/- per yard run, would cost £1,056.

(g) Provide alternative water supplies to replace those formerly taken from the canal.

33. Under the Canal Acts the canal proprietors were normally required to make alternative provision wherever the construction of a waterway severed access to natural watering places for cattle. Even when these conditions do not apply landowners have sometimes claimed prescriptive rights by long user. This claim has been reinforced in the case of certain canals closed to navigation by provisions or covenants enforcing a specified depth of water for that purpose.

34. It is particularly difficult to assess what the cost will be—in present-day conditions—of replacing such water supplies. In the first place, supplies have become increasingly available in rural areas and in the second place, canal water is quite often nowadays considered unsuitable for attested herds. Farmers can, moreover, in certain circumstances seek Government aid for the installation of fresh water supplies. A provision of £4,000 is a fair one for the typical ten-mile length, striking a mean between a canal where a high figure would apply and a canal where this problem would barely arise.

35. The foregoing shows the main items which, in the costing study, are dealt with on a “typical length” basis. The remaining items, except for (l), are dealt with on the basis of actuals in that study.

(h) Accommodation bridges.

36. Under the Canal Acts, at points where land ownership was severed by the construction of a waterway, the proprietors were normally required to provide and maintain accommodation bridges giving access between the severed lands. The Board’s responsibility for maintaining these structures could be met by demolishing the bridges, infilling (and, if necessary, piping) the site and constructing a level causeway. Recent experience confirms that a figure of £300 per bridge is adequate as an estimate for this work. If fifteen such accommodation bridges are assumed on the typical ten-mile stretch of rural canal, the cost would be £4,500.

(i) Public road bridges.

37. The Board’s responsibility for public road bridges crossing a canal is generally that of providing only for the standard of traffic at the time the bridges were constructed, i.e. a wagon or pack horse. Over the years many such bridges have been transferred to the appropriate highway authority on payment of a sum representing commutation of the Board’s maintenance liability.

Often the need for a road widening or other improvement has provided a suitable opportunity to make such arrangements (on terms acceptable to the canal proprietors).

38. Having regard to the Board's very restricted measure of liability, the payment negotiated in respect of such transfers has usually been small. It is considered a fair estimate on the basis of experience, to take six bridges at £400 each in the typical ten-mile stretch, a total of £2,400.

(j) Demolish lock chambers, infill and make safe.

39. In dealing with locks it is the practice to provide for their demolition and infilling by bulldozing in the banks, as they could otherwise constitute a danger to children and animals. This in fact follows the precedent set by some County authorities who have imposed these measures as a condition during the passage of closure legislation.

40. £400 per lock is considered a realistic estimate for a narrow lock on a rural canal, and assuming ten locks on the typical ten-mile length the cost would be £4,000.

(k) Demolish or negotiate the transfer of an aqueduct.

41. It is difficult to assess the likely expenditure under this heading with any exactitude. There is unlikely to be more than one aqueduct of any size on a typical ten-mile length of rural canal although there may be a number of minor structures carrying the canal over a lane or stream. A reasonable estimate of the average cost of demolition would be £1,500.

(l) Extinguish fishing rights.

42. Where fishing rights are in the ownership of riparian landowners and have been exercised, compensation would need to be paid for their loss. On the other hand, these circumstances do not always apply, and in any event their value on a canal being considered for elimination is likely to be low. On the typical ten-mile length of rural canal it is considered that a prudent estimate would be £400.

Summary for rural narrow canal.

43. To summarise the detailed analysis, the costs for eliminating a typical ten-mile length of rural narrow canal come out as follows:—

	£
(a) Culverts	6,750
(b) Pipe discharges	6,000
(c) Bulldoze banks, import fill	20,650
(d) Restore hedges, layering	1,228
Extend hedges	550
(e) Replace fences	1,000
(f) Fence rights of way	1,056
(g) Alternative water supplies	4,000
(h) Accommodation bridges	4,500
(i) Public road bridges	2,400
(j) Lock chambers	4,000
(k) Aqueduct	1,500
(l) Fishing rights	400
	54,034
Add 10% contingencies	5,403
	59,437

Say, £6,000 per mile.

RURAL WIDE CANALS

44. Items (b), (d), (e), (f), (g), and (l) are not significantly affected by the variation between wide and narrow canals. As far as (a) (Culverts) is concerned, the length to be opened up would be somewhat longer and it is appropriate to increase the unit cost from £450 to £650 thus adding £3,000 to the total.

45. For items under (c) (bulldoze banks and import fill) it is estimated that the volume of material required to infill a typical broad canal will be approximately 19 cu. yds for each yard of canal in level cut, i.e. 7 cu. yds greater than for a narrow canal. In a three-mile length the additional material to be imported is therefore 36,960 cu. yds., and at 5/- per cu. yd. the additional cost is £9,240.

46. Where the canal is in embankment up to 3 feet high the additional material required is approximately 4 cu. yds per yard of canal. In five miles the volume required is 35,200 cu. yds., and at 5/- per cu. yd. the additional cost is £8,800.

47. Where the canal is in embankment up to 6 feet high the additional material required is approximately 2 cu. yds. per yard of canal. In two miles the volume required is 7,040 cu. yds., and at 5/- per cu. yd. the additional cost is £1,760.

48. So the total additional cost compared with a narrow canal is:—

£9,240
8,800
1,760
<hr style="width: 50px; margin: 0 auto;"/>
£19,800
<hr style="width: 50px; margin: 0 auto;"/>

and the total cost is £20,650 + £19,800, i.e. £40,450.

49. The bridges on a wide canal are normally significantly more substantial structures and it is reasonable to increase the unit cost for an accommodation bridge (h) from £300 to £400, and for a public road bridge (i) from £400 to £600. Similarly a 14-ft lock chamber (j) is an altogether larger affair and an increase in the unit cost from £400 to £600 is reasonable. And an additional £500 is included for a larger aqueduct (k).

50. In summary, therefore, the costs for eliminating a typical ten-mile stretch of rural wide canal are:—

	£
(a) Culverts (15 at £650)	9,750
(b) Pipe discharges (unchanged)	6,000
(c) Bulldoze banks, import fill	40,450
(d) Restore hedges, layering (unchanged)	1,228
Extend hedges	840
(e) Replace fences (unchanged)	1,000
(f) Fence rights of way (unchanged)	1,056
(g) Alternative water supplies (unchanged)	4,000
(h) Accommodation bridges (15 at £400)	6,000
(i) Public road bridges (6 at £600)	3,600
(j) Lock chambers (10 at £600)	6,000
(k) Aqueduct	2,000
(l) Fishing rights (unchanged)	400
	<hr style="width: 50px; margin: 0 auto;"/>
	82,324
Add 10% contingencies	8,232
	<hr style="width: 50px; margin: 0 auto;"/>
Total	90,556
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Say, £9,000 per mile.

SITE VALUES

51. It is necessary to be cautious about the value of the resultant site—it will vary considerably case by case according, for instance, to the quality of the surrounding land and the question whether both sides are or are not at present in the same ownership. It will have been observed from paragraph 29 above that the costs do not provide for certain fencing requirements or for the provision of top soil. In determining site value, account must be taken of this and also of the fact that the narrow strip of land which was formerly a canal bed will be of interest only to adjoining owners and will not have a general market. In normal cases the sort of price realisable on sale will not significantly affect the figures outlined above though there will, of course, be exceptions to this general proposition and the position relating to canals in towns is commented on below.

MINOR RURAL CANALS

52. There will be certain cases where elimination would not be necessary and where the canals could be allowed to sink to a gentle “existence” level. These cases, however, are few. A number of conditions have to be fulfilled; for instance the original construction must have been such that there are no special land drainage or embankment problems; the general area must be extremely rural, otherwise a decaying canal will become a nuisance. The small number of cases where “mere existence” (and relatively low expenditure) would be practicable are noted case by case in Appendix 5—see for instance the Grand Western Canal and the Pocklington Canal.

CANALS IN TOWNS

53. Canals (or parts of canals) which flow through towns, on the whole, require case by case treatment. It should by no means be automatically assumed that the financial case for elimination (as against water channelling) is automatically stronger where an urban canal is concerned. In the first place, it is in the towns that water revenue is most likely to arise. In the second place, the cost of elimination—per unit length—in the towns may well be much higher than in the country because of difficulties of site, inapplicability of the bulldozer and fill method, etc. In the third place, not all the sites which would become available would be of any great value. The canals often run through the parts of towns with which time has dealt hardly. The problems of the Ashton Canal, the B.C.N. and the Regent’s Canal are commented on specially in the individual studies dealing with these waterways. Lastly, it is in these urban areas that problems of surface drainage are likely to be particularly acute.

54. In short, the general relative advantages and disadvantages of water channelling as compared with elimination may well be not greatly altered by the fact of a bit of a canal going through a town—though in the case of water channelling there would often be specific problems of whether it would be better on economic or social grounds to keep a particular urban length as an open channel, or to pipe or culvert it.

APPENDIX 5

(Chapter V, paras. 151 to 162, 166)

MINIMUM COSTS: INDIVIDUAL STUDIES

1. This Appendix contains individual studies covering all the Board's waterways other than those included in the proposed Commercial Division explained in Chapter II. (Exceptionally, there is no individual study in respect of the Kensington Canal, which is only half a mile in length and is in effect a tidal creek of the Thames; it has a very small toll revenue (some £350 in 1964) and expenditure in recent years has been infinitesimal).

2. It is important that the studies—which have intentionally been limited to financial and engineering facts and judgments—should be read in conjunction with Chapter V, which outlines the basis on which they have been compiled and goes on to draw certain conclusions in respect of “minimum costs”. In this connection, the reference to Water Channelling Costs in paragraphs 154 to 156 and Elimination Costs in paragraphs 157 to 162 of Chapter V are of particular importance.

3. The categories X, Y and Z under which the individual waterways are classified are defined in paragraph 166 of Chapter V. The category “Special Commercial”, applied to the Caledonian Canal, the Crinan Canal and the lower Grand Union Canal, is explained in paragraphs 69 to 74 of Chapter II.

4. It will be seen that in a number of the individual studies there are references to “redevelopment” and to the “Redevelopment Committee”. “Redevelopment” is a term which has come—in the inland waterways context—to have a somewhat specialised meaning. It does not mean expansion; on the contrary, it means adaptation for uses other than commercial transport (and quite commonly, for uses other than navigation of any kind).

5. The full title of the “Redevelopment Committee” was “The Inland Waterways Redevelopment Advisory Committee”. This was a body appointed by the Minister of Transport—following the White Paper “Government Proposals following the Report of the Committee of Inquiry into Inland Waterways” (Cmnd. 676, H.M.S.O., February 1959). Under the Chairmanship of Admiral Sir Frederick Parham, it began work in April 1959 and reported directly to the Minister.

ASHBY CANAL

1. The Ashby Canal now extends $22\frac{3}{4}$ miles from Ilott Wharf (Measham) to Marston Junction, where it joins the Coventry Canal. There were originally a further seven miles at the northern end which were seriously affected by mining subsidence; the length from Moira to Donisthorpe ($2\frac{1}{4}$ miles) was closed to navigation under the L.M.S. (Canals) Act 1944 and disposed of to the National Coal Board, and the length from Donisthorpe to Ilott Wharf was closed under the B.T.C. Act 1957 and is now largely disposed of. A further short length at the top end will be affected by mining subsidence in the fairly near future.

2. Apart from a stop-lock at Marston Junction, the canal is lock free. Its water supplies derive from a number of feeders. Water sales are only modest. The canal passes through pleasant countryside but is not greatly used by pleasure craft and has carried no commercial traffic for a number of years until a recent move to revive coal traffic. It suffers from weed growth at the top end; but, subject to this, it is navigable.

3. Based on the 1964 figures, annual gross receipts are about £1,400, of which £1,100 is from water sales. Direct costs are about £6,215 (£273 per mile) per annum. The deficit is about £8,100 per annum.

4. If the canal were to be converted to a water channel, there would only be a slight reduction in the deficit to about £7,500 per annum, as neither receipts nor expenditure would be greatly affected. On this rural canal there is nothing to suggest that water sales could be increased in any great measure; and in any case its water resources are relatively small unless supplemented from the Coventry Canal where demand for the supplies available is more likely to increase.

5. Elimination would result in a deficit of about £7,900 per annum, with an increase to about £9,900 per annum during the interim period.

FINANCIAL SUMMARY

	1963 £	1964* £	Water Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	24	13	—	—	—
Water	1,250	1,100	1,100	—	—
Other	297	275	200	100	100
Total	1,571	1,388	1,300	100	100
Expenditure—Direct	5,568	6,215	5,800	—	2,900
Other	4,792	3,307	3,000	8,000	7,100
Total	10,360	9,522	8,800	8,000	10,000
Deficit	8,789	8,134	7,500	7,900	9,900
Direct costs per mile	245	273	(say) 260		

*Adjusted to exclude exceptional or non-recurring items.

Category: Y

ASHTON CANAL

1. The main line of the Ashton Canal extends $6\frac{3}{4}$ miles from Ashton Junction, where it connects with the Huddersfield Narrow Canal and the lower Peak Forest Canal, to Manchester (Ducie Street), where a short length of the Rochdale Canal connects it to the Bridgewater Canal. Both the Rochdale and the Bridgewater are independently owned. It has two main branches—the Hollinwood and Stockport Branches. The Hollinwood Branch was closed to navigation by the B.T.C. Acts of 1955 and 1961 and the Stockport Branch by the B.T.C. Act of 1962. Both branches are being redeveloped on the general lines recommended by the Redevelopment Committee in 1961 and 1962.

2. Water supplies derive mainly from the Huddersfield Narrow Canal. Supplementary feeds can also be taken from the River Tame and the lower Peak Forest Canal.

3. The canal has not been maintained for navigation, though the main line has not been formally closed. It has suffered severely from mining subsidence and there is a likelihood of this developing further in the future. To restore it to navigation would involve expenditures substantially larger than those now undertaken. In spite of views sometimes expressed, there seems no reliable prospect whatsoever of extra revenue being forthcoming to offset such expenditures.

4. The difficulties of maintenance are aggravated by rubbish dumping and vandalism in the industrial area through which it passes.

5. With its substantial water sales revenue and restricted level of maintenance the canal breaks even or (on occasion) makes a small surplus. Even if it were to be primarily retained as a water channel it would require rather higher maintenance than at present. All the same, it is clear that from the purely financial point of view, the water channel solution would be financially more attractive than complete elimination (the cost of which is particularly difficult to estimate given the nature of the land through which the canal passes). A detailed study of the many features involved is at present being undertaken to determine what the most economic future treatment should be. It is reasonable to assume that the financial future will not be better than the financial present.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft		88			
Water	11,678	9,141	9,000	—	—
Other	902	1,174	1,000	1,000	1,000
Total	12,580	10,403	10,000	1,000	1,000
Expenditure—Direct	6,664	5,801	8,200		4,100
Other	5,156	5,000	3,600	3,500	5,500
Total	11,820	10,801	11,800	3,500	9,600
Surplus or <i>Deficit</i>	760	398	1,800	2,500	8,600
Direct costs per mile	987	860	(say) 1,210		

Category: Z

BIRMINGHAM & FAZELEY CANAL

1. The Birmingham & Fazeley Canal extends 22 miles from Farmer's Bridge (junction with B.C.N. main line) to Huddlesford Junction (where a short detached length of the Coventry Canal proceeds onward to join the Trent & Mersey Canal at Fradley Junction). At Salford Junction it connects with the Tame Valley Canal and Grand Union Canal, and at Fazeley Junction with the Coventry Canal. The length from Farmer's Bridge to Salford Junction is included with the B.C.N. for administrative convenience. From Salford Junction there are 14 locks in two flights. Water feeds into the canal from the B.C.N. and Grand Union at Salford Junction and is supplemented from the Coventry Canal at Fazeley Junction. There are a number of industrial abstractions near the Birmingham end. There is a modest local commercial traffic, and a fair amount of use by pleasure craft. The canal passes through fairly pleasant countryside after leaving the outskirts of Birmingham and is useful as a connecting route to the Coventry or Trent & Mersey.

2. Ignoring exceptional items, gross receipts in 1964 were only £2,816, of which £1,000 was from water sales. Operating, dredging and maintenance direct costs totalled £12,919 (£679 per mile). The deficit was about £13,195.

3. If the canal were to be converted to a water channel, direct costs would fall to about £7,900 (£420 per mile) per annum, and the deficit to about £9,100 per annum.

4. Elimination would result in a deficit of about £6,100 per annum, with an increase to about £9,700 per annum during the interim period. It must be added that as regards the first few miles in Birmingham, elimination would involve a special physical and financial study.

FINANCIAL SUMMARY

	1963 £	1964* £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	502	548	—	—	—
Water	1,009	1,000	1,000	—	—
Other	1,559	1,268	1,200	1,000	1,000
Total	3,070	2,816	2,200	1,000	1,000
Expenditure—Direct	14,924	12,919	7,900	—	4,000
Other	4,806	3,092	3,400	7,100	6,700
Total	19,730	16,011	11,300	7,100	10,700
<i>Deficit</i>	<i>16,660</i>	<i>13,195</i>	<i>9,100</i>	<i>6,100</i>	<i>9,700</i>
Direct costs per mile	780	679	(say) 420		

* Adjusted to exclude exceptional or non-recurring items.

Category: X

BIRMINGHAM CANAL NAVIGATIONS

1. The Birmingham Canal Navigations comprise an important network of canals at the geographical centre of the Board's system. Their total present mileage is about 112.

2. In 1964, gross receipts of £138,769 included £105,246 water sales, £13,780 commercial tolls, £13,290 rents and wayleaves and £934 pleasure craft. Direct costs were £91,358 (£816 per mile). The surplus was £15,862.

3. The present level of commercial traffic, at about 300,000 tons per annum, compares extremely unfavourably with the figure of over a million tons in the early 1950's, and all the evidence points to a continuance of this sharp decline. A number of coal movements to power stations and gas works have ceased over the years for reasons outside the control of the waterways. With the decline in narrow boat carrying, very little traffic now comes on to the network from outside the Midlands. To an increasing extent, the traffic still remaining comprises short-distance or inter-factory movements, from which the revenue is very small. There is no indication of new boat construction among the carriers in the area. In spite therefore of recent attempts to revive traffic (the recent formation of a new carrying company is an isolated example), the decline in tonnage and receipts must be expected to continue.

4. The water sales position is altogether healthier. The demand for industrial water can be expected to increase in accordance with general trends, and supplies are available to provide for this. In short, the prospect is of steady (if unspectacular) improvement in water sales revenue which already exceeds £100,000 a year.

5. From the pleasure craft standpoint, revenue from mooring is very small indeed—obviously most owners prefer to moor their craft just outside the industrial area in which most of the B.C.N. network lies. The network provides a number of essential links between the popular pleasure craft areas; these links are nearly all provided by the Birmingham level (or corresponding Wolverhampton level) main line from Worcester Bar to Aldersley Junction, with essential connections.

6. Physically, the network is in generally fair condition throughout except for a few disused arms, etc. Over the years a considerable number of arms and short branches have been closed to navigation—often following direct approaches from interested parties urgently needing the sites for redevelopment—and in total these already represent a considerable pruning and “tidying” of the network. Such requests continue to be received.

7. In their Interim Report (para. 173) the Board expressed the view that “the realistic pattern of future development is likely to add significantly to those lengths which are already “closed to navigation” and to develop the system primarily for water supply purposes”. There is no doubt that the financial figures—and the underlying trends outlined above—strongly endorse this view. If, for example, the network were to be converted to a water channel, the declining traffic revenues would be lost but there would be substantial savings in maintenance and the surplus would rise to about £24,000 per annum.

8. Moreover, a study of the present patterns of water supply, water sales, and traffic and pleasure craft movements clearly indicates that there is a not inconsiderable part of the network from which little or no benefit is derived. The Tame Valley Canal and the Rushall Canal fall for consideration in this context.

9. To summarise, while the future of individual lengths of the B.C.N. will obviously be a matter for a series of detailed studies, it is clear that the facts and figures fully endorse the views expressed by the Board in their Interim Report. Wholesale elimination would obviously be most unattractive financially, but (as with other urban or largely urban canals) there will be certain spurs and other lengths where culverting or perhaps total elimination would be appropriate. This is unlikely however to affect in any drastic way the financial picture outlined above.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	15,931	16,150	—		
Water	86,879	105,246	102,000		
Other	29,348	17,373	13,000		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	132,158	138,769	115,000		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Expenditure—Direct	106,514	91,358	62,500		
Other	48,750	31,549	28,500		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	155,264	122,907	91,000		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Surplus or <i>Deficit</i>	<u>23,106</u>	<u>15,862</u>	<u>24,000</u>	<hr/>	<hr/>
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Direct costs per mile	<u>951</u>	<u>816</u>	<u>(say) 560</u>		

Category: X

BRIDGWATER & TAUNTON CANAL

1. The Bridgwater & Taunton Canal extends 14½ miles from its junction with the River Tone at Taunton, to Bridgwater Docks. There is also in Taunton a short length of the River Tone Navigation which, together with other residual responsibilities on this latter virtually extinct navigation, has long been associated with the Bridgwater & Taunton Canal. The canal, which has carried no traffic since about 1907 and has long been unnavigable, has six wide locks, while a number of swing bridges were replaced by low level fixed bridges in 1940. However, it has never been formally closed to navigation. Until 1st January 1964, the canal was managed by British Railways on behalf of the Board.

2. Water supplies are taken from the River Tone and a number of drainage discharges, and pass out through Bridgwater Docks which depend on the canal for their supply. There are water sales to British Railways and a few agricultural supplies.

3. The canal has some use for fishing and amenities, but has been maintained virtually as a water channel, and is also useful from the drainage aspect. In recent years, the former Somerset River Board considered the adaptation of the canal as a flood relief channel to the River Tone, but this proposal has now been superseded by a scheme of proposed improvement to the river not affecting the canal.

4. Gross receipts, nearly all from water sales, are about £6,500 per annum. Direct costs are about £6,670 (£451 per mile) per annum. The deficit is about £4,490 per annum.

5. If the canal were to be converted to a water channel, there would be very little change from these figures, except that maintenance costs should be slightly reduced. The deficit would fall to about £3,100 per annum so long as current water sales were maintained.

6. If the canal were to be eliminated, the deficit would be about £5,300 per annum, with an interim figure of about £10,400 per annum. But there would first be a number of drainage and water supply problems to be resolved.

FINANCIAL SUMMARY

	1963 £	1964* £	Water Channel £ p.a.	Elimination Final £ p.a.	Interim £ p.a.
Receipts—Craft	Managed by	30	—	—	—
Water	British	6,350	6,300	—	—
Other	Railways	110	100	100	100
Total		6,490	6,400	100	100
Expenditure—Direct		6,670	5,900	—	3,000
Other		4,310	3,600	5,400	7,500
Total		10,980	9,500	5,400	10,500
Deficit		4,490	3,100	5,300	10,400
Direct costs per mile		451	(say) 400		

* Based also on 1965 Budget.

CALDER & HEBBLE NAVIGATION

1. The Calder & Hebble Navigation extends about 21½ miles up the valley of the River Calder from Wakefield to Sowerby Bridge. At Wakefield it joins the Aire & Calder Navigation, while at Sowerby Bridge it formerly joined the independently owned Rochdale Canal (closed to navigation in 1952). It is convenient to include also the Huddersfield Broad Canal (3½ miles) which joins the Navigation at Cooper Bridge. The Navigation mainly comprises a number of river lengths alternating with artificial cuts. The locks are wide, but for the most part their length restricts navigation to craft of about 80 tons capacity. In addition to the natural waters of the River Hebble and the River Calder, supplies are taken from the Rochdale and the Huddersfield Canals and a number of feeders and discharges. There are a number of water sales throughout its length, but mainly falling within the upper length between Greenwood Lock and Sowerby Bridge.

2. The lower length from Wakefield to Greenwood Lock (9½ miles) is considerably used for commercial traffic; much of this passes to or from the Aire & Calder Navigation, and there is also a large internal tonnage from loading staiths to Thornhill Power Station. Except in the Wakefield area there is little pleasure craft activity. The upper length from Greenwood Lock to Sowerby Bridge carries very little commercial traffic, and is also very little used by pleasure craft. As mentioned above, however, it has a number of water sales. It is therefore appropriate to take Greenwood Lock as the point below which the Navigation should be regarded as a transport waterway. An approximate division of receipts and expenditure above and below this point has been made in respect of 1964.

3. The lower length incurs a deficit of about £13,500 per annum. Considered in isolation this is a disappointing picture, but it is reasonable to consider the length as an extension of the busy Aire & Calder Navigation.

4. On the upper length, there is a deficit of about £8,900 per annum. If this length were to be converted to a water channel, direct costs would be reduced by about £4,000 per annum and the deficit would fall to about £4,300 per annum. Elimination would be impracticable on the river sections; a certain amount could be done on the artificial cuts, but would almost certainly prove unattractive financially as the fairly considerable water revenues would be lost.

FINANCIAL SUMMARY
Sowerby Bridge to Greenwood Lock

	1963 £	1964* £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	Not	300	—	Not	
Water	available	6,500	6,500	applicable	
Other	see para. 2	1,100	1,100		
Total		7,900	7,600		
Expenditure—Direct		10,300	6,100		
Other		6,500	5,800		
Total		16,800	11,900		
<i>Deficit</i>		8,900	4,300		
Direct costs per mile		664	(say) 390		

* Approximation based on 1965 Budget—see para. 2.

Category: Y

CALEDONIAN CANAL

1. The Caledonian Canal, 60½ miles in length, consists of 21 miles of artificial channels linking the Beaully Firth to Loch Ness and onwards through Loch Oich and Loch Lochy to the sea at Fort William. It is a wide waterway taking craft up to 150-ft. length at 13' 6" draft and having 29 locks with flights at Banavie near Corpach (8 locks), Fort Augustus (5 locks), and Muirtown near Inverness (4 locks). At the Fort William end the canal terminates in a basin at Corpach, the entrance to which has recently been lengthened to take craft up to 203-ft. long in connection with the traffic being handled for the Scottish Pulp Mill development nearby. The Board have approved in principle the completion over the next few years of the lock mechanisation programme started some years ago on this major waterway.

2. Gross receipts, totalling about £20,000 in a normal year, fall far short of working expenses, and the deficit is of the order of £50,000 per annum. (The exceptional nature of the 1964 figures was explained in the Board's Annual Report). The Board believe the position will be somewhat—though not radically—improved by a revised charging system introduced in November, 1965.

3. As is to be expected, water revenue on this canal is very small and conversion to a water channel would on this basis be unrealistic. If, however, it was intended to close the canal to navigation, conversion of the locks to weirs would provide the least resulting deficit and would show a substantial saving on the current level of deficit.

4. Total elimination of the artificial lengths of canal would be extremely costly because of the large width and depth of the canal and the size of structures generally.

5. On purely financial considerations, therefore, the choice would lie between continuing to operate the canal as economically as possible as a navigable waterway between the east and west coast or, as an alternative, reducing it to a water channel to minimise the deficit incurred.

FINANCIAL SUMMARY

	1963	1964*	Water Channel £ p.a.	Elimination	
	£	£	See para. 3	Final £ p.a.	Interim £ p.a.
				See para. 4	
Receipts—Craft	9,252	5,738			
Water	393	428			
Other	5,963	5,609			
Total	15,608	11,775			
Expenditure—Direct	52,894	123,111			
Other	12,775	13,279			
Total	65,669	136,390			
Deficit	50,061	124,615			
Direct costs per mile	2,460	5,726			

* The 1964 figures are altogether exceptional—see para. 2.

Category: Special Commercial.

CHESTERFIELD CANAL

1. The Chesterfield Canal extends $45\frac{1}{4}$ miles from Chesterfield to West Stockwith, where it enters the River Trent through Stockwith Basin. The collapse of Norwood Tunnel in 1907 separated the top 14 miles from the remainder of the canal, which fell into commercial disuse many years ago.

2. As regards the length west of (and including) Norwood Tunnel, the Redevelopment Committee recommended in 1960 that the Section A from Chesterfield to Spink Hill Bridge (8 miles) should be retained as a water channel, and that the Section B from Spink Hill Bridge to (and including) Norwood Tunnel (6 miles)—much of it dry and affected by mining subsidence—should be eliminated.

3. As regards the length east of Norwood Tunnel, the Committee recommended that the Section C from the Tunnel to Worksop (6 miles) should be retained as a water channel, and that the Section D from Worksop to Stockwith ($25\frac{1}{4}$ miles) should be redeveloped as a navigation for pleasure craft.

4. Relief from statutory obligations was obtained by the B.T.C. Act 1962, when a Ministerial assurance was given in the House that the length from Worksop to Stockwith would be maintained in its present condition until a decision had been reached on the Committee's restoration proposals. Progress continues on the elimination of Section B and on the conversion of Sections A and C as water channels, and a certain amount of restoration work is being undertaken on Section D in co-operation with the Retford and Worksop (Chesterfield Canal) Boat Club.

5. Receipts and expenditure have been studied for the Chesterfield Canal portions east and west of Norwood Tunnel (west end), these being the only figures available for past years; nevertheless they are sufficiently indicative for present purposes, for very little has been spent on the Norwood-Worksop length. Obviously, the portion west of Norwood Tunnel does not fall for consideration in the present context, having been dealt with as explained above. The deficit on this portion in 1964 was £1,598, and it should be assumed for present purposes that a deficit of this order will continue.

6. On the portion east of Norwood Tunnel, gross receipts in 1964 were £4,108. Direct costs were £13,136 (£395 per mile for the $31\frac{1}{4}$ miles) though of course these were mainly incurred on the $25\frac{1}{4}$ miles from Worksop to Stockwith. The deficit was £13,782.

7. From Norwood to Worksop, the canal is already being converted to water channel, and if the remainder from Worksop to Stockwith were to be converted as such, direct costs for the section would fall to about £8,900 (£280 per mile) per annum, and the deficit to about £10,300 per annum.

8. If the length from Worksop to Stockwith were to be eliminated, then assuming that the Norwood/Worksop length broadly broke even as a water channel, the resulting deficit would be about £8,500 per annum, increasing to about £11,000 per annum during the interim period.

FINANCIAL SUMMARY

Norwood Tunnel to West Stockwith

	1963 £	1964 £	Water	Elimination*	
			Channel £ p.a.	Final £ p.a.	Interim £ p.a.
Receipts—Craft	840	1,384	—	—	—
Water	1,479	1,932	1,900	—	—
Other	779	792	700	—	—
Total	3,098	4,108	2,600	—	—
Expenditure—Direct	13,073	13,136	8,900	—	4,000
Other	4,785	4,754	4,000	8,500	7,000
Total	17,858	17,890	12,900	8,500	11,000
Deficit	14,760	13,782	10,300	8,500	11,000
Direct costs per mile	393	395	(say) 280		

Category: Y

* Assuming Worksop to Stockwith eliminated with Norwood/Worksop "breaking even" as water channel.

COVENTRY CANAL

1. The Coventry Canal extends 27 miles from Coventry Basin to Fazeley Junction, where it joins the Birmingham & Fazeley Canal. It also connects with the Ashby Canal at Marston Junction and the Oxford Canal (North) at Hawkesbury Junction. (There is also a detached length of 5½ miles from Whittington Brook to Fradley Junction, which is included administratively with the Birmingham & Fazeley Canal (1½ miles) and Trent & Mersey Canal (4 miles) respectively.) The canal has 13 narrow locks, including the Atherstone flight of 11 locks. The length from Coventry to Atherstone, together with the Ashby Canal and the Oxford Canal to Hillmorton, comprises over 50 miles on the one level, subject only to stop-locks at Marston and Hawkesbury Junctions. Water supplies derive from Oldbury Reservoir, from a discharge of sewage effluent at Nuneaton, from the Oxford Canal at Hawkesbury Junction, and from a number of feeder intakes in the Nuneaton area where there are also substantial water sales. Until recently it had a fair traffic in coal, but with the general decline in narrow boat activity this is now small. The canal passes through a number of urban areas and has a fair use by pleasure craft, both for mooring and cruising and as a useful connecting route. The canal was constructed originally to shallow draft and dredging costs per mile tend to be high. There is also some mining subsidence on the Coventry Arm.

2. Taking the 1964 figures adjusted to exclude non-recurring items, gross receipts were £16,737 of which £12,356 was from water sales, £1,883 from pleasure craft and £88 from commercial traffic. Operating, dredging and maintenance direct costs were £23,852 (£883 per mile). The deficit was £12,117.

3. If the canal were to be converted to a water channel, direct costs would reduce to about £14,500 (£540 per mile) per annum, and the deficit to about £4,700 per annum.

4. If the canal were to be eliminated, the substantial water sales revenue would be foregone, and the deficit would be about £7,300 per annum with an increase to about £15,100 per annum in the interim period.

FINANCIAL SUMMARY

	1963 £	1964* £	<i>Water</i>	<i>Elimination</i>	
			<i>Channel</i> £ p.a.	<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	1,579	1,971	—	—	—
Water	8,419	12,356	13,000	—	—
Other	2,741	2,410	2,200	2,000	2,000
Total	12,739	16,737	15,200	2,000	2,000
Expenditure—Direct	28,495	23,852	14,500	—	7,200
Other	7,185	5,002	5,400	9,300	9,900
Total	35,680	28,854	19,900	9,300	17,100
<i>Deficit</i>	<i>22,941</i>	<i>12,117</i>	<i>4,700</i>	<i>7,300</i>	<i>15,100</i>
Direct costs per mile	1,055	883	(say) 540		

* Adjusted to exclude exceptional or non-recurring items.

CRINAN CANAL

1. The Crinan Canal, 9 miles in length, consists of an artificial canal linking the sea at Ardrishaig (on the east side of the Mull of Kintyre) to Crinan on the west side. It enables craft to save about 80 miles and avoid the circuitous and exposed route round the Mull. It has 15 locks with a central summit pound fed by a group of eight reservoirs.

2. Water revenue is very small indeed, and most of the total revenue of about £11,000 per annum arises from coasting and fishing vessels, pleasure craft and yachts. The deficit amounts to about £27,000 per annum.

3. Conversion of the canal to a water channel would be unrealistic, having regard to the negligible water sales, but it would enable the current deficit to be substantially reduced.

4. Elimination, because of the size of the canal, its depth and difficult access, would be extremely costly and on purely financial considerations the choice would lie between continuing to operate the canal as a navigable channel and reducing it to a water channel to minimise the deficit incurred.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a. See para. 3	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	9,951	11,019			
Water	24	21			
Other	947	943			
Total	10,922	11,983			
Expenditure—Direct	32,077	29,515			
Other	6,129	8,838			
Total	38,206	38,353			
<i>Deficit</i>	<i>27,284</i>	<i>26,370</i>			
Direct costs per mile	3,564	3,279			

Category: Special Commercial.

Appendix 5

CROMFORD CANAL

1. The Cromford Canal extends 14½ miles from Cromford to Langley Mill, where it joins the Nottingham and the Erewash Canals. There is also the 2½-mile Pinxton Branch. It was closed to navigation under the L.M.S. (Canals) Act 1944, with the exception of the bottom half mile at Langley Mill which was closed under the B.T.C. Act 1962 as a result of consideration by the Redevelopment Committee.

2. The Committee's recommendations in 1961 were as follows:—

- (i) The first six miles (from Cromford to the Bullbridge Aqueduct at Ambergate) are lock free and attractive for boating. Fed from the river at Cromford and providing limited industrial and agricultural water sales, this length should be retained for boating and water supply.
- (ii) The next 2½ miles (from the aqueduct to the collapsed Butterley Tunnel) is dry, scenically unattractive, suffers from mining subsidence, and should be eliminated.
- (iii) The next 3½ miles (from the tunnel to Codnor Park) draws water from the Codnor Park and Butterley Park Reservoirs and is important for water supply, including a statutory free abstraction. This should be maintained as a water channel.
- (iv) The final 2½ miles (from Codnor Park to Langley Mill) includes seven derelict locks, is unattractive, and should be eliminated.
- (v) So should the 2½-mile Pinxton Branch, which the Committee found in an advanced state of decay.

3. The cost of eliminating (ii), (iv) and (v) would be about £45,000 for the 7½-miles concerned.

4. In 1964, gross receipts of £1,470 were nearly all from water sales and would, of course, have been higher had not the biggest abstraction been free under statute. Direct costs were £4,701 (£277 per mile). The deficit was £5,720.

5. If the canal were treated as recommended by the Redevelopment Committee, with 9½ miles in water and the remainder eliminated, the deficit would be about £7,200 per annum. Assuming the whole canal were to be eliminated, the deficit would be about £6,000 per annum with an interim figure of about £7,300 per annum. From the purely financial standpoint, therefore, there would be relatively little variation from the present position in either case.

6. The case for treatment along the lines recommended by the Redevelopment Committee seems to us to be beyond dispute both on practical and social grounds, and if favourable opportunities of elimination and disposal can be found, an increase in annual costs may be avoided.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water*</i> <i>Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	—	—	—	—	—
Water	1,090	1,330	1,000	—	—
Other	132	140	100	100	100
Total	1,222	1,470	1,100	100	100
Expenditure—Direct	4,706	4,701	3,300	—	1,600
Other	2,746	2,489	5,000	6,100	5,800
Total	7,452	7,190	8,300	6,100	7,400
<i>Deficit</i>	<u>6,230</u>	<u>5,720</u>	<u>7,200</u>	<u>6,000</u>	<u>7,300</u>
Direct costs per mile	<u>277</u>	<u>277</u>	(say) 350		

* Assuming 9½ miles water channel, 7½ miles eliminated—see para. 5.

Category: Z

EREWASH CANAL

1. The Erewash Canal extends 12 miles from Langley Mill (junction with the Cromford Canal and Nottingham Canal, both unnavigable) to Trent Lock where it joins the River Trent. From the 1930's until 1947 it formed the northernmost portion of the Grand Union Canal Company's undertaking. It is a broad canal with 14 wide locks. The upper length from Langley Mill to Ilkeston was closed to navigation under the B.T.C. Act 1962 but remains navigable at present. Below Ilkeston the canal is in fair condition. It passes mainly through semi-industrial and relatively unattractive country but the last few miles to the Trent are quite pleasant. There is a limited use for pleasure cruising, mooring and houseboats, but no commercial traffic. Water supplies are taken from the River Erewash at Langley Mill, where they can also be supplemented from the Moor Green Reservoir on the Nottingham Canal. There are substantial sales to industry, mainly near Ilkeston. The upper ("closed") length therefore serves as a water channel to the lower length.

2. In 1964, gross receipts of £7,241 included £6,276 from water sales. Direct costs of £6,616 (£551 per mile) included £1,104 dredging. The deficit was £2,250.

3. If the canal were to be converted to a water channel, direct costs would be reduced to about £4,700 (£390 per mile) per annum, and the deficit would be about £600 per annum.

4. If the canal were to be eliminated, the substantial water sales would be foregone, and the deficit would rise to about £6,000 per annum, with an increase to about £7,500 per annum in the interim period.

5. On purely financial considerations, therefore, the choice would clearly lie between continuance as a navigation up to Ilkeston or conversion to a water channel throughout. The latter alternative would nearly eliminate the present relatively small deficit.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	627	598	—	—	—
Water	6,352	6,276	6,300	—	—
Other	409	367	400	300	300
Total	7,388	7,241	6,700	300	300
Expenditure—Direct	6,452	6,616	4,700	—	2,300
Other	3,035	2,875	2,600	6,300	5,500
Total	9,487	9,491	7,300	6,300	7,800
<i>Deficit</i>	<i>2,099</i>	<i>2,250</i>	<i>600</i>	<i>6,000</i>	<i>7,500</i>
Direct costs per mile	538	551	(say) 390		

Category: Y

Appendix 5

FORTH & CLYDE AND MONKLAND CANALS

1. The Forth & Clyde and Monkland Canals operate as a group, the Monkland Canal feeding its considerable water resources arising from the Hillend group of reservoirs into the Glasgow Arm of the Forth & Clyde. The feed then enters the summit pound of the main line between Grangemouth on the Firth of Forth and Bowling on the River Clyde. The supplies are further supplemented on this length by the Townhead group of reservoirs. The Monkland Canal (13 miles in length) was abandoned under Warrant and Order in 1950, and the Forth & Clyde including the Glasgow Arm (a total of 38 miles) was closed to navigation under the Forth & Clyde (Extinguishment of Rights of Navigation) Act 1962.

2. The canals are extensively used as a group for industrial water supplies and arising from their water sales currently make a small surplus. They are operated as water channels and work has already been carried out to enable water levels to be reduced and maintenance minimised. The mooring facilities provided by the Board at Bowling Basin are extensively used, producing revenues currently exceeding £2,000 per annum. Redevelopment is currently taking place over part of the system within Glasgow and Coatbridge by the local authorities, who are piping and infilling considerable lengths, and the first phase of this work is nearing completion. Glasgow Corporation have proposals for the further piping and infilling of virtually the whole of the system within the city in connection with major road and motorway projects. These proposals give rise to considerations of major technical complexity.

3. The position is thus that the process of redevelopment is likely to continue while at the same time safeguarding and extending the use of the considerable water resources and the revenues arising therefrom. In these circumstances the question of elimination by a general infilling of the system does not arise.

FINANCIAL SUMMARY

	Forth & Clyde Canal		Monkland Canal	
	1963	1964	1963	1964
	£	£	£	£
Receipts—Craft	2,033	2,071	—	—
Water	20,573	17,977	9,314	9,014
Other	6,542	3,596	74	118
	<hr/>	<hr/>	<hr/>	<hr/>
Total	29,148	23,644	9,388	9,132
	<hr/>	<hr/>	<hr/>	<hr/>
Expenditure—Direct	23,836	17,023	4,892	7,786
Other	9,513	4,896	434	451
	<hr/>	<hr/>	<hr/>	<hr/>
Total	33,349	21,919	5,326	8,237
	<hr/>	<hr/>	<hr/>	<hr/>
Surplus or <i>Deficit</i>	4,201	1,725	4,062	895
	<hr/>	<hr/>	<hr/>	<hr/>
Direct costs per mile	615	439	369	588
	<hr/>	<hr/>	<hr/>	<hr/>
		Category: Z		Category: Z

FOSSDYKE NAVIGATION

1. The Fossdyke Navigation extends for 11¼ miles from the River Trent at Torksey Lock to Lincoln, where it flows into the Witham Navigation. A broad waterway, it carries commercial traffic to Saxilby and Lincoln, and is popular with pleasure cruisers as a route to Lincoln. There are no reservoirs, water supplies being obtained from the upper River Witham, the River Till and other natural drainage channels. It forms an integral part of the land drainage arrangements of a wide area. Bank protection and dredging are special problems due to the sandy nature of the soil, and extensive piling works are carried out under an agreement with the Lincolnshire River Authority and other interested authorities. The Board normally contribute 60% to the cost of the works carried out under the scheme, which is administered by the Lincolnshire River Authority. These works have resulted in a substantial improvement to the condition of the banks in the last few years, but much remains to be done.

2. Financially, it is a heavy loser. Excluding rechargeable piling work, receipts in 1964 were only £4,928, including commercial tolls of £1,663 and water sales of £2,155. Operating, dredging and maintenance direct costs totalled £30,808 (£2,738 per mile). Rents payable include an annual payment of £9,570 to the Company of Proprietors of the Witham Navigation under the terms of a 999-year lease of 1850 from the Proprietors to the Great Northern Railway Company. There is no chance of this payment being met from the income of the waterway. The deficit was £28,373.

3. If the navigation were to be converted to a water channel, direct costs would fall to about £11,100 (£990 per mile) per annum, and the deficit to about £19,000 per annum.

4. As already mentioned, the Fossdyke functions as an integral part of the drainage and flood prevention regime of the area, and for this reason the question of physical elimination is unrealistic.

FINANCIAL SUMMARY

	1963 £	1964 £	Water Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	2,654	2,235	—	Not applicable see para. 4	
Water	2,842	2,155	2,000		
*Other	34,862	31,574	15,300		
Total	40,358	35,964	17,300		
Expenditure—Direct	28,063	30,808	11,100		
*Other	37,042	33,529	25,200		
Total	65,105	64,337	36,300		
<i>Deficit</i>	24,747	28,373	19,000		
Direct costs per mile	2,494	2,738	(say) 990		

* Includes rechargeable piling work—see para. 1.

Category: X

**GRAND UNION CANAL
MAIN LINE—BELOW SLOUGH JUNCTION**

1. The Grand Union Canal below the junction with the Slough Arm at Cowley Peachey includes the lengths from Slough Junction to Brentford, the Paddington Arm and Regent's Canal from Bulls Bridge Junction to Regent's Canal Dock, and the Hertford Union Canal (connecting to the Lee Navigation). The total mileage is $33\frac{1}{4}$. Of this, $22\frac{3}{8}$ miles from Hampstead Road Lock to Cowley and Norwood are all on the one level. Traffic is substantial, but mainly for short distances only and on the lengths above Brentford and Regent's Canal Dock respectively. Toll revenues fall far short of maintenance and operating costs.

2. Because of the physical makeup of the system it would not be a fruitful exercise to re-define the length so as to exclude the less used part. That part is in the middle of the long pound, and the length must be regarded as a whole for reasons now explained.

3. The principal water supplies to this part of the system are provided by the River Colne near Uxbridge and by the Brent Reservoir at Hendon, from which a feeder connects to the Paddington Arm near Willesden. A further supply is derived at the foot of the Hanwell flight, where the River Brent enters and the canal then becomes canalised river down to the junction with the Thames. Numerous surface water discharges enter the system throughout the length—and some of them are big. The system acts as a means of conveying surface waters arising from the concentrated urban development from the points of discharge into the canal to points where it is discharged to the river system over weirs. It thus provides valuable balancing capacity in times of flood or near flood. There are numerous and substantial water sales throughout the length, particularly on the Paddington Arm and the Regent's Canal.

4. It is, of course, a broad canal on which considerable expenditure was incurred under the British Transport Commission's Development Plan, including extensive lengths of bank protection piling. The developments also included the lengthening and duplication of the two locks leading from the Thames at Brentford Creek to enable standard Lee-type craft to reach the Board's Brentford Depot. The navigation is in good condition, but is inevitably costly to maintain, especially in the heavily built-up London area through which it passes. There are 27 wide locks, including the Hanwell flight of 8 locks leading from the Paddington level down to the entry point of the River Brent at Brentford, and 12 duplicate locks on the Regent's Canal falling to Regent's Canal Dock. Many of these have to be attended for both water regulation and traffic purposes.

5. In 1964, gross receipts of £99,019 included £40,430 from commercial traffic and £31,210 from water sales. Operating, dredging and maintenance direct costs were £124,906 (£3,757 per mile). The deficit was £63,694.

6. If the canal were to be converted to a water channel, there is no doubt that the loss of traffic and pleasure craft revenues would be more than offset by savings in operating, dredging and maintenance costs. Direct costs would fall to about £49,200 (£1,480 per mile) per annum. The deficit would be reduced to about £35,000 per annum.

7. As regards elimination, it would obviously be unrealistic to apply any ordinary calculations of cost in this heavily built-up area. The water supply would certainly have to be maintained by measures of piping and culverting, which would have to be considered as and when appropriate site projects arose. Indeed, it is a fundamental characteristic of the canal below Slough Junction that those lengths least in use for commercial traffic are the most important for water supply and sales. Moreover, as already stressed, the canal forms an integral part of the drainage system in this area of Greater London.

8. In brief, the position therefore is that although maintenance as a transport waterway does not generate revenue which fully offsets expenditure, it is difficult to see an effective alternative. Conversion to a water channel would substantially reduce the deficit but such a course would inevitably add in some degree to London's traffic problems. Partial elimination seems no answer because the lengths least in use by commercial traffic are most important for water channelling and sale. Total elimination would also raise serious problems in view of the part played by the canal in the drainage of the adjoining areas.

FINANCIAL SUMMARY
Grand Union Canal—below Slough Junction

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p. a.
Receipts—Craft	44,517	44,798	—		
Water	34,700	31,210	31,000	Not applicable	
Other	22,069	23,011	8,700	see para. 7	
Total	<u>101,286</u>	<u>99,019</u>	<u>39,700</u>		
Expenditure—Direct	127,792	124,906	49,200		
Other	54,753	37,807	25,500		
Total	<u>182,545</u>	<u>162,713</u>	<u>74,700</u>		
<i>Deficit</i>	<u>81,259</u>	<u>63,694</u>	<u>35,000</u>		
Direct costs per mile	<u>3,843</u>	<u>3,757</u>	(say) 1,480		

Category: Special Commercial

GRAND UNION CANAL
MAIN LINE—SLOUGH JUNCTION TO BIRMINGHAM

1. The Grand Union Canal main line to Birmingham is financially perhaps the Board's most intractable single problem. For both historical and geographical reasons it has always been considered as a major trunk route in the canal system, linking London and the Thames to the Birmingham canal network. Physically it is in good condition. Its commercial traffic, however, has steadily declined over the years and is now negligible, and there is a very heavy financial deficit.

2. For the purposes of the present study the main line is best considered in three lengths:—
Length 1 is from the junction of the Slough Arm at Cowley Peachey (including the Slough Arm) up to the northern end of the Tring summit (Lock 45), from whence the summit reservoirs feed both northwards and southwards.

Length 2 is from the northern end of the Tring summit (Lock 45) to the southern end of the Braunston summit (Lock 7, Buckby), including the Northampton Arm.

Length 3 is from the southern end of the Braunston summit (Lock 7, Buckby) to Digbeth and Salford Bridge, Birmingham, where the B.C.N. system is joined.

3. The financial results for 1964, together with the "water channel" figures, in respect of each of these three lengths may be summarised as below:—

Length	Mileage miles	1964	1964	1964	1964	Water Channel
		Receipts £	Expenses £	Deficit £	Direct costs £ per mile	Deficit £
1	34	19,152	72,819	53,667	1,767	30,000
2	58	11,368	60,173	48,805	821	25,600
3	48½	16,498	77,329	60,831	1,333	31,300
Total	140½	47,018	210,321	163,303	1,227	86,900

The current figures are indeed disturbing, with receipts from all sources making all too little impact on the formidable costs incurred.

4. It is also clear that if the canal were to be converted to a water channel, the deficit would be considerably reduced. Due, however, to the largely rural route of the canal, water sales are nowhere substantial while on the middle length they are only about £3,700 per annum for the 58 miles.

5. As regards elimination, this would be hardly realistic on Length 1 (south of the Tring summit), having regard both to the appreciable water sales on this length and also to the essential feed which it provides to the transport length of the Grand Union in the London Area. Certain portions, moreover, consist of canalised rivers. Similarly on Length 3, the Braunston summit reservoirs feed not only the Grand Union as far as Leamington where appreciable water sales take place, but also feed the North Oxford Canal. No such considerations apply to Length 2 at present, though the situation might be altered by the New Town development at Bletchley. But, of course, the Grand Union is a "big" canal even though the question whether it is technically "wide" is attended by difficulties. So the cost of elimination would be high. In fact, if this intermediate length were to be eliminated, the deficit thereon would be about £27,500 which—although £21,000 less than the existing deficit—is £1,900 more than the "water channel" deficit for this length.

6. The overall picture, therefore, is:—

- (a) The deficit incurred in maintaining the Grand Union main line (above Slough Junction) to navigational standards is well over £150,000 a year.
- (b) This existing deficit would be reduced to about £87,000 a year if the canal were to be converted to a water channel.
- (c) Elimination would scarcely be realistic except on the middle length, where however it would cost more than conversion to a water channel.

FINANCIAL SUMMARY
Slough Junction to Tring Summit, including Slough Arm

	1963 £	1964* £	<i>Water</i>	<i>Elimination</i>	
			<i>Channel</i> £ p.a.	<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	7,923	6,860	—	—	—
Water	6,814	4,762	5,000	—	—
Other	10,244	7,530	5,900	4,600	4,600
Total	<u>24,981</u>	<u>19,152</u>	<u>10,900</u>	<u>4,600</u>	<u>4,600</u>
Expenditure—Direct	63,948	60,091	29,900	—	15,000
Other	40,709	12,728	11,000	18,300	20,600
Total	<u>104,657</u>	<u>72,819</u>	<u>40,900</u>	<u>18,300</u>	<u>35,600</u>
<i>Deficit</i>	<u>79,676</u>	<u>53,667</u>	<u>30,000</u>	<u>13,700</u>	<u>31,000</u>
Direct costs per mile	<u>1,881</u>	<u>1,767</u>	(say) 880		

Category: X

* Adjusted to exclude exceptional or non-recurring items.

Tring Summit to Lock 7, Buckby					
	1963	1964	Water Channel	Final	Interim
Receipts—Craft	4,948	3,274	—	—	—
Water	3,717	3,502	3,700	—	—
Other	4,013	4,592	3,400	2,400	2,400
Total	<u>12,678</u>	<u>11,368</u>	<u>7,100</u>	<u>2,400</u>	<u>2,400</u>
Expenditure—Direct	56,986	47,610	22,800	—	11,400
Other	19,817	12,563	9,900	29,900	24,900
Total	<u>76,803</u>	<u>60,173</u>	<u>32,700</u>	<u>29,900</u>	<u>36,300</u>
<i>Deficit</i>	<u>64,125</u>	<u>48,805</u>	<u>25,600</u>	<u>27,500</u>	<u>33,990</u>
Direct costs per mile	<u>982</u>	<u>821</u>	(say) 390		

Category: X

Lock 7, Buckby, to Birmingham					
	1963	1964	Water Channel	Final	Interim
Receipts—Craft	4,774	5,076	—	—	—
Water	7,683	4,967	5,200	—	—
Other	4,578	6,455	3,800	3,000	3,000
Total	<u>17,035</u>	<u>16,498</u>	<u>9,000</u>	<u>3,000</u>	<u>3,000</u>
Expenditure—Direct	71,104	64,661	29,100	—	14,600
Other	14,823	12,668	11,200	28,000	25,600
Total	<u>85,927</u>	<u>77,329</u>	<u>40,300</u>	<u>28,000</u>	<u>40,200</u>
<i>Deficit</i>	<u>68,892</u>	<u>60,831</u>	<u>31,300</u>	<u>25,000</u>	<u>37,200</u>
Direct costs per mile	<u>1,466</u>	<u>1,333</u>	(say) 600		

Category: X

GRAND UNION CANAL—AYLESBURY ARM

1. The Aylesbury Arm of the Grand Union Canal descends through 16 narrow locks in its 6½ miles from Marsworth Junction to its terminus at Aylesbury Basin. Water supplies derive from the Tring summit supplies on the main line, of which a large proportion have first to be pumped from the Tring group of reservoirs into the Tring summit. There are a number of water sales in Aylesbury. Commercial traffic is negligible but there is a fair use by pleasure craft. The Arm is expensive to operate and maintain—not least in terms of lockage water—and incurs a heavy deficit in relation to its length.

2. In 1964, gross receipts were £2,453, including £1,350 from water sales and £713 from pleasure craft. Direct costs totalled £6,828 (£1,092 per mile). The deficit was £6,404.

3. If the Arm were to be converted to a water channel, direct costs would fall substantially to about £2,600 (£420 per mile) per annum, and the deficit to about £2,300 per annum.

4. If the Arm were to be eliminated, the deficit would be about £2,200 per annum, with an increase to about £3,500 per annum during the interim period.

5. Clearly the present high level of deficit on this heavily-locked short length would be greatly reduced by conversion to a water channel. Moreover, as water sent down the Arm is lost to the system the balance of advantage might well be in elimination on general water conservation grounds, even though the interim period figure is higher than the water channel one. However, a decision between these alternatives would require careful study of the alternatives available to the present Aylesbury users.

FINANCIAL SUMMARY

	1963	1964	Water Channel	Elimination	
	£	£	£ p.a.	Final £ p.a.	Interim £ p.a.
Receipts—Craft	632	714	—	—	—
Water	1,512	1,350	1,300	—	—
Other	662	389	400	300	300
Total	2,806	2,453	1,700	300	300
Expenditure—Direct	4,595	6,828	2,600	—	1,300
Other	2,124	2,029	1,400	2,500	2,500
Total	6,719	8,857	4,000	2,500	3,800
<i>Deficit</i>	<i>3,913</i>	<i>6,404</i>	<i>2,300</i>	<i>2,200</i>	<i>3,500</i>
Direct costs per mile	735	1,092	(say) 420		

Category: Y

GRAND UNION CANAL—LEICESTER SECTION

1. The Leicester Section of the Grand Union Canal extends from Leicester (West Bridge) to Norton Junction on the Grand Union main line, and includes the Market Harborough Arm and the Welford Arm. The total mileage is 48. Commercial traffic is negligible and pleasure craft use is not extensive. The canal passes through pleasant countryside, however, and provides the main north-south connection between the Trent and the Grand Union, including the lock-free length of over 20 miles on the summit pound between Foxton and Watford top locks. Water supplies are derived principally from the Foxton summit reservoirs (the highest on the Grand Union system) and from Saddington Reservoir below the Foxton flight; at Norton Junction the flow augments supplies to the Grand Union main line, to which it is a major and indispensable source of supply. Although a great deal of work has been carried out in recent years in overtaking arrears of maintenance on lock gates and structures generally, much still remains to be done.

2. Receipts are heavily outweighed by expenditure. In 1964, receipts were only £6,499, of which £3,141 was water sales. Operating, dredging and maintenance direct costs were £41,641 (£867 per mile). The deficit was £44,072.

3. If the canal were to be converted to a water channel, direct costs would fall to about £16,500 (£340 per mile) per annum, and the deficit to about £19,700 per annum.

4. Physical elimination would result in a deficit of about £15,600 per annum, with an increase to about £23,500 per annum during the interim period. In considering this, it has to be borne in mind (as pointed out above) that the main line south of Norton Junction would be deprived of an essential source of water.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	539	633	—	—	—
Water	3,770	3,141	3,100	—	—
Other	1,715	2,725	1,900	1,400	1,400
Total	6,024	6,499	5,000	1,400	1,400
Expenditure—Direct	35,756	41,641	16,500	—	8,300
Other	10,564	8,930	8,200	17,000	16,600
Total	46,320	50,571	24,700	17,000	24,900
Deficit	40,296	44,072	19,700	15,600	23,500
Direct costs per mile	745	867	(say) 340		

Category: Y

GRAND WESTERN CANAL

1. The Grand Western Canal was never fully completed and all that now remains is an isolated length of $11\frac{1}{4}$ miles from Lowdwells to Tiverton. It passes through pleasant country and has no nuisance problem. It obtains its water from springs in the canal bed at Lowdwells, supplemented by a few small streams. A length of about $1\frac{1}{2}$ miles has been dammed off to avoid fissure leakages in the canal bed. There are small water sales to agriculture and industry. There has been no commercial traffic for very many years, though it was not until 1962 that the canal was formally closed to navigation. Until 1st January 1964, the canal was managed by British Railways on behalf of the Board.

2. The Redevelopment Committee in 1961 found considerable local interest in the preservation of the canal for its amenities. They recommended that it should be legally closed to navigation, that it should continue to be maintained in decent condition and made available for worthwhile projects (such as transfer to the Devon River Board) as and when required. Closure to navigation was obtained in the B.T.C. Act of 1962.

3. The only receipts are from water sales and are under £200 per annum. Direct costs are about £3,000 (£266 per mile) per annum. The deficit is about £4,000 per annum. As has been explained, this is in effect the cost of maintaining the canal as a water channel.

4. Elimination would result in a deficit of about £3,700 per annum, with an interim figure of about £4,300 per annum.

FINANCIAL SUMMARY

	1963 £	1964* £	Water Channel £ p.a.	Elimination Final £ p.a.	Interim £ p.a.
Receipts—Craft	Managed by	—	—	—	—
Water	British	200	200	—	—
Other	Railways	—	—	—	—
	_____	_____	_____	_____	_____
Total		200	200	—	—
	_____	_____	_____	_____	_____
Expenditure—Direct		3,000	3,000	—	1,500
Other		1,200	1,200	3,700	2,800
	_____	_____	_____	_____	_____
Total		4,200	4,200	3,700	4,300
	_____	_____	_____	_____	_____
Deficit		4,000	4,000	3,700	4,300
	=====	=====	=====	=====	=====
Direct costs per mile		266	(say) 270		
	=====	=====	=====		

* Based also on 1965 Budget.

Category: Z

GRANTHAM CANAL

1. The Grantham Canal extends 33 miles from Grantham to its junction with the River Trent just below Nottingham. It was closed to navigation under the L.N.E.R. (General Powers) Act 1936 and has been unnavigable for many years. Water supplies derive from the Knipton and Denton Reservoirs near Grantham, in which area there are limited water sales to industry. Elsewhere water is supplied to farmers. Under the closure Act, 2-ft of water has to be maintained in the canal for this purpose. The canal passes through quite pleasant country, especially for its first five miles or so from Grantham.

2. The Redevelopment Committee recommended in 1961 that the canal should only be redeveloped as and when definite demands for its reintegration arose or other practical proposals were made by interested parties; and that meanwhile British Waterways should maintain the waterway in a decent state and partial redevelopment should not be allowed to interfere with the through flow of water in what remained.

3. In 1964, gross receipts were £1,861, of which £1,507 was water sales. Direct costs (including £2,125 for dredging) totalled £7,861 (£238 per mile). The deficit was £9,008. Maintenance has long been kept to a minimum, i.e. at an "existence" level subject to the statutory water requirement. Closed nearly 30 years ago, a certain amount of elimination work (on bridges, locks, etc.) has been carried out over the years. In places, and particularly on the lower lengths towards Nottingham, the canal is in a poor condition.

4. To restore the whole canal to full use as a water channel would raise direct costs by about £3,000 per annum with no real likelihood of increasing water sales. The deficit would rise to about £12,500 per annum.

5. If the top five miles were retained as water channel and the remainder eliminated the deficit would be about £8,800 per annum, assuming (as seems likely) that the top end could "break even" on the water sales arising there. The deficit would rise to about £12,000 per annum in the interim period.

6. This is clearly a problem waterway. There seems no sufficient justification—physical or financial—for conversion to full water channel standards. To do so would increase the deficit (see para. 4 above). Elimination of all except the top five miles would slightly reduce the deficit. For this purpose, relief from the obligation to maintain 2-ft. of water in the channel would first be necessary.

FINANCIAL SUMMARY

	1963	1964	<i>Water</i>	<i>Elimination*</i>	
			<i>Channel</i>	<i>Final</i>	<i>Interim</i>
	£	£	£ p.a.	£ p.a.	£ p.a.
Receipts—Craft	159	—	—	—	—
Water	896	1,507	1,800	1,800	1,800
Other	182	354	200	200	200
Total	1,237	1,861	2,000	2,000	2,000
Expenditure—Direct	8,408	7,861	10,600	1,800	5,300
Other	3,421	3,008	3,900	9,000	8,700
Total	11,829	10,869	14,500	10,800	14,000
<i>Deficit</i>	<i>10,592</i>	<i>9,008</i>	<i>12,500</i>	<i>8,800</i>	<i>12,000</i>
Direct costs per mile	255	238	(say) 320		

*Assumes 28 miles eliminated, with the top five miles "breaking even" as water channel—see paragraph 5.

Category: Z

HUDDERSFIELD NARROW CANAL

1. The Huddersfield Narrow Canal extends for 20 miles from Huddersfield, where it flows into the Huddersfield Broad Canal, to Ashton Junction where it flows into the Ashton Canal. Water supplies, deriving from ten reservoirs in the summit area near Standedge Tunnel, can for the most part be passed in either direction as required. Closed to navigation under the L.M.S. (Canals) Act 1944, it has for many years been maintained to "water channel" standards, the locks (originally 74 in number) being weired for reasons of economy and safety. Revenue from water sales is substantial, and supplies still remain available for sales to be increased.

2. In 1964, gross receipts, including £11,374 from water sales, were £11,986. Direct costs totalled £5,923 (£296 per mile). The surplus was £2,330.

3. The question of conversion to a water channel does not arise as the canal is already maintained and operated as such. Examination of the 1964 figures in relation to those for 1963 and for the 1965 budget suggests that about £300 per mile per annum is a likely future figure for direct costs, with an annual surplus of some £4,000 per annum at present levels of abstraction.

4. Against this financial background, to consider elimination would be unrealistic. Questions of piping or culverting individual urban lengths would fall to be considered on their merits.

FINANCIAL SUMMARY

	1963*	1964*	Water*	Elimination	
	£	£	Channel £ p.a.	Final £ p.a.	Interim £ p.a.
Receipts—Craft	—	—	—	Not applicable see para. 4	
Water	16,120	11,374	11,400		
Other	673	612	600		
Total	16,793	11,986	12,000		
Expenditure—Direct	3,246	5,923	5,700		
Other	2,036	3,733	2,300		
Total	5,282	9,656	8,000		
Surplus	11,511	2,330	4,000		
Direct costs per mile	162	296	(say) 290		

* The canal is already operated as a water-channel, but the 1963 and 1964 figures include exceptional or non-recurring items and the "water channel" figures may be taken as more typical. See paragraph 3.

Category: Z

KENNET & AVON CANAL—WESTERN SECTION

1. The western section of the Kennet & Avon Canal consists of the River Avon Navigation, which extends for $11\frac{1}{4}$ miles from Bath Bottom Lock (where the central canalised section joins the river) to Hanham Lock, about 5 miles east of Bristol. Below Hanham the River Avon is under the jurisdiction of the Port of Bristol Authority (Bristol Corporation). In the length for which the Board are responsible there are six locks, all wide. There is a modest commercial traffic, and a fair amount of use by pleasure craft (who pay only for the use of the locks).

2. In 1964, gross receipts were only £1,150. Operating, dredging, and maintenance direct costs totalled £6,204 (£551 per mile). The deficit was £7,702.

3. There are no water sales, but if the navigation were to be converted to a water channel, direct costs would fall to about £2,400 (£210 per mile) per annum. The deficit would be reduced to about £4,300 per annum. The substantial reduction compared with maintaining for navigation arises from the fact that the locks are somewhat costly both as to operation and maintenance, while dredging costs would also be appreciably reduced.

4. The question of elimination does not arise in view of the natural river flow.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	822	960	—		
Water	3	—	—		
Other	246	190	200		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	1,071	1,150	200		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Expenditure—Direct	7,090	6,204	2,400		
Other	3,378	2,648	2,100		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	10,468	8,852	4,500		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
<i>Deficit</i>	<i>9,397</i>	<i>7,702</i>	<i>4,300</i>		
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Direct costs per mile	630	551	(say) 210		
	<hr/>	<hr/>	<hr/>		

Category: X

KENNET & AVON CANAL—CENTRE SECTION

1. The centre section of the Kennet & Avon Canal consists (administratively) of the 43¼ miles of artificial canal constructed from the junction with the River Avon in Bath through Bradford-on-Avon and Devizes to Bedwyn. From Bath the canal rises through the 7 locks of the Bath flight and continues along the side of the Avon valley and generally near the course of the River Avon, crossing the river by the three-arch masonry aqueduct at Dundas. It continues thereafter through Limpley Stoke to Bradford-on-Avon and then through Devizes up the 29-lock Devizes flight and the Wootton Rivers flight into the summit pound at Savernake. At the eastern end of the summit the canal starts its descent to Reading via the Crofton flight as far as Bedwyn. In all, there are 59 wide locks on this section.

2. Water supplies are mainly derived from the River Avon by the Claverton pumping station, four miles from Bath, and into the summit pound from the Crofton Reservoir by the Crofton pumping station. Supplies are also obtained from feeders entering along the length. Because of bed fissures, the length between the Avoncliff aqueduct and Limpley Stoke (about two miles) has been dewatered, and water levels are held down over a further length of about two miles from Limpley Stoke towards Bath.

3. The canal is maintained to minimum standards only and the background was set out in the Board's Interim Report (Chapter X). Subsequent developments, including the investigation by a joint working party with the Kennet and Avon Canal Trust of the possibility of restoration of the length from Bath to Bradford-on-Avon, are referred to in the Board's Annual Report for 1964 (paras. 169 to 171).

4. The canal has a small income from pleasure craft and from water sales to British Railways but total receipts amounted in 1964 to only £1,659, of which £470 was from water sales. Direct costs in 1964 amounted to £19,706 (£456 per mile). The deficit was £24,758.

5. As stated above, this section of the canal is affected by a number of serious engineering difficulties, including shortage of water supplies, which it would require very extensive expenditure to overcome. On this basis, conversion to a water channel is therefore unrealistic; but if it were assumed that restoration to this standard had been achieved, the deficit at about £26,300 per annum would broadly correspond to the deficit currently being incurred.

6. Elimination would entail a deficit of about £23,300 per annum with an increase to about £29,000 per annum during the interim period.

FINANCIAL SUMMARY

	1963	1964	<i>Water*</i> <i>Channel</i>	<i>Elimination</i> <i>Final</i>	<i>Interim</i>
	£	£	£ p.a.	£ p.a.	£ p.a.
Receipts—Craft	269	234	—	—	—
Water	379	470	400	—	—
Other	874	955	900	800	800
Total	1,522	1,659	1,300	800	800
Expenditure—Direct	16,037	19,706	18,700	—	9,400
Other	8,614	6,711	8,900	24,100	20,400
Total	24,651	26,417	27,600	24,100	29,800
<i>Deficit</i>	<i>23,129</i>	<i>24,758</i>	<i>26,300</i>	<i>23,300</i>	<i>29,000</i>
Direct costs per mile	371	456	(say) 430		

* Assuming very extensive restoration work first undertaken—see paragraph 5.

Category: (mostly) Z

KENNET & AVON CANAL—EASTERN SECTION

1. The eastern section of the Kennet & Avon Canal consists (administratively) of the length between Mill Bridge, Bedwyn and High Bridge, Reading where it joins waters under the jurisdiction of the Thames Conservancy to connect to the Thames. Its length is 32 miles. From Bedwyn the artificial canal continues its descent towards Reading through Hungerford and Kintbury, where it connects with the River Kennet, and continues through Newbury and Aldermaston to Reading. The canal passes through very pleasant country and a length in the Newbury area is in regular use by pleasure craft. Pleasure craft also use the length from Reading to Sulhampstead where the lock (now being reconstructed by the Kennet and Avon Canal Trust) has hitherto formed the first major barrier to navigation to points further west. The length contains 41 wide locks, with many of the lock gates in a derelict condition and a number of lock chambers requiring extensive repair or reconstruction.

2. The length from Bedwyn to Kintbury is deficient in water supplies, being dependent on the Crofton Reservoir and minor feeders, which are unreliable in dry weather. From Kintbury the supplies are taken from the River Kennet, with which it is closely connected until, at Newbury, it becomes the River Kennet Navigation consisting of the canalised River Kennet. A number of mills (or former mills) have water rights and control the water levels in the navigation pounds. Close liaison has to be maintained with the mill owners on water control matters. Certain irrigation rights are also claimed by riparian owners. The River Kennet from Garston Lock to High Bridge, Reading is excluded from the provisions of Section 131 of the Water Resources Act 1963 and revenue arising on this length of about five miles will be lost to the Board, but the remainder will be retained.

3. The position on the Kennet & Avon Canal is set out in the Board's Interim Report (Chapter X) and in the Annual Report for 1964 (paras. 169-172). The joint working party with the Kennet and Avon Canal Trust reported on the extent and cost of restoration work on the length between Reading and Hungerford.

4. In 1964 gross receipts amounted to £2,093 of which £822 was from water sales and £469 from pleasure craft. Direct costs amounted to £36,304 (£1,135 per mile) but included special work on the reconstruction of Sulhampstead sluices. A more normal level of direct costs would be about £21,000 (say £650 per mile). The deficit on this basis would be about £27,000.

5. Conversion to a water channel would result in a deficit of about £26,000 per annum, the revenue arising being extremely small.

6. Many inquiries have been unanimous in pointing out the extreme difficulties that would be involved in eliminating this length because of its integration in the drainage, etc. pattern of the area. Because of its connections with the river, the normal approach to elimination costings is inappropriate. Almost certainly, however, elimination would not yield greater savings than water channelling.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	319	469	—	Not applicable see para. 6	
Water	479	822	500		
Other	475	802	700		
Total	1,273	2,093	1,200		
Expenditure—Direct	21,213	36,304*	18,900		
Other	12,434	8,769	8,300		
Total	33,647	45,073	27,200		
<i>Deficit</i>	<u>32,374</u>	<u>42,980*</u>	<u>26,000</u>		
Direct costs per mile	663	1,135*	(say) 590		

* See paragraph 4.

Category: (partly) Y

LANCASTER CANAL

1. The Lancaster Canal extends for 54 miles from Crowpark Bridge (Natland) to Preston, and also has a branch to Glasson Basin ($2\frac{3}{4}$ miles) connecting through Glasson Dock to the River Lune and the sea. It originally terminated at Kendal, but the top $2\frac{1}{4}$ miles from Kendal to Crowpark Bridge was sold to Kendal Corporation and other parties between 1952 and 1957. From Crowpark Bridge to the Stainton Feeder ($3\frac{3}{4}$ miles) the canal is closed to navigation and has in part been restored to agricultural use; this section has no reliable water supply though parts are still in water. From Stainton to Tewitfield Lock ($8\frac{1}{2}$ miles) the canal acts as a water channel to the south for supplies arising from the Killington Reservoir and feeders serving the canal at its northern end. Water levels over this length have been held down in recent years to reduce losses from fissures in the canal bed. In order to enable very substantial savings in motorway crossing construction costs, the Board sought and obtained (in their 1965 Act) relief from the obligation to maintain the length from Stainton to Carnforth, and culverting (Stainton-Tewitfield) or reduced clearances (Tewitfield-Carnforth) will apply over this length. For the $41\frac{1}{2}$ miles from Tewitfield to Preston, water supplies are augmented by the Catterall Feeder. There are substantial sales of water, at Lancaster, Preston and Garstang in particular.

2. The canal itself has 8 locks at Tewitfield, in the length now "closed". It is otherwise lock-free. There are 7 locks on the Glasson Branch to Glasson Basin, where the Board provide mooring facilities. All the locks are wide. The canal passes through pleasant countryside and is popular for mooring and cruising, though lacking direct connection to other parts of the Board's system.

3. Due largely to its water sales, the canal makes a surplus. In 1964, gross receipts (adjusted in respect of exceptional or non-recurring items) were £37,010, of which £31,467 was water sales and £3,722 pleasure craft. Operating, dredging and maintenance direct costs totalled £21,002 (£370 per mile). The surplus was £9,047.

4. If the canal were to be converted to a water channel, direct costs would fall only slightly to about £17,200 (£300 per mile) per annum, and the substantial pleasure craft revenue would be lost. The surplus would be about £8,000 per annum. The canal is, of course, already maintained very largely as a water channel, being lock-free for most of its length.

5. Elimination would be unrealistic, having regard to the water sales revenue that would be foregone. Moreover, during the passage of the Board's 1965 Bill both the Minister and the Board gave assurances that very sympathetic consideration would be given to the continuance of pleasure boating, and additional expenditure from public funds is being incurred on a bridge (as distinct from a culvert) near Carnforth to afford continued pleasure boat access.

FINANCIAL SUMMARY

	1963 £	1964* £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	3,969	3,729	—	Not	
Water	32,518	31,467	31,500	applicable	
Other	777	1,814	1,500	see para. 5	
Total	37,264	37,010	33,000		
Expenditure—Direct	19,958	21,002	17,200		
Other	10,709	6,961	7,800		
Total	30,667	27,963	25,000		
Surplus	6,597	9,047	8,000		
Direct costs per mile	352	370	(say) 300		

* Adjusted to exclude exceptional or non-recurring items.

Category: Y

LEEDS & LIVERPOOL CANAL

1. The Leeds & Liverpool Canal extends 127 miles from the River Aire at Leeds to the River Mersey at Liverpool. Including the Rufford Branch ($7\frac{1}{4}$ miles), the Leigh Branch ($7\frac{1}{4}$ miles) and the Walton Summit Branch (3 miles), the total length is $144\frac{1}{2}$ miles. A fine broad waterway, scenically attractive on the Pennines section in particular, it is unfortunately—with the Grand Union Canal—one of the Board's greatest financial problems. The Leigh Branch still carries a substantial traffic connecting with the Bridgewater Canal. The recently extensive traffic on the Liverpool to Wigan section of the main line has now ceased, and at present even the congestion-avoiding route from Liverpool Docks to south west Lancashire has no significant commercial usage. Pleasure boating is mainly concentrated in the Bingley/Skipton and Lydiate/Scarisbrick areas, and the canal is less used for cruising than it deserves to be.

2. Water supplies are obtained principally from the group of summit reservoirs in the Foulridge/Gargrave area, feeders, sewage effluent, mine water and the River Douglas. Water from the summit supplies is fed towards both Leeds and Liverpool. The canal, which is under-reservoired, requires careful management and control of its water supplies. Water sales are substantial but represent only a fraction of maintenance and operating expenditure.

3. The level of dredging and normal maintenance has been appreciably reduced over the last two years, but the current total deficit is still of the order of £120,000 per annum. There has been a big mining subsidence problem on the Leigh Branch and there is a lesser one on the main line in the Burnley area.

4. For present purposes, the canal has been considered under the following four lengths:—

1. Liverpool to Wigan (Ellmeadow Lock)—33 miles
2. Wigan (Ellmeadow Lock) to Leeds—97 miles
3. Leigh Branch— $7\frac{1}{4}$ miles
4. Rufford Branch— $7\frac{1}{4}$ miles.

5. On *Length 1* (Liverpool to Wigan), gross receipts in 1964 were £12,692, including £9,923 from water sales. Operating, dredging, and maintenance direct costs were £37,749 (£1,144 per mile). The deficit was £32,345. If the length were to be converted to a water channel, the deficit would be reduced to about £18,400 per annum. Elimination would, of course, involve a special study in the Liverpool area particularly, but on the basis of costs adopted for present purposes the deficit would be reduced slightly further to about £16,900 per annum, with an interim figure of about £25,700 per annum.

6. On *Length 2* (Wigan to Leeds including the disused Walton Summit Branch), gross receipts in 1964 were £25,996, including £17,862 from water sales. Direct costs were £93,541 (£964 per mile). The deficit was £90,308. The Walton Summit Branch was formally closed to navigation under the Board's 1965 Act. Conversion to a water channel would reduce the deficit to about £59,400 per annum. Elimination would reduce the deficit further to about £52,300 per annum, with an interim figure of about £71,700 per annum.

7. On the *Leigh Branch*, gross receipts in 1964 were £13,999 including £11,406 from commercial tolls and £1,985 from water sales. Direct costs were £13,741 (£1,895 per mile). The deficit was £1,675. Conversion to a water channel would increase the deficit to about £9,100 per annum. Elimination would increase the deficit to about £3,500 per annum, with an interim figure of about £7,800 per annum.

8. On the *Rufford Branch*, gross receipts in 1964 were only £608. Direct costs of £2,489 (£343 per mile) reflected the relatively low level of maintenance. There are however inherent difficulties arising from the nature of the terrain through which the length passes, and significant increase in cost cannot be ruled out. Because of these difficulties, the water level has to be carefully controlled. The deficit was £3,229. Conversion to a water channel would result in very little variation from the present maintenance costs; the deficit would be about £3,700, and the engineering difficulties already referred to would remain. Elimination would also result in a deficit of about £3,700 per annum with an interim figure of about £4,200 per annum.

Appendix 5

9. On the main line, therefore, the deficit could be reduced considerably—though it would remain very substantial—by conversion to a water channel, but there would be relatively little further to be gained by elimination. Although expensive to maintain and considerably affected by mining subsidence the Leigh Branch is best operated as a commercial navigation. The Rufford Branch incurs a modest deficit which would be little varied by either water channelling or elimination.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Main Line (Liverpool to Wigan)					
Receipts—Craft	1,150	979	—	—	—
Water	12,371	9,923	10,000	—	—
Other	1,508	1,790	1,300	1,200	1,200
Total	<u>15,029</u>	<u>12,692</u>	<u>11,300</u>	<u>1,200</u>	<u>1,200</u>
Expenditure—Direct	31,270	37,749	22,600	—	11,300
Other	12,196	7,288	7,100	18,100	15,600
Total	<u>43,466</u>	<u>45,037</u>	<u>29,700</u>	<u>18,100</u>	<u>26,900</u>
<i>Deficit</i>	<u>28,437</u>	<u>32,345</u>	<u>18,400</u>	<u>16,900</u>	<u>25,700</u>
Direct costs per mile	<u>948</u>	<u>1,144</u>	(say) 690		

Category: Y

Main Line (Wigan to Leeds)

Receipts—Craft	3,378	2,874	—	—	—
Water	22,268	17,862	18,000	—	—
Other	4,431	5,260	3,800	3,500	3,500
Total	<u>30,077</u>	<u>25,996</u>	<u>21,800</u>	<u>3,500</u>	<u>3,500</u>
Expenditure—Direct	73,520	93,541	62,000	—	31,000
Other	39,654	22,763	19,200	55,800	44,200
Total	<u>113,174</u>	<u>116,304</u>	<u>81,200</u>	<u>55,800</u>	<u>75,200</u>
<i>Deficit</i>	<u>83,097</u>	<u>90,308</u>	<u>59,400</u>	<u>52,300</u>	<u>71,700</u>
Direct costs per mile	<u>758</u>	<u>964</u>	(say) 640		

Category: Y

FINANCIAL SUMMARY (continued)

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Leigh Branch					
Receipts—Craft	14,116	11,621	—	—	—
Water	2,474	1,985	2,000	—	—
Other	331	393	300	300	300
Total	<u>16,921</u>	<u>13,999</u>	<u>2,300</u>	<u>300</u>	<u>300</u>
Expenditure—Direct	10,746	13,741	9,800	—	4,900
Other	4,849	1,933	1,600	3,800	3,200
Total	<u>15,595</u>	<u>15,674</u>	<u>11,400</u>	<u>3,800</u>	<u>8,100</u>
Surplus or <i>Deficit</i>	<u>1,326</u>	<u>1,675</u>	<u>9,100</u>	<u>3,500</u>	<u>7,800</u>
Direct costs per mile	<u>1,482</u>	<u>1,895</u>	(say) <u>1,350</u>		

Category: X

Rufford Branch					
Receipts—Craft	252	215	—	—	—
Water	—	—	—	—	—
Other	331	393	300	300	300
Total	<u>583</u>	<u>608</u>	<u>300</u>	<u>300</u>	<u>300</u>
Expenditure—Direct	2,813	2,489	2,700	—	1,300
Other	2,645	1,348	1,300	4,000	3,200
Total	<u>5,458</u>	<u>3,837</u>	<u>4,000</u>	<u>4,000</u>	<u>4,500</u>
<i>Deficit</i>	<u>4,875</u>	<u>3,229</u>	<u>3,700</u>	<u>3,700</u>	<u>4,200</u>
Direct costs per mile	<u>388</u>	<u>343</u>	(say) <u>370</u>		

Category: Y

MACCLESFIELD AND PEAK FOREST CANALS

1. The Macclesfield Canal extends $26\frac{1}{2}$ miles from Hall Green (junction with the Trent & Mersey Canal) to Marple (where it joins the Peak Forest Canal). There are 12 locks, all in the Bosley Flight, and a stoplock. Water supplies derive from the Sutton and Bosley reservoirs and the feed from the upper section of the Peak Forest Canal. There are substantial water sales. The canal passes through attractive country and is extensively used for pleasure cruising and mooring. There is no commercial traffic.

2. The Peak Forest Canal extends from Whaley Bridge to Marple (7 miles) where it joins the Macclesfield Canal, continuing down the Marple flight of 16 locks and thence over the Marple Aqueduct to Dukinfield (8 miles) where it joins the Ashton Canal. Water supplies derive from the Todd Brook and Coombs Reservoirs on the upper length, which is all on a common level with the upper pound of the Macclesfield. There are appreciable water sales. The upper length is attractive and popular for pleasure cruising. The lower length passes through country of increasing development into unattractive surroundings at its lower end. The Marple flight of locks is unnavigable.

3. The group falls naturally into two separate parts, the upper Peak Forest with the Macclesfield forming a length of high amenity value while the lower Peak Forest becomes less attractive as it approaches the industrial areas. For this reason, separate figures for the two parts have been produced in respect of 1964.

4. On the *upper Peak Forest and Macclesfield*, gross receipts in 1964 were £19,097, of which £15,013 was water sales. Discounting exceptional maintenance in that year, the deficit was £14,644. Conversion to a water channel would result in a deficit of about £6,200 per annum. Elimination would result in a deficit of about £12,500 per annum with an increase to about £19,300 per annum in the interim period.

5. On the *lower Peak Forest*, gross receipts in 1964 were £3,980, of which £3,782 was water sales. Again discounting exceptional maintenance, there was a surplus of £2,130. This reflects a level of ordinary maintenance work undertaken which was lower than would be sufficient on a long term basis, and indeed during 1965 very considerably greater expenditure has been incurred. Permanent retention as a water channel would result in a deficit of about £2,100 per annum. Elimination would result in a deficit of about £3,300 with an interim figure of about £4,800 per annum. The future of this waterway is closely bound up with that of the Ashton Canal (*q.v.*).

FINANCIAL SUMMARY

Macclesfield and Upper Peak Forest Canals

	1963	1964*	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	Not	2,842	—	—	—
Water	available	15,013	15,000	—	—
Other	see para. 3	1,242	1,300	1,200	1,200
Total		19,097	16,300	1,200	1,200
Expenditure—Direct		27,291	16,300	—	8,200
Other		6,450	6,200	13,700	12,300
Total		33,741	22,500	13,700	20,500
<i>Deficit</i>		<i>14,644</i>	<i>6,200</i>	<i>12,500</i>	<i>19,300</i>
Direct costs per mile		815	(say) 490		

Category: Y

	Lower Peak Forest Canal				
	Not	—	—	—	—
	available	3,782	3,000	—	—
	see para. 3	198	200	200	200
Receipts—Craft					
Water					
Other					
Total		3,980	3,200	200	200
Expenditure—Direct		837	3,700	—	1,800
Other		1,013	1,600	3,500	3,200
Total		1,850	5,300	3,500	5,000
Surplus or <i>Deficit</i>		<i>2,130</i>	<i>2,100</i>	<i>3,300</i>	<i>4,800</i>
Direct costs per mile		105	(say) 460		

* Excluding exceptional maintenance.

Category: Z

MANCHESTER, BOLTON & BURY CANAL

1. The Manchester, Bolton & Bury Canal formerly extended from Salford (where it connected with the River Irwell branch of the Bridgewater Canal) to Bury (13 miles) with a branch from Prestolee to Bolton (3 miles). Less than 11 miles, however, still remain in the Board's ownership.

2. Under the L.M.S. Act of 1941, some 8 miles (the whole of the Bolton Branch together with a portion in the centre of the main line) were closed to navigation. To meet an undertaking then given at the Bill stage, a later Act (L.M.S. Act of 1947) specified conditions governing the dewatering, piping, disposal, etc. of the closed portions to meet the requirements of local and statutory authorities. Measures of redevelopment have made considerable progress over the years, and in 1960 the Redevelopment Committee, while emphasising the unsatisfactory condition of the canal, endorsed the British Transport Commission's proposal that the remainder of the canal should be closed to navigation and redeveloped. Closure to navigation was obtained in the B.T.C. Act of 1961, and gradual progress has since continued.

3. The portions of canal now remaining in the Board's ownership are of considerable importance for water supply and sale. Supplies are taken by pumping from the River Irwell on the Manchester portion, and from the Elton Reservoir (itself also fed from the River Irwell) on the disconnected Bury portion. In each case there are substantial water sales.

4. Taking the 1965 Budget figures as the basis for a normal year (the 1964 figures having been distorted by a retrospective payment), gross receipts are currently about £13,250 per annum, nearly all from water sales. Direct costs are about £2,550 (£232 per mile) per annum. The surplus is about £8,300 per annum.

5. As already explained, water supply is already the sole function of the canal. It is estimated that on a long term basis direct costs would rise to about £3,800 (£350 per mile) per annum. The surplus would be reduced to about £7,000 per annum.

6. Elimination—other than in association with measures of piping, etc.—is obviously unrealistic in the circumstances obtaining on this canal.

7. In short, the canal is already in a fairly advanced stage of redevelopment as a water channel in an area where water is in demand. It would seem appropriate to undertake further measures of redevelopment—probably taking the form of piping, lagooning and so on—and these will assist in reducing problems of maintenance (and nuisance) in the industrial area through which the canal passes.

FINANCIAL SUMMARY

	1963 £	1964* £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	53	58	—	Not applicable see para. 6	
Water	5,580	16,071	12,500		
Other	816	1,146	800		
Total	6,449	17,275	13,300		
Expenditure—Direct	2,913	2,858	3,800		
Other	2,677	3,577	2,500		
Total	5,590	6,435	6,300		
Surplus	859	10,840	7,000		
Direct costs per mile	265	260	(say) 350		

* See paragraph 4.

Category: Z

MONMOUTHSHIRE & BRECON CANAL

1. The Monmouthshire Canal and the Brecon & Abergavenny Canal are together generally known as the Monmouthshire & Brecon Canal. The canal is most conveniently considered in two parts. The first is the southern part from Jockey Bridge (Pontypool) to Newport, and including the arm from Crumlin to Newport. The second is the northern part from Jockey Bridge to Brecon. Separate figures are shown for the two parts.

2. The future of this canal has, of course, been the subject of intense interest and extensive discussion involving the National Parks Commission, the Park Planning Authorities, the Welsh Office, and the Ministry of Transport.

3. The *southern section* is maintained to water channel standards at the present time. It is legally closed to navigation and it is, at a number of places, not physically navigable. Part of the length has been disposed of to Cwmbran Urban District Council (the Board's rights to the passage of water being retained). Negotiations with other local authorities, particularly Newport, are in train. Their future is likely to depend largely on whether it will be possible to agree to continue to pass water down the length and this, in turn, is linked with the future of the northern section. Costs on the southern section currently incurred are to "water channel" standards and there is significant water revenue. The disposal of successive lengths to local authorities would improve the position and—given the relatively small deficit on this length as a whole—it is likely that it would be financially more attractive to proceed by piecemeal disposal (while retaining water revenues) than to embark on elimination.

4. A large part of the *northern section* (from Jockey Bridge to Brecon) runs through Brecon Beacons National Park. It is of great beauty and its future has been much discussed in connection with that Park. At present it is hardly navigable and requires special initial expenditure on dredging and bridges to make it navigable. The present level of maintenance costs has been intensively studied in conjunction with the Welsh Office, and it is clear that a cut to about half the level of present costs would be, in all the special circumstances of this canal, appropriate for mere water channel purposes. Taking the years 1963, 1964 and having some regard to the 1965 budget, this means that total annual expenses of, say £20,500 would be cut to about £10,250. This, minus miscellaneous revenue of about £900, gives a deficit of about £9,350 per annum. If the negotiations with the Welsh Office and others proceed satisfactorily, the Board's loss would be restricted to about this figure, with the other parties to the agreement providing the corresponding funds to make pleasure boating possible.

5. In view of the strong and understandable interest aroused by this canal, it is more than usually artificial to think of elimination.

FINANCIAL SUMMARY

	Southern Section		Northern Section		<i>Water Channel</i> £ p.a.
	1963 £	1964 £	1963 £	1964 £	
Receipts—Craft	—	—	651	612	—
Water	6,076	6,685	50	61	100
Other	780	767	786	834	800
Total	6,856	7,452	1,487	1,507	900
Expenditure—Direct	9,420	8,740	12,012	12,253	see
Other	3,982	3,906	7,694	7,565	para. 4
Total	13,402	12,646	19,706	19,818	(say) 10,250
<i>Deficit</i>	<i>6,546</i>	<i>5,194</i>	<i>18,219</i>	<i>18,311</i>	<i>9,350</i>
Direct costs per mile	725	672	370	377	

Category: Z

Category: Z

NOTTINGHAM CANAL

1. The Nottingham Canal originally extended some 14½ miles from its junction with the River Trent at Nottingham to its junction with the Cromford Canal at Langley Mill. Since 1937, when it was closed to navigation under the L.N.E.R. Act of that year, the 2½-mile length from the junction with the Beeston Canal to the River Trent has formed the Trent Navigation route through the city. In 1952 the further length of 3½ miles within the city of Nottingham was sold to the Corporation, and part of this has since been culverted and infilled. There are thus about 8½ miles remaining, from Langley Mill to the Nottingham City boundary.

2. Under the closure Act 2' 6" of water has to be retained in the canal. Water supplies are taken from Moorgreen Reservoir, and can be fed into the Erewash Canal at Langley Mill. Very little water is taken for industrial use, but there is some agricultural use. The canal is unnavigable, and the Redevelopment Committee endorsed the British Transport Commission's proposal to eliminate the canal and reintegrate with the surrounding land. Only very limited progress, however, has since been achieved—or is likely to be achieved until the law is altered.

3. Gross receipts in 1964 were only £151. Direct costs were £2,962 (£348 per mile). The deficit was £4,796. The canal has been maintained at about minimum standards subject to the statutory water channel requirement.

4. The cost of continuing the canal as a water channel would be very little different from the 1964 costs; the deficit would be about £4,600 per annum. But there is no present evidence of demand on this canal for the water available.

5. Elimination would result in a deficit of about £2,600 per annum, with an increase to about £4,200 per annum in the interim period.

6. The figures support the view that on this canal maintenance should be continued at a minimum while continuing to seek every favourable opportunity to negotiate its redevelopment, pending a change in the statutory position which would permit its ultimate elimination.

FINANCIAL SUMMARY

			<i>Water</i>	<i>Elimination</i>	
	1963	1964	<i>Channel</i>	<i>Final</i>	<i>Interim</i>
	£	£	£ p.a.	£ p.a.	£ p.a.
Receipts—Craft	—	2	—	—	—
Water	45	43	—	—	—
Other	108	106	100	100	100
Total	153	151	100	100	100
Expenditure—Direct	4,972	2,962	3,100	—	1,600
Other	1,406	1,985	1,600	2,700	2,700
Total	6,378	4,947	4,700	2,700	4,300
<i>Deficit</i>	6,225	4,796	4,600	2,600	4,200
Direct costs per mile	585	348	(say) 370		

Category: Z

OXFORD CANAL (NORTH)

1. The northern section of the Oxford Canal extends $22\frac{3}{4}$ miles from Braunston Junction (where it joins the Grand Union Canal) to Hawkesbury Junction (where it joins the Coventry Canal). There are also a number of short arms or branches totalling a further few miles. There are three duplicate narrow locks at Hillmorton and a stop lock at Hawkesbury. The top $7\frac{1}{2}$ miles from Braunston to Hillmorton are fed from the Grand Union Canal which is on the same level. Below Hillmorton, water supplies are obtained from the River Swift at Rugby, and pass into the Coventry Canal at Hawkesbury. Water sales are mainly in the Rugby area.

2. Like the adjoining Coventry Canal, it had until recently a fair traffic in coal, but with the decline in narrow boat activity this is now small. There is a fair amount of use by pleasure craft both for mooring and as a through route for cruising.

3. In 1964, gross receipts of £8,335 included £5,945 from water sales, £986 from pleasure craft and £276 from commercial traffic. Operating, dredging and maintenance direct costs totalled £26,648 (£1,077 per mile). The deficit was £23,445.

4. If the canal were to be converted to a water channel, direct costs would fall to about £11,900 (£480 per mile) per annum. The deficit would be reduced to about £9,500 per annum.

5. If the canal were to be eliminated, the deficit would be about £8,600 per annum, with an increase to about £13,800 per annum in the interim period.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	1,746	1,296	—	—	—
Water	2,762	5,945	5,500	—	—
Other	1,267	1,094	1,200	1,100	1,100
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	5,775	8,335	6,700	1,100	1,100
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Expenditure—Direct	27,625	26,648	11,900	—	6,000
Other	4,504	5,132	4,300	9,700	8,900
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	32,129	31,780	16,200	9,700	14,900
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Deficit	26,354	23,445	9,500	8,600	13,800
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Direct costs per mile	1,116	1,077	(say) 480		
	<hr/>	<hr/>	<hr/>		

Category: X

OXFORD CANAL (SOUTH)

1. The southern section of the Oxford Canal extends for $49\frac{1}{4}$ miles from Napton Junction to Oxford. A length of about a mile near Oxford consists of the canalised River Cherwell. Four reservoirs are situated near the Claydon summit. There are 39 locks. A pleasant rural canal providing a useful connection between the Thames and the Grand Union system, it is increasingly used by pleasure craft. It carries an extremely small amount of commercial traffic.

2. In 1964, gross receipts were £10,461 of which £5,837 were water sales; commercial traffic receipts were negligible and pleasure craft—in spite of the popularity of this waterway—contributed only £1,372. Operating, dredging and maintenance direct costs totalled £26,377 (£536 per mile). The deficit was £25,368.

3. If the canal were to be converted to a water channel, direct costs would fall to about £17,400 (£360 per mile) per annum. The deficit would be reduced to about £18,000 per annum.

4. Elimination would reduce the deficit to about £15,500 per annum with an increase to about £24,200 per annum in the interim period.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	1,517	1,398	—	—	—
Water	5,186	5,837	5,200	—	—
Other	3,045	3,226	2,800	1,300	1,300
Total	9,748	10,461	8,000	1,300	1,300
Expenditure—Direct	26,860	26,377	17,400	—	8,700
Other	11,514	9,452	8,600	16,800	16,800
Total	38,374	35,829	26,000	16,800	25,500
<i>Deficit</i>	<i>28,626</i>	<i>25,368</i>	<i>18,000</i>	<i>15,500</i>	<i>24,200</i>
Direct costs per mile	545	536	(say) 360		

Category: Y

POCKLINGTON CANAL

1. The Pocklington Canal extends through pleasant countryside for $9\frac{1}{2}$ miles from Pocklington to Cottingwith where it joins the River Derwent. There are no reservoirs, water supplies being drawn from natural streams and feeders. There are nine wide locks, but these are inoperable, and although never formally closed to navigation the canal has been unnavigable for many years.

2. For financial reasons, expenditure on maintenance has been kept to a minimum or "existence" level. In 1964 direct costs were £1,076 (£113 per mile), and the deficit was £1,536.

3. The level of maintenance is less than would be required to maintain the canal as a water channel, and there is nothing to suggest that it would be profitable to raise the level of maintenance to full water channel standards. The alternatives therefore are:—

- (i) keeping the waterway at broadly its present level but in fair condition; and
- (ii) elimination.

Alternative (i) would result in a deficit of about £2,300 per annum.

4. Elimination would result in a deficit of about £3,300 per annum, with an interim figure of about £2,600 per annum.

5. This is therefore a case where elimination would prove more costly than continuing maintenance at the present "existence" standard. The Redevelopment Committee took the view that "existence" was in any case to be preferred.

FINANCIAL SUMMARY

	1963 £	1964 £	Water* Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	1	—	—	—	—
Water	—	—	—	—	—
Other	89	93	100	100	100
Total	90	93	100	100	100
Expenditure—Direct	1,355	1,076	1,800	—	600
Other	497	553	600	3,400	2,100
Total	1,852	1,629	2,400	3,400	2,700
<i>Deficit</i>	<i>1,762</i>	<i>1,536</i>	<i>2,300</i>	<i>3,300</i>	<i>2,600</i>
Direct costs per mile	143	113	(say) 180		

* See paragraph 3.

Category: Z

RIPON CANAL

1. The Ripon Canal, extending $2\frac{1}{4}$ miles from Ripon to its junction with the River Ure at Oxclose Lock, was closed to navigation under the B.T.C. Act of 1955. There were originally three wide locks, but the top two have been cascaded and only the bottom $1\frac{1}{4}$ miles to Oxclose Lock are navigable. There is some use by a local motor boat club but no commercial traffic. Water supplies are taken from the River Skell at Ripon, and pass into the River Ure at Oxclose Lock.

2. Maintenance has been kept to a minimum, there being one man who is engaged on general maintenance and "tidying" duties. In 1964, receipts were £142, while direct costs were £717 (£319 per mile). The deficit was £826.

3. If the canal were to be converted to a water channel, one man would still be required. The deficit would be about £950 per annum. Elimination would result in a deficit of about £650 per annum, with an increase to about £900 per annum in the interim period.

4. The canal is already at "existence" level, and its future treatment turns largely on the question of the future of the River Ouse (at present navigable to Linton Lock, above York, and not vested in the Board).

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	15	22	—	—	—
Water	30	30	50	—	—
Other	25	90	50	50	50
Total	70	142	100	50	50
Expenditure—Direct	814	717	850	—	450
Other	166	251	200	700	500
Total	980	968	1,050	700	950
<i>Deficit</i>	<i>910</i>	<i>826</i>	<i>950</i>	<i>650</i>	<i>900</i>
Direct costs per mile	362	319	(say) 380		

Category: Y

ST. HELENS CANAL

1. The St. Helens Canal, a broad canal, originally extended from St. Helens to the River Mersey at Widnes and with three branches had a total length of about 17 miles. Following an application by the St. Helens Corporation the three branches and three miles of the main line were abandoned by Warrant and Order in 1931. Following consideration by the Redevelopment Committee, the remainder of the canal (about 11 miles) was closed to navigation by the British Waterways Act 1963 with the immediate object of facilitating a trunk road diversion work.

2. Water supplies derive from the Carr Mill Reservoir and a number of feeders and discharges, and the canal plays an important role in water channelling, drainage and supply.

3. In 1964, gross receipts were £10,978, nearly all from water sales. Direct costs totalled £3,101 (£197 per mile). The surplus was £1,897, but this included an exceptional charge and a more typical surplus would have been about £4,500.

4. If the long term solution is to retain the canal as a water channel throughout its length, direct costs would increase to about £5,300 (£340 per mile) per annum. The surplus would be about £2,100 per annum.

5. The utilisation of this canal to the best economic and social effect will require further study. Measures of redevelopment will probably include sections of piping in order to preserve the industrial water supplies. In the final outcome, however, it seems unlikely that the financial position will show significant improvement over the present modest surplus.

FINANCIAL SUMMARY

	1963 £	1964* £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	—	8	—	Not applicable see para. 5	
Water	11,120	10,448	10,000		
Other	469	522	500		
Total	11,589	10,978	10,500		
Expenditure—Direct	3,160	3,101	5,300		
Other	4,107	5,980	3,100		
Total	7,267	9,081	8,400		
Surplus	4,322	1,897	2,100		
Direct costs per mile	201	197	(say) 340		

* Exceptional. See paragraph 3.

Category: Z

SHEFFIELD & SOUTH YORKSHIRE NAVIGATION
(Sheffield to Rotherham)

1. The top 5½ miles of the Sheffield & South Yorkshire Navigation from Sheffield to Rotherham (Ickles Lock) contains 15 locks (including the Tinsley flight of 11), and over recent years waterborne traffic to the terminal at Sheffield has fallen away. From the Board's Sheffield terminal the canal passes through the heavy industrial area between Sheffield and Rotherham. Operating, dredging (mainly for traffic purposes) and maintenance are all costly, and the length incurs a heavy deficit. Water supplies are derived from Nunnery Colliery, Sheffield and by pumping from the River Don at Tinsley, these being supplemented from surface discharges. There are numerous water sales throughout the length.

2. In 1964, gross receipts (adjusted to exclude non-recurring items) were £12,159, including £8,710 from water sales, £2,477 from commercial traffic and £301 from pleasure craft. Direct costs were £17,664 (£3,365 per mile)—and even at this level of expenditure the Board were under constant pressure from the carriers on this length. The deficit (adjusted) was £11,544.

3. If the length were to be converted to a water channel, direct costs would be substantially reduced to about £5,600 (£1,070 per mile) per annum. The deficit would be about £1,000 per annum.

4. If the length were to be eliminated, normal figures of cost could not, of course, be applied in this industrial area. To give a general indication of the position arising on elimination, however, annual charges on say £50,000 less the residual income would result in a deficit of about £2,500 per annum, with an increase to about £9,000 per annum in the interim period.

5. Revenue from water sales has increased in the current year. Nevertheless it is clear that the financial position of this length would be much improved if it were not maintained as a commercial navigation. It is likely that in such an important industrial area a combination of water channelling, piping and elimination would prove the most economic solution.

FINANCIAL SUMMARY

	1963	1964*	<i>Water Channel</i>	<i>Elimination†</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	2,761	2,778	—	—	—
Water	6,597	8,710	8,500	—	—
Other	3,613	671	500	500	500
Total	<u>12,971</u>	<u>12,159</u>	<u>9,000</u>	<u>500</u>	<u>500</u>
Expenditure—Direct	21,869	17,664	5,600	—	2,800
Other	19,224	6,039	4,400	3,000	6,700
Total	<u>41,093</u>	<u>23,703</u>	<u>10,000</u>	<u>3,000</u>	<u>9,500</u>
<i>Deficit</i>	<u>28,122</u>	<u>11,544</u>	<u>1,000</u>	<u>2,500</u>	<u>9,000</u>
Direct costs per mile	<u>4,165</u>	<u>3,365</u>	(say) 1,070		

* Adjusted to exclude exceptional or non-recurring items.

† Based on £50,000 as general indication—see paragraph 4.

Category: X

SHROPSHIRE UNION CANAL—MAIN LINE

1. The main route of the Shropshire Union Canal extends from Autherley Junction (where it connects with the Staffordshire & Worcestershire Canal and at nearby Aldersley Junction with the B.C.N.) via Barbridge Junction and the Middlewich Branch to Middlewich, where it joins the Trent & Mersey Canal. At Hurleston Junction it is joined by the Llangollen Branch, and at Barbridge Junction by the length to Ellesmere Port, which also includes a short branch to the River Dee at Chester. This note deals with the lengths Autherley/Barbridge/Middlewich (52 miles) and Barbridge/Ellesmere Port (24½ miles).

2. Except for the Barbridge/Ellesmere Port length which is a wide canal of early construction, the canal was built in the 1820's and ignores contours, taking a direct route by means of cuttings, embankments and viaducts. As a commercial navigation it became a main route between the Mersey and the Midlands, but with the decline in narrow boat activity this traffic has virtually ceased in recent years. It is, however, very popular with pleasure craft, both for mooring and cruising. It is itself an attractive route and also leads to the beautiful Llangollen Branch. Indeed, some of the revenue derives from moorings near to the junction with the Llangollen Branch and used by boats which cruise primarily on the latter. The length from Barbridge to Chester is also in regular pleasure craft use. The canal is in good condition throughout, having had a considerable amount of bank protection in recent years, particularly on the lengths of high embankment.

3. Water supplies are abundant, deriving mainly from the Staffordshire & Worcestershire Canal at Autherley, supplemented by a large intake at the same point from the Wolverhampton sewage works. The Belvide Reservoir (6 miles north of Autherley) acts as a reserve. The former Knighton Reservoir (20 miles north of Autherley) was taken out of use some years ago when the bed suffered from ground movements. There is also the feed from the Llangollen Branch at Hurleston where the Hurleston Reservoir (which mainly supplies the Mid and South-East Cheshire Water Board) is also available. The canal falls continuously from Autherley to Middlewich and Ellesmere Port. There are water sales mainly in the Chester and Ellesmere Port area, and a channelling payment arises from the Wolverhampton sewage intake, but in the largely rural area through which the canal passes there is a surplus of water available for sale.

4. On the *Autherley/Barbridge/Middlewich length* (52 miles), gross receipts in 1964 were £8,803, including £4,431 from pleasure craft and £1,974 from fishing (a popular activity on this canal, for which the rights are vested in the Board). Water sales revenue, however, was nil. Direct costs were £43,718 (£841 per mile). The deficit was £49,997. In 1964, however, there was heavy special maintenance expenditure on bank protection, and a more normal figure for the deficit would be, say, the £40,000 of 1963. If this length were to be converted to a water channel, the deficit would be reduced to about £26,000 per annum. Elimination would further reduce the deficit to about £18,100 per annum with an interim figure of about £28,000 per annum, but dealing with the large Wolverhampton sewage effluent discharge would be a special problem.

5. On the *Barbridge/Ellesmere Port length* (24½ miles), gross receipts in 1964 were £13,466 including £2,088 from pleasure craft and £9,432 from water sales. Direct costs were £16,066 (£656 per mile). The deficit was £9,320. If this length were to be converted to a water channel, the deficit would be reduced to about £4,400 per annum. If the length were to be eliminated the deficit would be about £7,800 per annum, with an interim figure of about £13,400 per annum. From the amenity and water sales points of view, the length would have to be considered in two parts, Barbridge to Chester and Chester to Ellesmere Port respectively.

Appendix 5

FINANCIAL SUMMARY

(Autherley—Barbridge—Middlewich)

	1963	1964	<i>Water</i>	<i>Elimination</i>	
	£	£	<i>Channel</i>	<i>Final</i>	<i>Interim</i>
			£ p.a.	£ p.a.	£ p.a.
Receipts—Craft	4,591	4,743	—	—	—
Water	—	—	—	—	—
Other	4,516	4,060	4,700	2,000	2,000
Total	9,107	8,803	4,700	2,000	2,000
Expenditure—Direct	34,447	43,718	20,300	—	10,100
Other	15,525	15,082	10,400	20,100	19,900
Total	49,972	58,800	30,700	20,100	30,000
<i>Deficit</i>	<u>40,865</u>	<u>49,997*</u>	<u>26,000</u>	<u>18,100</u>	<u>28,000</u>
Direct costs per mile	<u>662</u>	<u>841</u>	(say) <u>390</u>		

* £40,000 would be a more normal figure—see paragraph 4.

Category: Y

(Barbridge—Ellesmere Port)

Receipts—Craft	1,994	2,122	—	—	—
Water	8,822	9,432	9,000	—	—
Other	2,127	1,912	2,000	900	900
Total	12,943	13,466	11,000	900	900
Expenditure—Direct	16,451	16,066	10,600	—	5,300
Other	6,973	6,720	4,800	8,700	9,000
Total	23,424	22,786	15,400	8,700	14,300
<i>Deficit</i>	<u>10,481</u>	<u>9,320</u>	<u>4,400</u>	<u>7,800</u>	<u>13,400</u>
Direct costs per mile	<u>671</u>	<u>656</u>	(say) <u>430</u>		

Category: Y

SHROPSHIRE UNION CANAL—LLANGOLLEN BRANCH

1. The Llangollen Branch—by common consent in the “first three” of the Board’s most beautiful waterways and including Telford’s aqueduct at Pontcysyllte—extends 46 miles from Llantisilio to Hurleston, where it joins the Shropshire Union main line. The Prees Branch is a further $3\frac{3}{4}$ miles. There are 21 narrow locks. Though statutorily closed to navigation, the canal is much used by pleasure craft and also serves as a major water channel, conveying waters taken from the River Dee at Llantisilio to the Hurleston Reservoir for the Mid and South-East Cheshire Water Board.

2. In 1964, gross receipts of £45,151 included £43,032 water sales and £622 from pleasure craft. The pleasure craft figure relates to craft based on the canal, and therefore does not fully reflect its great popularity for holiday cruising. Direct costs totalled £30,152 (£603 per mile); this figure reflects the water control, dredging and bank maintenance work required to secure the safe passage of large quantities of water throughout its length. The surplus (adjusted) was £6,399.

3. If the canal were to be converted to a water channel, direct costs would reduce slightly to about £27,800 (£560 per mile) per annum. The surplus would be about £8,300 per annum. This apparent slight improvement in the surplus, however, is somewhat unrealistic, as the pleasure craft revenues which would be foregone are undoubtedly understated for the reasons mentioned in the preceding paragraph; many craft based on other waterways are licensed with a main view to a cruising holiday on the Llangollen Branch.

4. The question of elimination does not arise on this profitable canal, which is already operated and maintained largely as a major water channel. Substantial pleasure craft revenues undoubtedly also accrue—though for the most part indirectly.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	685	643	—	Not applicable see para. 4	
Water	33,617	43,032	43,000		
Other	1,544	1,476	1,500		
Total	<u>35,846</u>	<u>45,151</u>	<u>44,500</u>		
Expenditure—Direct	30,468	30,152	27,800		
Other	11,284	8,600*	8,400		
Total	<u>41,752</u>	<u>38,752*</u>	<u>36,200</u>		
Surplus or <i>Deficit</i>	<u>5,906</u>	<u>6,399</u>	<u>8,300</u>		
Direct costs per mile	<u>609</u>	<u>603</u>	(say) 560		

* Adjusted.

Category: Y

Appendix 5

SHROPSHIRE UNION CANAL—MONTGOMERY, NEWPORT, etc. BRANCHES

1. This note covers two groups of branches of the Shropshire Union Canal:
 - (i) The Montgomery Branch, from Newtown to Frankton Junction (on the Llangollen Branch), which with the Weston and Guilsfield Arms was formerly 43½ miles in length.
 - (ii) The Shrewsbury, Newport and Trench Branches from Shrewsbury to the main line at Norbury Junction, which formerly totalled 28¾ miles in length.

2. All were closed to navigation by the L.M.S. (Canals) Act 1944, which imposed conditions regarding their future upkeep but provided generally for the dewatering and transfer of the site subject to the prior approval of the Ministry of Agriculture and Fisheries and the appropriate River Authority. A number of such agreed disposals have been effected over the years; lengths of canal have been piped or dewatered; the majority of the locks have been weired; bridges have been transferred to highway authorities and replaced by embanked crossings; and the process continues.

3. The branches were the subject of reports to the Redevelopment Committee in 1960. On the Montgomery Branch, the Committee recommended that lengths where there existed no immediate need of elimination should be kept in water for the time being and maintained at the minimum expense consistent with the avoidance of danger and nuisance. On the Shrewsbury, etc. branches they endorsed the continuance of negotiations with local farmers with a view to the formulation of schemes of redevelopment for agricultural use.

4. As explained above, the branches are no longer continuous waterways. The process of agreed redevelopment under the terms of the 1944 Act is well advanced, and has gone beyond the point where any general "unscrambling" would be practicable. Restoration would be somewhat costly. The financial position has recently been improved by the negotiation of a new agreement increasing water revenues significantly. The water sales arise on the short Trench Branch (where the Shrewsbury and Newport Branches meet), which in any event it would seem best to retain as a water channel from the Trench Reservoir.

5. Elimination or redevelopment has been in progress for a long time on these branches but under the accounting arrangements of the British Transport Commission past expenditure of this nature has not been charged against the waterway and is not reflected in the figures shown.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	37	51	—	Not applicable	
Water	3,135	1,584	8,000	see paragraphs	
Other	1,627	1,641	1,000	2 to 5	
Total	4,799	3,276	9,000		
Expenditure—Direct	7,105	7,018	8,500		
Other	4,677	2,472	3,800		
Total	11,782	9,490	12,300		
<i>Deficit</i>	6,983	6,214	3,300		

Direct costs per mile. Not applicable because of state of redevelopment in certain areas.

Category: Z

RIVER SOAR NAVIGATION

1. The River Soar Navigation extends 25 miles from West Bridge, Leicester, where it is joined by the Grand Union Canal (Leicester Section), to Trent Junction, where it joins the River Trent. From the 1930's until 1947 it formed part of the Grand Union Canal Company's undertaking. A short length in Leicester is the responsibility (for most purposes) of Leicester Corporation. There are 18 wide locks. The navigation passes through attractive open country and is popular with pleasure craft both for cruising and mooring, particularly between Loughborough and the Trent, but there is no commercial traffic. Water supplies derive mainly from the River Soar and its tributaries and from storm water discharges in built-up areas. In rainy seasons the flood prevention role is important. At a number of points the natural river passes in and out of the navigation, necessitating dredging of the shoals, and there are also dykes and drains which are the responsibility of the navigation. There are a number of water sales, for the most part in Leicester and Loughborough, but the revenue from these will be lost as a result of the Water Resources Act 1963.

2. In 1964, gross receipts of £4,985 included £2,430 from pleasure craft and £1,002 from water sales. Operating, dredging and maintenance direct costs totalled £13,984 (£559 per mile). The deficit was £15,268. (Recoverable works for third parties have been excluded from both receipts and expenditure). Excluding water sales revenue to be foregone under the Water Resources Act, the deficit would have been £16,270.

3. If the navigation were to be converted to a water channel, direct costs would reduce to about £9,600 (£380 per mile) per annum, but pleasure craft revenues would be lost. The deficit would fall to about £13,500 per annum. These are disappointing figures—particularly on a river where no water sales revenue will accrue. Any extensive modification of the present arrangements for the passage of water through the built-up areas would raise very considerable problems needing special study in conjunction with the River Authority. The question of elimination does not arise, in view of the natural river flow.

FINANCIAL SUMMARY

	1963*	1964*	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	2,764	2,515	—	Not applicable see para. 3	
Water	1,026	1,002	—†		
Other	757	1,468	900		
Total	4,547	4,985	900		
Expenditure—Direct	18,020	13,984	9,600		
Other	6,997	6,269	4,800		
Total	25,017	20,253	14,400		
<i>Deficit</i>	<i>20,470</i>	<i>15,268</i>	<i>13,500</i>		
Direct costs per mile	721	559	(say) 380		

* Adjusted—see paragraph 2.

† Water Resources Act 1963—see paragraphs 2 and 3.

Category: Y

STAFFORDSHIRE & WORCESTERSHIRE CANAL (NORTH)

1. The northern section of the Staffordshire & Worcestershire Canal extends $20\frac{1}{2}$ miles from Autherley Junction (connections with Shropshire Union, B.C.N.—at Aldersley, nearby—and Staffordshire & Worcestershire (South)) to Great Haywood Junction on the Trent & Mersey Canal. It is a narrow canal, with 12 locks, a popular pleasure craft route passing through pleasant countryside. There is no commercial traffic. Water supplies arise from the Gailey and Calf Heath reservoirs, which are fed by the disused Hatherton Branch. In addition, there is a substantial intake of purified sewage effluent at Wolverhampton. These supplies all arise on the top pound between Autherley and Gailey, and can be passed downwards either to the Trent & Mersey at Great Haywood, or to the Shropshire Union or to the southern section of the Staffordshire & Worcestershire Canal at Autherley. There is a substantial revenue from water sales.

2. In 1964, there were exceptional and non-recurring items of receipts and expenditure. Taking a normal year based on 1964, gross receipts of about £13,000 include £10,000 from water sales, £1,100 from fishing and £750 from pleasure craft. Operating, dredging and maintenance direct costs total about £9,000 (£439 per mile) per annum. The net result is a small deficit.

3. If the canal were to be converted to a water channel, direct costs would be reduced to about £5,700 (£280 per mile) per annum. The surplus would be about £3,300 per annum.

4. This is an attractive and popular canal which at present almost breaks even and which would earn a modest surplus as a water channel. The question of elimination, therefore, does not arise except that, dependent on the decision taken in respect of the Trent & Mersey Canal, it might possibly be terminated short of Great Haywood Junction; this would need to be examined on its merits.

FINANCIAL SUMMARY

	1963	1964*	Water Channel	Elimination	
	£	£	£ p.a.	Final £ p.a.	Interim £ p.a.
Receipts—Craft	700	732	—	Not	
Water	9,963	9,983	10,100	applicable	
Other	1,628	8,008	1,900	see para. 4	
Total	12,291	18,723	12,000		
Expenditure—Direct	10,125	1,629	5,700		
Other	4,153	10,363	3,000		
Total	14,278	11,992	8,700		
Surplus or <i>Deficit</i>	1,987	6,731	3,300		
Direct costs per mile	494	79	(say) 280		

* Exceptional. See paragraph 2.

Category: Y

STAFFORDSHIRE & WORCESTERSHIRE CANAL (SOUTH)

1. The southern section of the Staffordshire & Worcestershire Canal extends $25\frac{3}{4}$ miles from Autherley Junction (connections with Shropshire Union, B.C.N.—at Aldersley, nearby—and Staffordshire & Worcestershire (North)) to Stourport where it joins the River Severn. At Stourton Junction it is joined by the Stourbridge Canal. Passing through pleasant countryside, it forms an attractive route to the Severn from both the Wolverhampton and Birmingham areas and, though carrying no commercial traffic, is very popular for mooring and cruising. Stourport Basin, at the junction with the Severn, is one of the Board's most successful yacht basins and mooring sites. There are 33 narrow locks, all descending to the Severn. Water supplies are fed from the northern section at Autherley and from the Stourbridge Canal at Stourton, and pass out into the Severn. Supplies can also be taken from the B.C.N. There is very little revenue from water sales, nor apparent scope for increasing this.

2. Excluding Stourport Basin, gross receipts in 1964 were £5,798, including £1,984 from pleasure craft. If this figure reflected the number of craft using the canal for holiday cruising and so on, it would undoubtedly be higher. Water sales were only £324. Operating, dredging and maintenance direct costs totalled £15,547 (£604 per mile). The deficit was £15,443.

3. If the canal were converted to a water channel (but retaining pleasure craft facilities at Stourport Basin), direct costs would fall to about £9,000 (£350 per mile) per annum. The deficit would be about £11,700 per annum.

4. Elimination of the canal (but retaining Stourport Basin) would further reduce the deficit to about £8,300 per annum, with an increase to about £12,300 per annum in the interim period.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i>	<i>Elimination</i>	
	£	£	£ p.a.	<i>Final</i>	<i>Interim</i>
				£ p.a.	£ p.a.
Receipts—Craft	1,988	2,000	—	—	—
Water	355	324	300	—	—
Other	2,392	3,474	1,500	1,400	1,400
Total	4,735	5,798	1,800	1,400	1,400
Expenditure—Direct	17,954	15,547	9,000	—	4,500
Other	5,690	5,694	4,500	9,700	9,200
Total	23,644	21,241	13,500	9,700	13,700
<i>Deficit</i>	<u>18,909</u>	<u>15,443</u>	<u>11,700</u>	<u>8,300</u>	<u>12,300</u>
Direct costs per mile	<u>697</u>	<u>604</u>	(say) 350		

All figures exclude Stourport Basin.

Category: Y

RIVER STORT NAVIGATION

1. The River Stort Navigation extends $13\frac{3}{4}$ miles from Bishops Stortford to its junction with the Lee Navigation at Fieldes Weir, near Hoddesdon. It carries no commercial traffic but has a fair use by pleasure craft, which however need only pay for the use of locks. Its waters join the Lee Navigation, from which supplies are abstracted by the Metropolitan Water Board. Its service as a flood channel is recognised by the Lee Conservancy Catchment Board, who contribute one half of all operating, dredging and maintenance direct costs. The figures shown under these headings accordingly represent 50% of actual total outgoings. There are 15 locks, all of which have to be attended for flood control purposes, although lock-keepers attend one or more locks as appropriate. Most of the lock gates have been renewed in recent years.

2. In 1964, gross receipts were only £751, of which £234 was from pleasure craft and £32 from water sales. The Board's 50% proportion of direct costs was £6,008 (£437 per mile). The deficit was £7,181.

3. Water sales arising directly on the Stort are negligible, but as already stated the waters contribute to the Metropolitan Water Board abstraction. If the navigation were to be converted to a water channel, the Board's 50% proportion of direct costs would fall to about £5,200 (£380 per mile) per annum. The deficit would be about £7,000 per annum. The smallness of the apparent saving reflects the fact that most of the work undertaken would still be required for the purposes of water control.

4. The question of elimination does not arise, in view of the natural river flow.

FINANCIAL SUMMARY

	1963	1964	Water Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	287	274	—	Not applicable see para. 4	
Water	27	32	100		
Other	389	445	400		
Total	703	751	500		
Expenditure—Direct*	11,974	6,008	5,200		
Other	2,689	1,924	2,300		
Total	14,663	7,932	7,500		
Deficit	13,960	7,181	7,000		
Direct costs per mile*	871	437	(say) 380		

* 50% of actual outgoings—see paragraph 1.

Category: Y

STOURBRIDGE CANAL

1. The Stourbridge Canal extends for $5\frac{1}{4}$ miles from Black Delph, where it connects with the B.C.N., to Stourton Junction where it joins the Staffordshire & Worcestershire Canal. The Fens Branch ($\frac{3}{4}$ mile) connects the main line to the Fens Pools Reservoirs, and also gives access to the last remaining $\frac{1}{4}$ mile of the Stourbridge Extension Canal. There is also the Stourbridge Arm ($1\frac{1}{4}$ miles).

2. Water supplies are obtained from the Fens Pools Reservoirs and also from the B.C.N., and finally feed into the Staffordshire & Worcestershire Canal. There are 20 locks on the Stourbridge Canal and a stoplock on the Extension Canal. The canal passes partly through pleasant country and forms the shortest link between Birmingham and the Severn. For some years, however, navigation has been prevented by the poor condition of the Sixteen Locks, the restoration of which is now being undertaken in conjunction with the Staffordshire and Worcestershire Canal Society.

3. In 1964, gross receipts were only £1,929 of which £1,338 was water sales. Maintenance was on virtually an "existence" basis, and direct costs were only £237 (£31 per mile). The surplus was £277, but the figures merely reflect the absence of maintenance expenditure. Over recent years the general condition of the canal has fallen below the standards that would be acceptable on a long term basis.

4. In view of the restoration work with which the Board are associated, they would obviously be reluctant to consider converting the canal into a water channel. If, however, this were to be undertaken, it is envisaged that the Stourbridge Arm and the remainder of the Stourbridge Extension Canal would be eliminated, leaving only the main line and Fens Branch, totalling six miles, to be converted. If this were done, the deficit would be about £2,700 per annum.

5. If the whole of the canal and branches, etc. were to be eliminated, the deficit would be about £2,300 per annum, with an increase to about £3,900 per annum in the interim period.

FINANCIAL SUMMARY

	1963	1964	Water* Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	13	31	—	—	—
Water	1,515	1,338	1,200	—	—
Other	517	560	600	600	600
Total	2,045	1,929	1,800	600	600
Expenditure—Direct	2,541	237	2,400	—	1,200
Other	2,521	1,415	2,100	2,900	3,300
Total	5,062	1,652	4,500	2,900	4,500
Surplus or Deficit	3,017	277	2,700	2,300	3,900
Direct costs per mile	339	31	(say) 400		

* Six miles only, remainder eliminated—see paragraph 4.

Category: Y

STRATFORD-ON-AVON CANAL (NORTH)

1. The northern section of the Stratford-on-Avon Canal extends for 12½ miles from King's Norton Junction on the Worcester & Birmingham Canal to Kingswood Junction on the Grand Union. The first ten miles to Lapworth are on a level with the top of the Worcester & Birmingham Canal (and B.C.N.), and are also supplied by the reservoirs at Earlswood. The canal then descends to Kingswood Junction by the Lapworth flight of 19 locks. Except at the King's Norton end the canal passes through pleasant country, and has a fair amount of use by pleasure craft. It carries no commercial traffic.

2. In 1964, gross receipts of £4,169 included £2,446 water sales and £1,108 pleasure craft. Operating, dredging, and maintenance direct costs totalled £10,033 (£803 per mile). The deficit was £7,447.

3. If the canal were to be converted to a water channel, direct costs would fall to about £4,100 (£330 per mile) per annum. The deficit would be reduced to about £3,600 per annum.

4. Elimination would result in a deficit of about £4,200 per annum, with an interim figure of about £5,700 per annum. Elimination would therefore prove more costly than preservation as a water channel. The water feed from the Earlswood reservoirs to the Grand Union system would be foregone, and elimination would also complicate the Board's liability to supply water to the southern section of the canal, from Kingswood to Stratford-on-Avon, now owned and managed by the National Trust.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	1,301	1,108	—	—	—
Water	2,035	2,446	2,000	—	—
Other	523	615	500	500	500
Total	3,859	4,169	2,500	500	500
Expenditure—Direct	8,590	10,033	4,100	—	2,000
Other	3,926	1,583	2,000	4,700	4,200
Total	12,516	11,616	6,100	4,700	6,200
<i>Deficit</i>	<i>8,657</i>	<i>7,447</i>	<i>3,600</i>	<i>4,200</i>	<i>5,700</i>
Direct costs per mile	687	803	(say) 330		

Category: Y

SWANSEA CANAL

1. The Swansea Canal originally extended from Abercrave to Swansea Docks, but traffic ceased many years ago. Some three miles at the southern end were closed to navigation under various Acts between 1928 and 1957, and a short length at the northern end in 1946, and parts of these were sold or transferred. The length now remaining in the Board's ownership is $13\frac{1}{4}$ miles. As the Redevelopment Committee agreed, the canal is of no value as a navigation or for recreation or amenity, and it is in a poor condition for much of its length. Its only use is for industrial water supply at the southern end. This length of about nine miles derives its water from the Rivers Tawe and Clydach. The northern length of about $4\frac{1}{4}$ miles is almost entirely dewatered and derelict and serves no useful purpose.

2. The Redevelopment Committee recommended in 1960 that the upper section should be eliminated, adding that the cost would be worth incurring to avoid the continuing nuisance of a derelict waterway. They also recommended that the lower section should be retained, and adapted as necessary, for use as a water channel. The prerequisite relief from statutory obligations was obtained by the British Transport Commission in 1962. The transfer of a two-mile length to Glamorgan County Council for a road improvement has been negotiated, and progress has been made on a scheme for part of the upper section.

3. Due to its substantial water sales and its low standard of maintenance, the canal incurs only a small deficit. In 1964, gross receipts of £6,106 were very largely from water sales. Direct costs were £4,062 (£307 per mile). The deficit was £502.

4. If the top $4\frac{1}{4}$ miles were eliminated and the remainder converted for use as a water channel, there would be a deficit of about £2,800 per annum. Total elimination would result in a much increased deficit—of about £4,900 per annum with an interim figure of about £8,000 per annum—and is not realistic.

5. The facts point to the elimination of the top section while retaining the lower section as a water channel, on the lines recommended by the Redevelopment Committee.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water*</i> <i>Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	—	—	—	—	—
Water	5,743	5,573	4,900	—	—
Other	367	533	500	500	500
Total	6,110	6,106	5,400	500	500
Expenditure—Direct	3,273	4,062	3,500	—	1,700
Other	2,991	2,546	4,700	5,400	6,800
Total	6,264	6,608	8,200	5,400	8,500
<i>Deficit</i>	<i>154</i>	<i>502</i>	<i>2,800</i>	<i>4,900</i>	<i>8,000</i>
Direct costs per mile	247	307	(say) 390		

* Nine miles only, remainder eliminated—see paragraph 4.

Category: Z

TRENT & MERSEY CANAL

1. The Trent & Mersey Canal extends from Preston Brook, where it connects with the Manchester Ship Canal Company's Bridgewater Canal, to Derwent Mouth where it joins the Trent Navigation. The main line is about 93 miles, there also being the Caldon and Leek Branches totalling 21½ miles, and the short Hall Green Branch, while the length of Coventry Canal from Fradley to Huddlesford (4 miles) is also included for administrative convenience. In addition to the connections at Preston Brook and Derwent Mouth, the canal connects with the Weaver (via the lift at Anderton); with the Shropshire Union at Middlewich; with the Macclesfield Canal at Hardingswood (via the Hall Green Branch); with the Caldon Branch at Etruria (near Stoke); with the Staffordshire & Worcestershire Canal at Great Haywood, and with the Coventry Canal at Fradley. The restoration of all or part of the Caldon Branch has recently been the subject of investigation and discussion.

2. Water supplies derive mainly from the Rudyard, Knypersley and Stanley reservoirs on the Caldon Branch which feeds into the summit pound of the main line at Etruria. From the summit the canal falls continuously both northwards and southwards. The reservoir supplies are supplemented by a number of important feeders throughout its length, including the River Trent below Fradley, and by the feeds from the Shropshire Union, Macclesfield, and Staffordshire & Worcestershire Canals. It also connects with the Coventry Canal. There are substantial industrial water sales, mainly in the Potteries and Middlewich areas.

3. One of the earliest (Brindley) Canals, it formerly had an extensive narrow boat traffic between the Potteries and the Mersey, but in recent years this has declined severely and is now only small. The later and better engineered (Telford) Shropshire Union route became preferred as a route to the Midlands, and this position is still reflected in that whilst the Trent & Mersey Canal is in fair condition, it is not comparable as a navigation with the main line of the Shropshire Union. The canal has a fair use by pleasure craft both for mooring and (by virtue of its many connections) as a cruising route, the length between the summit and Middlewich being the most used. The canal is relatively costly to maintain. It is subject to brine subsidence in the mid-Cheshire area and to extensive mining subsidence in the Rugeley and Stoke areas. Subsidence is likely to develop further to very substantial proportions over the next few years, especially around Armitage and Rugeley.

4. Figures of receipts and expenditure for past years are available in two parts only—Preston Brook to Burton (Dallow Lane Lock), and Burton to Derwent Mouth—and are commented on separately below. For present purposes, water channelling and elimination costs for Preston Brook to Burton have been subdivided at Trentham Lock, a few miles south of Etruria.

Preston Brook to Burton (Dallow Lane Lock)

In 1964, gross receipts of £50,888 included £35,893 from water sales. The bulk of the water sales arose on the northern length above Trentham Lock, as did the whole of the revenue from commercial traffic (£1,563) and the bulk of that from pleasure craft (£4,147). Direct costs on the northern length were £47,750 (£770 per mile) and on the southern length were £20,991 (£509 per mile). The deficit for the whole length was £42,442.

If the length north of Trentham Lock (62 miles) were to be converted to a water channel, its deficit would be about £12,200 per annum. The corresponding deficit for the length south of Trentham Lock (41½ miles) would be about £12,900 per annum. The combined deficit would therefore be reduced to about £25,100 per annum.

In the event of elimination, the deficits would be about £19,700 (northern) and £12,600 (southern) per annum, a total of about £32,300 per annum, with interim figures of about £39,300 and £18,900 per annum respectively, totalling about £58,200 per annum.

Conversion of the whole length to a water channel would therefore effect a substantial reduction in the deficit. On the southern—but not the northern—length there would be a further very small saving if the length were eliminated.

Burton (Dallow Lane Lock) to Derwent Mouth

The 16¾ miles length from Burton (Dallow Lane Lock) to Derwent Mouth has six wide (13' 6") locks. There is a fair use by pleasure craft, but no regular commercial traffic. Its water sales are almost all in Burton. In 1964, gross receipts were £4,467, including £3,240 from water sales. Direct costs were £8,769 (£523 per mile). The deficit was £8,153, but taking the

three years 1963, 1964, and 1965 (Budget), a deficit of say £7,000 would be a more normal figure.

If the length were to be converted to a water channel, the deficit would be reduced to about £5,000 per annum. If the length were to be eliminated, the deficit would be about the same, with an interim figure of about £8,300 per annum.

5. The future of the Trent & Mersey Canal has, of course, to be considered in conjunction with the numerous other canals with which it connects. The current total deficit of about £50,000 per annum would be reduced to about £30,000 per annum if the whole canal were converted to water channel. On the length between Trentham Lock and Burton (Dallow Lane) there would be a further marginal saving from elimination; this might well become more than marginal (in relation to the Fradley-Great Haywood length) because of the mining developments referred to in paragraph 3.

FINANCIAL SUMMARY Preston Brook to Burton

	1963 £	1964 £	Water Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	5,444	5,742	—	—	—
Water	35,898	35,893	36,000	—	—
Other	8,372	9,253	8,000	5,000	5,000
Total	49,714	50,888	44,000	5,000	5,000
Expenditure—Direct	52,833	68,741	46,900	—	23,500
Other	27,651	24,589	22,200	37,300	39,700
Total	80,484	93,330	69,100	37,300	63,200
Deficit	30,770	42,442	25,100	32,300	58,200
Direct costs per mile	513	667	(say) 460		

Category: X (Preston Brook to Trentham)
Y (Trentham to Burton)

Burton to Derwent Mouth

Receipts—Craft	908	865	—	—	—
Water	3,587	3,240	3,500	—	—
Other	621	362	300	300	300
Total	5,116	4,467	3,800	300	300
Expenditure—Direct	6,661	8,769	5,300	—	2,600
Other	3,802	3,851	3,500	5,300	6,000
Total	10,463	12,620	8,800	5,300	8,600
Deficit	5,347	8,153*	5,000	5,000	8,300
Direct costs per mile	398	523	(say) 310		

* £7,000 would be a more normal figure—see paragraph 4.

Category: Y

TRENT NAVIGATION (UPPER)

1. The upper portion of the Trent Navigation extends $13\frac{1}{2}$ miles from Shardlow (Wilden Ferry) to Nottingham (Meadow Lane) where the portion extensively used for transport begins. It also connects with the Trent & Mersey Canal at Derwent Mouth, and with the River Soar and the Erewash Canal at Trent Junction. Above Trent Junction there are two artificial cuts (Sawley Cut and Cranfleet Cut), while the route through Nottingham comprises the Beeston Canal ($2\frac{1}{2}$ miles) and a $2\frac{1}{2}$ -mile length of the former Nottingham Canal. There are no reservoirs and no water supply problems; indeed, the emphasis is on flood prevention and a number of works have been carried out on the river by the Trent River Authority in the Sawley, Cranfleet and Beeston areas. There are substantial water sales on the Beeston Canal and Nottingham Canal, the revenue from which will be retained when the River Trent itself is "excluded" from the provisions of Section 131 of the Water Resources Act 1963. There is virtually no commercial traffic, but the river is popular for cruising, and for mooring in the cuts and elsewhere.

2. Mainly for flood control reasons, lock-keepers are stationed at five of the seven wide locks. Considerable dredging is required to remove river shoals. Substantial expenditure has been incurred on the weirs and other protection works in recent years, and further works will be required over the next few years. Not surprisingly the navigation is costly to operate, dredge, and maintain, and it incurs a heavy deficit.

3. In 1964, gross receipts of £9,344 included £3,969 pleasure craft and £3,166 water sales. Operating, dredging and maintenance direct costs totalled £23,862 (£1,786 per mile). The deficit was £24,297.

4. If the navigation were to be converted to a water channel, direct costs would fall to about £10,200 (£750 per mile) per annum, and the deficit to about £12,000 per annum.

5. The question of elimination does not arise on the river navigation portion. Elimination of the Beeston Canal and Nottingham Canal portion would be possible, but, as mentioned above, there is a substantial water sales revenue arising on these lengths.

FINANCIAL SUMMARY

	1963 £	1964 £	Water Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	3,839	4,067	—	Not applicable see para. 5	
Water	2,758	3,166	2,700		
Other	2,291	2,111	1,300		
Total	<u>8,888</u>	<u>9,344</u>	<u>4,000</u>		
Expenditure—Direct	20,778	23,862	10,200		
Other	11,268	9,779	5,800		
Total	<u>32,046</u>	<u>33,641</u>	<u>16,000</u>		
Deficit	<u>23,158</u>	<u>24,297</u>	<u>12,000</u>		
Direct costs per mile	<u>1,539</u>	<u>1,768</u>	(say) 750		

Category: Y

UNION CANAL

1. The Union Canal between Edinburgh and Falkirk (31 miles) was formerly connected to the Forth & Clyde Canal at Falkirk by a flight of 11 locks. These locks were closed in 1936 and the canal as it now exists has no locks within its length. The canal has recently been closed to navigation under a Scottish Order made under the Private Legislation Procedure (Scotland) Act 1936.

2. Water supplies derive from the waters of the River Almond and from a reservoir at Cobbinshaw and the canal is extensively used for industrial water supplies. Supplies are also being made available to the Edinburgh Corporation Water Department direct from the reservoir.

3. Water sales are being steadily developed and in 1964 accounted for £24,406 out of total receipts of £25,154. These figures, however, included certain retrospective payments. Revenue in a normal year should amount to about £16,000 and allowing for expenses at about £12,500 would result in a surplus of about £3,500 per annum.

4. Although there are likely to be a series of schemes for short lengths of piping in connection with road proposals, a general elimination of the canal by infilling would be unrealistic in view of the surplus being made from water sales.

FINANCIAL SUMMARY

	1963	1964	<i>Water Channel</i> £ p.a. See para. 3	<i>Elimination</i>	
	£	£		<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	5	—		Not applicable	
Water	11,686	24,406		See para. 4	
Other	809	748			
Total	12,500	25,154			
Expenditure—Direct	8,492	9,817			
Other	1,319	1,076			
Total	9,811	10,893			
Surplus	2,689	14,261*			
Direct costs per mile	272	314			

* £3,500 would be a more normal figure—see paragraph 3.

Category: Z

RIVER URE NAVIGATION

1. The River Ure Navigation extends for eight miles from Oxclose Lock (junction with Ripon Canal) to Swale Nab (junction with Rivers Swale and Ouse). There are two locks, both wide. There is an intermittent local commercial traffic and a fair use by pleasure craft, who pay for the use of the locks. Pleasure cruising might increase if Linton Lock on the River Ouse were restored to use.

2. Little maintenance is required, and this has been confined to the activities of one man, supplemented by occasional minor contract jobs. In 1964, gross receipts of £493 included £98 water sales which will cease to be receivable as the River Ure is excluded from the provisions of Section 131 of the Water Resources Act 1963. Direct costs were £1,835 (£229 per mile)—but these included some exceptional expenditure—and the deficit was £1,677.

3. If the navigation were to be converted to a water channel, costs would be slightly reduced but one man would still be required. The deficit would be about £1,200 per annum. The question of elimination does not arise in view of the natural river flow.

4. The future of this waterway—and of the Ripon Canal above it—as a navigation turns largely on the question of the future of the River Ouse (at present navigable to Linton Lock, above York, and not vested in the Board). Meanwhile, costs are so low that there would be little to be gained by disturbing the present position.

FINANCIAL SUMMARY

	1963 £	1964 £	<i>Water Channel</i> £ p.a.	<i>Elimination</i>	
				<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	305	321	—	Not applicable see para. 4	
Water	101	98	—*		
Other	35	74	100		
Total	441	493	100		
Expenditure—Direct	517	1,835	900		
Other	315	335	400		
Total	832	2,170	1,300		
<i>Deficit</i>	<i>391</i>	<i>1,677</i>	<i>1,200</i>		
Direct costs per mile	65	229	(say) 110		

* Water Resources Act 1963—see paragraph 2.

Category: Y

WITHAM NAVIGATION

1. The Witham Navigation extends for $31\frac{3}{4}$ miles from Lincoln to Boston. Passing through the Lincolnshire fenlands, it is lined on each side by high embankments and is therefore somewhat unattractive for cruising. There is no shortage of water and a considerable excess in times of floods, the passage of which is controlled by sluices under the supervision of the River Authority. Under the Lincolnshire River Board (River Witham) Transfer Order, 1962, maintenance of the majority of the banks was transferred to the River Authority. A wide, deep waterway, it carries a little commercial traffic from the Fossdyke Navigation at the Lincoln end. It is relatively little used by pleasure craft except for moorings at and near Boston. There are only three locks—at Lincoln, Bardney (eight miles from Lincoln) and Boston.

2. In 1964, receipts were £5,518 of which £4,525 was from water sales. Revenues from this source will cease because the Witham becomes an excluded river under Section 131 of the Water Resources Act 1963. Direct costs totalled £10,476 (£330 per mile). Rents payable include an annual payment of £10,545 to the Company of Proprietors of the Witham Navigation under their 999-year lease of 1850 to the Great Northern Railway Company. As in the case of the Fossdyke, this payment is totally unsupported by revenues. The deficit was £19,310.

3. There would be little or no advantage to the Board in converting the navigation to a water channel, as the water revenues will be lost because of the Water Resources Act. However, direct costs would fall to about £4,500 (£150 per mile) per annum, and the deficit would be slightly reduced to about £18,300 per annum. It will be appreciated, however, that on this river navigation which is also the major flood relief channel for the large fenland area through which it passes, the principle of weiring locks would be inappropriate. Arrangements would have to be made in conjunction with the River Authority for the provision and operation of flood control weirs and sluices, etc.

4. For similar reasons, the question of elimination does not arise.

FINANCIAL SUMMARY

	1963 £	1964 £	Water Channel £ p.a.	Elimination	
				Final £ p.a.	Interim £ p.a.
Receipts—Craft	316	407	—	Not applicable see paras. 3 and 4	
Water	8,218	4,525	—*		
Other	544	586	500		
Total	9,078	5,518	500		
Expenditure—Direct	6,137	10,476	4,500		
Other	14,120	14,352	14,300		
Total	20,257	24,828	18,800		
Deficit	11,179	19,310	18,300		
Direct costs per mile	193	330	(say) 150		

* Water Resources Act 1963—see paragraph 3.

Category: Y

WORCESTER & BIRMINGHAM CANAL

1. The Worcester & Birmingham Canal, extending for 30 miles from Birmingham (Worcester Bar) to Worcester (Diglis), provides one of the three routes from the B.C.N. system to the River Severn. (The second route is via the Stourbridge Canal and the Staffordshire & Worcestershire Canal, while the third is from Wolverhampton along the Staffordshire & Worcestershire Canal throughout). Between King's Norton (where there is a connection to the Stratford-on-Avon Canal) and the outskirts of Worcester it passes through pleasant rural countryside. Water supplies from the B.C.N. and from reservoirs and other sources are adequate. There are 58 locks (all between Tardebigge and Worcester), a large number of bridges, five tunnels (totalling $2\frac{1}{2}$ miles in length) and eight aqueducts. There is no commercial traffic except just at the Birmingham end, but the canal is popular with pleasure craft to whom the locks and slow passage prove less of a deterrent. Diglis Basin, at the junction with the Severn, is a popular yacht basin and mooring site.

2. Receipts of £9,508 in 1964 included £3,330 from pleasure craft and £2,921 from water sales. The physical character of the canal makes its maintenance cost higher than comparable but simpler canals. Operating, dredging, and maintenance direct costs totalled £24,040 (£801 per mile). The deficit was £22,592. The figures for both receipts and expenditure include Diglis Basin.

3. If the canal were converted to a water channel (but retaining pleasure craft facilities at Diglis Basin), direct costs would fall to about £13,600 (£450 per mile) per annum, and the deficit to about £13,800 per annum.

4. Elimination of the canal (but retaining Diglis Basin) would reduce the deficit to about £9,000 per annum with an interim figure of about £15,900 per annum.

FINANCIAL SUMMARY

	1963	1964	<i>Water*</i> <i>Channel</i>	<i>Elimination*</i>	
	£	£	£ p.a.	<i>Final</i> £ p.a.	<i>Interim</i> £ p.a.
Receipts—Craft	4,563	4,155	2,000	2,000	2,000
Water	3,107	2,921	2,700	—	—
Other	2,347	2,432	2,300	2,200	2,200
Total	10,017	9,508	7,000	4,200	4,200
Expenditure—Direct	27,580	24,040	13,600	1,000	7,300
Other	10,380	8,060	7,200	12,200	12,800
Total	37,960	32,100	20,800	13,200	20,100
<i>Deficit</i>	<u>27,943</u>	<u>22,592</u>	<u>13,800</u>	<u>9,000</u>	<u>15,900</u>
Direct costs per mile	919	801	(say) 450		

* Assuming retention of pleasure craft facilities at Diglis Basin, Worcester—see paragraphs 3 and 4.

Category: Y

	1963		1964		1965		Water Channel £.p.a.	Elimination		Remarks
	Actual £	Budget £	Actual £	Budget £	Actual £	Budget £		Final £.p.a.	Interim £.p.a.	
GROSS RECEIPTS										
Tolls & Dues—Traffic craft	288		26		25		—	—	—	
" —Pleasure craft	1,191		1,372		1,400		—	—	—	
" —Miscellaneous	38		—		—		—	—	—	
Water Charges	5,186		5,837		5,200	5,200	—	—	—	
Recoverable works and services	98		5		90		—	—	—	
Hire of craft, plant and equipment	16		—		—		—	—	—	
Towage	—		—		—		—	—	—	
Fishing rights	1,406		1,343		1,500	1,500	—	—	—	
Other receipts	437		730		50		—	—	—	
Rents and Wayleaves	1,088		1,148		1,270	1,300	1,300	1,300	1,300	
TOTAL GROSS RECEIPTS	9,748		10,461		9,535	8,000	1,300	1,300	1,300	
EXPENSES										
Operating expenses										
Locks, bridges and weirs	797		840		850		1,000	Cost as per Statement attached—£279,475	½ Water channel costs (less other Administration) £10,950	*Note: Weir control expenses are included under "Water Supply" in 1965 Budget figures.
" " " " —*Staff Expenses	—		—		100					
" " " " —Other Expenses	450		175		600					
" " " " —Staff Expenses	—		—		—					
" " " " —Water	16		3		50					
Ice-breaking	98		72		—		2,500	At 6% per annum = £16,768	½ Elimination costs =£8,400	Add for other Administration =£6,150
" " " " —Staff Expenses	7		15		—					
" " " " —Other Expenses	—		—		—					
" " " " —Staff Expenses	—		—		—					
" " " " —Other Expenses	—		—		—					
Craft, plant and equipment let out on hire	—		—		—		1,500			See statement attached.
Towage	—		—		—					
Miscellaneous	353		162		400					
Dredging	2,976		1,852		3,490	1,500				
Maintenance of Structures	—		—		—					
Normal	16,286		19,156		20,850	12,900	2,000			
Abnormal	—		—		1,500	—				
Special	5,877		4,102		4,400	2,000				
Area Engineers and Section Administration	2,042		2,641		2,130	2,000				
Other administration and retirement benefits	6,950		4,763		5,000	4,100				
Works undertaken for third parties	81		4		60		2,500			
Compensation and Insurance	6		75		500					
Rents (including amortisation)	312		308		300					
Local rates	2,028		1,638		2,260					
Other waterway expenses	95		23		200					
TOTAL EXPENSES	38,374		35,829		42,690	26,000	16,800	25,500		
DEFICIT	28,626		25,368		33,155	18,000	15,500	24,200		
OPERATING, DREDGING AND MAINTENANCE COSTS										
	Per mile		Per mile		Per mile		Per mile			
	£	£	£	£	£	£	£	£		
OPERATING	1,721	35	1,267	26	2,000	41	1,000	20		
DREDGING	2,976	60	1,852	38	3,490	71	1,500	30		
NORMAL MAINTENANCE	16,286	331	19,156	389	20,850	423	12,900	264		
ABNORMAL/SPECIAL MAINTENANCE	5,877	119	4,102	83	5,900	120	2,000	41		
TOTAL	26,860	545	26,377	536	32,240	655	17,400	355		

Waterway Length—NAPTON JUNCTION to OXFORD

Accounting classification—8611

Mileage—49¼

NORMAL MAINTENANCE EXPENDITURE

	<i>Actual</i> 1963 £	<i>Actual</i> 1964 £	<i>Budget</i> 1965 £	<i>Water</i> <i>Channel</i> £.p.a.	<i>Remarks</i>
Locks and Lock Gates } Lock Machinery }	3,889	4,495	5,310	700*	*Interest charges on cost of conversion to weirs, plus subsequent maintenance.
Reservoirs and Feeders } Weirs, Dams and Sluices }	3,239	2,425	2,930	2,700	
Canal and River Banks	2,329	3,845	4,300	3,000	
Towpaths } Hedges and Ditches }	3,192	4,196	2,830	2,000	
Mining Subsidence	—	—	—	—	
Bridges and Tunnels } Bridge Machinery }	2,775	1,389	3,290	2,500	
Craft, Plant and Machinery	167	87	50	100	
Supervision } Transport } Miscellaneous }	268	2,091	1,080	1,200	
Buildings	963	628	1,060	700	
Total	<u>16,286</u>	<u>19,156</u>	<u>20,850</u>	<u>12,900</u>	

ELIMINATION COSTS

Costs for rural narrow canal (*See Appendix 4, paragraph 43*)

	£
Items (a) to (g) and (l): 49¼ miles @ say £4,700 per mile	231,475
Item (h)—Accommodation bridges: 68 @ £300 per bridge	20,400
Item (i)—Public road bridges: 30 @ £400 per bridge	12,000
Item (j)—Lock chambers: 39 @ £400 per lock	15,600
Item (k)—Aqueducts None	—
Total estimated cost of elimination	<u>£279,475</u>
Cost per mile	<u>£5,670</u>

Waterway Length— Ashton Junction to Huddersfield
Accounting Classification— 4511.

HUDDERSFIELD NARROW CANAL
Mileage— 20

	1963 Actual £	1964 Actual £	1965 Budget £	Water Channel £.p.a.	Elimination Final £.p.a.	Interim £.p.a.	Remarks	
GROSS RECEIPTS								
Tolls & Dues—Traffic craft	—	—	—	—			Note—The canal is already maintained	
" —Pleasure craft	—	—	—	—				
" —Miscellaneous	—	—	—	—				
Water Charges	16,120	11,374	11,000	11,400	N	N	as a water channel.	
Recoverable works and services	55	127	—	—				
Hire of craft, plant and equipment	—	—	—	—	O	O		
Towage	—	—	—	—			The Water Channel	
Fishing rights	85	101	100	100	T	T	column shows 1964	
Other receipts	107	8	—	—			figures as adjusted	
Rents and Wayleaves	426	376	450	500			to represent a	
TOTAL GROSS RECEIPTS	<u>16,793</u>	<u>11,986</u>	<u>11,550</u>	<u>12,000</u>			typical year.	
EXPENSES								
Operating expenses								
Locks, bridges and weirs —Staff Expenses	—	1	—	—				
" " —Other Expenses	—	13	—	—	A	A		
Water Supply —Staff Expenses	598	708	700	700				
" " —Water	—	—	—	—	P	P		
" " —Other Expenses	—	—	—	—				
Ice-breaking —Staff Expenses	—	—	—	—	P	P		
" " —Other Expenses	—	—	—	—				
Craft, plant and equipment let out on hire	—	—	—	—	L	L		
Towage	—	—	—	—				
Miscellaneous	—	—	—	—	I	I		
Dredging	—	—	—	500				
Maintenance of Structures					C	C		
Normal	2,648	5,201	4,410	4,000			See statement attached.	
Abnormal	—	—	—	—	A	A		
Special	—	—	—	500				
Area Engineers and Section Administration	275	975	1,240	1,000	B	B		
Other administration and retirement benefits	1,606	2,616	1,200	1,250				
Works undertaken for third parties	38	87	—	—	L	L		
Compensation and Insurance	—	—	—	—				
Rents (including amortisation)	117	55	50	50	E	E		
Local rates	—	—	—	—				
Other waterway expenses	—	—	—	—				
TOTAL EXPENSES	<u>5,282</u>	<u>9,656</u>	<u>7,600</u>	<u>8,000</u>				
SURPLUS	<u>11,511</u>	<u>2,330</u>	<u>3,950</u>	<u>4,000</u>				
OPERATING, DREDGING AND MAINTENANCE COSTS								
	£	Per mile £	£	Per mile £	£	Per mile £	£	Per mile £
OPERATING	598	30	722	36	700	35	700	35
DREDGING							500	25
NORMAL MAINTENANCE	2,648	132	5,201	260	4,410	220	4,000	200
ABNORMAL/SPECIAL MAINTENANCE							500	25
TOTAL	<u>3,246</u>	<u>162</u>	<u>5,923</u>	<u>296</u>	<u>5,110</u>	<u>255</u>	<u>5,700</u>	<u>285</u>

CATEGORY: Z

HUDDERSFIELD NARROW CANAL

Waterway Length—ASHTON JUNCTION to HUDDERSFIELD

Accounting classification—4511

Mileage—20

NORMAL MAINTENANCE EXPENDITURE

	<i>Actual</i> 1963 £	<i>Actual</i> 1964 £	<i>Budget</i> 1965 £	<i>Water</i> <i>Channel</i> £, p.a.	<i>Remarks</i>
Locks and Lock Gates } Lock Machinery }	5	1	—	—*	*Locks are already weired —otherwise charges of about £1,300.p.a. (interest on outlay, and mainten- ance) would have been in- curred.
Reservoirs and Feeders } Weirs, Dams and Sluices }	692	2,768	1,530	1,500	
Canal and River Banks	700	1,180	1,400	1,200	
Towpaths } Hedges and Ditches }	548	788	700	700	
Mining Subsidence	—	—	—	—	
Bridges and Tunnels } Bridge Machinery }	204	125	400	200	
Craft, Plant and Machinery	84	—	—	—	
Supervision } Transport } Miscellaneous }	345	339	380	400	
Buildings	—	—	—	—	
Total	<u>2,648</u>	<u>5,201</u>	<u>4,410</u>	<u>4,000</u>	

ELIMINATION COSTS

Costs for rural narrow canal (*See Appendix 4, paragraph 43*)

	£
Items (a) to (g) and (l): 20 miles @ say £4,700 per mile	94,000
Item (h)—Accommodation bridges 23 @ £300 per bridge	6,900
Item (i)—Public road bridges 37 @ £400 per bridge	14,800
Item (j)—Lock chambers 74 @ £400 per lock	29,600
Item (k)—Aqueducts 6 @ £1,500 per aqueduct	9,000
Total estimated cost of elimination	<u>£154,300</u>
Cost per mile	<u>£7,720</u>

APPENDIX 7

(Chapter VI, paras. 188 to 198)

PLEASURE CRUISING: EXTRA COSTS

<i>Waterway</i>	<i>Miles</i>	<i>Pleasure</i>	<i>Extra cost</i>		<i>Notes</i> (see Appendix 5 for fuller details)
		<i>Craft</i> <i>Receipts</i> <i>1964</i>	<i>Basis</i> <i>A</i>	<i>Basis</i> <i>B</i>	
		£	£ p.a.	£ p.a.	
Aire & Calder Navigation	53 $\frac{1}{4}$	1,238	None	None	In commercial part.
Ashby Canal	22 $\frac{3}{4}$	13	600	600	
Birmingham Canal Navigations	24 (out of 112)	934	6,250	5,750	Estimate based on the extra cost of a single through route with connexion to the Stour-bridge Canal.
Birmingham & Fazeley Canal	22	139	3,200	3,100	
Calder & Hebble Navigation:—					
Sowerby Bridge/Greenwood	15 $\frac{1}{2}$	250	4,700	4,600	
Greenwood/Wakefield	9 $\frac{1}{2}$	600	None	None	In commercial part.
Caledonian Canal	60 (with lochs)	1,291	None	None	In 'special' commercial part.
Chesterfield Canal (East of Worksop)	25 $\frac{1}{2}$	1,276	3,600	3,000	
Coventry Canal	27	1,883	5,600	4,700	
Crinan Canal	9	5,236	None	None	In 'special' commercial part.
Cromford Canal	6 (out of 17)	—	Very Small	Very Small	Isolated length suitable only for rowing boats and canoes. Pleasure boating not practicable on the remainder.
Erewash Canal	12	597	1,800	1,500	This would be reduced if the length south of Ilkeston only were included.
Fosdyke Navigation	11 $\frac{1}{4}$	572	4,000	3,700	Some commercial traffic also.
Gloucester & Sharpness Canal	16 $\frac{3}{4}$	1,154	None	None	In commercial part.
Grand Union Canal:—					
Below Slough	33 $\frac{1}{4}$	4,223	None	None	In 'special' commercial part.
Slough/Tring	34	5,396	20,400	17,700	Main through route.
Tring/Buckby	58	2,161	19,900	18,800	Main through route.
Buckby/Kingswood Jn.	31 $\frac{1}{2}$	1,866	16,600	15,700	Main through route.
Kingswood Jn./Birmingham	17	1,024	9,100	8,600	Main through route.
Aylesbury Arm	6 $\frac{1}{4}$	713	4,300	3,900	Water lost to main line.
Leicester Section	48	618	24,500	24,200	
Kenet & Avon Canal:—					
Hanham/Bath	11 $\frac{1}{4}$	170	3,700	3,600	
Bedwyn/Reading	32	469	1,000	800	Restoration expenditure required, but reasonable to assume that thereafter extra revenue would broadly balance extra expenditure in this very special case.

Appendix 7

Waterway	Miles	Pleasure Craft Receipts 1964	Extra cost		Notes (see Appendix 5 for fuller details)
			Basis A	Basis B	
		£	£ p.a.	£ p.a.	
Kensington Canal	$\frac{1}{2}$	—	—	—	<i>De minimis.</i>
Lancaster Canal	$56\frac{3}{4}$ ($46\frac{1}{4}$ effectively)	3,722	1,000	None	
Lee Navigation	$27\frac{3}{4}$	1,274	None	None	In commercial part.
Leeds & Liverpool Canal:—					
Liverpool/Scarisbrick	20	530	8,600	8,300	Special problems in Liverpool area.
Scarisbrick/Wigan	13	344	5,500	5,300	
Wigan/Leeds	97	2,567	31,500	30,200	
Leigh Branch	$7\frac{1}{4}$	192	None	None	Required for commercial use.
Rufford Branch	$7\frac{1}{4}$	192	1,000	900	Currently below effective pleasure cruising standard.
Macclesfield & upper Peak Forest Canal	$33\frac{1}{2}$	2,842	9,200	7,800	
Monmouthshire & Brecon Canal (North)	$32\frac{1}{2}$	612	None	None	Estimate on assumption that the Park Authorities meet extra cost.
Oxford Canal (North)	$24\frac{3}{4}$	986	11,800	11,300	To be considered in conjunction with the Coventry Canal.
Oxford Canal (South)	$49\frac{1}{4}$	1,372	7,700	7,000	As on the Llangollen Branch, actual pleasure craft receipts understate popularity.
Ripon Canal	$2\frac{1}{4}$	22	Small	Small	Depends on related waterways.
River Severn	$42\frac{3}{4}$	912	None	None	In commercial part.
Sheffield & South Yorkshire Navigation:—					
Rotherham/Keadby	$43\frac{1}{4}$	1,098	None	None	In commercial part.
Rotherham/Sheffield	$5\frac{1}{4}$	301	11,300	11,100	Unattractive industrial setting, small pleasure use.
Shropshire Union Canal:—					
Ellesmere Port/Chester	$8\frac{1}{2}$	200	1,900	1,800	
Chester/Barbridge	16	1,888	3,600	2,700	Includes link to River Dee.
Barbridge/Middlewich/Autherley	52	4,431	15,400	13,200	
Llangollen Branch	50	622	2,000	1,700	Very popular cruising route. Surplus of income over expenditure.
River Soar Navigation	25	2,430	3,500	2,300	
Staffs. & Wors. Canal (North):—					
Atherley/Gailey	8	332	1,000	800	
Gailey/Gt. Haywood	13	400	2,750	2,500	Serves mainly as link to Trent & Mersey Canal.
Staffs. & Wors. Canal (South)	$25\frac{3}{4}$	1,984	4,250	3,250	Figures exclude Stourport Basin.
River Stort Navigation	$13\frac{3}{4}$	234	250	100	

<i>Waterway</i>	<i>Miles</i>	<i>Pleasure Craft Receipts 1964</i>	<i>Extra cost</i>		<i>Notes (See Appendix 5 for fuller details)</i>
			<i>Basis A</i>	<i>Basis B</i>	
		£	£ p.a.	£ p.a.	
Stourbridge Canal	7½	26	1,500	1,500	Board participating in restoration scheme.
Stratford-on-Avon Canal (North)	12½	1,108	4,100	3,600	
Trent & Mersey Canal:—					
Preston Brook/Middlewich	17	685	2,500	2,200	Link to Bridgewater Canal at Preston Brook and to Shropshire Union at Middlewich.
Middlewich/Etruria (inc. Caldon Branch)	41	1,650	6,000	5,200	Gives access to (a) Macclesfield Canal and (b) Caldon Branch. This branch, once restored, would not add significantly to the cost.
Etruria/Gt. Haywood	19	765	2,800	2,400	Link to Staffs. & Worcs. Canal at Great Haywood.
Gt. Haywood/Fradley	12¾	515	1,900	1,600	Looming subsidence problem in Rugeley area.
Fradley/Burton	13¼	535	2,000	1,700	} Link from Birmingham and } Coventry to River Trent.
Burton/Derwent Mouth	16¾	860	2,200	1,700	
Trent Navigation:—					
Nottingham/Gainsborough	55	887	None	None	In commercial part.
Shardlow/Nottingham	13½	3,969	13,300	11,300	
River Ure Navigation	8	35	800	800	Depends on related waterways.
Weaver Navigation	21	1,078	None	None	In commercial part.
Witham Navigation	31¾	349	5,600	5,400	
Worcester & Birmingham Canal	30	1,800	9,900	9,000	Figures exclude Diglis Basin.
			304,100	276,900	

	£ p.a.
Mean between Basis A and Basis B—say	290,000
Add for central charges (see para. 195)	10,000
Add for unremunerative capital expenditure (see para. 195)	40,000
Total extra cost of providing for pleasure cruising	340,000

Note: For waterways other than those included in the Commercial Division, the “extra cost” has been calculated as follows. Taking the 1964 working results for each waterway, commercial traffic receipts have been deleted and, in the case of waterways maintained to commercial traffic standards (category X), direct costs have been reduced by 10%. For basis A, actual pleasure craft receipts have been reduced by 25% while for basis B they have been increased by 25%. The resultant adjusted surplus or deficit has then been compared with the “minimum future cost” figure to give the extra cost of providing for pleasure cruising, as shown in columns A and B respectively.

WATERWAYS NOT AVAILABLE FOR PLEASURE CRUISING

<i>Waterway</i>	<i>Miles</i>	<i>Notes</i>
		(see Appendix 5 for fuller details).
Ashton Canal	6 $\frac{3}{4}$	Not formally closed to navigation but considerable restoration expenditure would be required before navigation would be possible. Many other problems.
Bridgwater & Taunton Canal	14 $\frac{3}{4}$	Not formally closed to navigation but maintained only as water and drainage channel for many years.
Chesterfield Canal (West of Worksop)	20	Being eliminated/redeveloped as water channel.
Cromford Canal	11	Mainly derelict. Planned for elimination except for 3 $\frac{1}{2}$ miles required as water channel.
Forth & Clyde and Monkland Canals	51 (out of 17)	Important for water supply. Being redeveloped in conjunction with local authorities. Bowling Basin will be retained.
Grand Western Canal	11 $\frac{1}{4}$	Disconnected length.
Grantham Canal	33	Elimination/redevelopment held up by statutory position.
Huddersfield Narrow Canal	20	Important as water channel.
Kennet & Avon Canal:— Bath to Bedwyn	43 $\frac{1}{4}$	Navigable in parts by light craft. Not formally closed to navigation. Grave restoration problems.
Bedwyn to Reading	32	Navigable in parts. Not formally closed to navigation. See also Appendix 7.
Lower Peak Forest Canal	8	Linked with Ashton Canal—see above.
Manchester, Bolton & Bury Canal	11	Advanced stage of redevelopment as important water channel.
Monmouthshire & Brecon Canal:— Pontypool to Brecon	32 $\frac{1}{2}$	Navigable in parts by light craft. See also Appendix 7.
Newport to Pontypool and Crumlin	13	Water channel only.
Nottingham Canal	8 $\frac{1}{2}$	Elimination/redevelopment held up by statutory position.
Pocklington Canal	9 $\frac{1}{2}$	Not formally closed to navigation but maintained only at “existence” level.
St. Helens Canal	17	Important for drainage and water supply.
Shropshire Union Canal (Montgomery, Newport and Shrewsbury Branches)	72 $\frac{1}{4}$	Redevelopment under L.M.S. (Canals) Act 1944 is far advanced.
Swansea Canal	13 $\frac{1}{4}$	Being eliminated/redeveloped as water channel.
Trent & Mersey Canal (Caldon Branch)	17 $\frac{1}{2}$	Not formally closed to navigation. See also Appendix 7.
Union Canal	31	Important for water supply. Being redeveloped in conjunction with local authorities, etc.
	<u>476$\frac{1}{2}$</u>	

APPENDIX 9

(Chapter VI, paras. 178 to 181)

USE OF RESERVOIRS FOR RECREATION

<i>Reservoir</i>	<i>Location</i>	<i>Water area Acres (Approx).</i>	<i>Recreational use</i>
<i>Aire & Calder Navigation</i> Southfield	near Castleford, Yorks.	117	Fishing let to club. Sailing let to sailing club, with some use by sea cadets.
<i>Birmingham Canal Navigations</i> Lodge Farm	Dudley, Worcs.	14	Sporting rights vested in Local Authority, the Board retaining operational water rights only.
Norton Pool (Cannock Chase)	Brownhills, Staffs.	260	ditto
Rotton Park	Edgbaston, Birmingham	61	ditto
<i>Chesterfield Canal</i> Harthill	near Chesterfield, Derbyshire	42	Sailing let to sailing club. Fishing rights reserved to adjoining land-owners.
Killamarsh	near Chesterfield, Derbyshire	4½	Fishing rights reserved to adjoining land-owners.
Pebley	near Chesterfield, Derbyshire	18	ditto
Woodhall	near Chesterfield, Derbyshire	7	ditto
<i>Coventry Canal</i> Oldbury	near Atherstone, Warwickshire	10	Sailing let to club. Fishing rights not owned by the Board.
<i>Crinan Canal</i> Camloch	Knapdale, Argyllshire	69	Fishing and sporting rights not owned by the Board, being vested in adjoining land-owners or third parties.
Daill Loch	" "	50	
Glen Loch	" "	32	
Loch an Add	" "	61	
Loch Clachaig	" "	46	
Loch Duin	" "	9	
Loch na Bric	" "	12	
Loch na Feoline	" "	35	
<i>Cromford Canal</i> Butterley	near Cromford, Derbyshire	33	Sailing let to schools association and privately. Shooting let privately. Fishing rights not owned by the Board.
Codnor Park	near Cromford, Derbyshire	14	Sailing let to schools association and privately. Fishing rights not owned by the Board.
<i>Forth & Clyde Canal</i> Birkenburn	Kilsyth Hills, Stirlingshire	37	Fishing and shooting rights reserved to third parties.
Bishop Loch	Gartcosh, Lanarkshire	20	Fishing and shooting rights reserved to third parties. Board have water rights only.
Johnstone Loch	Gartcosh, Lanarkshire	26	Fishing and shooting rights reserved to third parties only. Board have water rights only.
Kilmannan	Kilpatrick Hills, Dumbartonshire and Stirlingshire	89	Fishing and shooting rights reserved to third parties.
Lochend Loch	Gartcosh, Lanarkshire	33	Fishing and shooting rights reserved to third parties. Board have water rights only.
Townhead	Kilsyth, Stirlingshire	66	Fishing and shooting rights reserved to third parties.
Woodend Loch	Gartcosh, Lanarkshire	50	Fishing and shooting rights reserved to third parties. Board have water rights only.

Appendix 9

<i>Reservoir</i>	<i>Location</i>	<i>Water area Acres (Approx).</i>	<i>Recreational use</i>
<i>Grand Union Canal</i>			
Aldenham	Elstree, Herts.	65	Fishing by ticket to general public and limited rights to school. Sailing let to club.
Braunston	near Daventry, Northants.	3	Fishing let to club. Pleasure craft base let to commercial operator.
Brent	Brent and Barnet, London	144	Fishing let to angling association. Sailing let to clubs.
Daventry	Daventry, Northants.	100	Fishing, sailing and shooting let to clubs.
Drayton	Daventry, Northants.	26	Fishing let to industrial concern. Sailing let to club.
Halton	Weston Turville, Bucks.	40	Fishing and sailing let to clubs. Protective shooting rights let to Naturalists Trust.
Marsworth	near Tring, Herts.	20	With Startopend, Tringford and Wilstone, controlled by Nature Conservancy. Fishing rights vested in third parties.
Napton	near Southam, Warwickshire	21	Sailing let to commercial club. Fishing rights generally vested in adjoining owners.
Naseby	Naseby, Northants.	81	Fishing, sailing and shooting let to private party.
Olton	Solihull, Warwickshire	31	Fishing, sailing and shooting let to club.
Saddington	near Market Harborough, Leicestershire.	40	Fishing and fowling rights let to private party. Sailing let to club.
Startopend	near Tring, Herts.	26	See Marsworth above.
Stockton	near Southam, Warwickshire	5	Fishing let to industrial concern.
Sulby	near Welford, Northants.	35	Fishing and sporting let to private party. Fishing rights partly vested in adjoining owners.
Tringford	near Tring, Herts.	27	See Marsworth above.
Welford	near Welford, Northants.	20	Fishing and sporting let privately with Sulby above. Fishing rights mainly vested in adjoining land owners.
Wilstone	near Tring, Herts.	110	See Marsworth above.
<i>Grantham Canal</i>			
Denton	near Grantham, Lincs.	24	Fishing and sporting rights vested in third parties.
Knipton	near Grantham, Lincs.	60	ditto
<i>Huddersfield Narrow Canal</i>			
Black Moss	near Huddersfield	14	} Fishing let to club but generally poor, Slaithwaite being the most suitable. Boating let to industrial social club, and shooting to private party. Swimming let to sub aqua club.
Brunclough	" "	3	
Diggle	" "	4	
March Haigh	" "	13	
Red Brook	" "	18	
Slaithwaite	" "	12	
Sparth	" "	3	
Swellands	" "	14	
Tunnel End	" "	12	
<i>Kennet & Avon Canal</i>			
Crofton	near Marlborough, Wilts.	8	Board have operational water rights only. Fishing and fowling rights owned by third party.
<i>Lancaster Canal</i>			
Killington	near Kendal, Westmorland	154	Fishing not vested in the Board but exercised by third parties. Sailing let to an association and shooting rights to private party.
<i>Leeds & Liverpool Canal</i>			
Barrowford	near Nelson, Lancs.	16	Fishing let to angling association.
Foulridge (Upper)	near Nelson, Lancs.	32	Fishing, boating and sporting let to private party.
Foulridge (Lower)	near Nelson, Lancs.	87	Fishing rights not vested in the Board but exercised by club with consent of adjoining owners.
Rishton	near Blackburn, Lancs.	33	Rights not vested in the Board.
Slipper Hill	near Nelson, Lancs.	13	Rights not vested in the Board.
White Moor	near Nelson, Lancs.	38	Rights not vested in the Board.
Winterburn	near Gargrave, Yorks.	39	Rights not vested in the Board but exercised by third parties.

<i>Reservoir</i>	<i>Location</i>	<i>Water area Acres (Approx).</i>	<i>Recreational use</i>
<i>Macclesfield Canal</i>			
Bosley	near Congleton, Cheshire	78	Fishing not owned by the Board but exercised by third parties.
Sutton	near Congleton, Cheshire	15	Sailing let to social organisation. Fishing rights not owned by the Board.
<i>Manchester, Bolton & Bury Canal</i>			
Elton	near Oldham, Lancs.	55	Fishing let to angling association. Sailing let to club.
<i>Monkland Canal</i>			
Black Loch	Slamannan, Stirlingshire & Lanarkshire	117	Fishing and shooting rights reserved to third parties. Water ski-ing let by the Board.
Hillend	Caldercruix, Lanarkshire	326	Fishing and shooting rights reserved to third parties. Sailing let to club.
Lilly Loch	Caldercruix, Lanarkshire	49	Fishing and shooting rights reserved to third parties. Sailing let to club.
<i>Monmouthshire & Brecon Canal</i>			
Pen-y-Fan	near Crumlin, Monmouthshire	20	Fishing let to angling association.
<i>Nottingham Canal</i>			
Moorgreen	near Nottingham	44	Fishing and sporting rights reserved to adjoining landowners.
<i>Oxford Canal</i>			
Boddington	near Byfield, Northants.	65	Fishing by ticket to general public. Sailing let to club.
Byfield	near Rugby, Northants.	5	Fishing by ticket to general public.
Clattercote	near Cropredy, Oxon.	20	Fishing let to angling association.
Newbold	Rugby, Warwickshire	7	Fishing let to club. Swimming let to sub aqua club.
Wormleighton	near Fenny Compton, Warwickshire	12	Fishing and shooting let to private party.
<i>Peak Forest Canal</i>			
Coombes	near Whaley Bridge, Cheshire	66	Sailing let to club. Fishing not owned by the Board.
Todd Brook	near Whaley Bridge, Cheshire	39	Sailing let to club. Fishing rights vested in third parties.
<i>St. Helens Canal</i>			
Carr Mill	near St. Helens, Lancs.	52	Rights not owned by the Board but fishing made available by owners.
<i>Shropshire Union Canal</i>			
Belvide	Wheaton Aston, near Wolverhampton	186	Nature reserve. Fishing rights not vested in the Board.
Harleston	near Nantwich, Cheshire	19	Rights not vested in the Board.
Knighton	near Stafford	35	Rights not vested in the Board. Not in use as reservoir.
Trench Pool	near Wellington, Salop.	16	Fishing let to commercial undertaking.
<i>Staffordshire & Worcestershire Canal</i>			
Calf Heath	Gailey, near Wolverhampton	18	Fishing let to angling association. Sailing let to club.
Dimmingsdale	near Wombourne, Staffs.	5	Fishing let to commercial sports club.
Gailey Upper	near Wolverhampton	36	Shooting let to private party. Other sporting rights not owned by the Board.
Gailey Lower	near Wolverhampton	64	Fishing let to angling association. Swimming and diving let to youth club.
<i>Stourbridge Canal</i>			
Fens Pools (Three reservoirs)	Brierley Hill, Staffs.	25	Sailing let to private club. Fishing and sporting rights not owned by the Board.
<i>Stratford-on-Avon Canal</i>			
Earlswood (Three reservoirs)	Earlswood, near Birmingham	72	Fishing and sporting rights not owned by the Board. Sailing on one reservoir let to club with consent of owner.

Appendix 9

<i>Reservoir</i>	<i>Location</i>	<i>Water area Acres (Approx).</i>	<i>Recreational use</i>
<i>Trent & Mersey Canal</i>			
Knypersley	Endon, near Stoke-on-Trent	48	Sporting rights not owned by Board.
Rudyard Lake	near Leek, Staffs.	170	Fishing by ticket to general public. Sailing let to club.
Stanley Pool	Endon, near Stoke-on-Trent	34	Fishing let to club. Sailing let to clubs and Local Authorities.
<i>Union Canal</i>			
Cobbinshaw	Cobbinshaw, Midlothian	310	Fishing and shooting let to club.
<i>Worcester & Birmingham Canal</i>			
Bittell (Upper)	near Birmingham	80	Sporting rights not owned by the Board. Board have operational water rights only.
Bittell (Lower)	near Birmingham	22	ditto
Cofton	near Barnt Green, Birmingham	11	ditto
Tardebigge	near Bromsgrove, Worcestershire	16	Fishing let to commercial concern.
Wychall	near Birmingham	2	Reservoir mainly de-watered. No facilities available for fishing or sporting.

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